



CocoaSoils

COCOASOILS ME&L PLAN

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I. Introduction and justification

Upon review of the CocoaSoils project document by the donor, a number of observations were made in its decision document including; a limited causal link between the various levels of results in the Theory of change e.g. difficulty finding specific outputs and their contributions to specific outcomes), the results framework had limited and unclear indicators especially at the outcome and impact level (indicators to measure sustainability) which needed clarification and definitions. Also, the risk analysis had limited internal risk factors, much general risks indicated for environment, human rights and gender.

As a follow up to address above issues, it was requested by the donor to develop a ME&L plan which includes a revised results framework (that ensures expected results are clear) with sufficient indicators to measure progress through the various steps of development. The plan should also indicate procedures and tools for data collection, analysis and reporting requirements with clear roles and responsibilities by all partners and should indicate the type of impact evaluation to be done.

This document is therefore intended to address above feedback; a revised Theory of change (scheme and narrative), revised results framework, procedures, roles and responsibilities of all partners regarding data collection, analysis and reporting and a revised risk analysis. These revisions do not have adverse effect on the initial project budget approved. The plan is also to foster a common ME&L approach across the implementing countries and to achieve the project's objective by providing timely delivery of data to assess project results. The plan measures result from all project interventions and assesses impacts of the project.

I.1 Brief Project Description

The overall objective of CocoaSoils is a sustainable cocoa supply sector with increased productivity of cocoa farms, efficient use of agricultural inputs and improved rural livelihoods while reducing the risk of cocoa-driven deforestation. The main focus of the project includes development of relevant ISFM products and other cocoa production related tools that are demanded by cocoa stakeholders, including private sector companies, private and public dissemination networks and policymakers. The other focus will be to make the products available to beneficiaries for use. Extension agents will have necessary skills and state-of-the art knowledge and tools and smallholder cocoa farmers (90,000) will benefit through enhanced cocoa productivity, better income, and improved livelihoods. Through the monitoring of deforestation, development of tools to help support a more ecosystem-services based approach to cocoa development (at landscape and national level) and the coordination of efforts from private and national government sectors on deforestation, Policymakers will benefit from such technical support to improve policy frameworks on deforestation.

The target groups include National Agricultural Research Systems (NARS), Extension agents of both private and public organisations, fertilizer companies, cocoa authorities of the target countries. The target countries include Cote d'Ivoire, Ghana, Nigeria, and Cameroon and the project will be implemented in the cocoa-producing areas of these countries.

I.2 Purpose and Scope of the ME&L Plan

Monitoring and Evaluation are integral tools for managing and accessing the efficiency and effectiveness of investments related to what the CocoaSoils objective set out to achieve. The overall goal of the ME&L plan is to 'provide critical information for decision-making in relation to the results framework (RF) and to assist in guiding the implementation of project activities'. This goal recognizes that specific elements of the project implementation may require adjustment to respond to evolving conditions either within or external to the project. A more strategic framework allowing for timely feedback, desired level of consistency in design and data collection to allow for meta-analyses across all countries is emphasised. It also allows for learning across focal areas of the project, i.e. Research for Development (R4D) and Partnership for Development (P4D).

The specific purposes for which the ME&L plan exist is to:

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- Outline and organize plans for data collection to ensure quality feedback (data collection tools, database design, analysis, use, and data quality),
- Serve as a communication tool that outlines various roles and responsibilities of partners regarding Monitoring and Evaluation and how to integrate in all aspects of project implementation,
- Outline specific strategies and platforms to encourage informed decision making based on ME&L feedback (e.g. integration of ME&L feedback in annual review and planning meetings)
- Organize the numerous ME&L activities that must occur in order for ME&L to be successful

Users of this ME&L plan include project staff, project partners, project management team, beneficiaries, and the donor (Norad). Therefore, establishing an effective performance measurement system would require developing a shared understanding and agreement among all project stakeholders on the scope and dynamism of the ME&L approach.

Upon acceptance of the ME&L plan by partners and the donor, the project coordination team together with its partners will develop required ME&L tools and provide training on the operationalization and implementation of the plan.

II. The Project Theory of Change

The project Theory of Change (ToC) identifies the overall challenge in cocoa production in the target countries and the subsequent impacts to contribute. This is followed by sections of intermediate results (what CocoaSoils will achieve-outputs and the changes that the outputs will lead to-outcomes). The specific interventions that the project will implement are also identified. The assumptions (factors beyond the project's control or that require further intervention apart from the planned interventions) are also indicated at various results levels and also in the risk analysis (refer to Annex II).

Cocoa production currently in Africa is about 20% less than yields under optimal conditions. This is as a result of many interplaying factors, including pest and diseases, poor agronomic and pest/disease management practices, poor soil fertility, and lack of access to quality agro-inputs and extension services. Low productivity from above factors and unfavourable price setting results in low net incomes of cocoa producers. To curtail the poor soil fertility from existing land, smallholder farmers clear natural vegetation which offers better conditions. Low cocoa yields on existing land therefore contribute to enhanced deforestation.

The CocoaSoils initiative is therefore built around the lack of appropriate knowledge on fertilizer recommendations (commonly considered as part of Integrated Soil Fertility Management (ISFM), other agronomic components and practices, and also includes the use of improved, disease-tolerant germplasm and the use of other amendments.

The CocoaSoils Theory of Change is therefore constructed around the demand for R4D products required to intensify cocoa production which in turn will increase productivity of cocoa on existing cultivated land, increase incomes of smallholder cocoa farmers and help reduce pressure on forests. This is the ultimate change expected as impact of the CocoaSoils initiative with the assumption that the products will be used by end-users (extension networks, smallholder cocoa farmers and policymakers/private organisations) to generate such changes. Results from a study conducted in Ghana by Gockowski et. al., (2013) (<http://dx.doi.org/10.1080/14735903.2013.772714>) showed that producing 1 million tons of cocoa with productivity enhanced technology like fertilizer, good planting materials and good agricultural practices would generate greater producer income, while requiring over 200,000 fewer hectares of land to do so. It is therefore assumed within CocoaSoils project that farmers will require fewer hectares to obtain the potential yield levels and the percentage income increases as indicated.

To achieve this, three preconditions (outcomes) are required; (i) extension networks of both private and public organisations acquire knowledge and use the R4D products (intensification practices/recommendations and tools referred to as extension tools) in their service delivery systems; (ii) smallholder farmers acquire the knowledge and use the intensification recommendations for cocoa

production and (iii) Policymakers and other organisations (including the private sector) integrate intensification recommendations in (country) policies and support the use of feedback from applying developed tools (sustainability assessment tools, deforestation monitoring tool) to provide policy guidance to address cocoa-driven deforestation at country level.

The achievement of the above preconditions depends on a number of direct results generated through project interventions (here referred to as the outputs). Development and availability of R4D products is key. To start with, existing research products (such as guides for farmer training: Manual 2: Integrated crop and pest management for mature cocoa farms; manual 3: conservation and biodiversity in and around cocoa farms) will be reviewed and used in the first two years and build the capacity of extension networks within the partner organisations. New R4D products related to appropriate nutrient management will be developed in addition to the existing products from second year of the project and included in the capacity building process for extension networks.

Extension agents will impart the knowledge acquired on the target smallholder farmers using both existing and new R4D products developed through their engagement in dissemination activities of implementing partners. These dissemination activities will use varied extension approaches such as Farmer Field Schools (FFS), Farmer Learning Groups (FLG), Video Viewing Clubs (VVC), etc. Through this process, the target farmers will acquire the necessary knowledge to use the research products/recommendations.

Capacity of other end-users such as policymakers and private organisations will be built to enable them to use the products/tools. Increased capacity of policymakers on monitoring forest cover change (using Terra-i) and assessing implications for biodiversity and ecosystem services (using sustainability assessment tools) can support governments in their efforts to fulfil commitments to reduce deforestation. Terra-i is used in Peru as the official land use change monitoring system (<http://www.terra-i.org/news/news/-Terra-i-Peru---The-Peruvian-Ministry-of-Environment-and-CIAT-present-an-early-warning-system-for-land-cover-change.html>) which provides information on changes that happen in the Peruvian territory, most of which are mainly caused by the development of human activities (e.g. agriculture, mining, etc). Based on Terra i information, the Peruvian Government has strengthened the legal framework for forest management through a series of new laws (<http://www.terra-i.org/news/news/The-Devastating-Costs-of-the-Rush-for-Gold-in-Madre-de-Dios--Peru.html>). With this in Peru, it is envisaged that Terra i will be used in a similar way in the CocoaSoils target countries to support decreased deforestation related to cocoa production. Figure 2 presents the Theory of Change with underlying assumptions.

To curb child labour as a result of using the research recommendations, CocoaSoils project will work with cocoa authorities and cocoa company partners that have signed on to and have adopted child labour-free ethical code, e.g. Tom Harkin and Eliot Engel (H.E) Protocol or relevant ILO protocols in that matter in their implementation strategy for cocoa production to ensure a reduction of the incidence of child labour in the project target farms.

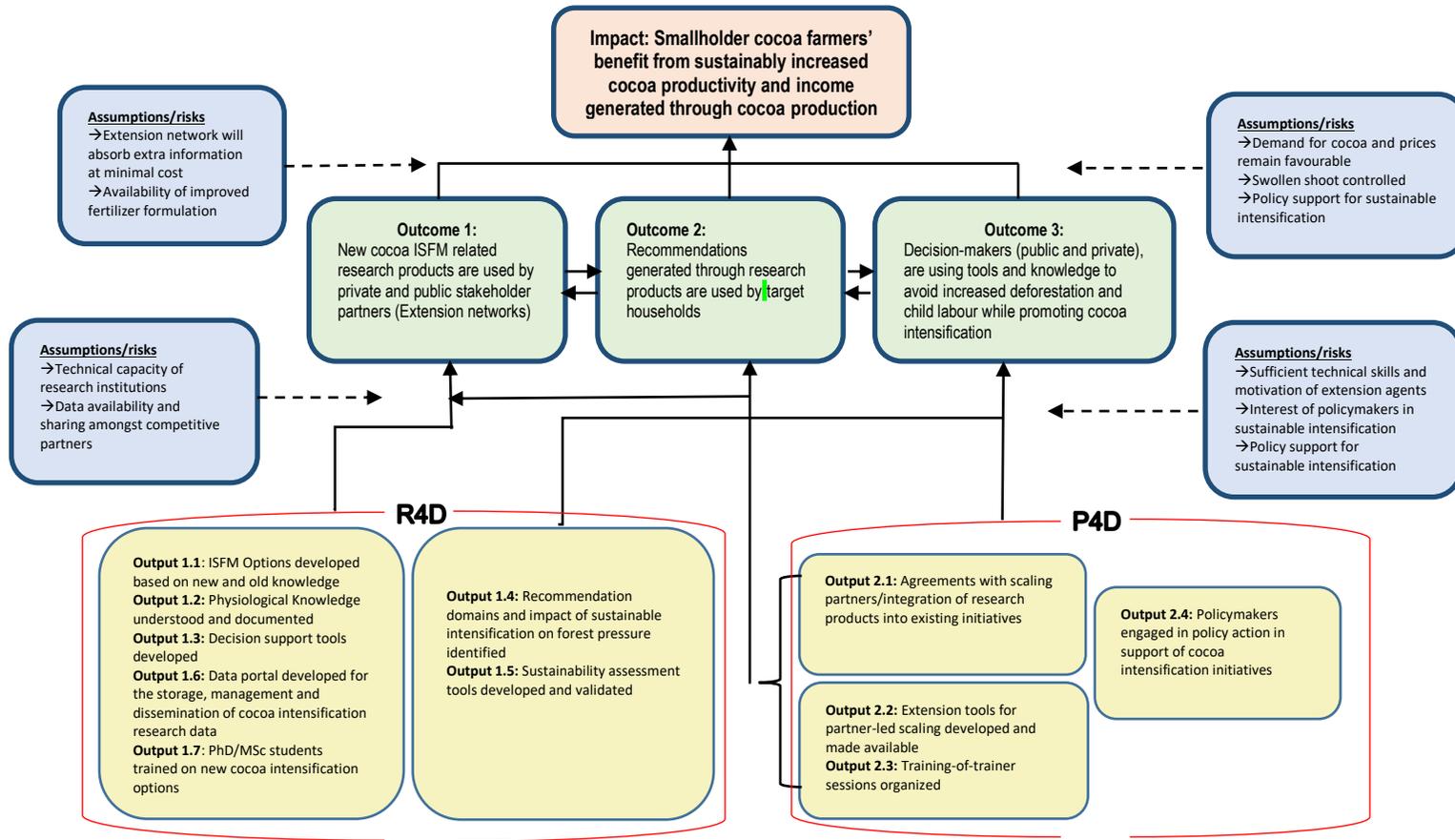
To enable implementation of interventions and transfer of the products/recommendations to end-users, two streams of implementation structures will be used (i) the R4D component; which will develop and make available validated products will also be supported with degree trainings and the (ii) P4D component; which will ensure the transfer of the products to end-users through existing dissemination initiatives.

Assumptions underlying the ToC

The achievement of the impact through the outcomes is based on a number of assumptions; (i) the demand for cocoa will remain focused to a large extent on the West African production areas, (ii) other initiatives ensure that the cocoa swollen shoot pandemic is dealt with, (iii) cocoa prices remain favourable, (iv) extension networks will absorb extra information on ISFM and climate-smart cocoa production at minimal cost with visible increases in return-on-investments; (v) availability of improved fertilizer formulation and (vi) Policy support for sustainable intensification.

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In addition, a number of internal assumptions will have to hold to enable the generation of outputs and their use to achieve the outcomes; (i) Research institutions have technical capacity to support the development of the R4D products, (ii) Competitive partners willingness to share and avail data for the development of the products, (iii) sufficient technical skills and motivation of extension agents, (iv) Interest of policymakers in sustainable intensification.



III. Results Framework with Targets

The project overall results framework is stipulated in the table below for specific results levels.

Table 1 Results Framework with yearly targets

Project results	Indicators	Baseline ¹	Targets				
			Year 1-2018	Year 2-2019	Year 3-2020	Year 4-2021	Year 5-2022
Impact 1. Smallholder cocoa farmers benefit from sustainably ² increased cocoa productivity and income generated through cocoa production	→ Change (%) in cocoa yields for target households (90,000 households)	→ Current cocoa yields for target households	→ No change in cocoa yield	→ No change in cocoa yield	→ No change in cocoa yield	→ Yields 20% increased against baseline	→ Yields 30% increased against baseline
	→ Change (%) in income generated from cocoa production for target households (90,000 households)	→ Current income generated from cocoa production for target households	→ No change in income generated through cocoa production	→ No change in income generated through cocoa production	→ No change in income generated through cocoa production	→ Income 15% increased against baseline	→ Income 25% increased against baseline
	→ Number of households achieving the anticipated increases in yield and income	→ No households achieve the yield and income increases	→ No households achieve the yield and income increases	→ No households achieve the yield and income increases	→ No households achieve the yield and income increases	→ At least 50,000 households achieve the yield and income increases	→ At least 90,000 households achieve the yield and income increases
	→ Change (%) in deforestation rates compared to control sites	→ Current deforestation rates (using terra-l)	→ No visible increases in deforestation compared to control sites	→ No visible increases in deforestation compared to control sites	→ No visible increases in deforestation compared to control sites	→ No visible increases in deforestation compared to control sites	→ No visible increases in deforestation compared to control sites
	→ No evidence for child labour obtained	→ current form of labour and used by households	→ No evidence for child labour obtained				
	→ change in carbon stock, water and biodiversity indexes in cocoa zone of Cote d'Ivoire and Ghana	→ current carbon stock, water and biodiversity indexes in cocoa zone of Cote d'Ivoire and Ghana	→ no change in carbon stock, water and biodiversity indexes in cocoa zone of Cote d'Ivoire and Ghana	→ no change in carbon stock, water and biodiversity indexes in cocoa zone of Cote d'Ivoire and Ghana	→ no change in carbon stock, water and biodiversity indexes in cocoa zone of Cote d'Ivoire and Ghana	→ no change in carbon stock, water and biodiversity indexes in cocoa zone of Cote d'Ivoire and Ghana	→ no change in carbon stock, water and biodiversity indexes in cocoa zone of Cote d'Ivoire and Ghana

¹ When there is mention of 'current' in the column describing baseline conditions, this means that during the baseline activity, the current status of these indicators will be quantified for the target countries, areas, or populations.

² Sustainability is the continuous increase in cocoa productivity through avoided deforestation and child labour. Avoided deforestation is not cutting down the forest for purposes of cocoa production and maintaining ecosystem functions

Project results	Indicators	Baseline ¹	Targets				
			Year 1-2018	Year 2-2019	Year 3-2020	Year 4-2021	Year 5-2022
					zone of Cote d'Ivoire and Ghana		
<p>Outcome 1 New cocoa ISFM related research products are used by private and public stakeholder partners <i>[Contributing to Impact 1]</i></p>	<p>→ Number and types of new research products (related to R4D products) being used by stakeholders</p> <p>→ Number of extension agents using the new research products <i>[Relates directly to Outputs 1.1, 1.2, and 1.3, supported by Outputs 1.6 and 1.7]</i></p>	<p>→ Current soil fertility management recommendations based on current knowledge status</p> <p>→ No extension agents are using the new research products</p>	<p>→ No new research products validated and used by stakeholders</p> <p>→ No extension agents are using the new research products</p>	<p>→ At least 1 research product (validated and used by private and/or public stakeholders)</p> <p>→ At least 50 extension agents are using the new research products</p>	<p>→ At least 2 research products validated and used by private and/or public stakeholders</p> <p>→ At least 100 extension agents are using the new research products</p>	<p>→ At least 4 research products validated and used by private and/or public stakeholders</p> <p>→ At least 350 extension agents are using the new research products</p>	<p>→ At least 6 research products validated and used by private and/or public stakeholders</p> <p>→ At least 450 extension agents are using the new research products</p>
<p>Outcome 2. Recommendations generated through research products are used by target households <i>[Contributing to Impact 1]</i></p>	<p>→ Number of cocoa-producing households (gender disaggregated) using new recommendations/new knowledge</p> <p>→ Types of recommendations being used by the target households <i>[Relates directly to Outputs 2.1, 2.2, and 2.3, supported by results from Outcome 1]</i></p>	<p>→ No households using new recommendations/new knowledge</p> <p>→ No new recommendations is being used</p> <p>→ limited use of existing (old) recommendations</p>	<p>→ No households are using the new recommendations/new knowledge</p> <p>→ No new recommendations is being used</p> <p>→ limited use of existing recommendations</p>	<p>→ No households are using the new recommendations/new knowledge</p> <p>→ No new recommendations is being used</p> <p>→ limited use of existing recommendations</p>	<p>→ No households are using the new recommendations/new knowledge</p> <p>→ No new recommendation is being used</p> <p>→ At least 4 existing (old) recommendations are being used</p>	<p>→ At least 10,000 cocoa farmers using the new recommendations/new knowledge</p> <p>→ At least 30,000 cocoa farmers using the existing recommendations/new knowledge</p> <p>→ At least 2 new recommendations are being used</p> <p>→ At least 5 existing (old) recommendations are being used</p>	<p>→ At least 30,000 cocoa farmers using the new recommendations/new knowledge</p> <p>→ At least 60,000 cocoa farmers using the existing recommendations/new knowledge</p> <p>→ At least 3 new recommendations are being used</p> <p>→ At least 5 existing (old) recommendations are being used</p>
<p>Outcome 3. Decision-makers (public and private), are using tools and knowledge to avoid increased deforestation and child labour while promoting cocoa intensification</p>	<p>→ Deforestation and ecosystem services maps in the cocoa zones of CI and Ghana <i>[Relates directly to Outputs 1.4 and 1.5,</i></p>	<p>→ no information available on land use patterns and ecosystem services using new tools</p>	<p>→ no information available on land use patterns and ecosystem services using new tools</p>	<p>→ no information available on land use patterns and ecosystem services using new tools</p>	<p>→ no information available on land use patterns and ecosystem services using new tools supply chains</p>	<p>→ Draft Maps of land use patterns and ecosystem services in target countries</p>	<p>→ Final maps and assessments available</p>

Project results	Indicators	Baseline ¹	Targets				
			Year 1-2018	Year 2-2019	Year 3-2020	Year 4-2021	Year 5-2022
<p>[This Outcome is related to the 'sustainability' dimension of Impact 1 through reducing the risk for deforestation, a major component of the 'do no harm' content related to Impact 1]</p>	<p>supported by Outputs 2.1 (private sector) and 2.4 (public sector)]</p>						
	<p>→ Number of policy documents that integrate tools/information to support avoided cocoa-driven deforestation</p> <p>→ Number of public and private sector organisations using tools and knowledge to promote deforestation free supply chains</p> <p>→ Number of public and private sector organisations enforcing the H.E and ILO protocols on child labour-free production to promote new recommendations/ Knowledge</p>	<p>→ no policy document of the target countries has integrated new tools</p> <p>→ no public or private sector organisation is using new tools and knowledge to promote deforestation free supply chains</p> <p>→ all public and private sector organisations engaged in CocoaSoils initiative are enforcing the H.E and ILO protocols on child labour-free production</p>	<p>→ no policy document of the target countries has integrated new tools</p> <p>→ No public or private sector organisation is using new tools and knowledge to promote deforestation free supply chains</p> <p>→ all public and private sector organisations engaged in CocoaSoils initiative are enforcing the H.E and ILO protocols on child labour-free production to promote new recommendations/ Knowledge</p>	<p>→ No policy document of the target countries have integrated new tools</p> <p>→ No public or private sector organisation is using new tools and knowledge to promote deforestation free supply chains</p> <p>→ all public and private sector organisations engaged in CocoaSoils initiative are enforcing the H.E and ILO protocols on child labour-free production to promote new recommendations/ Knowledge</p>	<p>→ No policy document of the target countries have integrated new tools</p> <p>→ No public or private sector organisation is using new tools and knowledge to promote deforestation free supply chains</p> <p>→ all public and private sector organisations engaged in CocoaSoils initiative are enforcing the H.E and ILO protocols on child labour-free production to promote new recommendations/ Knowledge</p>	<p>→ At least 1 policy document of the target countries have integrated new tools</p> <p>→ At least 4 public and private sector organisations are using new tools and knowledge to promote deforestation free supply chains</p> <p>→ all public and private sector organisations engaged in CocoaSoils initiative are enforcing the H.E and ILO protocols on child labour-free production to promote new recommendations/ Knowledge</p>	<p>→ At least 3 plus policy documents of the target countries have integrated new tools</p> <p>→ At least 6 public and private sector organisations are using new tools and knowledge to promote deforestation free supply chains</p> <p>→ all public and private sector organisations engaged in CocoaSoils initiative are enforcing the H.E and ILO protocols on child labour-free production to promote new recommendations/ Knowledge</p>
<p>Output 1.1. A set of integrated soil fertility management options generated</p>	<p>→ Number of ISFM recommendations generated</p>	<p>→ None</p>	<p>→ None</p>	<p>→ None</p>	<p>→ None</p>	<p>→ A first set of ISFM recommendations generated, ready for integration in scaling</p>	<p>→ A final set of ISFM recommendations generated, including feedback from scaling and the physiology work</p>
<p>Output 1.2. Documented evidence for understanding the physiological basis of cocoa nutrient uptake and use</p>	<p>→ Number of papers on cocoa physiology</p>	<p>→ None</p>	<p>→ No papers on cocoa physiology</p>	<p>→ No papers on cocoa physiology</p>	<p>→ No papers on cocoa physiology</p>	<p>→ At least 4 papers on cocoa ISFM/physiology accepted</p>	<p>→ At least 6 papers on cocoa ISFM/physiology accepted</p>

Project results	Indicators	Baseline ¹	Targets				
			Year 1-2018	Year 2-2019	Year 3-2020	Year 4-2021	Year 5-2022
<u>Output 1.3.</u> A decision support system developed for intensifying cocoa production	→ Number of decision support tools for cocoa intensification developed	→ None	→ Tools for farmer segmentation and step-wise intensification adapted for cocoa-producing areas	→ Draft 1 of segmentation and stepwise investment tools available for validation	→ Draft 1 of segmentation and stepwise investment tools validated in Cote d'Ivoire and Ghana	→ Draft 2 of segmentation and stepwise investment tools available	→ Final set of decision support tools ready for scaling
<u>Output 1.4.</u> Recommendation domains and impact of sustainable intensification on forest pressure identified	→ Number of Sites for trials identified → Recommendations of trials extrapolated to domains → Buffering effect of sustainable intensification on cocoa suitability across W-Africa mapped	→ Unknown locations for trial sites → No recommendations available → Cocoa suitability maps for W-Africa only include business as usual scenario	→ Sites for trials identified → No recommendations available	→ Terra-i baseline established → No recommendations available	→ Climate change impacts maps on cocoa include scenarios of improved practices of sustainable intensification	→ Impact of sustainable intensification deforestation and REDD+ schemes quantified	→ Final cocoa suitability maps and deforestation scenarios.
<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	→ Number and types of validated tools to support sustainable development of cocoa production in relation to biodiversity and ecosystem services at the landscape level	→ No sustainability assessment tools available	→ No tools available	→ Draft 0 of sustainability assessment tools available	→ Draft 1 of sustainability assessment tools validated at site level	→ Draft 2 of sustainability assessment tools available	→ Final version of sustainability assessment tools available
<u>Output 1.6.</u> Operational open knowledge and data sharing portal for the storage, management and dissemination of cocoa intensification research results	→ number and type of data sharing portal allowing for research data sharing among partners and stakeholders → % of datasets submitted on the portal for sharing	→ No data sharing portal available → No datasets submitted	→ Beta version of a portal available → Baseline data available through portal	→ Final version of a portal available → No datasets submitted	→ Final version of a portal available → At least 25% of all datasets submitted	→ Final version of a portal available → At least 50% of all datasets submitted	→ Final version of a portal available → All datasets submitted
<u>Output 1.7.</u> A new cadre of PhD and MSc-holding cocoa scientist with knowledge on new cocoa intensification options	→ Number of PhD and MSc theses delivered	→ None	→ None	→ None	→ At least 2 MSc theses approved	→ At least 4 MSc theses approved	→ At least 4 PhD theses approved → At least 6 MSc theses approved
<u>Output 2.1.</u> Agreements with private (including digital partners) and/or governmental scaling partners developed and signed to disseminate new	→ Number of agreements with scaling partners developed and signed	→ None → None	→ At least 2 agreements with scaling partners developed and signed → None	→ At least 4 agreements with scaling partners developed and signed → None	→ At least 6 agreements with scaling partners developed and signed	→ At least 8 agreements with scaling partners developed and signed	→ At least 8 agreements with scaling partners developed and signed

Project results	Indicators	Baseline ¹	Targets				
			Year 1-2018	Year 2-2019	Year 3-2020	Year 4-2021	Year 5-2022
recommendations/knowledge through their existing platforms, structures/frameworks (H.E Protocol or ILO Protocol)	→ Number of agreements with digital partners developed and signed				→ At least 1 agreement with digital partners developed and signed	→ At least 2 agreements with scaling partners developed and signed	→ At least 2 agreements with scaling partners developed and signed
<u>Output 2.2.</u> Appropriate extension tools assembled and revised for integration in partner-led scaling (including integration into digital platforms) of new recommendations/tools	→ Number of extension tools available → Number of adapted digital platforms available	→ Available extension tools with information on soil fertility management → Available digital platforms with information on soil fertility management	→ Draft of adapted extension tools available, based on secondary ISFM-related information, → No adapted digital platforms available, based on secondary ISFM-related information,	→ Version 1 of adapted extension tools available, based on secondary ISFM-related information, → No adapted digital platforms available, based on secondary ISFM-related information,	→ Version 1 of adapted extension tools available, based on secondary ISFM-related information, → Draft of adapted digital platforms available, based on secondary ISFM-related information,	→ Version 2 of adapted extension tools available, with inclusion of new information and feedback from ME&L → Version 1 of adapted digital platforms available, based on secondary ISFM-related information,	→ Version 3 of adapted extension tools available, with inclusion of new information and feedback from ME&L → Version 2 of adapted digital platforms available, based on secondary ISFM-related information,
<u>Output 2.3.</u> Appropriate training-of-trainers manuals developed (including customized digital platforms) for use in the training sessions for extension agents	→ Number and types of training manuals developed → Number and types of digital platforms with revised ISFM information → Number of training-of-trainer sessions held for extension agents (including training on use of digital platforms for dissemination) → Number of extension agents trained on research products	→ Available training materials covering soil fertility management → No digital platform with revised ISFM information → No training-of-trainer sessions organized for extension agents → No extension agent trained on new research products	→ Version 1 of adapted extension tools available → No digital platform with revised ISFM information → No training-of-trainer sessions organized for extension agents → No extension agent trained on new research products	→ Version 1 of adapted extension tools available → No digital platform with revised ISFM information → At least 2 training-of-trainer sessions organized → At least 50 extension agents trained (gender disaggregated)	→ Version 2 of adapted extension tools available → Appropriate digital platforms identified, contract signed and ISFM revised information integrated → At least 6 training-of-trainer sessions organized → At least 100 extension agents trained (gender disaggregated)	→ Version 2 of adapted extension tools available → At least 2 digital platforms integrate ISFM knowledge → At least 20 training-of-trainer sessions organized (including digital platforms) → At least 500 extension agents trained including training in digital platform for dissemination	→ Version 3 of adapted extension tools available → At least 3 digital platforms integrate ISFM knowledge → At least 25 training-of-trainer sessions organized (including digital platforms) → At least 625 extension agents trained (gender disaggregated) on research products and child labour concept

Project results	Indicators	Baseline ¹	Targets				
			Year 1-2018	Year 2-2019	Year 3-2020	Year 4-2021	Year 5-2022
	→ Number of cocoa farmers trained on research recommendations	→ No cocoa farmer is trained on new recommendations and child labour concept	→ No cocoa farmer is trained on new recommendations and child labour concept	→ No cocoa farmer is trained on new recommendations and child labour concept	→ At least 10,000 cocoa farmers trained on new recommendations and child labour concept	→ At least 90,000 cocoa farmers trained on new recommendations and child labour concept	→ At least 140,000 cocoa farmers trained on new recommendations and child labour concept
<u>Output 2.4.</u> Engagement in policy action in support of sustainable cocoa intensification ensuring avoidance of deforestation and child labour in applying new recommendations	→ Number of policy briefs in support of cocoa intensification	→ No policy briefs in relation to cocoa ISFM	→ No policy briefs	→ No policy briefs	→ No policy briefs	→ At least 2 policy briefs	→ At least 4 policy briefs
	→ Number of interactions (trainings, spot checks, meetings and stakeholder workshops) with policy makers → Number of government officials from relevant sectors and private sector companies engaged in training and stakeholder workshops	→ Limited interactions with policy makers → Private and public stakeholder have not been exposed to and/or trained in the use of such tools	→ No extra interactions with policy makers → No Private and public stakeholders have been exposed and/or trained in the use of such tools	→ No extra interactions with policy makers → No Private and public stakeholders have been exposed and/or trained in the use of such tools	→ No extra interactions with policy makers → No Private and public stakeholders have been exposed and/or trained in the use of such tools	→ At least 2 extra interactions with policy makers in at least 2 countries → At least 10 public and private sector partners involved in testing/validating the draft tools and knowledge	→ At least 4 extra interactions with policy makers in at least 3 countries → At least 15 public and private sector partners trained in using the developed tools and knowledge

IV. Components of the ME&L System

The ME&L plan consists of two components:

- 1) The monitoring and learning system
- 2) Impact assessment (at the end of the project)

As the first component of the ME&L Plan, monitoring and learning system includes monitoring of project results against target set, and documenting lessons through a designed and timely learning process to steer the project implementation. This will include collection of routine data on outputs and outcomes to generate the necessary information and learning. Learning will focus on feedback from quantitative and qualitative data analysis and direct/observable feedback from partners and beneficiaries. Case studies will be conducted to generate feedback from sampled participating farmers and partners to determine the outcomes (as in RF) and behavioural changes as a result of the project interventions. This will be used to refine specific interventions and implementation approaches.

A second component of the ME&L plan is the impact assessment which will be conducted to ascertain the changes made by the project on the beneficiaries and the environment based on its impact indicators. The two components of the ME&L system will assist to track the implementation process along the Theory of Change.

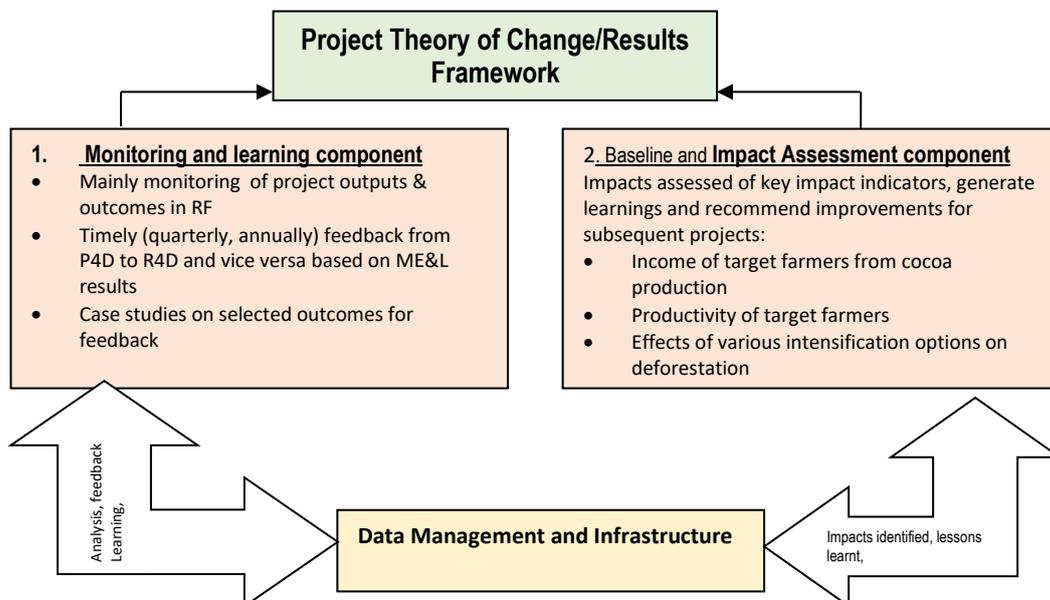


Figure 1: Components of the ME&L System and relation to Project Theory of Change/RF

The project results (outputs, outcomes and impacts) will be measured and other learning areas from both R4D and P4D activities based on the project theory of change. The two main components therefore measure specific areas within the theory of change to ascertain the impact pathway of the project.

V. Monitoring and Learning Component

The monitoring and learning component will have its structures regarding data collection, analysis and data management. This will take into account the various types of indicators, implementing partners and their roles in the project and the database infrastructure to use. Figure 3 indicates the flow of data, its use and feedback within this component. According to the flow chart, implementing partners will be involved in data collection with support from project staff (training, follow ups to ensure data is uploaded and cleaned).

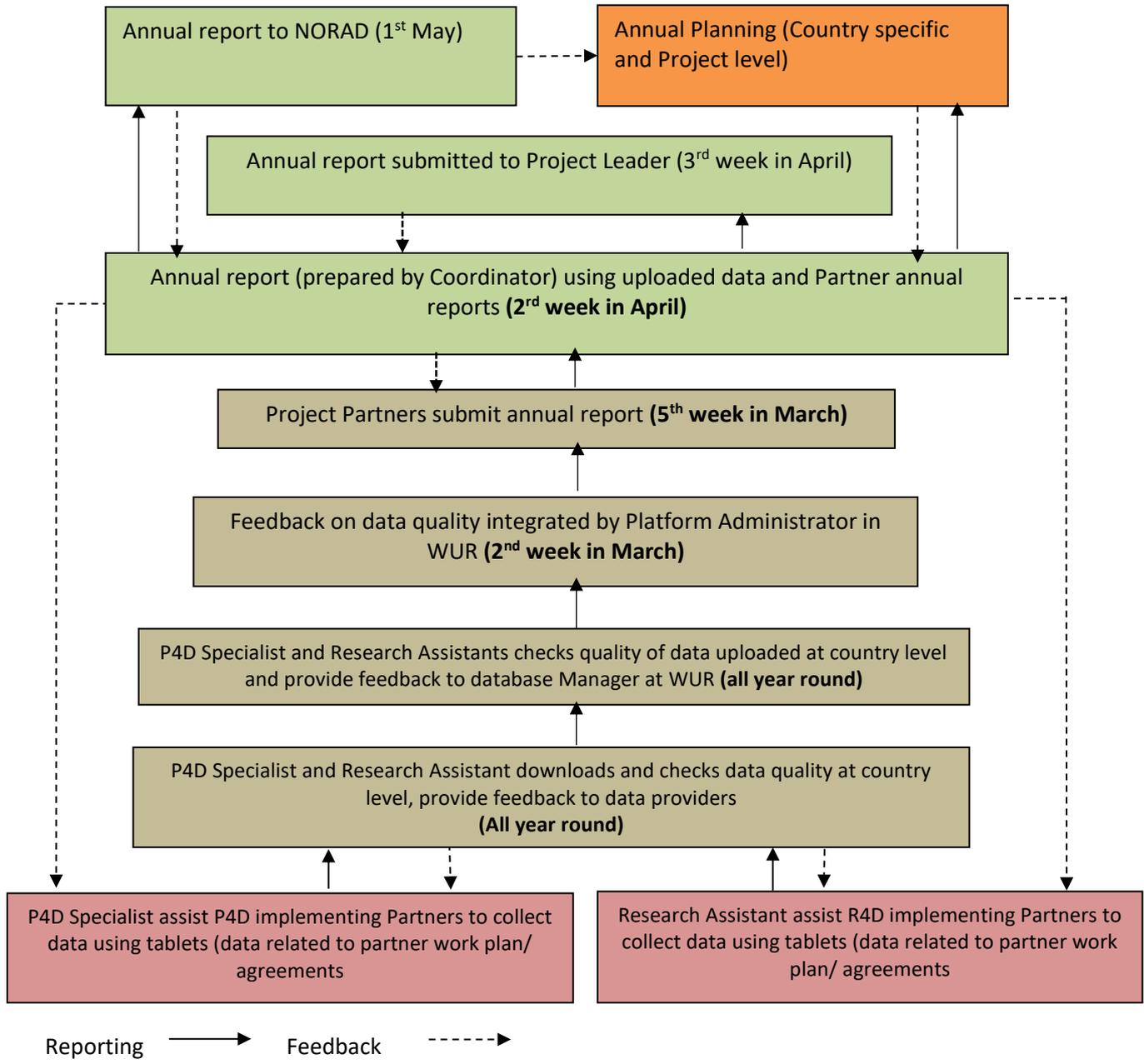


Figure 2: Project M&E Data collection, reporting and feedback flow chart

V.1 Data collection

The information needed from this component will be in two folds; routine data collection and case studies. These will originate from different sources as specified in the performance indicator sheet (Annex I). The target cocoa farmers, extension agents of public and private organisations, policymakers and implementing partners will be the main sources of data required. Other secondary technical reports will also serve as sources of data.

With regards to routine data collection, data will be collected throughout the year on the output indicators for reporting and learnings. Data collection tools will be developed based on the indicator data needed, the sources of data and frequency. The specific data collection method, frequencies, and reporting schedules for each indicator, are outlined in the Performance Indicator Sheet.

Both project and partner staff will be responsible for all required information within the routine data collection. Each implementing partner has specific results related to its implementation work plan.

Data regarding such results will be required from respective partners with the designed data collection tools. Such data will be collected using Information and Communication Technologies (ICT) programmed and approved project data collection tools which will be directly forwarded to an approved ICT platform (hosted in WUR) to be accessible by all (but depending on one's role in ME&L).

Case studies will be conducted for selected outcome indicators and based on sampled households and partners. This will assist to document the various change processes which are more qualitative and not easily measurable and to give update on progress made towards achieving the stated outcomes. Some assumptions will be tested as part of the case study. The study will include the use of the research products/recommendations and the associated behavioural changes at farmer, extension and policymakers' levels. As the years progress, some impact level indicators (e.g. income, yield) will be included in selected cases studies to track the yearly targets. Table 2 indicates examples of case studies to be conducted, levels and how the results will be used.

Table 2 Selected areas for case studies

Level of study	Content
Farmers level	Feedback on performance of recommendations, which research product/knowledge is being used on their own, key questions on child labour and land use patterns, income, yields, factors that may affect the use of the products, effectiveness of extension tools/methods on awareness of products and knowledge.
Extension Agents	Feedback on performance of extension tools, adoption perception based on extension tools, factors that may affect use of the products at extension level and farmer level, etc
Partner level (Implementing partners)	Partner feedback on performance of research products, extent of use of the research products and tools, benefits so far, best way to integrate in their systems, factors that may affect the use, effectiveness and efficiency of extension tools,
Country level (Policymakers, private companies)	Feedback on performance of research products, to what extent they are being used, Policymakers (e.g. sustainability assessment tools and how it is being used, how other products have been used to reshape country strategies, etc), private companies (which tools have been integrated in their systems, how well are their extension agents using the tools, etc.)

Data collection tools will be designed for each case study and all data uploaded on same platform for analysis and easy access by all. As indicated earlier, feedback will be generated from all data collected (routine and case studies) and learnings documented. Key learning questions will be formulated based on content of the case studies (Table 2). Such feedback/learnings will be fed into project implementation through the planning and review sessions, R4D and P4D committee meetings sessions, etc. Again, major communication materials will be developed based on such feedback. Summaries of case studies can form basis for communication newsletters.

V.2 Data Analysis

Data analysis for all data from all countries and sources will be on two levels; Country level data analysis and Project level data analysis and where applicable gender disaggregated. Data collected will be analysed initially at country levels for reporting and documenting learnings. The project level analysis will be a combination of country level reports. Quantitative data to be used will be solely data uploaded on the platform and accessible by all. The project level analysis will largely be the responsibility of the Project Coordinator and the lead persons within the consortium with inputs from other project team members. In addition to providing quantitative data, written narratives covering major achievements during the reporting period and/or major obstacles that hampered progress will also be reported on. Anecdotal information will also be provided where applicable and mainly based on field observations.

V.3 Reporting and Dissemination of information

ME&L information will form the basis for annual reports to the project management, R4D and P4D committees, implementing partners, the donor and other stakeholders. Reporting formats will be developed to facilitate country level reporting by implementing partners and project level. All implementing partners are required to submit yearly reports (based on work plans) using the data uploaded on the platform with related qualitative/observational data. An annual project report will be summarized based on the same uploaded data and reports submitted. Case studies when conducted will be summarized and included in the annual report. However, there will also be case study specific reports with details submitted to the donor and other partners.

V.4 Specific approach to Monitor and Evaluate deforestation

The proposed approach to monitor and evaluate deforestation within the CocoaSoils project uses CIAT's Terra-i system (<http://www.terra-i.org/terra-i.html>). Terra-i is a satellite-based land-use change detection system. It detects land-cover changes resulting from human activities in near real-time, producing updates every 16 days. Deforestation will be mapped from 2004 up to the CocoaSoils project start indicating the timeline of deforestation activities. This will provide the baseline reference for evaluating potential impacts induced by the project activities. After the project start, these maps will be updated on a yearly basis. As identifying linkages between forest loss and CocoaSoils project activities will be difficult, a two-tiered approach is proposed:

Firstly, monitoring of overall vegetation change across West Africa before and after project initiation with lower resolution imagery of MODIS (250 m) with an overflight frequency of 1-2 days aggregated to 1-year vegetation change. The use of lower resolution imagery allows reducing processing requirements while being able to monitor the large area where cocoa is cultivated in West Africa. Secondary data will be overlaid on spatial distribution of forests and protected forests to quantify forest and protected forest loss;

Secondly, a higher resolution imagery (10 m) combining Synthetic Aperture Radar imagery from Sentinel 1A & 1B and multispectral optical imagery from Sentinel 2A & 2B providing images every week will allow to detected vegetation change around the selected CocoaSoils trial sites. This vegetation change will be compared to a random stratified sample of other sites unrelated to the trial sites.

Having this monitoring system in place allows a first assessment of changes in rates and locations of vegetation loss in parallel to the ongoing CocoaSoils activities. This will allow an objective evaluation of (un)expected deforestation dynamics due to cocoa farming in general and in relation to the project activities in particular, providing options for response.

The project will further verify the changes (presented from terra-i) with farmers at the identified sites (through spot checks) and also discuss the drivers behind this vegetation change and knowledge gained by the CocoaSoils consortium can be shared for achieving sustainable intensification.

CocoaSoils through IDH will then engage with public and private sector partners on the use of the results to facilitate awareness and discussions to promote deforestation free cocoa supply chains.

V.5 Specific approach to Monitor and Evaluate Child Labour

A number of national programs exist on child labour across West African countries in response to the requirements of ILO and Harken-Engel Protocol. Countries embarked on the National Program for the Elimination of Worst Forms of Child Labour in Cocoa (NPECLC) and has raised awareness and contributed to attitudinal change in cocoa communities. There exist the Hazardous Child Labour Activity Framework (HAF) which seeks to sensitize farmers on general occupational health and safety issues as well as permissible work for children and in Ghana there is a well targeted and participatory tool to tackle child trafficking cases in the sector called the Ghana Child Labour Monitoring System (GCLM).

The CocoaSoils project will work with cocoa authorities and cocoa company partners that have signed on to and have adopted child labour-free ethical code, e.g. Tom Harkin and Eliot Engel (H.E) Protocol or relevant ILO protocols in that matter in their implementation strategy for cocoa production to ensure a reduction of the incidence of child labour in the project target farms that use recommendations of the project.

Monitoring will be done through spot checks (using existing partner systems) and household interviews (at baseline and impact assessment) in Ghana and Côte d'Ivoire to ascertain the incidence of child labour in the project target farms and in the use of the new research recommendations.

VI. Baseline and Impact Assessment Component

The impact assessment will be conducted in selected project areas in different ecological zones and across all target countries. The design will focus on specific expected effects (based on the impact indicators), assess the assumptions within the theory of change and consider changes in those areas among target farmers for most variables.

VI.1.1 Impact assessment related indicators

The impact assessment at the end of the project will concentrate on four key indicators at the impact level but with causal relationship to other result at outcome and output levels. In addition, qualitative questions on perspectives of child labour and deforestation at farmer levels and policy will be included. Below is list of the impact indicators as indicated in the results framework:

- Change (%) in cocoa yields for target households (90,000 households)
- Change (%) in income generated from cocoa production for target households (90,000 households)
- Number of households achieving the anticipated increases in yield and income
- Change (%) in deforestation rates compared to control sites
- No evidence of child labour obtained
- Change in carbon stock, water and biodiversity indexes in the cocoa zone of Ghana and Cote d'Ivoire

VI.1.2 Impact Assessment Methodology

In terms of methodology, a non-experiment design will be used mainly with 2-fold approaches; (i) pre-test and post-test without controls and (ii) pre-test and post-test with controls.

(i) Pre-test and post-test without controls

With this methodology, baseline and end line evidence comparison of target farmers will be used to sum up the worth or value of the project interventions at its conclusion and to mainly determine contributions made by the project, where it made that difference and for whom based on selected indicators. Parameters such as yield, income, behavioural changes in terms of practices, knowledge, etc will be the basis of this assessment. In this instance, the assessment will also use earlier results from case studies focusing on specific issues to determine causal links between results at each level. Such case studies and other project outcome data will contribute to the final impact assessment of the project.

In addition, the impact pathway evaluation method will be used to generate more qualitative information to trace the impact pathway of the project using the project theory of change. This means establishing attribution of project benefits based on the causal relationship within the project logic (ToC) and processes used. Critical qualitative questions will be used to trace the link between the reported benefits (mostly quantitative) and the project interventions.

(ii) Pre-test and post-test with controls

A second methodology will be a quasi-experimental design with control groups/sites to evaluate potential impacts induced by the project activities on land use patterns (deforestation). In this case, treatment and comparison groups/areas will be measured for before and after situations (land use patterns among target farmers/communities and non-target farmers/communities). Target

households/land areas will be sampled with appropriate control groups (reasonable comparison group for those situations) in target countries. Baselines will be constructed for both groups and followed with end line study using remote sensing (Terra-I, see V.5). Vegetation changes detected using high resolution imagery around the selected CocoaSoils trial sites compared to a random stratified sample of unrelated sites, linked with the responses on land use in the baseline household survey can give an idea of the difference in land use patterns among beneficiary farmers. The opinions of stakeholders will also be captured through participatory discussions for correction and confirmation purposes.

VI.1.3 Data collection, Analysis and Management

Data for the pre-test and post-test without controls will be collected through household survey with sampled beneficiaries (and an agreed gender strategy to ensure female participation). Agreed structured and semi-structured tools will be developed and used for data gathering with a sampling strategy. Same sampling procedure for baseline will be repeated for the impact assessment with same locations. Collected data will be uploaded on the agreed database platform for analysis. Maps generated will be shared and stored on agreed system for decision making and learning.

VI.1.4 Reporting and Dissemination of information

Data will be analysed, and an impact assessment report shared by IITA as lead responsible organisation. Synthesis of learnings from the assessment will be shared with key stakeholders in the cocoa industry.

VI.1 Baseline Survey

As the methodology for impact assessment indicates, the baseline study which will be conducted by the second half of the first year will use both pre-test and post-test without controls and (ii) pre-test and post-test with controls, involving both qualitative and quantitative data on outcomes and impact indicators. The baseline study will be implemented in project target areas (trial sites, cocoa zone) and few non-target areas (i.e. remote sensing data). Respondents will include only participating farmers for most indicators (income of households, yield, management practices, perspective of child labour, gender equalities and land use patterns, etc). Data on deforestation will focus on target areas and selected control sites which will provide a comparison data.

The main focus of the study (data to be collected) will be the data needs of the indicators in the agreed results framework. The survey tool will have specific questions on areas including current productivity levels, current incomes from cocoa production, current cocoa production practices/management, role of women in cocoa production and constraints, major land use patterns, recent changes that have taken place on, etc. These will be at household levels with sampled households at target areas across the countries. Spot checks will also be conducted as part of the child labour monitoring system.

Partner Extension Agents will also be assessed on Knowledge, Attitudes, Practices and Behaviour of cocoa production whereas policymakers in target countries will be interviewed to assess and document the current policy framework and strategies. Documentation of current country policies regarding ISFM recommendations will be documented to ascertain the available recommendations at country level.

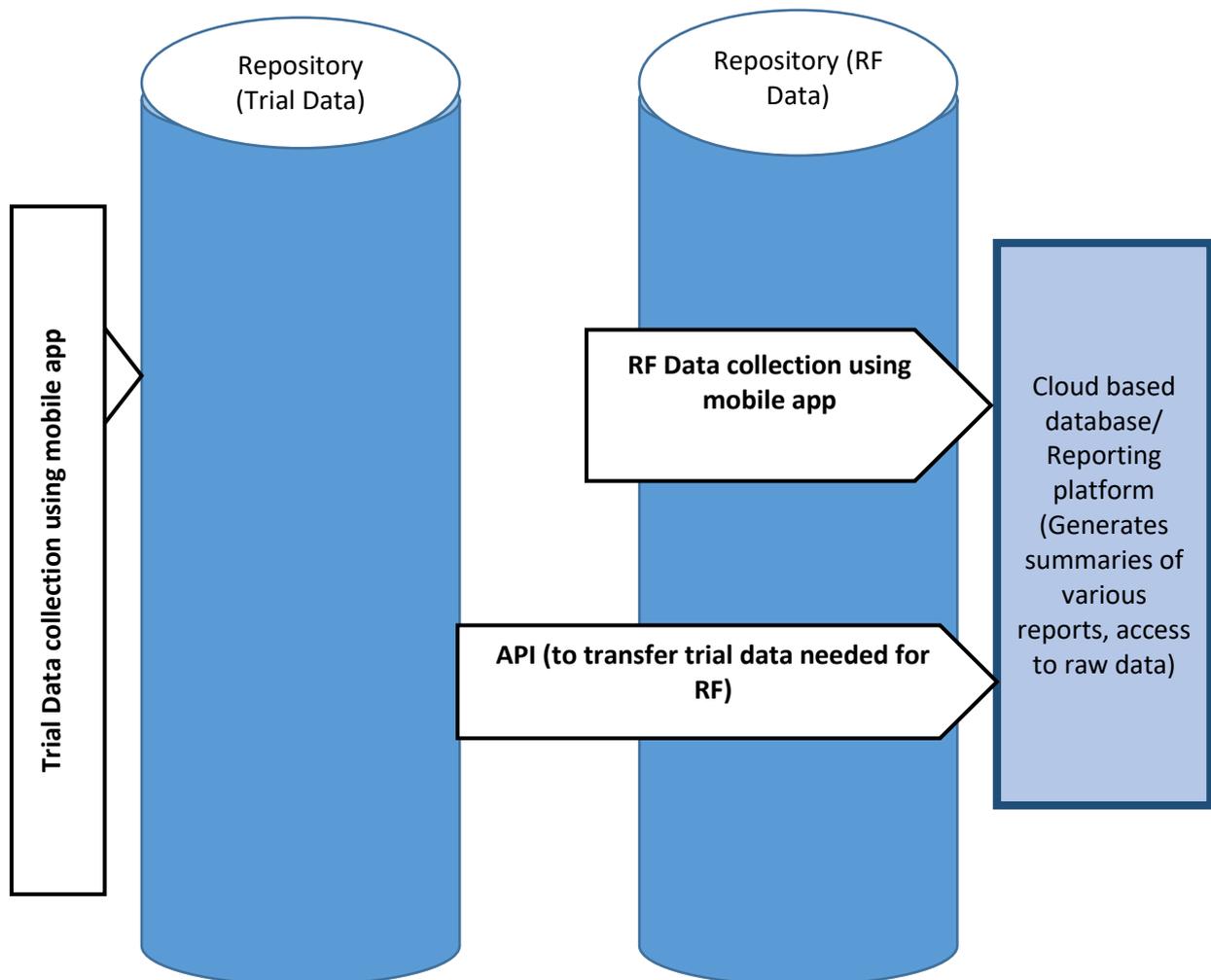
On deforestation, maps regarding land use patterns will be generated (using terra-i) for both target areas and non-target areas at baseline to establish the current status. The extra questions in the household survey tool regarding land uses at household level will establish an estimate of how much land is used for major land uses at household levels and the changes made. This will be in addition to the maps which will provide only the general landscape statement.

VII. Overview of Data Infrastructure

All project data (trial related and results framework data) will be collected using both web and mobile phone-based application. Though a platform is yet to be agreed among partners, selected platform will be linked to a cloud database and reporting platform for data cleaning and subsequent analysis and reporting. The database will be hosted by WUR and be accessible to third party systems (i.e., for

integration of surveys – farmer survey). Data on results framework will be analysed using simple charts and tables directly on the reporting platform. Indicator calculations methods will be integrated into the system to aid the analysis of the indicator data. All products (including reports and publications) and analyses will use the data stored in the central database, with explicit reference to the date on which it was accessed. Important changes to the data will be communicated to responsible persons so that these changes may be incorporated in the database. Figure 5 shows the database infrastructure.

Figure 3: Sketch of data infrastructure for data collection, analysis and feedback



VIII. Overall implementation plan for ME&L activities

ME&L Activities	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	Q1	Q2	Q3	Q4																
Routine data collection activities																				
Develop data collection tools			X	X																
Train Project and partner ME&L focal staff on ME&L requirements			X	X	X															
A. Collect ME&L data & upload by country teams, and Partners				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Submit annual report to NORAD				X			X				X				X					X
Conduct Impact Assessment, Case Studies & other assessment																				
Conduct baseline			X	X						X				X				X		
Conduct case studies & panel on selected outcome indicators										X				X				X		
Conduct impact assessments																X	X	X	X	X
Review Performance Information																				
Bi-annual review with country specific partners		X		X		X		X		X		X		X						
Annual review of performance & Planning					X				X				X				X			
Review & Update ME&L Plan																				
Update indicator matrix & ME&L plan to reflect any changes in project strategy	X	X	X	X	X	X	X	X	X	X			X	X						

ANNEXES

Annex I Indicator Reference Sheet

Results	Indicator	Definition of indicator(s) / Interpretation/key terms	Calculation method	Measurement Unit	Data source	Method of data collection	Measurement notes		
							Level of collection	Frequency	Responsible for data & reporting
<p>Impact Smallholder cocoa farmers benefit from sustainably increased cocoa productivity and income generated through cocoa production</p> <p><i>Sustainability is the continuous increase in cocoa productivity without adverse effects on deforestation and child labour</i></p> <p><i>Deforestation is cutting down the forest for purposes of cocoa production and altering the ecosystem functions</i></p>	→ Change (%) in cocoa yields for target households (90,000 households)	Productivity: Change in cocoa yield per given land area (main fields) of target households. This excludes trial fields (if applicable) Sustainably increased income and yield from cocoa production is the continuous increase in income and yield from cocoa production without adverse effect on land use and ecosystem functions	Additional yield increase as a percentage of total yield. Sum of (production at individual farmer level / individual land area planted Disaggregate by crop, male/female Change (%) = numerator (difference between baseline and end line / denominator (baseline)*100	Percentage	Baseline report, Impact assessment report, case study report	Household survey (Through baseline and impact assessment) Panel surveys with sampled farmers each year	Target cocoa farmers	Yearly panel surveys Baseline & Impact assessment in Year 2, Year 5 respectively	ME&L Consultant, IITA
	→ Change (%) in income generated from cocoa production for target households (90,000 households)	Income is referred to as net farm income from cocoa production (operations). Net farm income is income after production cost. Data disaggregated by country and gender to also capture the gender dimension of impact/inequality	Gross farm income (total value of production) minus production expenses Change (%) = numerator (difference between baseline and end-line/denominator(baseline)*100;	Percentage	Baseline report, Impact assessment report, case study report	Household survey (Through baseline and impact assessment) Panel surveys with sampled farmers each year	Target cocoa farmers	Yearly panel surveys Baseline & Impact assessment in Year 2, Year 5 respectively	ME&L Consultant, IITA
	→ Number of households achieving the anticipated increases in yield and income	Number of target households with increased yield and income. Data disaggregated by yield and income, country and gender to also capture the gender dimension of impact/inequality	Count all sampled households with increased income of 30%, extrapolate to the total target households Disaggregate by gender	Percentage	Impact assessment report, case study report	Household survey (Through impact assessment)	Target cocoa farmers	Yearly panel surveys Impact assessment in Year 5	ME&L Consultant, IITA
	→ Change (%) in deforestation rates compared to control sites	Deforestation is the clearing of a forest and the cleared converted to a non-forest use especially cocoa production and in relation to using the new research recommendations	Area under use per each of the major land uses at baseline/ Area under use per each of the major land uses at end line*100	Percentage	Remote sensing maps	Remote sensing using Terra-I Geo-referenced cocoa farms of target households and non-targeted households	Target household farms and non-target household farms	Baseline in Y 1, impact assessment in Y5	CIAT, ME&L Consultant

Results	Indicator	Definition of indicator(s) / Interpretation/key terms	Calculation method	Measurement Unit	Data source	Method of data collection	Measurement notes		
							Level of collection	Frequency	Responsible for data & reporting
	→ No evidence for child labour obtained	Child Labour is defined as work that "is mentally, physically, socially or morally dangerous and harmful to children; and interferes with their schooling by depriving them of the opportunity to attend school; by obliging them to leave school prematurely; or by requiring them to attempt to combine school attendance with excessively long and heavy work." (ILO definition adopted)	Count number of households who are not using child labour in the application of the new research recommendations		Spot checks reports from target countries	Sampled Household spot checks	Target Households	Yearly spot checks	IITA, ME&L Consultant
	→ change in carbon stock, water and biodiversity indexes in cocoa zone of Cote d'Ivoire and Ghana	Carbon stock refers to the amount of carbon stored in the forest ecosystem, (Source: based on GreenFacts);		Percentage	country reports	Desk review of country reports	Country/ Target area	Baseline Y 1 and impact Y 5,	ME&L consultant, UNEP-WCMC, IITA
Outcome 1: New cocoa ISFM related research products are used by private and public stakeholder partners	→ Number and types of new research products (related to R4D products) being used by stakeholders	Stakeholders include private sector companies, private and public dissemination networks and policymakers. New Research products ³ are tools and methods (unknown to stakeholders and generated through the core and satellite trials) to increase skills, knowledge and enhance performance in cocoa production	Count the number of research products used by listed stakeholders. Disaggregate by year of development-to indicate if new or old, disaggregate by type (ISFM options)	Number	Stakeholders engaged in the project	Case study involving extension agents and their organisations	organisation	Y3 and Y5	ME&L Consultant, IITA
	→ Number of extension agents using the new research products	Use refers to application of skills/knowledge and research products in extension service delivery systems without project funds/support	Count number of extension agents using any of the new research products as part of their routine duties outside CocoaSoils activities; extrapolate to the total number of extension agents engaged; disaggregate by gender	Number	Sampled extension agents	Case study	Extension agents	Y3 and Y5	ME&L Consultant, IITA

Results	Indicator	Definition of indicator(s) / Interpretation/key terms	Calculation method	Measurement Unit	Data source	Method of data collection	Measurement notes		
							Level of collection	Frequency	Responsible for data & reporting
Outcome 2. Recommendations generated through research products are used by target households	→ Number of cocoa-producing households (gender disaggregated) using new recommendations/new knowledge	Use refers to application of skills/knowledge and research products by target households without project funds/support Recommendations are documented conclusions from the research trials and validated tools of various intensification options developed which are a key part of the value offered to end-users (extension agents, farmers, policy makers) of the project	Count number of extension agents using any of the new research products as part of their routine duties outside CocoaSoils activities; extrapolate to the total target households engaged; disaggregate by gender	Number	Sampled households engaged	Case study (using outcome mapping) involving sampled households), impact assessment	Target households	Y3 and Y5	ME&L Consultant, IITA
	→Types and number of recommendations being used by the target households	Recommendations are documented conclusions from the research trials and validated tools of various intensification options developed which are a key part of the value offered to end-users (extension agents, farmers, policy makers) of the project	Count the number of research products used by households. Disaggregate by year of development-to indicate if new or old, disaggregate by type (ISFM options)	Number	Target households	Case study (using outcome mapping) involving sampled households	Target Household	Y3 and Y5	ME&L Consultant, TTA
Outcome 3. Decision-makers (public and private) are using tools and knowledge to avoid increased deforestation and child labour while promoting cocoa intensification	→ Deforestation and ecosystem services maps in the cocoa zones of CI and Ghana	Deforestation is cutting down the forest for purposes of cocoa production and altering the ecosystem functions, affecting ecosystem services	Area under use per each of the major land uses in the cocoa producing areas-maps showing land uses Modelling and GIS tools to assess the relationship between land cover and ecosystem services	Percentage , indices	Remote sensing, databases for biodiversity and ecosystem services data, literature	Remote sensing using Terra-I Geo-referenced cocoa farms of target households and non-targeted households	→Project sites and control areas →Target households	Baseline in Y 1, impact assessment in Y5	ME&L Consultant, CIAT, UNEP-WCMC,
	→ Number of policy documents that integrate tools/information to support avoided cocoa-driven deforestation	Policy document is a structure of principles, ideas to guide decisions (in this context at country level). A policy is a statement of intent, and can be implemented as a procedure or a protocol (dict. Definition)	Count the number of policy documents that have integrated CocoaSoils research products	Number	Policy documents from Policymakers engaged in the project	Baseline, and impact assessment	Country level (involving policymakers)	Baseline in Y 1, impact assessment in Y5, annually through ME&L	UNEP-WCMC, CIAT, IDH
	→ Number of public and private sector organisations using tools to promote	Tools are approaches/systems (unknown to organisations before project intervention) to increase skills, knowledge and enhance	Count number of organisations using tools; disaggregate by type (private/public) of organisation and tool	Number	Desk review of partner reports/impact reports on Public and private	Baseline, and impact assessment	Country level (organisations)	Baseline in Y 1, impact assessment in Y5, annually	ME&L Consultant, CIAT, ICRAF, IDH,

Results	Indicator	Definition of indicator(s) / Interpretation/key terms	Calculation method	Measurement Unit	Data source	Method of data collection	Measurement notes		
							Level of collection	Frequency	Responsible for data & reporting
	deforestation free supply chains	performance in reducing deforestation			sector organisations engaged in target countries			through ME&L	UNEP-WCMC
	→ Number of public and private sector organisations enforcing the H.E and ILO protocols on child labour-free production to promote new recommendations/ Knowledge	Enforcement is the process of partners making sure that cocoa farmers obey Child Labour policies	Count number of organisations promoting tools/new recommendations in the context of existing child labour framework; disaggregate by type of organisation (private/public) of organisation and tool	Number	Annual reports from Public and private sector organisations engaged in target countries, spot check reports	Desk review of partner annual reports and spot check reports	Country level (organisations)	Annually through ME&L	ME&L Consultant, IDH, IITA
<u>Output 1.1.</u> A set of integrated soil fertility management options generated	→ Number of ISFM recommendations generated	Best fit practices based on research results	Count the number of ISFM recommendations; disaggregate by country, location (site)	Number	Recommendation reports from trials	Desk review of recommendations generated/reported	Country	Annually	IITA
<u>Output 1.2.</u> Documented evidence for understanding the physiological basis of cocoa nutrient uptake and use	→ Number of papers on cocoa physiology	Physiology: understanding the "workings" of the cocoa plant and its response to factors such as light, temperature, water availability, etc (the UK chocolate and cocoa industry definition)	Count number of accepted papers with agreed journals	Number	Papers accepted in agreed journals	Desk review	Partner level	Annually	ICRAF
<u>Output 1.3.A</u> decision support system developed for intensifying cocoa production	→ Number of decision support tools for cocoa intensification developed	Decision support tools refer to tools for farmer segmentation and step-wise intensification	Count number of decision support tools, disaggregate by country, location	Number	Versions of the decision support tools	Review of the decision support tools	Country	Annually	IITA
<u>Output 1.4.</u> Recommendation domains and impact of sustainable intensification on forest pressure identified	→ Number of Sites for trials identified	Sites are locations suitable for trial establishment based on existing recommendation domains	Count the number of trial sites identified, disaggregate by location/agro ecological zones, climate		List of sites identified and validated by stakeholders	Review of sites selected	Country, (agro ecological zones)	Annually	CIAT
	→ Recommendations of trials extrapolated to domains	Recommendations are documented conclusions from the research trials and validated tools of various intensification options developed which are a key part of the value offered to end-users (extension agents,	Recommendations based on domains, disaggregate by country and agro ecological zone		Recommendations, CIAT report	Review of the recommendations	Country	Annually	CIAT

Results	Indicator	Definition of indicator(s) / Interpretation/key terms	Calculation method	Measurement Unit	Data source	Method of data collection	Measurement notes		
							Level of collection	Frequency	Responsible for data & reporting
		farmers, policy makers) of the project							
	→ Buffering effect of sustainable intensification on cocoa suitability across W-Africa mapped		Map showing buffering effects, disaggregate maps by country, agro ecological zone		Map	Mapping	Country, agro ecological zones	Annually	CIAT
<u>Output 1.5.</u> Sustainability assessment tools developed and validated to assess the sustainability of cocoa production on biodiversity and ecosystem services	→ Number and types of validated tools to support sustainable development of cocoa production in relation to biodiversity and ecosystem services at the landscape level	Tools include knowledge Products, guidance (adapted to stakeholder needs) to help understand implications to biodiversity and ecosystem services from different strategies for managing cocoa landscapes. Sustainability is the continuous production of cocoa without adverse effects on biodiversity and ecosystem services	Count the number of validated tools	Number	Validated tools	Review of validated tools	Country, location	Annually	UNEP-WCMC
<u>Output 1.6.</u> Operational open knowledge and data sharing portal for the storage, management and dissemination of cocoa intensification research results	→ number and type of data sharing portal allowing for research data sharing among partners and stakeholders	Type of data sharing portal should be an open knowledge platform accessible by all partners	Count number of platforms	Number	Data sharing portal, partner staff	Desk review of WUR report, expert review of the data sharing portal	Partner level	Annually	WUR
	→ % of datasets submitted on the portal for sharing	Dataset is a group of related data that may be accessed independently or in combination	Number of datasets submitted/total datasets expected*100	Percentage	Data sharing portal	Desk review of submitted data	Partner, country levels	Annually	WUR
<u>Output 1.7.</u> A new cadre of PhD and MSc holding cocoa scientist with knowledge on new cocoa intensification options	→ Number of PhD and MSc theses delivered	Thesis is a long essay or dissertation involving personal research related to CocoaSoils research needs and written by a candidate for a university degree	Number of thesis approved and submitted	Number	Thesis approved and submitted	Review list of graduated students/thesis approved	Country level	Yrs 4 & 5	WUR
<u>Output 2.1.</u> Agreements with private and/or governmental scaling partners	→ Number of agreements with scaling partners developed and signed	An agreement is a binding document that indicates key activities, roles and responsibilities of partners to disseminate cocoa research	Count the total number of agreements developed in each country with scaling partners	Number	Agreements	Desk review of agreements	Country level	Annually	IDH

Results	Indicator	Definition of indicator(s) / Interpretation/key terms	Calculation method	Measurement Unit	Data source	Method of data collection	Measurement notes		
							Level of collection	Frequency	Responsible for data & reporting
developed and signed to disseminate new recommendations /knowledge through their existing structures/frame works		products to target farmers and how the dissemination will be done							
<u>Output 2.2.</u> Appropriate extension tools assembled and revised for integration in partner-led scaling of new recommendations /tools	→ Number of extension tools available with aspects of avoided deforestation and child labour (e.g. ICPM Manual)	Extension tools refer to an integrated, multiple systems approach/ method to extension (with new information from research) that combines site specific information with farmer specific information	Count the total number of extension tools	Number	List of adapted Extension tools with new information, Partner reports	Desk review of list of adapted extension tools, review of partner reports	Country level, partner level	Annually	IITA
<u>Output 2.3.</u> Appropriate training-of-trainers manuals developed for use in the training sessions for extension agents	→ Number and types of training manuals developed	A training-of-trainers manual are books or booklets of instructions, reference to specific subject matter used for the extension agents training sessions	Count the number of manuals (disaggregate by type) used for extension training sessions	Number	Research partners/IITA	Desk review of training manuals	Project and country levels	Annually	IITA
	→ Number of training-of-trainer sessions held for extension agents	Training sessions organised for extension agents to equip them with knowledge about the new research products	Count the number of extension agents' training sessions organised by partners	Number	Uploaded data from Scaling partners	Use designed data collection tool	Partner and country levels	Annually	IITA
	→ Number of extension agents trained on research products	Training means participation in an organised workshop (of more than 10 extension agents) to teach the use of new research products in cocoa production	Count the number of extension agents who participate in organised trainings on new research products	Number	Uploaded data from Dissemination partners	Use designed data collection tool at partner level, sum total extension agents trained	Partner and country levels	Annually	IITA
	→ Number of cocoa farmers trained (gender) on research recommendations,	Training means participation in Farmer Field Schools (FFS), Farmer Learning Groups (FLG) and Video Viewing Clubs (VVC)	Count the number of farmers who participate in dissemination activities focused on	Number	Uploaded data from Dissemination partners	Use designed data collection tool at partner level, sum total	Partner and country levels	Annually	IITA

⁴ Existing Manuals: 1. Planting, replanting and tree diversification of cocoa systems; 2. Integrated crop and pest management for mature cocoa farms; 3. Conservation and biodiversity; 4. Preventing and reducing injuries and ill health in cocoa production; 5. Methods for training farmers on sustainable cocoa production

Results	Indicator	Definition of indicator(s) / Interpretation/key terms	Calculation method	Measurement Unit	Data source	Method of data collection	Measurement notes		
							Level of collection	Frequency	Responsible for data & reporting
	deforestation and child labour concepts	that seeks to introduce new research products to farmers	introducing new research products			using data platform			
<u>Output 2.4.</u> Engagement in policy action in support of sustainable cocoa intensification ensuring avoidance of deforestation and child labour in applying new recommendations	→ Number of policy briefs in support of cocoa intensification → Number of interactions (trainings, spot checks, meetings, and stakeholder workshops) with policy makers	A policy brief in the context of CocoaSoils is the summary of issues including deforestation, effects of intensification scenarios on ecosystem function and natural capital, the policy options to deal with it, and recommendations on the best option. It can take different formats.	Count the number of policy briefs in the identified areas per target country	Number	Progress report of cocoa sector in target countries, IDH annual report	Desk review of progress report of cocoa sector in target countries, IDH annual report	Country level, partner level	Annually	IDH
		Interactions means organised meetings with policymakers, trainings sessions for policymakers	Count number of workshops, trainings with policymakers;	Number	IDH reports	Desk review	Country level, partner level	Annually	IDH
	→ Number of government officials from relevant sectors and private sector companies engaged in training and stakeholder workshops	Training means participation in an organised workshop (of more than 10 officials)	Count the number of officials who participate in organised trainings and workshops; disaggregate by type of organisation (public/private)	Number	Uploaded training data, UNEP-WCMC, CIAT, annual reports	Use designed data collection tool to capture trainings, sum total officials trained	Partner and country levels	Annually	UNEP-WCMC,

Annex II Risks Analysis including assumptions

Identification	Analysis			Management	Follow-up		
Risk	Probability	Impact	Overall risk	Risk-reducing measures	Responsibility	Deadline	Status
Lack of government engagement (Lack of enabling policy environment to support the intensification of cocoa	Medium	Medium; Lack of sustainable capacity building; Lower project sustainability; Lower legitimacy	Medium	→ Ensure cocoa authorities' active participation in the planning and supervision of the program → Ensure active participation of NARS in planning and implementation of field trials	Program coordinators IITA-WUR-IDH	Throughout project implementation	Cocoa authorities and NARS have signed letters of support and attended planning and technical meetings. NARS invited to future planning meetings

Identification	Analysis			Management	Follow-up		
Risk	Probability	Impact	Overall risk	Risk-reducing measures	Responsibility	Deadline	Status
production whilst preserving natural ecosystems)				<ul style="list-style-type: none"> → Keep country policies and cocoa sector development strategies at the core of the program priorities → ensure cocoa authorities and policymakers accept the research products/recommendations 			
Lack of (fertilizer) industry engagement in implementation	Medium	Medium: Lower usefulness of research findings; Lower validity of research	Medium	<ul style="list-style-type: none"> → Ensure that research outcomes feed into field level outcomes that are commercial viable → Outreach to fertilizer industry beyond direct program partners 	Program coordinators IITA-WUR-IDH	Throughout project implementation	Four fertilizer companies have confirmed commitment, further outreach to fertilizer companies and networks ongoing
Financial solvency of private partners to take up dissemination activities	Medium	Medium: limited funding from private partners to continue trials establishment	Medium	<ul style="list-style-type: none"> → Ensure that funding from private partners are guaranteed to establish the required trials 	Program coordinators IITA-WUR-IDH	Throughout project implementation	Private partners have confirmed contributions and amounts for various number of trials
Socio-economic developments → increase in prices of inputs and limited access to inputs; → fluctuations in global cocoa prices- fluctuations in demand forecast and market prices)	Low	Medium: Downturn in revenue and/or higher input costs may alter business case for fertilizer and other inputs	Medium	<ul style="list-style-type: none"> → Integrate socio-economic developments into scenario modelling that links to policy formulation, related to Output 1.3 and Output 2.4 → Work closely with national cocoa authorities who set farm-gate prices (in CDI & Ghana) to monitor and mitigate price shocks → Work closely with cocoa authorities on input provision policies 	Program coordinators IITA-WUR-IDH	Throughout project implementation	Cocoa authorities have signed letters of support and attended planning and technical meetings.
Existence and spread of the cocoa swollen shoot pandemic	Medium	Medium: existence of cocoa swollen shoot disease will reduce the effect of ISFM on productivity hence reducing uptake	Low	<ul style="list-style-type: none"> → Engage with initiatives to ensure that the cocoa swollen shoot pandemic is dealt with. 	Program coordinators IITA-WUR-IDH	Throughout project implementation	Some Project Partners (NARS) are working to curb cocoa swollen shoot pandemic and their efforts will continue in the target areas
Technical capacity of research institutions and extension agencies (extension networks failure	Medium	Medium: Lower implementation quality (process and content); limited	Medium	<ul style="list-style-type: none"> → Ensure full transparency on roles and responsibilities and requirements 	Program coordinators IITA-WUR-IDH	Throughout project implementation	NARS have signed letters of support and attended planning and technical meetings. NARS invited to future planning meetings so as to proceed with the

Identification	Analysis			Management	Follow-up		
Risk	Probability	Impact	Overall risk	Risk-reducing measures	Responsibility	Deadline	Status
to absorb extra information on ISFM and climate-smart cocoa production)		(scale) dissemination of ISFM practices		<ul style="list-style-type: none"> → Target capacity building (PhDs and alike) based on mutual assessment of needs and ambitions → Ensure integration of developed ISFM options in NARS/extension systems 			formalization of collabo-ration. The selection of the various ISFM options to be developed were done in consultation with NARS
Limited/Delayed Data sharing among competitive partners	Medium	Medium: Delay in useful data exchange; lower usefulness of data due to incompatibilities	Medium	<ul style="list-style-type: none"> → Alignment on a detailed data collection, sharing and analysis protocol → Close data quality monitoring and assuring full transparency and accessibility through use of latest data management technologies 	Program coordinators IITA-WUR-IDH	Throughout project implementation	Alignment and finalization of research protocol with confirmed trial adopters
Cross-cutting issues: Negative impact on human rights (Use of child labour in the application of new ISFM tools/products)	None	Low: Possible lack of awareness of child labor, labour intensive ISFM options	None	<ul style="list-style-type: none"> → Norad, IITA, and the private sector do not accept any tolerance to child labour → This issue will also be discussed in the context of the Partnership Committee which will propose any required additional measures should this become an issue. → Ensure partners have signed on to and use existing protocols on child labour-free ethical codes to implement project activities with child labour policies in mind → Integrate child labour policy strategies in the dissemination of tools to farmers 	Partnership Committee, facilitated by IDH	Throughout project implementation	CocoaSoils will build on public and private partners' expertise and programs on fighting child labor (the risk was rates as low because the project will work with reputable companies that are very sensitive to child labour issues themselves). Program governance is being established which will include a Partnership Committee as well as public sharing and consultation events during which partnerships and collaborations can strengthen insights and facilitate action in relation to this issue (as relevant or needed)
Cross-cutting issues: Negative impact on women's rights and gender equality → Limited access to extension services by women, widening the gap between men and women cocoa farmers;	Medium	Medium: Limited participation of and impacts for women	Low	<ul style="list-style-type: none"> → Pay special attention to women's access to extension services as under Output 2.2 and Output 2.4 → Pay attention to women needs/constraints and integrate in development of products/extension tools 	Partnership Committee, facilitated by IDH	Throughout project implementation	Program governance is being established which will include a Partnership Committee as well as public sharing and consultation events during which partnerships and collaborations can strengthen insights on this topic

Identification	Analysis			Management	Follow-up			
	Risk	Probability	Impact		Overall risk	Risk-reducing measures	Responsibility	Deadline
→Research products not tailored to gender requirements								
<p>Cross-cutting issues: Negative impact on climate/environment</p> <p>→High deforestation levels due to increased farmer participation and expansion of farm sizes)</p> <p>→in-country migration of farmers into project target areas (causing deforestation)</p>	Low	Medium: Rebound effects could deplete natural resources	Medium	<p>→ Increasing (sustainable) productivity along scenario building of landscape interventions as under Output 1.4 and Output 1.5</p> <p>→ Build on public and private partners' expertise and programs on fighting deforestation; the cocoa sector itself is sensitive to the negative environmental impacts of cocoa intensification programs and the Partnership Committee, that has representation from the private and public sector, will evaluate forest dynamics, supported by tools from Outputs 1.4 and 1.5.</p> <p>→ Ensure greater farmer awareness and adoption of new recommendations to increase productivity</p>	Partnership Committee, facilitated by IDH	Throughout project implementation	Program governance is being established which will include a Partnership Committee as well as public sharing and consultation events during which partnerships and collaborations can strengthen insights on this topic	
<p>Cross-cutting issues: Negative impact on anti-corruption</p> <p>→productivity increase limited in one target area due to use of research recommendations causing price fluctuations and cocoa bean smuggling in other areas</p>	Low	Low: Lower efficiency of impact pathways	Low	<p>→ Continuous monitoring and reporting through public-private collaboration</p> <p>→ensure dissemination and uptake of research recommendations by households through the partnerships across target countries</p> <p>→ensure private supply partners and government institutions in the partnership collaborate to offer competitive prices</p>	All partners	Throughout project implementation	Clear (financial) reporting guidelines will be adhered to for activities funded by NORAD or other funding partners Policymakers will be engaged and supported to integrated research recommendations in country policies to ensure adherence at stakeholder levels Partnership already includes government agencies and private sector	