Technical Brief on Cocoa Traceability in West and Central Africa

Overview and recommendations for enhanced cocoa traceability in Côte d'Ivoire, Ghana and Cameroon

C-lever.org
Collaborative leverage towards inclusive development

Acknowledgment

Disclaimer

The opinions expressed in this publication are those of the authors. They do not purport to reflect the opinions or views of the National Platforms for Sustainable Cocoa in Europe and/or their members, nor the stakeholders who were interviewed in the process of developing it.

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Introduction

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1.1   Introduction

Improving the transparency and traceability of the cocoa value chain[1] is an important means of increasing accountability and sustainability of the chocolate and cocoa sector. For example, full traceability from farm level to first purchase point is one of the commitments of the Cocoa & Forests Initiative. This is a public-private partnership aiming to end deforestation and restore forest areas, signed in November 2017 by the governments of Ghana and Côte d'Ivoire and a group of 35 companies. A similar framework, the Roadmap to Deforestation-free Cocoa[2], was signed in Cameroon in January 2021 by the government, companies, farmer organizations and NGOs, which also aims to ensure the traceability of 100% of the cocoa supply from farm gate via warehouse to the port of exit by the end of 2025.

This Technical Brief on Cocoa Traceability aims to contribute to these partnerships and to the global debate on cocoa traceability by providing clarity in defining traceability, what it can help to achieve, and how traceability and transparency in the cocoa sector could be further improved.

This study was jointly commissioned by IDH, the Sustainable Trade Initiative and the German Initiative on Sustainable Cocoa (GISCO) and obtained funding from the UK-funded Partnerships for Forests (P4F) programme in the context of the Cocoa & Forests Initiative.

The ambition of the study is: (1) to provide insight into the strengths and challenges of existing practices and emerging trends in traceability systems in the cocoa sector (2) to develop a common understanding of cocoa traceability with shared definitions and (3) to contribute to a common vision on how traceability can and should evolve to contribute to the objectives of sustainable cocoa.

The content was developed by C-lever.org based on desk research and interviews with government representatives from Côte d'Ivoire, Ghana and Cameroon, cocoa and chocolate companies, certification bodies and technical service providers. It was reviewed by members of the European Traceability Working Group set up by the four national platforms for sustainable cocoa in Europe: the German Initiative on Sustainable Cocoa (GISCO), the Dutch Initiative on Sustainable Cocoa (DISCO), Beyond Chocolate (Belgium), and the Swiss Platform for Sustainable Cocoa (SWISSCO).

This Technical Brief will be complemented by case studies that explore in more detail how companies and certification bodies are implementing traceability in their operations.

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1.   In this document we use the term "value chain" whenever we could use both "value chain" and "supply chain".
     The term value chain is preferred as it better reflects the perspective of all actors involved.
2.   https://www.idhsustainabletrade.com/uploaded/2021/01/20210111-RDFC-2-Pager-2-_Final.pdf

Definitions of traceability in the cocoa sector

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2.1 Evolving concept of traceability

Historically[3], traceability emerged as a means to track and ensure the recall of food products in the event of food safety concerns. Over time, food supply chains have grown to be increasingly global. Price and competition driven globalisation, with associated increases in the cost of production, transportation, etc., have often had negative consequences on economic, environmental and social sustainability in the producing communities.

As a result, there is an increasing focus on how innovations in traceability can assist the food industry to understand and address concerns relating to sustainability. Today, traceability is emerging as an evolving set of concepts and tools with the potential to inform, support and enable the actions of the many participants in the food supply chain, from producer to consumer. As such, traceability has the potential both to enhance and to document the safety, quality and sustainability of food products.

While traceability has been a key discussion point and is considered to be important in the cocoa sector, and despite efforts towards joint definitions such as the ISO-CEN process, interviewees still expressed the need for comprehensive concepts and agreed definitions of traceability terms.

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3. The earliest reference to food traceability dates back to 1275 AD, as a means of tracing meat that carried cattle borne diseases. In 1994, the first ISO standard on traceability was introduced along with a definition of traceability for all goods - Dey, G., & Montet, D. (2017). *History of food traceability*. Food Traceability and Authenticity, CRC.

2.2 Definition of traceability

What traceability means to different actors in a value chain varies depending upon their role. For instance, (a) for a consumer, traceability could mean being assured of the safety and/or sustainability of the product they are consuming, (b) for a company, it could mean better supply chain management and mitigation of risks such as safety, quality and sustainability of production and supply, or even tracking payments to farmers, whilst (c) for authorities, it could act as tool to ensure compliance with sector policy and/or sustainability requirements and to verify payments made to farmers and farmer organisations. The definition of traceability differs between actors; some companies have their own definition, while others use definitions provided by certification bodies, or only have an implicit definition of traceability. Companies interviewed for this study cite both accountability to sustainability commitments and improving quality as their primary objectives for their traceability system.

ISO-CEN -34101: 2019	The ability to follow the physical movement and/or mass conformity of sustainably produced cocoa through specified stage(s) of production, processing and distribution.
Fairtrade	Traceability means that individual Fairtrade products need to be identifiable as Fairtrade at all steps of the value chain and in all relevant documents and packaging. • The aim of Physical Traceability is to ensure that products sold as Fairtrade are sourced from Fairtrade producers. • The objective of Documentary Traceability and Mass Balance is to ensure that Fairtrade producers have received the applicable Fairtrade Minimum Price and Fairtrade Premium.
Rainforest Alliance	Traceability is defined specifically for each level of traceability (Identity preserved, Segregated and Mass Balance) – details provided below and in Annex 2.1.
UN Global Compact	The ability to identify and trace the history, distribution, location and application of products, parts and materials, to ensure the reliability of sustainability claims, in the areas of human rights, labour (including health and safety), the environment and anti-corruption.
Accountability Framework	What is meant by supply chain mapping and traceability? Supply chain mapping and traceability are related terms that often lead to confusion in their interpretation and use. The Accountability Framework's definitions[4] are: ⊘ Supply chain mapping is the process of identifying the actors in a company's supply chain and the relationships among them. ⊘ Traceability is the ability to follow a product or its components through stages of the supply chain (e.g., production, processing, manufacturing, and distribution).

| ***Annex 2.1** has a more detailed overview of existing definitions of traceability.*

4.   https://accountability-framework.org/operational-guidance/supply-chain-management/ - box 3

In order to track progress against their members' commitments, three European platforms (Beyond Chocolate, GISCO and SWISSCO), have agreed on using four levels of traceability in their monitoring system. These are: Conventional (*Traceability level 0*), Mass balance (*Traceability level 1*), Segregated (*Traceability level 2*) and Identitypreserved (*Traceability level 3*). In each case, "conforming cocoa" is defined as certified or independently verified cocoa.

Defining traceability levels

Conventional - conventional cocoa is sourced without conforming to any of the traceability requirements of 'mass balance', 'segregated', or 'identity preserved' as defined below.

Mass balance - The mass balance system monitors the trade of conforming cocoa throughout the entire supply chain. This system requires transparent documentation and justification of the origin and quantity of conforming cocoa purchased by the first buyer. The mass balance system allows mixing conforming and nonconforming cocoa in later stages of the cocoa value chain (e.g. transport, processing, manufacturing). Cocoa value chain actors can sell a certain mass of conforming cocoa, or an equivalent volume of conforming cocoa-containing products, to the extent that the actual volumes of sales of conforming products are tracked and audited through the value chain, and provided that these volumes do not exceed the cocoa bean equivalents of conforming cocoa bought at origin. (Definition drafted using *elements borrowed from ISO-CEN and Fairtrade*)

Segregated - As with the mass-balance system, segregation requires transparent documentation and justification of the origin and quantity of conforming cocoa purchased by the first buyer. Conforming cocoa must be segregated from nonconforming cocoa, including during transport, storage, processing cocoa, and manufacturing of cocoa-containing products. Segregation allows mixing cocoa from different origins, to the extent that all cocoa being mixed qualifies as conforming cocoa as per the certification standard or verified company scheme being applied. The cocoa value chain actors must demonstrate that they have taken the required measures to avoid mixing conforming with nonconforming cocoa. (Definition drafted using *elements borrowed from ISO-CEN and Rainforest Alliance*).

Identity *preserved*. Identity preserved is the highest traceability type. There is no mixing of conforming cocoa, either with non-conforming cocoa, or with cocoa from other origins. If a 'single origin' is set at cooperative level or by cocoa-producing area (combining different cooperatives), then conforming cocoa from this broader origin may be combined. In other words, the "identity preserved" system meets all requirements of "segregated cocoa", but it does not allow mixing of cocoa from different origins.

2.3 Defining traceability systems

"A traceability system is a manual or electronic system that provides the ability to access any or all information relating to the material or product under consideration throughout their life cycle, by means of accessing documented information. Life cycle should be understood in the broadest possible sense, to include, for example, raw material extraction, agricultural production, final disposal, and reuse or recycling, as well as all other stages connected with product manufacture and use."[5]

> *Annex 2.2 has a more detailed overview of existing definitions.*

Recent discussions on sustainability in value chains describe traceability systems as an important tool for voluntary sustainability standards, programs and schemes to improve the trustworthiness of their sustainability claims. **Cocoa traceability systems provide a foundation for improving transparency along value chains, and facilitate the development of monitoring systems, allowing access to information and improving the reliability of sustainability claims.** By enabling transparency, traceability systems can build bridges between producers, governments, non-governmental organizations, and market actors, whilst providing a basis for ensuring that sustainability initiatives and standards are contributing to real impact.

Context of cocoa value chains in West and Central Africa

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3.1 Côte d'Ivoire

Côte d'Ivoire is the world's largest producer of cocoa. The cocoa sector is regulated by the Conseil du Café-Cacao (CCC). Founded in 2011, the CCC is a government institution that reports to both the ministry of agriculture and the ministry of economy and finance. The objective of the CCC is to develop a sustainable cocoa and coffee sector in Côte d'Ivoire by improving productivity, securing the income of producers and promoting national and international consumption of coffee and cocoa. The CCC sets the farmgate price for cocoa, controls the price of cocoa for subsequent transactions and issues exporting licenses.

The cocoa supply chain begins with the farmer. If part of a cooperative or farmers' organization, the farmer is identified and registered by the cooperative. Depending on accessibility to the cooperative, farmers may sell directly to it, or may sell to the cooperative through a délégué. There are two types of small trader in the first mile in the cocoa sector; pisteurs and délégués. The délégués have direct ties with cooperatives. Pisteurs are free agents or small traders who buy the cocoa from farmers then transport and sell it to cooperatives and/or buying centres.

From the cooperatives and buying centres, a portion of the cocoa beans may be processed locally and either be exported as semi-finished cocoa products or end up on the local consumer market. However, the majority of the cocoa beans are exported and further processed abroad.

COCOA SUPPLY CHAIN - CÔTE D'IVOIRE
Figure by C-lever.org
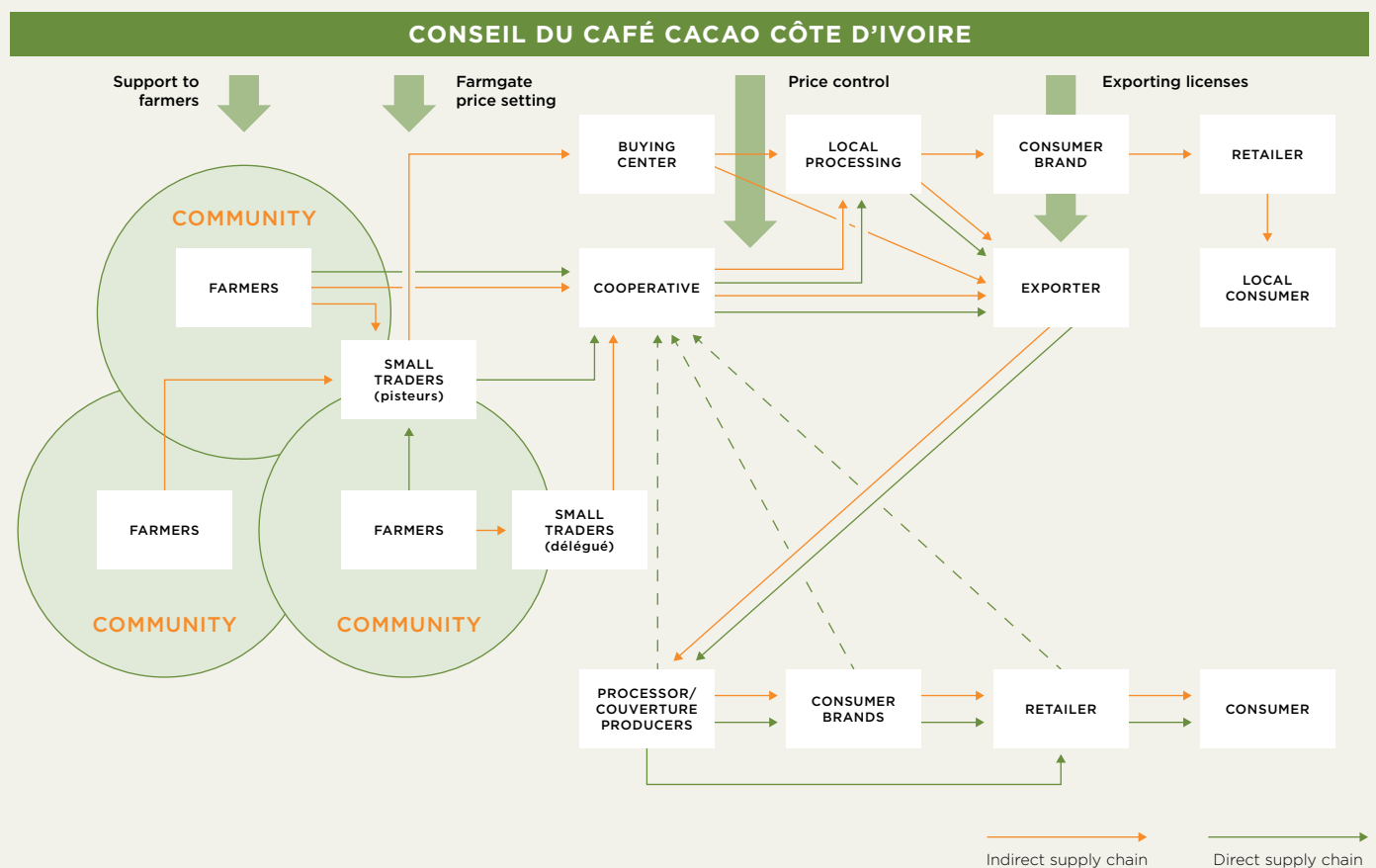
3.2 Ghana

Ghana is the world's second largest cocoa producer after Côte d'Ivoire. Cocoa is the main cash crop and as such is the backbone of Ghana's economy. Cocoa is cultivated in the Central, Ashanti, Eastern, Western South, Western North, Bono East, Ahafo and Volta Regions. The Ghana Cocoa Board (COCOBOD), regulates the cocoa sector with the aim of promoting the development of the industry by improving sustainable productivity. One of their key roles is to support farmers on the basis of their needs as identified through surveys conducted by COCOBOD.

The cocoa supply chain in Ghana is similar to that in Côte d'Ivoire. The main difference is that 27 registered Licence Buying Companies (LBCs) and the Produce Buying Company (PBC) buy the cocoa from smallholders. After purchase, the LBCs and PBC have to transport the cocoa to the Cocoa Marketing Company (CMC) centres in Tema, Takoradi and Kumasi. The CMC, a state-owned subsidiary, is the world's largest single seller and exporter of Ghanaian cocoa as the LBCs are only allowed to sell through it. The CMC promotes, sells and delivers Ghana's cocoa to local processors and international traders and processors.

COCOA SUPPLY CHAIN - GHANA

Figure by C-lever.org
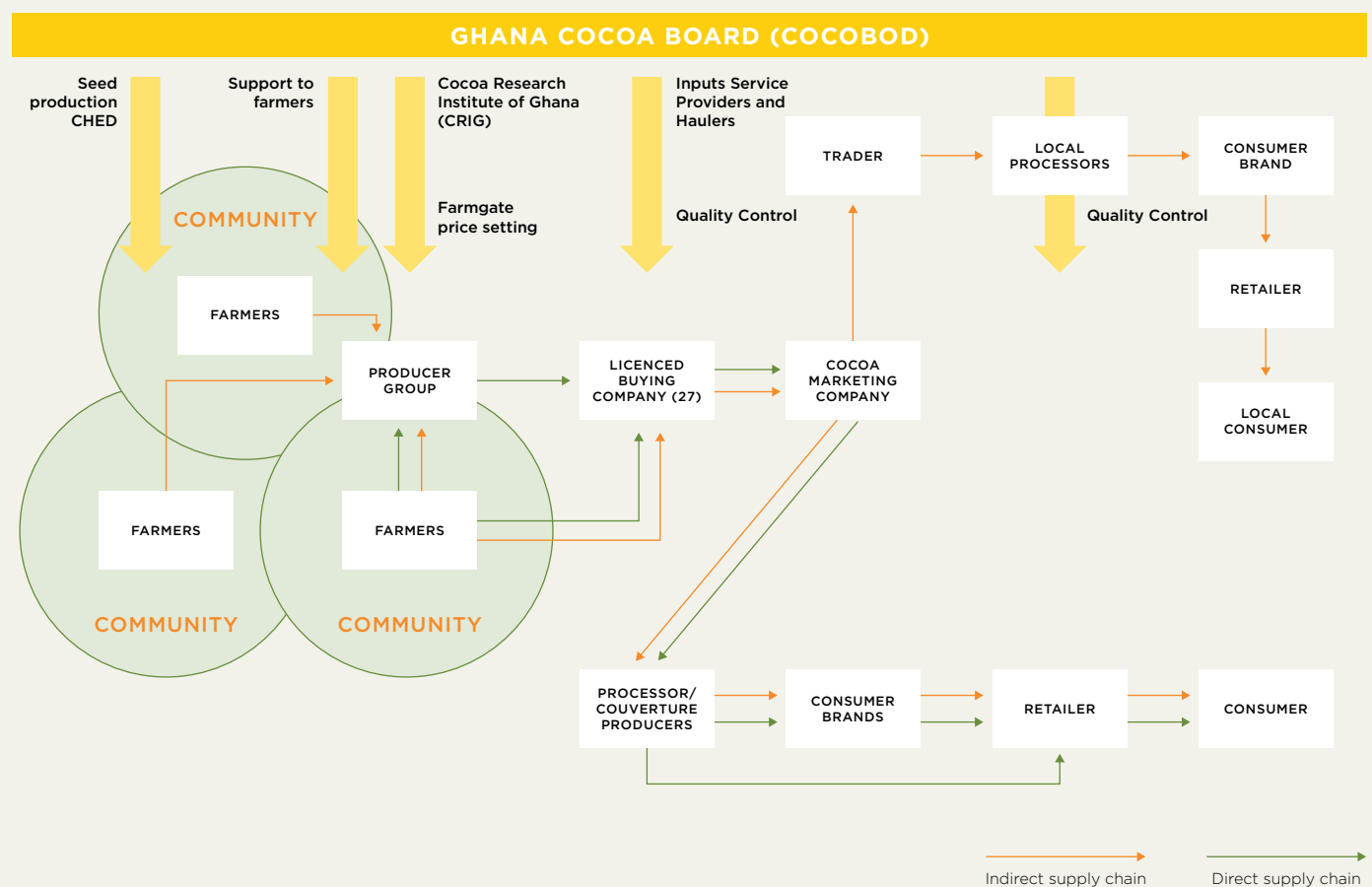
3.3 Cameroon

Cocoa production in Cameroon is on the rise, growing from 220,000 tons in 2014 to 270,000 tons in the 2019/2020 cocoa season. Most cocoa in Cameroon is produced in the Centre, South, and South West Regions. Cocoa is produced by small farmers and cooperatives, while Licensed Buying Agents (LBA), accredited by local control bodies, act as intermediaries to supply traders and exporters. Non-licensed intermediaries (coxeur / Non LBA) also operate between farmers and traders.

Part of Cameroon's cocoa is processed locally, but about 90% of the cocoa is exported to Europe, particularly to the Netherlands, as a raw material for chocolate makers and the confectionery industry.

Since 1991, following structural adjustment policies imposed by the Bretton Wood institutions, the cocoa sector in Cameroon moved from a stabilised system under the control of the cocoa and marketing board (ONCPB, a state-owned company) which used to be the single seller and exporter of Cameroon cocoa, to a liberalised system. This has reduced the intervention of the state and allowed the entrance of new actors in the value chain. Today the cocoa sector in Cameroon is managed by the National Cocoa and Coffee Board (ONCC), which oversees exports, conducts quality control and promotes the branding of cocoa of Cameroon origin. In addition, the Interprofessional Council of Coffee and Cocoa (CICC) supports its members to increase the efficiency of the cocoa sector in Cameroon.[6]

COCOA SUPPLY CHAIN - CAMEROON

Figure by C-lever.org

NATIONAL COCOA AND COFFEE BOARD CAMEROON (NCCB)

Control of production

Quality Control

COMMUNITY

FARMERS

LBA

LOCAL PROCESSING

CONSUMER BRAND

RETAILER

COOPERATIVE/ COMMUNAL INITIATIVE GROUP

TRADERS

EXPORTER

LOCAL CONSUMER

FARMERS

FARMERS

COXEUR / NON LBA

COMMUNITY

COMMUNITY

PROCESSOR/ COUVERTURE PRODUCERS

CONSUMER BRANDS

RETAILER

CONSUMER

Indirect supply chain   Direct supply chain

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6.   Herve, Z. E., & Zhao, G., "Cocoa Exports of Cameroon: Structure and Mechanism of Operation". Theoretical Economics Letters, 8(14), 3223-3251, 2018

Overview of current traceability systems and their implementation

This chapter provides an overview of the existing traceability systems in the cocoa sector, classifying the different actors according to their role in the cocoa value chain.

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4.1 Traceability systems of producing country governments

The traceability systems currently in use in Côte d'Ivoire, Ghana and Cameroon, as well as the systems that have been proposed by the national governments to address cocoa traceability are outlined below.

4.1.1   Existing traceability systems of producing country governments

Côte d'Ivoire	Ghana	Cameroon
Currently there is no national cocoa traceability system in Côte d'Ivoire, although there are certain mandatory elements of traceability. Every cooperative and buying centre reports to the CCC, registering every sale of cocoa beans in traceability software called SYDORE, installed by the Ivorian government.	Ghana has a national traceability system that can trace all cocoa, including conventional cocoa, from the LBC to the importer. Currently COCOBOD is implementing an improved traceability system, the Cocoa Management System (CMS), with the aim of providing 100% first mile traceability from the farm to the LBC.	There are some traceability requirements in place in Cameroon, mainly regarding quality control and assessment of quantity. Buyers are required to report weekly on quantities and qualities of cocoa bought. Exporters are required to report on the quantity and quality of cocoa exported. Transport of cocoa is checked at district level with paper-based waybills.

4.1.2 Envisaged traceability systems of producing country governments

All three countries are in the process of improving their national traceability systems. Côte d'Ivoire and Ghana are also jointly developing a regional sustainable cocoa standard that, in addition to quality criteria, will contain sustainability and traceability requirements. The new standard will cover the entire volume of cocoa in the supply chain from Côte d'Ivoire and Ghana.

Côte d'Ivoire	Ghana	Cameroon
The CCC organised a census in 2019 and 2020 to map producers and farms. As of late 2020, information on location, plots, and production estimates have been recorded for over 900,000 known producers. In 2020, the CCC commissioned a feasibility study for a unified cocoa traceability system. In 2021 the CCC intends to pilot the proposed system before nationwide roll out. The proposed system includes both physical traceability and financial traceability as well as data analysis and resulting 'alarms' to identify any risks of unsustainable practices or fraud in the traceability system.	The Cocoa Management System (CMS) currently being developed by COCOBOD will provide origin transparency from farm level. The CMS intends to address environmental sustainability by using polygon mapping to verify that cocoa farmers in the system are not farming in protected areas or recently degraded forests. The CMS intends to contribute to curbing child labour and reaching a living income through following initiatives: ⊘ Collection of farmer level data through farmer censuses. ⊘ Improved access to subsidies, crop insurance, and savings and pension schemes. ⊘ Using technology, track children growing up in cocoa farming households; intervene where child labour risks are identified: and deploy remediation efforts.	The envisaged cocoa traceability system in Cameroon is intended to include the following components: ⊘ National farmer database & plot registration (geo-referencing) ⊘ Improve quality of cocoa and increase productivity ⊘ Create awareness on deforestation and child labour issues at farmer level ⊘ Link information on sustainability characteristics to cocoa batches ⊘ Digitally track each batch of cocoa from farm to port of export

Annex 4 contains a SWOT analysis of the national traceability systems.
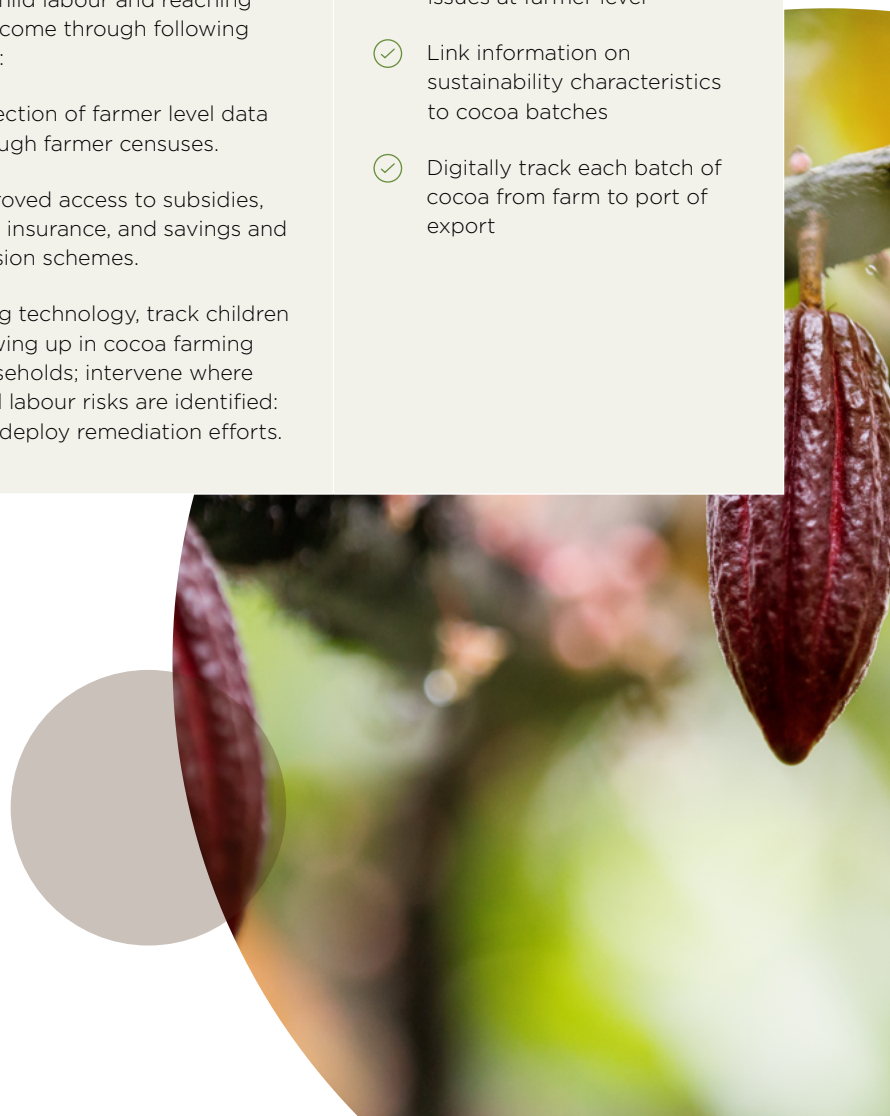
4.2 Traceability systems of standard setting bodies

Within the cocoa sector, there are currently two main standard setting bodies, Fairtrade International, and Rainforest Alliance. They were both pioneers in establishing the minimum requirements for sustainability and traceability in the cocoa sector. Private companies work with one set of standards, or both, or opt to apply their own company schemes. The adoption of standards set by these bodies has unravelled sustainability issues in the cocoa sector, and helped pave the way for organisations trying to determine ways in which they can tackle these issues.

4.2.1 Rainforest Alliance

UTZ was the largest program for sustainable cocoa until it merged with Rainforest Alliance in 2018 to form the new joint Rainforest Alliance standard in 2020, increasing its market power. To promote sustainable farming, it has developed two standards: the Code of Conduct (Code) and the Chain of Custody Standard (ChoC).

The *code of conduct*[7] promotes sustainable farming practices. It is a set of criteria for socially and environmentally responsible cocoa production and efficient farm management. According to Rainforest Alliance, the continuous improvement structure lowers the threshold for producers to join, while assuring a basic standard of safety and quality.

The *chain of custody standard* is a set of requirements designed to provide a high level of confidence that Rainforest Alliance certified products are physically or administratively (in the case of mass balance) related to Rainforest Alliance certified producers or producer groups, and ensures the traceability of Rainforest Alliance certified product. Rainforest Alliance always requires certified producers and producer organisations to conform with the Identity Preserved (IP) traceability requirements. From the first buyer onwards, and only for cocoa and hazelnut, certified value chain actors may apply the mass balance traceability system.

Rainforest Alliance recently launched *Origin Matching Mass Balance* with a certified country-level origin in its cocoa chain of custody certification standard. Origin matching mass balance requires companies to purchase certified cocoa from the countries that match the origin of cocoa used in certified consumer products. This move will continue to allow flexibility in the cocoa value chain and will better support the development of certified farming practices in countries where farmers are producing cocoa that is eventually sold as certified.

4.2.2 Fairtrade International

As a standard setting body, Fairtrade International defines compliance criteria to ensure the level of conformity across organisations and countries using Fairtrade Standards. When a product displays the FAIRTRADE Mark, it means that the producers and businesses have met the social, economic and environmental standards set by Fairtrade. According to Fairtrade International, traceability is defined as, "the ability to identify and trace the history, location, use and processing of products and materials".

Fairtrade International certifies cooperatives on the basis of adherence to sets of checkpoints against the Fairtrade standards called "compliance criteria". The cooperative is expected to define and implement a procedure to monitor and assess the performance and compliance of their members against the Fairtrade standard. The criteria range from cocoa production practices, trade, transport and processing practices, to business practices when selling cocoa containing products. In line with these criteria, each cooperative certified by Fairtrade is required to maintain member records. At the end of the first year and for each consecutive year of membership, the members records should be updated. From year three onwards Fairtrade International requires that the cooperatives collect household and farm data to assess the needs of members regarding improvements to their sustainable farming.

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7.   https://www.rainforest-alliance.org/business/wp-content/uploads/2020/04/global-code-of-conduct.pdf

4.3 Traceability systems of the private sector

In the last decade, multiple company-led traceability systems have emerged in the cocoa sector, with companies designing and implementing their own traceability systems according to their own sustainability standards, and based on their specific needs.

Despite enhanced attention to traceability, there has been only limited efforts to connect the traceability systems with cocoa sustainability projects and their impact on the ground. Company-led traceability systems focus only on their direct supply chain[8] with limited attention paid to traceability in their indirect supply chain. Also, the proliferation of different systems and standards has led to an increased burden of reporting for farmers and cooperatives. In addition, access to and ownership of data remains an issue due to absence of feedback loops[9] and limited cooperation or information sharing between private sector traceability systems.

Several interviewees stated that demand from investors to source more sustainable cocoa, and increasing corporate accountability requirements, were key drivers for enhancing traceability in cocoa value chains. While some private sector actors insist on fully segregated supply chains, this seems to be driven by the need to ensure quality rather than the need to gather and assess data on sustainability. Suppliers and traders interviewed during this study indicated that they were willing to collect data on sustainability characteristics if there was demand from their clients (the couverture, consumer brands, retailers and ultimately the consumers). But several also stated that many consumers were not interested in sustainability information, and were (or were perceived to be) unwilling to pay a higher price for more sustainable cocoa products.

SCOPE AND SCALE OF PRIVATE SECTOR TRACEABILITY SYSTEMS[10]

Figure by C-lever.org

1. Company traceability system
2. Traceability through suppliers and certifiers
3. No information available

Flow traceability data

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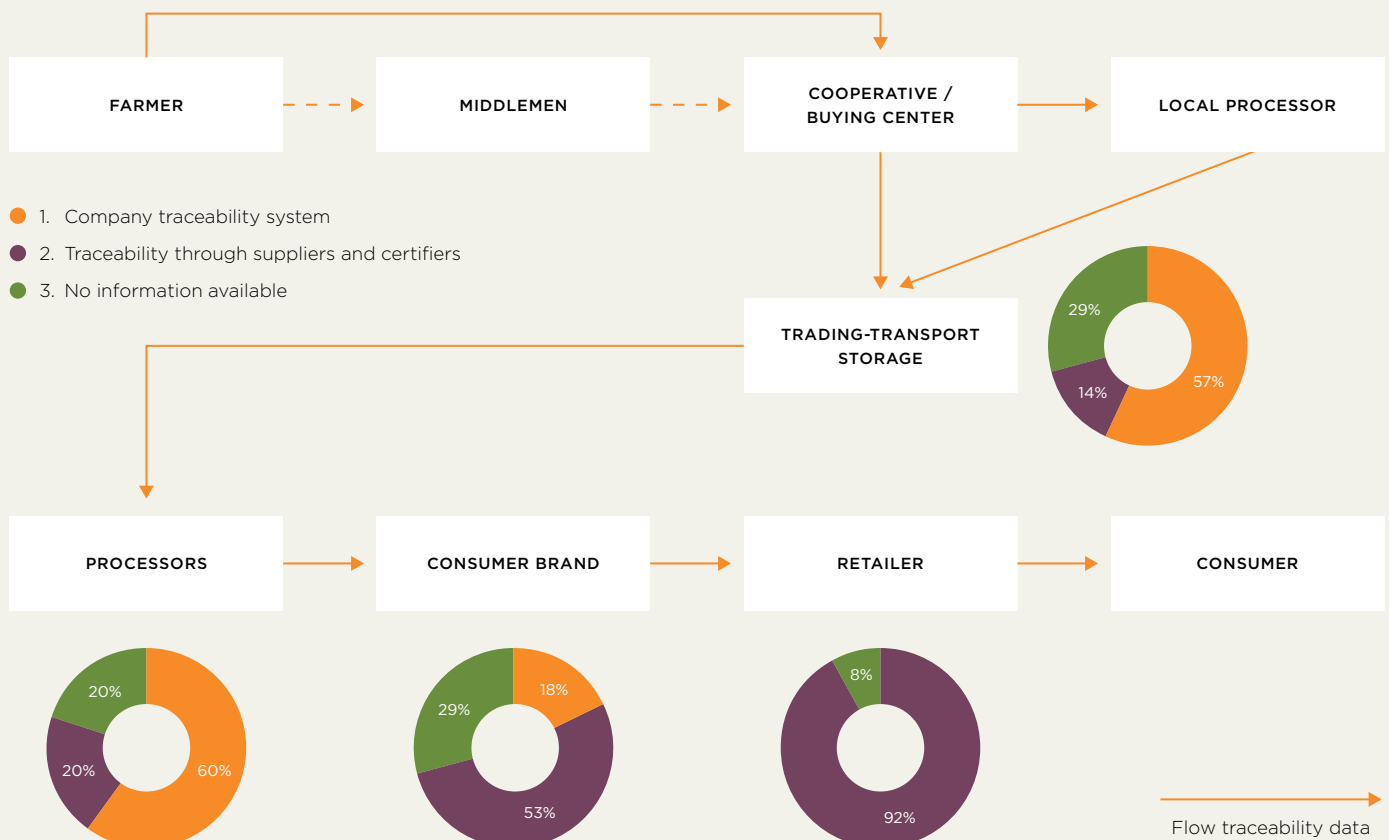
8.   "For cocoa to be categorised as "cocoa sourced through a direct supply chain, there shall be a relative stable partnership and collaboration, conceived to span at least 3 years, between the cocoa sourcing company and the cocoa producer. Such partnership and collaboration may cover issues such as price, quality, good agricultural practices, social, human rights and environmental issues, certification requirements, etc. This partnership and collaboration between the cocoa sourcing company and the producers (cocoa farming households) may be conducted through cooperatives, farmer organisations and/or other intermediaries embedded within the direct supply chain." – *Harmonised definition used by GISCO, Beyond Chocolate and SWISSCO. –* Definition in process of being further aligned with WCF definititions.
9.   Feedback loops refer to the concept that cocoa traceability is not unidirectional and should also empower and benefit the cocoa producers and their organisations.
10. Illustration is based on data obtained for the private sector members of the national platforms for sustainable cocoa in Europe (Beyond Chocolate, GISCO and SWISSCO)

The scope and scale of private sector traceability systems varies depending on the position of the actor in the value chain. Given the concentrated cocoa market, the few traders and processors controlling the value chain have the incentive to design their own systems, providing downstream traceability to buyers further along the value chain. The graph above illustrates this observation. However, retailers rely entirely on their suppliers and certifying bodies to provide them with traceability data. At present, most companies employ systems that have limited focus on financial traceability or on providing other benefits to the farmers. When they do, the tools are mainly directed towards the tracking of premium payments.

To interpret this figure, the level of traceability that company systems can provide must be considered. The Cocoa barometer 2020 shows the percentage of the sourced volumes that is traceable back to the level of the cooperative. Olam is at 61% while ECOM is at 47%. Both Cargill and Barry Callebaut report around 30% of the volumes sourced being traceable back to the cooperative. For consumer brands the numbers vary between 81% for Ferrero and 47% for Nestlé. Since most cocoa traceability systems today focus on traceability back to the first point of purchase (cooperative, LBC, etc.), data on traceability to farm level is often unavailable or unreliable. This underlines one of the key challenges to traceability in the cocoa sector, a challenge that must be overcome to provide accountability on sustainability commitments: the first mile of the cocoa value chain from the farm to the first point of purchase is under-reported in the majority of existing traceability systems.

LEVEL OF TRACEABILITY OF PRIVATE SECTOR SYSTEMS[11]

Figure by C-lever.org
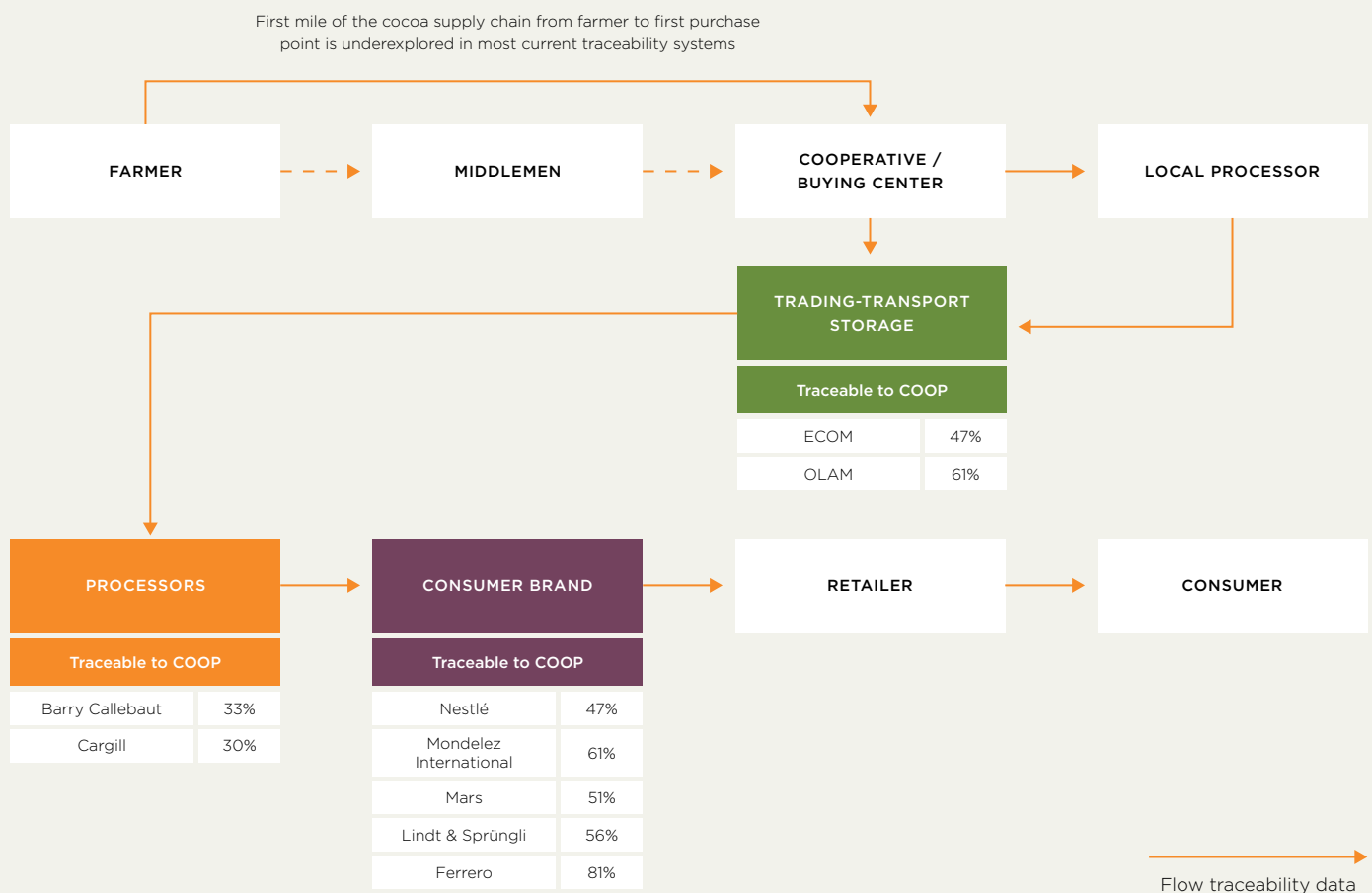
Source: Cocoa barometer, 2020

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11.   Ibid page 9; Fountain, S., Huetz-Adams, F., Cocoa Barometer 2020

Overview of technologies supporting cocoa traceability

05

While traceability in food products began as a means to ensure recall in case of food safety concerns, with the advancement in technology and the advent of tools targeting value chain traceability and transparency, traceability technology has started to play a key role in many aspects of value chain management.

In recent years, increasing numbers of actors in the cocoa value chain from the private sector as well as standard setting and certification bodies, have been exploring how technology solutions can help improve their traceability systems. As a result, most of the private sector traceability systems are strongly linked to digital service providers. These systems provide a range of tools that can gather and verify the geographical origin of cocoa at source; define, measure and link sustainability characteristics to batches of produced or processed cocoa; and forward origin and sustainability characteristics along the value chain.

Technology is now being used across the value chain, to manage internal key performance indicators (KPIs) with external supplier data, to trace individual products, to track materials from point of origin to the manufacturer, to ensure transparency, and to inform and engage consumers. By providing tools to ensure increased control over production, better inventory management and the ability to continuously monitor value chains, technology is enabling better value chain design and collaboration. All of this has led to improvements in value chain resilience. Traceability technology is aiding the analysis of performance, and in assessing the efficiency of the entire value chain process with data management and analytics from the production to the final point of sale and beyond.

However, the use of technology solutions to improve traceability is not without its challenges. Using these tools first requires knowledge and resources to access and use them, which is often a challenge on the ground, and has been reported as one of the greatest challenges faced by technology platforms working with the cocoa sector. The lack of access to resources such as electricity, mobile phones or mobile network is an ongoing challenge. This is being mitigated by the development of offline data collection tools and the education of local actors in the field about their use. New tools also require actors to change or adapt their working practices. A lot of data is still recorded on paper in distributed ledgers. Digitising such large quantities of data, while changing people's habits and ensuring that bureaucratic hurdles are overcome, is a daunting and time-consuming task which deters many stakeholders from adopting digital traceability tools.

The absence of shared platforms between cocoa companies and the reluctance of the key value chain actors to build such platforms means that even when technology is used, the data is stored in silos only accessible to the company that commissioned the data collection. This lack of system interoperability leads to double counting and increases the probability of falsification of data. It may also imply inefficiencies and excessive costs of cocoa traceability, with no benefit to the cocoa farmers.
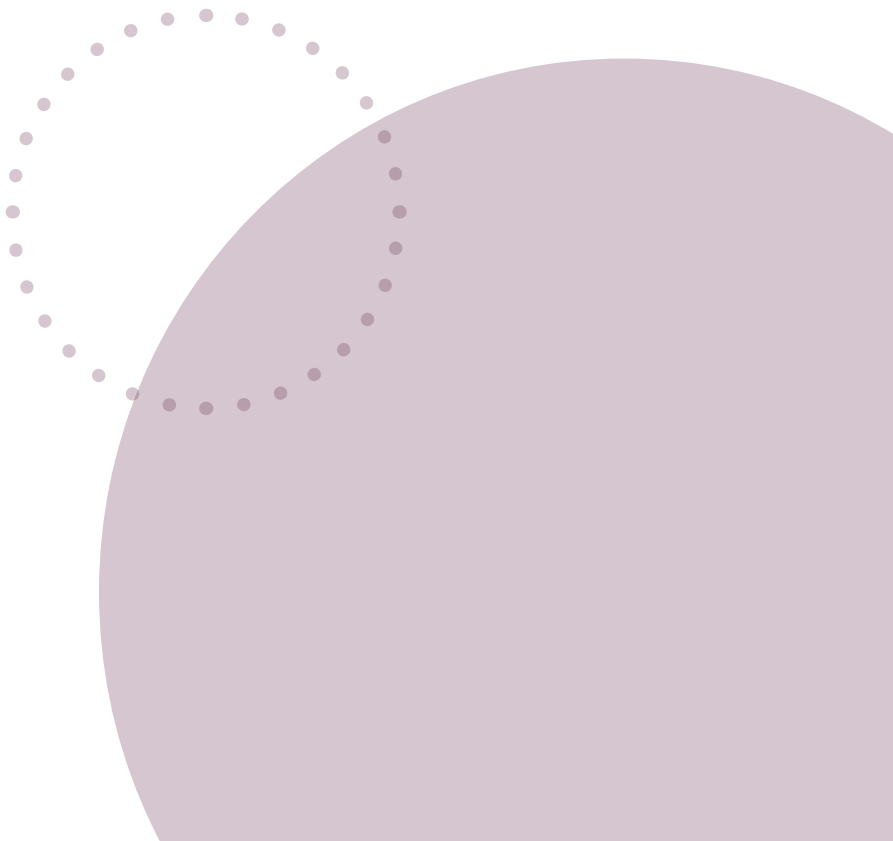
Another challenge is that all technology is ultimately managed by people, from data entry to final analysis and reporting. Any technical solution or tool is limited by the quality of data collection, the knowledge and expertise of the person using the technology, and ultimately the extent to which the data is used by the entity that is supposed to be evaluating it.

Despite these limitations, technology is providing powerful solutions to improve transparency and ensure better traceability in value chains.

In the last decade, cloud-based digital platforms have emerged which allow multiple companies to work together. Several types of collaboration are being used for traceability in the cocoa sector:

- **Company owned digital platforms** involve one of the companies in the supply chain implementing a digital platform and requesting upstream partners in its supply chain to provide data. Once entered into the system, the data is owned by the company which is also accountable for the data provided to any third party. Company owned digital platforms are primarily designed to facilitate data input by the parties who supply the data and to support the owner's business processes. Increasingly, these systems also support the monitoring of sustainability initiatives by the company. Examples of such platforms in the cocoa sector include Olam's AtSource and Barry Callebaut's Katchile.

- **External accessible data sources** apply to an independent organisation providing a cloud platform to assemble data and subsequently ensure the cleaning and transformation of the raw data into meaningful information for third parties. An example of the application of external data sources is the use of satellite images to identify and track deforestation, which can be used in other platforms. Examples of external data sources which may be useful in the cocoa supply chain are Farm-Trace, Mighty Earth Cocoa Accountability Map, Global Forest Watch (GFW) and Trase.

- **National and/or large farmer community owned initiatives** are those systems and platforms set up by a board, government or farmer community organisation to support the needs of its farmers, such as Ghana's CMS support verification processes done at national or community level, which gives added value to the data provided and makes it available to the exporters.

- **Supply chain collaboration initiative** is a term used to describe the coming together of two or more discrete organisations to work closely together with the aim of meeting shared objectives. Supply chain collaboration initiatives are based on principles of knowledge sharing and strategic collaboration. A supply chain collaboration initiative opts for a platform that supports the needs of each party, ensuring that their ownership is preserved, while certain data can still be made available to other parties involved, at the discretion of the data owner. Each party remains accountable for the quality and reliability of its own data. Examples of platforms that allow for such collaboration include Farmer Connect and Chainpoint.

More details on technology platforms and technology usage in cocoa traceability can be found in Annex 5.

# Cocoa traceability: why and what concept to apply?

06

6.1 Why invest in cocoa traceability?

Enhancing and consistently ensuring the sustainability of cocoa farming, and of the whole sector, is not possible without adequate forms of cocoa traceability. For the ambition of European initiatives for sustainable cocoa such as GISCO, SWISSCO, Beyond Chocolate and DISCO, to be achieved, a means of distinguishing between different levels of cocoa sustainability is needed. Improving the cocoa origin transparency (identifying where it was grown) and enhancing knowledge of the sustainability characteristics of cocoa batches along the value chain are crucial components of cocoa business ecosystems[12] that foster sustainable production, as well as fairness and accountability for all parties.

Effective and trustworthy traceability is essential to create a level playing field[13] for sustainable cocoa and to establish an ecosystem that gradually replaces unsustainable cocoa with more sustainable produce across the different types of value chain. The proposed traceability concepts should enable distinguishing between varying aspects and degrees of sustainability of cocoa and cocoa-containing products. This variance should be reliable and easy to understand, allowing targeted support for farmers and other incentives for the production and trade of more sustainable cocoa across the value chain. This could be complemented by disincentives, or even prohibitions, for less sustainable (or unsustainable) cocoa and cocoa-containing products. The tipping point will come when economies of scale favour the sustainable cocoa and when incentive and prohibition mechanisms strongly curb the demand for unsustainable cocoa, even if offered at significantly lower prices.

In importing regions, such as the European Union and the United States, supply chain due diligence requirements are becoming increasingly stringent. Effective cocoa traceability systems will allow companies at the end of the cocoa value chain to comply with human rights and environmental due diligence requirements.

Innovation requires experimentation, and this is true for traceability. However larger scale investment in cocoa traceability should build on well-documented, evidence-based good practices, adding value for money by ensuring sustainability, safety, fairness, transparency and accountability in cocoa value chains. **A number of interviewees appealed for avoiding traceability for traceability's sake, stressing that funding of sustainability in the cocoa value chain should not be diverted to traceability mechanisms.**

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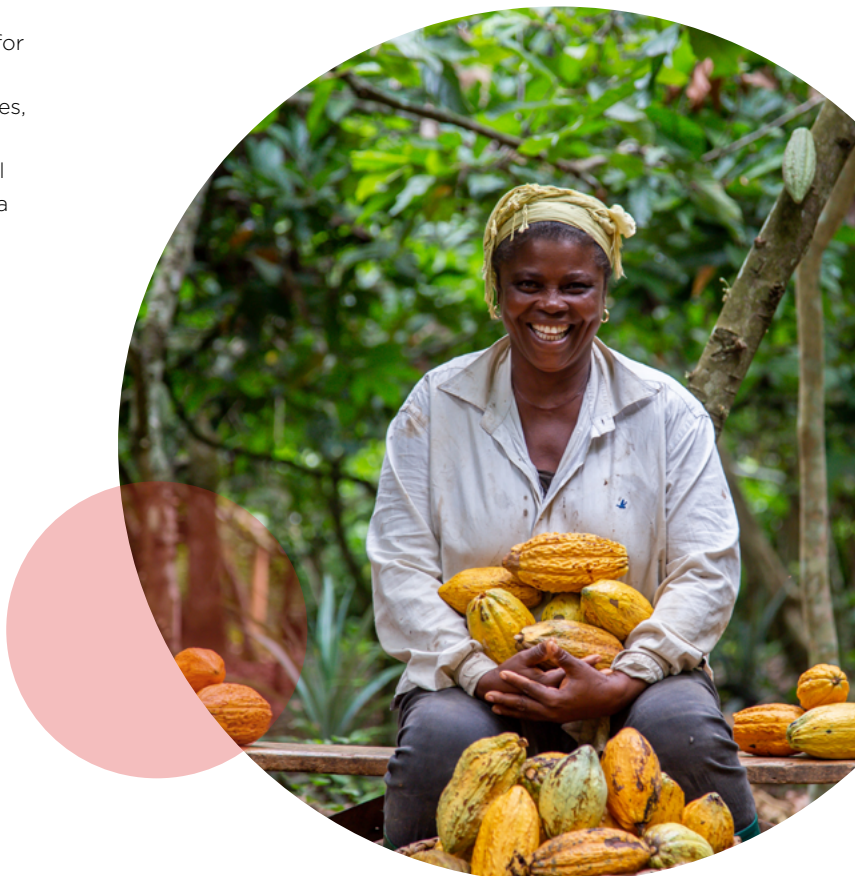
12.   A business ecosystem refers to (a) the network of organizations including suppliers, distributors, customers, competitors, government agencies etc. who are involved in the delivery of a specific product or service through both competition and cooperation, and (b) to the legal and regulatory framework and the agreements, practices relationships, access to funding, etc. that influence the interaction between these actors. The idea is that each entity in the ecosystem affects and is affected by the others, creating a constantly evolving relationship in which each entity must be flexible and adaptable in order to survive as in a biological ecosystem.
13.   A situation in which each actor involved in a process has a fair and equal chance of succeeding.

6.2 Proposed new definition of cocoa traceability

Building on the above, cocoa traceability may be further defined as the ability to:

a) **ensure transparency on the origin of cocoa;**

b) **link sustainability** (and other) **characteristics** (*measured at farm/community/area/... level*) **to** the (*produced and processed batches of*) **cocoa** (including batches of cocoa-containing end products), and

c) **document and trace steps** in (dis)aggregating, transporting and processing (batches of) cocoa and cocoa-containing products, while **transferring information on cocoa origin and sustainability characteristics, all along the value chain**, including feedback loops.[14]

> ### *Note on the proposed definition*
>
> This proposed definition concerns an extended concept of cocoa traceability, going beyond physical or batch traceability, thus positioning traceability as an effective tool to foster sustainability in the cocoa sector and to allow companies to meet sustainability requirements. Such extended definition of cocoa traceability covers additional elements of cocoa value chain transparency. It also requires disclosure of information and where relevant external assurance of the reliability of reported data and the associated sustainability claims.

6.3 Three main dimensions of cocoa traceability

With this proposed definition (§6.2), cocoa traceability can be approached along three complementary dimensions.

What is cocoa traceability about?

The 3 dimensions of the proposed definition

1 Information and transparency on the (geographical) origin of the cocoa

2 Linking (sustainability and other) characteristics to the produced / processed cocoa lots

3 Transmission of information on origin and characteristics along the supply and value chain and feedback loops

Environment → Product → Process → Community → **ACCOUNTABILITY**

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14.   Ibid §4.3.

6.3.1 Cocoa origin transparency (dimension 1)

Documenting where the cocoa batches entering the value chain have been produced constitutes the first dimension of cocoa traceability; it is also referred to as first mile traceability. This can be achieved through provision and use of unique farm IDs and farm mapping.

The benefits of farm mapping

Farm mapping can potentially:

- ✓ Help to provide verification of cocoa origin information and curb fraud through analyses using GPS point coordinates and outlines as well as productivity measurements and verifications.

- ✓ Provide a basis for land entitlement, in the absence of a fully deployed government cadastre (record of ownership or land tenancy) allowing for more long-term sustainable relationships and giving access to better financing for better farming practices and related investments. For example, Meridia is a social venture which works with farmers to provide land mapping, affordable land documentation and land titling at scale.

- ✓ Calibration of carbon reporting systems based on satellite images and deforestation measurement systems linked to farm mapping, such as Farm-Trace which is a platform that can provide environmental insights. It enables benchmarking and individual metric improvements through an app that can be used to enter land parcel polygons, land parcel/ forest carbon monitoring, and many detailed sustainability facts about the farm.

Farm mapping is a means for both dimension 1 and dimension 2 traceability and can create value and direct impact for farmers. Further developments are needed to reduce the cost of farm mapping and to ensure that the effort is embedded in broader cocoa sustainability ambitions.

6.3.2 Linking sustainability characteristics to cocoa (dimension 2)

The second dimension of the proposed definition of cocoa traceability concerns documenting and linking sustainability with other characteristics to the produced and processed cocoa batches.

Linking farm and farmer identity, and associated sustainability characteristics, to the cocoa batch and ensuring the transmission of this information along the value chain fits into a farmer-centric approach. Complementing this with feedback and sustainability support loops would then allow for farmers to actually benefit from cocoa traceability.

The (potential) sustainability characteristics are visualised in the figure below.

This second dimension of the proposed cocoa traceability definition corresponds well with and embraces the concept of social traceability systems[15], including human rights due diligence issues, as proposed by the International Cocoa Initiative. In the same way, a concept of "environmental sustainability" could be applied, covering the environmental sustainability characteristics of cocoa and thus also the issues pertinent for environmental due diligence.

SUSTAINABILITY CHARACTERISTICS OF COCOA BATCHES

Farm or farming household	Cocoa producing community / area	Supply chain
Cocoa origin: country / region / cooperative / farm and its characteristics	Child labour	Financial traceability (Price paid to the farmer, Premiums paid, Funding linked to cocoa sustainability)
Organic farming	School attendance rate / School outcome rate	
Cocoa agroforestry	Forced labour risk	Decent working conditions (transport, manufacturing, etc)
Child labour	Forest preservation and restoration	
Living income	Access to finance	Other, to be defined
Quality	Income diversification, skills development	
Other, to be defined	Other, to be defined	

15. "Social traceability systems: systems which link households, communities or geographic areas, and the cocoa beans they produce, to measures (and assurances) of responsible business conduct and (positive) social impacts in relation to the most salient human rights risks." – Child Labour in Cocoa - A Journey Towards "Social Traceability", Nick Weatherill, The International Cocoa Initiative (ICI), 16th March 2021 – EU Coco talks.

6.3.3 Tracking steps in the value chain and transferring information about cocoa characteristics (dimension 3)

The third dimension of the proposed cocoa traceability definition concerns:

a) documenting and tracing steps in (dis)aggregating, transporting and processing batches of cocoa; in its different forms of processing; and of the resulting cocoa-containing products;

b) transferring information on cocoa origin and sustainability characteristics, from batches entering to batches exiting, at every step of the value chain.

This third dimension of cocoa traceability does not preclude any type of processing in the cocoa value chain; it still allows for aggregating or disaggregating distinctive batches of cocoa or resulting intermediary cocoa-containing products. The third dimension only requires that the value chain actors systematically document which batches enter into a step and what batches exit that same step of the value chain.

The resulting value chain information (linking back to batches) allows transferral of information about origin and characteristics of initially sourced cocoa beans to the resulting cocoa containing end products. The essence of this third dimension is that a new "information preserved" concept can be applied when mixing and processing differing batches of cocoa beans. The resulting "composed batch" will thus include the aggregated or compiled information on the origin and characteristics of the underlying batches of cocoa beans, each with their percentage or weight expressed in cocoa bean equivalents.

The concept of the third dimension of cocoa traceability is visualised in the below figure.

CONCEPT OF INFORMATION PRESERVED COCOA

BATCH #1 — Origin and sustainability charactersitics

BATCH #2 — Origin and sustainability charactersitics

BATCH #3 — Origin and sustainability charactersitics

PROCESSING → Compound batch / cocoa-containing end product

Retaining information on the origin and characteristics of the underlying batches of cocoa beans / cocoa-containing products, each with their % or weight expressed in cocoa bean equivalents.

Recommendations to address the challenges identified

07

7.1 Challenges identified

The review of existing traceability systems and stakeholder interviews helped identify the following challenges:

1. There is a lack of common vision, definitions and standards for traceability in the cocoa sector.

2. There is still limited traceability in companies' indirect supply chains[16] and overall weak first mile traceability.

3. Little attention is given to systems that empower farmers and producer organisations, such as feedback loops and mechanisms that ensure ownership of sustainability data and return on efforts for cocoa farmers and their organisations. There is a need to ensure that traceability brings relevant benefit to farmers and that funding for sustainability, including improvements in cocoa farmer income, is not diverted to improve cocoa traceability.

4. There is limited coordination, collaboration and synergy in developing traceability systems and making best use of emerging possibilities for exploiting 'big data' and other new technologies to support innovative traceability in value chains for cocoa and other commodities.

5. Some practices of cocoa value chain actors and methods of production, collaboration and contracting undermine the trustworthiness of cocoa traceability data and information.

Even so, the emergence of new technologies and practices provides significant opportunities for the cocoa sector to enhance traceability systems and increase its scale.

Challenges to traceability ambitions in the field

As acknowledged in this report there is an increasing demand for improved traceability within the cocoa sector, with value chain actors setting their own traceability objectives and designing and implementing their own traceability systems. Nonetheless, there are many issues in the field that render the current traceability systems susceptible to loopholes and thus imply less reliable data and traceability claims.

A few examples:

• Financial traceability is still weak and corresponding claims may not be reliable; information obtained through desk research and interviewing indicates that in practice, cooperatives may retain an undisclosed percentage of the premium meant to be paid to the farmers as collateral for the high risks they endure such as armed robbers stealing the cash, theft of cocoa bags during transport, the poor state of roads, and the lack of insurance to cover such risks.

• It seems to be common practice for some cooperatives to meet the quality standards of the buyers by mixing volumes of certified and conventional cocoa, which remains undisclosed and is not documented.

• The busy mid-January sourcing period of many clients in Europe leads some cooperatives to source cocoa from farms outside their member list to meet the volume and quality needs of the client, then later on selling cocoa from their members as conventional cocoa.

A more detailed overview of the findings is given in Annex 6.

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16. With indirect supply chains we refer to cocoa sourcing other than through a "direct supply chain" as defined above (§4.3).

7.2 Recommendations

7.2.1 Development of standardised definitions and metrics

Harmonising and adopting standard definitions and measurements of traceability and sustainability characteristics in the cocoa sector is essential. Since 2020, the national platforms for sustainable cocoa in Europe have been working together, in collaboration with the World Cocoa Foundation (WCF) and the International Cocoa Initiative (ICI), towards harmonised indicators on cocoa sustainability. This significant move will contribute to comparability, effective tracking of progress and shedding light on real problems that need to be addressed to achieve traceability and sustainability in the cocoa sector.

To progress these standardised definitions and metrics, the European platforms, WCF, ICI and other stakeholders need to actively engage with producing countries. **Jointly defining cocoa sustainability characteristics and the corresponding metrics is an ongoing, collaborative learning exercise and work in progress;** the ongoing efforts to harmonise definitions, indicators and monitoring mechanisms for sustainability in the cocoa sector will provide a starting point to do so.

Note on the recommendation

This first recommendation should be read in conjunction with the other recommendations on ensuring that traceability benefits farmers and empowers producer organisations, and that effective sustainability incentives and reliability of sustainability claims are crucial. It is important to move on these different aspects in parallel.

7.2.2 Improving first mile traceability

Almost all traceability systems that exist today are directed towards companies' direct supply chains. The cocoa sourced from their indirect supply chains is often not traceable and remains somewhat opaque. This presents a tremendous problem since almost half of the cocoa entering the supply chain comes from indirect sources, so the corresponding farms and farmers and their conditions generally remain invisible. Therefore, the ongoing efforts of improving first mile cocoa traceability, including through national traceability systems, should also cover indirect supply chains. Some companies have already started addressing the issue, and are exploring how their supply chain mapping efforts could be expanded to cover their indirect supply chains.

Government regulated provision of individual and unique farm and farmer ID's can also help companies obtain a clear picture of all the farms, farmers and farming households involved in their value chain. Subsequently, data on household demographics, farm size and location can be linked to this identification data and entered into databases managed by national governments and/or value chain actors, while ensuring compliance with data protection regulations. The compatibility, interoperability and synergistic use of decentralised databases, precludes the need for a single organisation or entity to own, manage, maintain or claim responsibility for the database (*see section §7.2.5*). Using this data will help companies keep track of where and from whom the cocoa is being sourced, while also linking it to (trustworthy) data on the sustainability characteristics of that farm, farming household, cocoa producing community, cooperative / Farmer Based Organisation (FBO), particular region, etc. Relatively simple tools, such as large-scale data collection tools on mobile devices, can help the cocoa sector stakeholders to collect and share such data. A combination of existing technology such as GPS mapping and farmer data collection applications can also help pinpoint whether the data is being recorded in the polygon boundaries of the farm and then link it with the data on sustainability characteristics. It should be noted that the use of farmer IDs has been piloted by COCOBOD Ghana in their CMS, the Cocoa Horizons program, and FarmForce on behalf of Cargill.

Technology Use Case

The 'Olam Farmer Information System' (OFIS) by Olam is an example of using technology to enhance first-mile traceability and provide origin transparency. Through the use of this proprietary technology solution, first mile data is collected and centralised via a built for purpose Android OS application designed to operate in the remotest corners of the world. This app is designed to enable the collection of targeted, farmgate level data through a flexible, comprehensive survey tool that allows users to develop personalised questionnaires and collection schedules, record GPS data points directly on the ground for farms and social infrastructure, and upload farmer training data including modules, attendance and results. The data captured by the app can also include photos and GPS/time stamps. Ideally, the system is designed to manage all first-mile transactions including crop purchases, input distribution and financing. Additionally, 'GeoTagging' of each bag of produce provides the possibility of enriched cocoa origin data.

About financial traceability

At present, most companies employ traceability systems that do not pay much attention to financial traceability or other benefits for the farmers themselves, and even if they do, the tools are mainly directed at tracking premium payments. Providing e-wallets has been tried by some companies, like Cargill through their CocoaWise™ eFinance system and Olam through the Olam Farmer Information System (OFIS). However, so far digital payment mechanisms are mainly successful only to the level of the cooperatives, as many farmers remain without access to e-payments. Either the farmers do not know how to use e-wallets, or they cannot use them due to a lack of infrastructure. Thus, 'cash is still king' for many farmers and verification systems that can track the amount paid to farmers still need to be extended beyond the cooperatives to trace the amounts paid to the individual farmers. Establishment of systems that can track the payment of the farmgate price and the promised premiums to the level of the farmer would be an effective way of addressing this challenge. Linking payments from cooperatives to the farmers IDs would enable tracking of the amounts paid to the farmer that can be verified against the database and through periodic surveys with farmers.

Farmers and their organisations expect enhanced cocoa traceability to benefit them in several ways: (a) more rewards and incentives for cocoa farmers' efforts, resulting in improving sustainability and quality of cocoa, (b) increased assurance of effectively being paid a fair price (both farmgate price and premiums), (c) better access to finance and (d) further farmer empowerment, including for sustainability data and claims, within a transparent cocoa value chain. This suggests that investing in cocoa traceability should be intrinsically linked to pursuing such farmer benefits. This also links to the importance of empowering farmers and producer organisations (POs) in collecting, analysing and leveraging their own cocoa sustainability data (*see also section §7.2.4*).

Intermediaries and middle-men are often the weakest link in transferring first mile traceability data. The middle-men interviewed for this study indicated that they currently have nothing to gain from ensuring complete traceability since collecting data on the farmers from whom they collect cocoa is additional work for which they are not compensated. However, they did acknowledge that when a traceability system has been put in place by a company, they often do collect the relevant information required from the farmer. **Reducing the traceability-related workload and providing financial, operational or other benefits and incentives to intermediaries, could contribute to holistic solutions that leverage and value the role of intermediaries** in efficient and fully traceable value chains, applicable to both direct and indirect modes of cocoa sourcing.

While the private sector is limited to providing farm IDs only to farmers in their direct supply chain, the national governments, with the right mechanisms in place, are in the position of being able to track all the cocoa farms and farmers in the country; .The ongoing farmer census in Côte d'Ivoire and Ghana are examples of related national initiatives. Allowing data sharing about these farms and farmers with the companies would enhance knowledge on the source of the cocoa in the indirect supply chain and shed light on the sustainability characteristics of the origin.

Technology Use Case

In recognition of its critical role in improving value chain traceability, Cargill is working with Farmforce, a software company, to digitalize the operations of cooperatives in Côte d'Ivoire.

Cargill is now applying this approach to part of its direct supply chain in Côte d'Ivoire. Each délégué from partner cooperatives is issued with a mobile phone that is preloaded with a software and the délégué is trained in its use. This software connects with several other pieces of technology: digital weighing scales, tags with unique bar codes and serial numbers.

When the farmer arrives at the field warehouse to deliver cocoa, he first scans his ID card. This identifies the farmer and lets the délégué see all the relevant information, from the farm size and history of deliveries to the farmer's payment history. Then, each bag of cocoa is weighed on the digital scale, which prints out a receipt for the farmer and automatically transmits the data to the software. The délégué then scans a unique tag with his phone and attaches it to the bag. When the délégué delivers batches of cocoa to the cooperative, each bag is scanned into the system, directly linking it back to the farmer, who can then be paid digitally as soon as the bean quality check is complete. Once the bags reach Cargill, each bag can be traced back to the farmers who produced it.

7.2.3 Transparency of and minimal requirements for the indirect cocoa supply chains

While companies often rely on supplier codes of conduct, they might be aware that their suppliers lack the means to comply with, and account for, meeting the commitments stated in the supplier code of conduct, such as effective verification mechanisms and conducive environments.

Solving all human rights and environmental risks and issues from the existing cocoa value chains cannot be achieved overnight, but **the cocoa sector should agree on concrete, significant but achievable steps and improvement targets for the short, medium and longer term, covering both the direct and indirect supply chains.** Mandating short term improvements for the indirect supply chain will prove to be a game changer in cocoa sustainability. Furthermore, including the indirect supply chain is essential to allow companies in consumer markets meet their value chain due diligence obligations.

A key step for traceability and cocoa sustainability in indirect supply chains would be agreeing on minimal requirements for cocoa to be "acceptable" for entry in the value chain. This implies that cocoa not meeting these minimal requirements would be deemed "unacceptable cocoa", thus not eligible for import to the main consumer markets with due diligence requirements. These minimal requirements would also apply for mixing with certified or independently verified cocoa under a 'mass balance' mechanism. The initial level of minimal requirements should certainly not be prohibitive. Minimal requirements should be defined applying a stepping stone paradigm that triggers effective change. This could also include incentives to do a little better than the minimal requirements and thus lay the foundation for incremental improvements and subsequently raising the bar of minimal requirements. Such efforts could be aligned with the progressive implementation of the African Regional Standard, gradually raising the bar for any cocoa to be exported from producing countries and to be imported in consuming countries applying due diligence requirements.

This does not exclude, but rather fully aligns with, the internal efforts and responsibilities of companies to identify and address human rights and environmental due diligence issues in their indirect supply chains. Extending the percentage of cocoa sourced by direct supply chain arrangements and improving cocoa traceability and sustainability in indirect supply chains are both valid and complementary strategies.

Note on implementing the recommendations

Implementing these recommendations requires systemic analysis and holistic and adaptive approaches to avoid and mitigate any undesired side effects, such as increasing 'innovative' fraud and other loopholes, while negative impacts on weakest actors need to be mitigated. Again, it is about integrated approaches combining the different recommendations, that address root causes on the ground and establish appropriate conditions for cocoa sustainability.

7.2.4 Traceability systems empowering farmers and their organisations

Truly aligning with, and contributing to, the empowerment of farmers and their organisations is increasingly recognised as an essential, but still absent aspect of cocoa traceability. Famer level participation in cocoa traceability systems should in no way harm or threaten their personal, economic or financial interests. **On the contrary, collecting, managing and sharing their data for extensive cocoa traceability should empower and benefit farmers and their POs in the short, medium and long term.** This requires embedding cocoa traceability and ownership of sustainability data within a broader farmer empowering and enabling approach that substantially values the sustainability efforts and achievements of cocoa farming households, their communities and organisations. The concept of "feedback loops" are important as they should provide POs with benchmarking information and valuable insights from analysis in trends in their own data related to trends in the coca sector.[17]

This also implies the creation of innovative incentives that respond to the most pressing needs of the farming households. For example, farmers can be paid premiums for providing environmental services and cocoa sustainability data during the lean months instead of only at harvest time. Improved access to finance (e.g. sustainability linked financing), connected to cocoa traceability, could ensure that farmers and farming communities can send their children to school before they are paid for the harvest. Such sustainability linked financing can also help motivate farmers to engage in cocoa traceability since this could contribute to a secure income during the difficult non-harvest months.

Considerations on the benefits of farmers empowerment

As stated by one of the interviewees:

"Effective data management solutions can be very powerful tools in empowering farmers. They can unlock access to finance for farmers. Currently, commercial banks do not lend directly to farmers; without accurate financial data, performance or credit history, most farmers are not bankable. But such data are often available in the cooperatives' databases. When properly managed, and enhanced through financial traceability, this data can be fed selectively to the cooperatives' banking partners, greatly easing the onboarding process for new accounts. Several banks and microfinance institutions are developing banking services for cocoa farming communities based on this data. This is paving the way for banks to offer direct lending to farmers in the future, taking pressure off the cooperatives who currently provide the bulk of financing to their members."

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17. The Principles for Digital Development, e.g. 'design with the user', should be considered in alignment with the concepts of ownership of data and empowerment of producer organisations.

7.2.5 Harmonising and sharing data and producing sustainability insights

Monitoring cocoa related deforestation, child labour and living income gaps is not possible through individual and fragmented traceability systems and databases. For example, individual systems cannot cross-check whether conforming cocoa, sold by a same farm to different companies, actually contains cocoa produced in illegal areas or using child labour.

Harmonising and sharing cocoa traceability and sustainability data from different sources, including governments and companies, using contemporary tools for big data analysis, can provide accurate insights as well as information on the reliability and consistency of cocoa origin and sustainability data. This includes, among other things, targeted harmonising and sharing of farm-level and landscape level data, such as setting up a common forest monitoring system. Providing data-based insights will be essential in improving strategies and pathways towards enhancing cocoa farming household income and significantly curbing deforestation, child labour, and environmental harm. Such collaboration will require clear assignment of responsibilities across the cocoa sector for collecting, managing and sharing data, while complying with ethical data protection and processing principles.

Preliminary ideas for a value chain data collaboration initiative for sustainability in the cocoa sector are provided in Annex 7, and an overview of existing initiatives is provided in Annex 5.

7.2.6 Cross-commodity approaches at jurisdiction-level

The proposed new concept and 'way forward' for cocoa traceability fully acknowledges that many of the key ambitions linked to sustainable cocoa (such as living income for cocoa farming households, forest preservation and restoration in cocoa producing areas, curbing and eventually halting child labour and forced labour and empowerment of women) cannot be fully achieved through a single commodity approach. **To be effective in their cocoa sustainability efforts, the cocoa value chain actors need to engage in collaboration with actors from other commodity value chains and/or "landscape" or "jurisdictional" approaches[18], engaging multiple actors.** For instance, this would help to prevent displacement of issues across commodities, such as child labour or deforestation moving from cocoa to another crop like rubber, cashew or staple food crops.

Significant sustainability characteristics and outcomes (e.g. on halting deforestation and child labour) should be tracked and measured at community- or jurisdiction-level. This data will then become available and relevant for different commodities. Progress at jurisdiction level could be tracked using publicly available collaborative tools such as SourceUp, a platform that enables the sharing of sustainability data to increase transparency, helping companies make sourcing decisions that will fulfil sustainability commitments and raising the bar for sustainability at jurisdiction level. The proposed 'way forward' for cocoa traceability fully aligns with such ideas on cross-commodity synergies and sustainable production and sourcing areas. However, acknowledging complexity and importance of area-based approaches and involvement of national and local authorities should not be a reason for cocoa value chain actors to halt or to decline their own responsibilities.

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18. A landscape approach, also known as a jurisdictional or integrated landscape approach, is a framework for inclusive and multi-sectoral land use management and territorial development. Local or state government, private companies, civil society, producers, smallholders, NGOs, and any relevant stakeholders for a given area are integrated into the inclusive governance structure for that area. The boundaries of an area considered in a landscape approach could be geographical or administrative.

7.3 Conclusion on the "way forward" in cocoa traceability

A key conclusion of this Technical Brief is that cocoa value chain actors should invest in improved cocoa traceability. Enhancing and consistently ensuring the sustainability of cocoa is impossible without adequate forms of cocoa traceability. Effective cocoa traceability systems are an essential component of an ideal cocoa sector ecosystem that supports farmers in producing sustainable cocoa, and that enables companies at the end of the cocoa value chain to comply with their human rights and environmental due diligence requirements.

There are no "quick fixes", but this document provides first elements of a comprehensive proposal for the way forward in cocoa traceability. **Fully building on the work conducted and the progress made by many others, the proposed definition of cocoa traceability, combining 3 dimensions, implies a fundamental paradigm shift.**

The proposed new definition and 'way forward' for cocoa traceability fully acknowledges that many of the key ambitions linked to sustainable cocoa cannot be fully achieved through a single commodity approach. To be effective in their cocoa sustainability efforts, the cocoa value chain actors need to engage in collaboration with actors from other commodity value chains at landscape or jurisdiction-level.

While recommending gradual progress, this study also concludes that ongoing technical developments, improved data systems and emerging good practices allow for an innovative, next generation approach to cocoa traceability. The proposed way forward in cocoa traceability is a fully integrated component of the quest for sustainable cocoa, and is also essential to achieving real transparency and accountability in the cocoa sector.

Although this technical brief acknowledges that fundamental changes are not possible overnight, it also provides concrete ideas for very significant progress that can be made in the medium term, perhaps within 3 to 5 years. The proposed way forward has implications for all types of key actors involved in cocoa value chains.

The ambition of this document is not to provide a readymade action plan, but to contribute ideas and structure to the thinking process as well as the joint decision making. Priorities have to be set. Within a collaborative endeavour, different actors can focus on complementary components of the concept. However, isolated and unconnected partial developments should certainly be avoided.

Those at the end of the value chain, from consumers and retailers, to investors and shareholders may - and should - consistently demand reliable proof of progress toward enhanced sustainability in the cocoa sector. The proposed definition of cocoa traceability allows the cocoa sector to respond appropriately to these rightful demands and should gradually lead to convincing, verifiable stakeholder accountability in the cocoa sector. It is not about setting impossible targets but effectively ensuring that the possible improvements in cocoa sustainability are being achieved in a cost-effective manner.
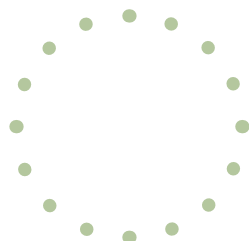
Annexes

08

8.1 Annex 1 – Methodology used for the study

Overview of steps in study process

The methodology for this cocoa traceability study builds upon three data collection methods: a desk review of traceability systems both within and beyond the cocoa sector, semi-structured interviews with stakeholders and the development of case studies. The data derived from the data-collection phase have been used to (1) built a joint vision and common definitions and indicators; (2) provide an overview of existing traceability systems and (3) create a technical brief.

September 2020   January 2021
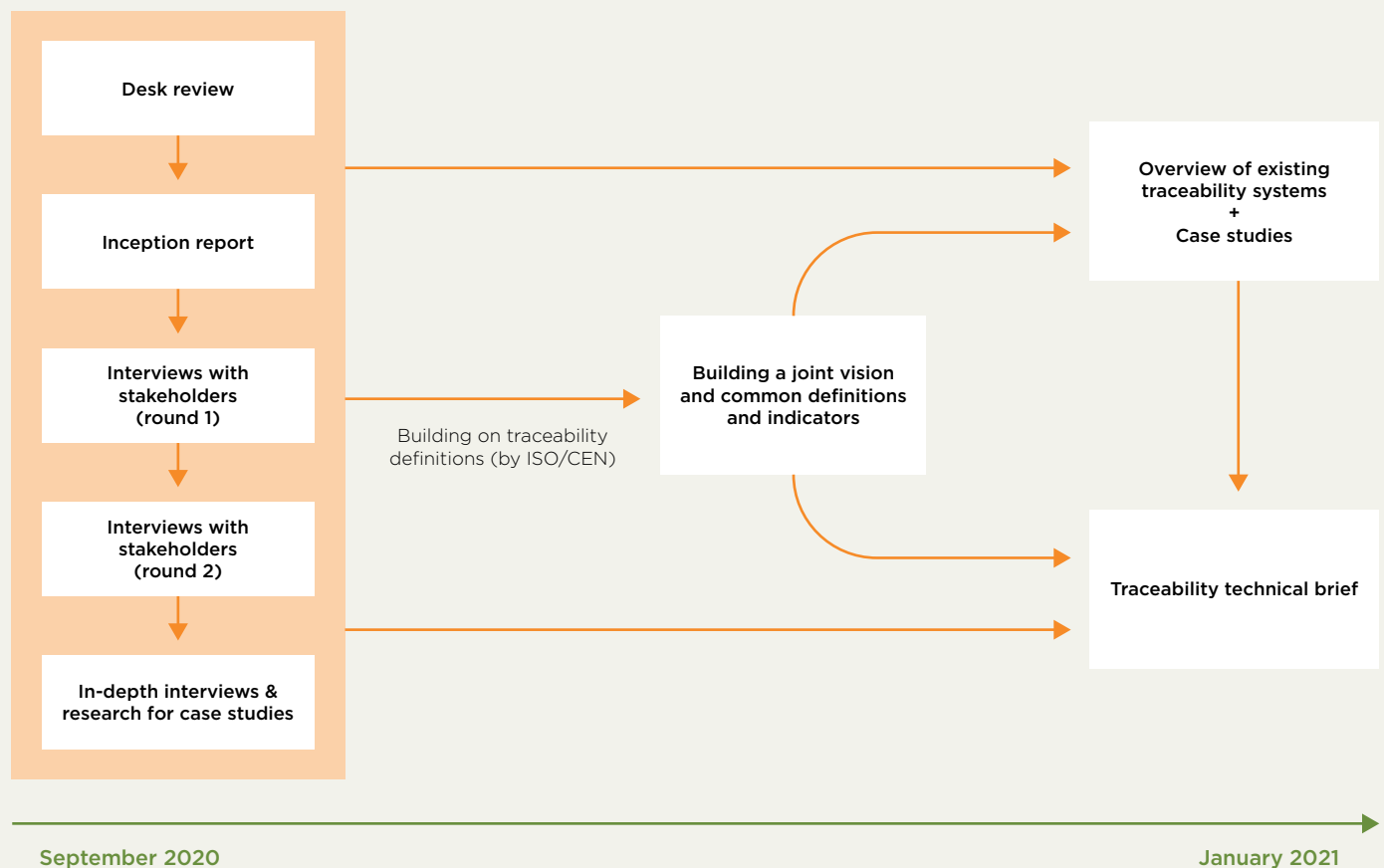
Sources of documents for the desk review

1. Publicly available company documents on traceability

2. Policy documents, regulations and standards

3. Research on traceability in cocoa value chain, focusing on West and Central Africa

4. Research on traceability and traceability systems in other value chains

5. Research on the role of technology in supply chain management and in food production supply chains

Interviews - Round 1

The first round of interviews was conducted between 14th and 28th October 2020. Covering the range of supply chain actors, 13 people from 12 organisations were interviewed. The semi-structured interviews were explorative and aimed to obtain a holistic understanding of traceability and traceability systems from the perspective of the different value chain actors and complemented the desk study.

Actors interviewed in round 1

No.	Organisation	Stakeholder group
1	Aldi	Retailer
2	Olam	Trader /Importer
3	Nestle	Consumer brand
4	ECOM	Couverture producer /trader
5	Nitidae	CSO
6	Mighty Earth	CSO
7	Rainforest Alliance	Standard setting bodies
8	ICCO	Other
9	Cooperative in Côte d'Ivoire	Other
10	Organic Cooperative Côte d'Ivoire	Other
11	International Cocoa Initiative	Other
12	Fairtrade International	Standard setting bodies

Interviews - Round 2

Building upon the findings from the desk review and the first round of interviews, stakeholders were identified for the second round of interviews and for the case studies. Acknowledging the gaps identified during the first round of interviews, we refined specific themes that were explored in detail during the second round of interviews with different stakeholders. The interviewees for the second round were selected on the basis of their role in the value chain (e.g., couverture producers whose produce eventually reaches the larger market, standard setting bodies with well-developed traceability systems etc.).

Case studies

A total of 4 case studies were conducted in the course of this study

- 3 private sector case studies: Mondelez, Barry Callebaut, and Cargill

- 1 certification standard case study: Fairtrade International;

Actors interviewed in round 2 and for case studies

No.	Organisation	Stakeholder group
1	Conseil du Café - Cacao (Côte d'Ivoire)	Producing Country Governments
2	Middlemen/Pisteur	Other
3	Lindt & Sprüngli	Consumer brand
4	Mondelez	Consumer brand
5	Cargill	Couverture producer / trader
6	Barry Callebaut	Couverture producer / trader/ grinder
7	Oxfam Wereldwinkels	CSO
8	COCOBOD	Producing Country Governments
9	WCF	Other
10	Sucden	Trader
11	Tony Chocolonely	Consumer brand
12	Farm-Trace	Technology platform
13	Chainpoint	Technology platform
14	Farmer Connect	Technology platform
15	Sourcemap	Technology platform
16	Farmstrong	CSO

8.2 Annex 2 – Detailed overview of existing definitions

8.2.1 Annex 2.1 - definitions of traceability

	Identity preserved	Segregated	Mass Balance
ISO-CEN	Identity preserved enables the identification of cocoa that has met specific requirements designed to preserve the genetic and/or physical identity of the cocoa from an organization that is sustainably producing cocoa beans[19].	The cocoa value chain actor shall ensure and verify through procedures and documentation that conforming cocoa is kept segregated from nonconforming cocoa, including during transport and storage. The cocoa value chain actor shall demonstrate that it has taken measures to avoid mixing conforming cocoa with nonconforming cocoa.	An actor can purchase a certain mass of conforming cocoa and use it to match the sales of equal quantities of cocoa without requiring a physical or chemical link between the acquired sustainably produced cocoa and the cocoa that is administrated by mass balance concept. *Single-site mass balance:* Conforming inputs shall be delivered and substituted/processed in the same site where conforming outputs with a claim of conformity are processed. *Multi-site mass balance:* The cocoa supply chain actor shall administer and control activities and sites in relation to fulfilling requirements of this document at an identified site. Participation of sites shall be documented. The geographical scope of the multi-site option is worldwide unless specified by the cocoa supply chain actor.
Rainforest Alliance	Traceability option where it is possible to trace the Rainforest Alliance Certified product or ingredient to one specific certified farm or group. There is no mixing neither with non-certified products nor different farms. This is the highest traceability type[20].	This is the most common option. There is no mixing with non-certified products of the same ingredient – the whole content is certified although it can come from different certified sources/farms including different countries of origin. The product can be traced to the certified source, or to the point where it was mixed with other certified sources. Traceability, segregation and identification systems are in place at the facilities to ensure only certified sources are in the product.	With mass-balance, products are physically segregated from the time they are harvested until the time they get to the exporter or first processor's facility (if processed in country of origin). Afterwards, certified and non-certified products can be physically mixed.

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19. ISO-CEN 34101-3, Part 3 Requirements for traceability 2019
20. https://www.rainforest-alliance.org/business/wp-content/uploads/2020/06/Annex-6-Traceability-and-Shared-Responsibility.pdf

	Identity preserved	Segregated	Mass Balance
ISO 22095:2020	ISO 22095:2020 - Chain of custody model in which the materials or products originate from a single source and their specified characteristics are maintained throughout the supply chain.	Chain of custody model in which specified characteristics of a material or product are maintained from the initial input to the final output. **Note 1:** Addition of material with different characteristics and/or grade to the input is not allowed. **Note 2:** Commonly, material from more than one source contributes to a chain of custody under the segregated model.	Mass balance model is the chain of custody model in which materials or products with a set of specified characteristics are mixed according to defined criteria with materials or products without that set of characteristics. **Note 1:** The proportion of the input with specified characteristics might only match the initial proportions on average and will typically vary across different outputs.
Fairtrade International	In a Fairtrade supply chain, physical traceability is the ability to follow a specific product throughout the supply chain and all stages of production and processing. In this model, Fairtrade products have to always be segregated from non-Fairtrade products and certified companies have to ensure that the product is clearly identifiable as Fairtrade. Under Fairtrade physical traceability the product can be traced all the way back to the producer organization. It is for cocoa supply chain operators to determine the level of traceability they wish to be audited against.	Segregated cocoa is possible as long as there is no origin claim when the segregated cocoa comes from multiple origins.	Under mass balance, companies may mix Fairtrade and non-Fairtrade products during the manufacturing process as long as the actual volumes of sales on Fairtrade terms are tracked and audited through the supply chain. *Single-site mass balance:* this means that when a producer or company delivers a quantity of Fairtrade ingredients to a factory or site, only the equivalent amount of processed Fairtrade product leaving that site may be sold as Fairtrade. *Multi-site mass balance:* This means that the amount of Fairtrade product a company buys must match the amount of the processed product it sells as Fairtrade. The company will be audited on the total amount bought and sold from all of their production sites instead of each individual site.

Concept of chain of custody

Understanding the origin of input materials, product components, product outputs and the conditions under which they are produced is becoming increasingly important. Manufacturers want to demonstrate compliance with requirements regarding health and safety, as well as environmental, social and quality-related aspects, while consumers or other end users need to be able to trust the claims made for these products. The main drivers are government policies, consumer and business demand. Companies directly active in a chain of custody (e.g.: manufacturers, traders, logistic and transport service providers, retailers) as well as those investing in such companies (e.g. financial institutions, governments) need transparency to understand and manage risks, to secure quality and to facilitate the implementation of a reliable chain of custody system. (Source: ISO 22095:2020 - Chain of custody - General terminology and models - https://www.iso.org/obp/ui/#iso:std:iso:22095:ed-1:v1:en)

Controlled blending

ISO 22095:2020 - chain of custody model in which materials or products with a set of specified characteristics are mixed according to certain criteria with materials or products without that set of characteristics resulting in a known proportion of the specified characteristics in the final output.

 Note 1: This chain of custody model is also referred to as the "single percentage method".

Book and Claim

ISO 22095:2020 - Chain of custody model in which the administrative record flow is not necessarily connected to the physical flow of material or product throughout the supply chain.

- **Note 1:** This chain of custody model is also referred to as "certificate trading model" or "credit trading".

- **Note 2:** This is often used where the certified/specified material cannot, or only with difficulty, be kept separate from the non-certified/specified material, such as green credits in an electricity supply.

8.2.2 Annex 2.2 - definitions of traceability systems

A traceability system is a manual or electronic system that provides the ability to access any or all information relating to the material or product under consideration throughout their life cycle, by means of accessing documented information. "Life cycle" should be understood in the broadest possible sense, to include, for example, raw material extraction, agricultural production, final disposal, and reuse or recycling, as well as all other stages connected with product manufacture and use.[21]

Traceability system is defined by **ISO-CEN 34101** as a "totality of data and operations that is capable of maintaining desired information about sustainably produced cocoa and its components through all or part of its production and/or cocoa supply chain".[22] ISO-CEN builds upon this definition by further describing the scope and functionality of a traceability system.

ISO-CEN 34101 definition of Traceability systems

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"A traceability system for sustainably produced cocoa is a technical tool to assist a cocoa supply chain actor operating within a cocoa supply chain to achieve defined sustainable cocoa objectives. The complexity of the traceability system for sustainably produced cocoa may vary depending upon requirements of each stage of the cocoa supply chain and the objectives to be achieved. It is intended to be flexible enough to allow cocoa supply chain actors within the sustainably produced cocoa supply chain to achieve identified objectives but robust enough to ensure credible implementation. The choice of a traceability system for sustainably produced cocoa is influenced by applicable requirements, product characteristics and customer expectations."

According to ISO-CEN, the implementation by a cocoa supply chain actor of a traceability system for sustainably produced cocoa depends on technical limits inherent to the cocoa supply chain actor and the cocoa (e.g. the nature of the raw cocoa, size of the batches, collection, handling, transport, production and processing procedures), and the cost and benefits of applying such a system. This description, while allowing traceability systems to be employed at the discretion and convenience of the supply chain actor, adds to the existing dissensus in the sector on what the components of an ideal traceability system should be and what information should be provided by them and to whom.

The **African Standard** further refines the requirements of a traceability system as a system that should be able to: (1) document the history of the cocoa or locate the cocoa in the cocoa supply chain; (2) contribute to the identification of the cause of non-conformity; (3) improve appropriate use and reliability of information, effectiveness and efficiency of the cocoa supply chain actor. Furthermore, an effective traceability system shall meet the following requirements: a) verifiable; b) applied consistently and equitably; c) implementable; d) effective and result oriented; e) balance technical feasibility and economical acceptability requirements[23].

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21.   Source: ISO 22095:2020
22.   ISO-CEN 34101-3, Part 3 Requirements for traceability 2019
23.   DARS 1000-1, African standard on sustainable cocoa, 2020

8.3 Annex 3 - Monitoring traceability within the national platforms for sustainable cocoa in Europe

GISCO, SWISSCO and Beyond Chocolate are currently working on a harmonised set of definitions and indicators. Two aspects of traceability were proposed in the form of indicators: 'cocoa origin transparency level' and 'traceability level' of cocoa sourced. These proposed indicators were already piloted for the 2019 annual report of Beyond Chocolate.

Cocoa origin transparency level

The **"cocoa origin transparency level"** concerns the level of information on the origin of cocoa being documented at the initial stage of the cocoa sourcing process, with such information remaining available at later stages of the value chain.

Distinction is made between the following supply origin transparency levels:

Score 1: origin unknown or only country of origin known

Score 2: country and region of origin known

Score 3: country, region and municipality/cooperative of origin known

Score 4: farm known, in addition to the country, region and municipality/cooperative of origin

Score 5: farm known and having point coordinates of the farm household (farm mapping)

Score 5+: farm known and having polygon boundaries of the farm.

Score 6: farm known, having polygon boundaries of the farm and farm fields verified as not in a protected forest and as not comprising land that was deforested since 2018.

Having a high origin transparency score still allows for massing and mixing of beans at later stages (during transport and/or processing).

It is generally accepted that the cocoa industry should at least evolve to level 4 as a minimum requirement, implying that the first mile of the cocoa value chain should be traceable. Cocoa batches (generally cocoa bags) sourced should be linked to the farm where that cocoa was produced, implying that the farms are at least identified. This principle should apply to both "direct" and "indirect" cocoa sourcing.

Traceability level of cocoa sourced

Conventional (Traceability level 0) - Cocoa sourced without conforming to the traceability requirements of 'mass balance', 'segregated', or 'identity preserved' as defined below.

Mass balance (Traceability level 1) - The mass balance system administratively monitors the trade of conforming cocoa throughout the entire supply chain. The system requires transparent documentation and justification of the origin and quantity of conforming cocoa[24] purchased by the first buyer. The mass balance system allows mixing conforming and nonconforming cocoa in later stages of the cocoa value chain (e.g. transport, processing, manufacturing). Cocoa value chain actors can sell a certain mass of conforming cocoa, or an equivalent volume of conforming cocoa-containing products, to the extent that the actual volumes of sales of conforming products are tracked and audited through the supply chain and providing that these volumes do not exceed the cocoa bean equivalents of conforming cocoa bought at origin. (Definition drafted using elements borrowed from ISO-CEN and Fairtrade)

Segregated (Traceability level 2) - Segregated cocoa - Certified or independently verified cocoa meeting the segregation requirements.

As with the mass-balance system, segregation requires a transparent documentation and justification of the origin and quantity of conforming cocoa purchased by the first buyer. Conforming cocoa must be segregated from nonconforming cocoa, including during transport, storage, processing cocoa, and manufacturing of cocoa-containing products. Segregation allows mixing cocoa from different origins, to the extent that all cocoa being mixed qualifies as conforming cocoa as per the certification standard or verified company scheme being applied. The cocoa value chain actors must demonstrate that they have taken the required measures to avoid mixing conforming cocoa with nonconforming cocoa. (Definition drafted using elements borrowed from ISO-CEN and Rainforest Alliance).

Identity *preserved (Traceability level 3):* Identity preserved is the highest traceability type. There is no mixing of cocoa, neither with non-conforming cocoa, nor with cocoa from other origins. If the 'single origin' is set at cooperative level or at cocoa-producing area (combining different cooperatives), then conforming cocoa from this broader origin may be combined. In other words, the "identity preserved" system meets all requirements of "segregated cocoa", but it does not allow mixing cocoa from different origins.

Note that the above traceability levels refer to the existing traceability practices in the cocoa sector and to the short term (first step) ambitions of the European platforms to maximise the percentage of cocoa that meets at least the sustainability requirements of certified or independently verified cocoa.

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24.   In each case, "conforming cocoa" is defined as certified or independently verified cocoa.

8.4 Annex 4 - SWOT analysis of traceability systems

SWOT analysis of national traceability systems

Strengths	Weaknesses	Opportunities	Threats
• Local ownership of the traceability system • Established links with and potential to align policies with other national and regional policies (employment, conservation, education, etc.) • **Ghana:** 100 % traceability from LBC to export, including for conventional cocoa.	• Effective national traceability systems do not yet exist in **Cameroon** and **Côte d'Ivoire** and only partially in **Ghana**. • First mile traceability is currently lacking so there is little information available on origin of cocoa and sustainability characteristics of producing communities or areas. • No ability for the supplier to access traceability data or to provide data to maintain quality and accuracy of the system. • Current practice of traceability in **Ghana** is linked to centralised and controlled buying and selling of cocoa, requiring large warehouse spaces. • Logistical and technology constraints (recordkeeping and quality assurance).	• Coordination and centralisation of traceability data can lead to a more cost-effective system that is based on sharing of knowledge and best practices • Applying experience of CFI framework in using traceability systems to address deforestation in **Ghana** and **Côte d'Ivoire** to tackle other sustainability issues • African Regional standard for sustainable cocoa (ARSS), a joint framework/standard on sustainability coordinated by **Ghana** and **Côte d'Ivoire** is an opportunity for producing countries to claim ownership and assume responsibility for transparency on origin and sustainability characteristics of cocoa, with traceability of cocoa from farm to export. Possibility for a mandated harmonised requirement for traceability. • Empowering farmers and their organisations by allowing them to access and use their own sustainability data • Introduction of the new COCOBOD Cocoa Management System (Ghana) to track from the farm to the LBC and to ensure sourcing transparency • Tailor national and regional interventions in a manner that is collaborative and cohesive to maximise impact on sustainability issues	• How will private companies react to potentially imposed traceability requirements? The risk may be that companies decide to source elsewhere. • Multiple data systems continue to exist in parallel, and the national and private sector data silos do not recognise or share data with each other, leading to double counting of farmer and produce/volume data and potential data conflict between the two.

SWOT analysis of traceability by certification bodies

The information obtained from the desk review and interviews allows the identification of strengths, weaknesses, opportunities, and threats of traceability practices in the certified cocoa value chain. The SWOT overview below can serve as input for discussions on the way forward with regard to traceability in the cocoa value chain.

Strengths	Weaknesses	Opportunities	Threats
• Due to the higher demand for certified cocoa in a mass balance system, more farmers can be reached within this certified system, which offers better terms of trade and enhanced opportunities for certified farmers to sell their certified crops. • Evolving standards as a stepping-stone to gradually raise the bar on sustainability • Mass balance system used by certifying bodies is less costly than physical traceability and segregation. In a context where the volume of certified cocoa is still limited and the certification standards are not mainstreamed yet, the mass balance system permits the combination of sustainability outcomes of certification with economies of scale of conventional cocoa. • Pioneers in applying traceability systems to meet sustainability commitments • Focus on financial traceability to track payment of premiums • Sensitising cocoa growing communities about social issues	• The mass balance system does not necessarily incentivise companies to buy more sustainable cocoa; the percentage of conventional cocoa remains high. • The bar for sustainability requirements and the outcome assurance of certification standards remains rather low compared with increasing sustainability ambitions in the cocoa sector. Key sustainability challenges (e.g. living income gap, child labour, deforestation, etc.) are not adequately addressed through the existing certification practices. • Cocoa buyers often do not buy the whole certified volume; therefore certified farmers regularly have to sell part of their produce as conventional cocoa, thus losing a significant part of their potential revenue from premiums. • Certification efforts and costs for farmers are significant and the net benefit of premiums for the farmers may be minimal or certainly insufficient. • Lack of alignment between definitions, criteria and standards of certifying bodies leading to confusion on the value and meaning of certification labels	• Potential for the certification and mass balance system to recognize and incentivise sustainability outcomes above the minimum requirements of the certification standard. • Having the sustainability characteristics documented and making them part of what is being sold. Both a 'book & claim' or an innovative mass balance system would allow the sector to do so. • Improved knowledge of origin and producing communities enables identification of risks and targeted interventions • Potential digitisation of cash transfers can lead to improved financial traceability • Sharing datasets between cocoa value chain actors and interoperability of data for traceability to avoid multiplication and falsification of data • Role of the national platforms for sustainable cocoa in Europe (the ISCO's) to enable information sharing and learning of best practices on traceability • Combining complementary technologies and data layers to foster a holistic approach to sustainability	• Risk of undocumented mixing of certified with non-certified cocoa is present. • Potential for fraud and corresponding impact on trustworthy sustainability claims • Predominance of two certification bodies across the cocoa sector. • Over-reliance of private sector companies on certification standards as a means of justification of their efforts towards traceability and sustainability objectives

SWOT analysis of private sector traceability systems

Strengths	Weaknesses	Opportunities	Threats
• Traceability systems strongly linked to sustainability schemes • Effective use of technology solutions – particularly in relation to deforestation commitments (GPS mapping) • Ensuring quality of products • Improved knowledge of source and of source communities enables identification of risks and targeted interventions • Digitisation of cash transfers by some actors leading to improved financial traceability • Reassuring consumers and investors on sustainability commitments • Provides data and insights for streamlining of supply chains	• Absence of harmonised traceability systems (fragmentation) • Increased burden of reporting on cooperatives and farmers due to fragmentation • High costs of development and application of individual traceability systems • Little to no alignment with national traceability systems • Unidirectional upstream flow of information, implies that farmers do not always have access to information that they can leverage to benefit from improved traceability • Focus on direct supply chains diverting attention from indirect supply chains • CLMRS data currently not linked to traceability data	• Sharing datasets – unified database for traceability to avoid multiplication and falsification of data • Role of the national platforms for sustainable cocoa in Europe in enabling information sharing and learning of best practices on traceability • Combining complementary technologies and data layers to foster a holistic approach to sustainability	• Paucity of third-party verification of individual company traceability systems casts doubt on sustainability claims • Absence of transparent sector-wide collaboration for traceability • Transfer of traceability data carried out on a supply and demand basis between buyers and suppliers • High incentives for traceability without provision of clear outcomes/ impact on sustainability commitments - "traceability for traceability's sake should be avoided"

8.5 Annex 5 - Technology in cocoa traceability

Company owned digital platform

One of the companies in the supply chain implements a digital platform and requests upstream suppliers in its supply chain to provide data for the system. Agreements are made with the upstream suppliers about whether and how they will be rewarded for the effort of providing their data. Once entered into the system, the data is owned by the company owning the platform, and they are also accountable for any data provided to a third party.

Company owned digital platforms are primarily designed to facilitate data input by the parties who supply the data and to support the business processes of the company. Such digital platforms enable the company to:

- Discover data discrepancies and launch remediation actions

- Provide batch traceability up to a certain step in the supply chain

- Offer this downstream transparency to customers and the consumer

- Design feedback loops upstream: provide information or even financial premiums upstream back to the farmer

Several companies in the supply chain have started to set up such a platform e.g. OLAM AtSource, and Barry Callebaut's Katchile, to support their own standards and company policies, while also offering this data to their customer network.

Externally accessible data source

The concept of externally accessible data sources is that an independent organisation provides a cloud-based platform to assemble data and subsequently ensures the cleaning and transformation of the raw data into meaningful information for third parties. This information can be accessed by another cloud platform via an API, an *Application Programming Interface*, that defines interactions between multiple software intermediaries. APIs define the kinds of calls or requests that can be made, how to make them, the data formats that should be used, the conventions to follow, etc.

An example of the application of external data sources is the use of satellite images to derive meaningful "deforestation indicators", which can be used by other platforms. Other platforms can call these APIs to gather additional information about their suppliers and batches of products. A price model has to be set up for the use of these APIs.

Examples of external data sources which might be useful in the cocoa supply chain are Farm-Trace, Mighty Earth Cocoa accountability map and Trase. Some details of these platforms are provided in the table below.

National and/or large farmer community owned initiatives

A company board, government or farmer community organisation can decide to set up a platform:

- To support the needs of all of its farmers

- To support verification processes done at national or community level, which gives added value to the provided data

- To make this data available to the exporters

Collaboration at this level makes the implementation of these systems (such as the CMS in Ghana) affordable, provides standards for all the farmers and companies downstream in the supply chain and allows for verification processes on an entire geographical area.

Supply chain collaborative initiatives

Supply chain collaboration is a term used to describe the coming together of two or more discrete organisations to work closely together with the aim of meeting shared objectives. Supply chain collaboration initiatives are based on principles of knowledge sharing and strategic collaboration. A supply chain collaboration initiative opts for a platform that supports the needs of each party, ensuring data remains in the ownership of each separate party, while specific data can still be made available to other/ all parties involved, at the discretion of the data owner.

In this setup, blockchain has emerged as a technology which can ensure data ownership in a manner that is auditable (who provided the data) and provides accountability (who is responsible for providing the correct data). This is done by:

- Ensuring that data that is collected at each point is transmitted to all parties and encrypted at each point.

- Providing knowledge on where and when data was recorded and encrypted at each step of the supply chain.

- Ensuring proof of accuracy of data since data cannot be manipulated without the knowledge of all involved stakeholders.

- Maintaining an incorruptible database about ongoing supply chain discovery, benchmarking and verification processes.

Examples of supply chain collaboration initiatives which might be useful in the cocoa supply chain are Farmer Connect and Chainpoint. Some details of these platforms are provided below.

Overview of technology platforms currently used in the cocoa supply chain

This table provides a more detailed overview of the technology service providers, the type of service they provide and the private sector companies who employ these services in the cocoa sector.

Commercial Platform	Type	Description	Reference Actors	Specific features
ChainPoint	Supply chain Traceability / Transparency platform	Highly configurable With smart features and excellent integration with mobile apps and external systems	Tony's Chocolonely Rainforest Alliance Marketplace 2.0	Supports mass balance and book and claim Adaptable to any sustainability standard
Sourcemap	Farm traceability & Supply chain Batch Traceability /Transparency platform	Technology to achieve 100% traceable, transparent supply chains	MARS, Hershey's Ferrero, Sucden	Supports practically all public cocoa sustainability standards Also includes farm app (input field polygons, etc.)
OLAM Atsource	Farm traceability & Supply chain Batch Traceability / Transparency platform From farm to factory	Sustainability insights platform for agricultural supply chains Carbon footprint calculator	Proprietary by OLAM	150 economic, social and environmental metrics Can be combined with independent verification services and optional impact-creating programs
SAP Rural Sourcing Management Solution (Katchile)	Supply Chain Management Platform; Integrated with Enterprise Resource Planning solutions Implemented from farm to manufacturing	Designed for agribusiness companies and powered by the SAP Cloud Platform, this supply chain management (SCM) software connects smallholder farmers to the agricultural value chain	Proprietary implementation by Barry Callebaut	Supports Cocoa Horizon standards
Farmforce	Farm management & first mile traceability	Farmforce is a cloud-hosted web and mobile platform enabling transparency and digital management in the first mile of agricultural value chains	Cargill, Papua New Guinea Agriculture Company	Supports Cargill Cocoa Promise
Farm-Trace	Farm management & capturing farm sustainability data	Farm-Trace builds software that connects to farm systems – unifying farm information and enabling a more united food value chain		App to enter parcel polygons, parcel/forest carbon monitoring, many detailed sustainability facts on the farm consumer facing info

Commercial Platform	Type	Description	Reference Actors	Specific features
ChainPoint	Supply chain Traceability /Transparency platform	Highly configurable With smart features and excellent integration with mobile apps and external systems	Tony Chocolo-nely Rainforest Alliance Marketplace 2.0	Supports mass balance and book and claim, Adaptable to any sustainability standard
Sourcemap	Farm traceability & Supply chain Batch Traceability /Transparency platform	Technology to achieve 100% traceable, transparent supply chains	MARS, Hershey's Ferrero, Sucden	Supports practically all public cocoa sustainability standards Also includes farm app (input field polygons, etc.)
OLAM Atsource	Farm traceability & Supply chain Batch Traceability / Transparency platform From farm to factory	Sustainability insights platform for agricultural supply chains Carbon footprint calculator	Proprietary by OLAM	150 economic, social and environmental metrics Can be combined with independent verification services and optional impact-creating programs
SAP Rural Sourcing Management Solution (Katchile)	Supply Chain Management Platform; Integrated with Enterprise Resource Planning solutions Implemented from farm to manufacturing	Designed for agribusiness companies and powered by the SAP Cloud Platform, this supply chain management (SCM) software connects smallholder farmers to the agricultural value chain	Proprietary implementation by Barry Callebaut	Supports Cocoa Horizon standards
Farmforce	Farm management & first mile traceability	Farmforce is a cloud-hosted web and mobile platform enabling transparency and digital management in the first mile of agricultural value chains	Cargill, Papua New Guinea Agriculture Company	Supports Cargill Cocoa Promise
Farm-Trace	Farm management & capturing farm sustainability data	Farm-Trace builds software that connects to farm systems – unifying farm information and enabling a more united food value chain		App to enter parcel polygons, parcel/forest carbon monitoring, many detailed sustainability facts on the farm consumer facing info
Farmer Connect	Authenticated Farmer ID & and batch traceability, allowing for trusted feedback loops	Helps farmers connect to the supply chain with Farmer ID app, get proof of identity and income so they can get loans, helps businesses store & share information about their products, and share that story through the Thank My Farmer™ app when a QR code is scanned	For coffee & cocoa supply chains	Based on blockchain which allows for trusted (including financial) feedback loops
Mighty Earth Cocoa accountability map	External Data Source	An interactive map and integrated database covering nearly 5,000 cocoa co-operatives in Côte d'Ivoire		Data to check cooperative location in relation to protected areas / deforestation data
Trase	External Data Source	Geo-analytical data of global commodities, land use maps, socio-economic valuation tools, connection of global data sources		

8.6 Annex 6 - Detailed findings

1.   **There is a lack of a common definitions on traceability in the sector, including a lack of a standardised units for measuring traceability.**

Without consensus on the meaning (concept and content) of traceability, it is difficult to agree on how to measure and monitor the level of traceability achieved. However, there is agreement that some form of traceability is necessary to provide accountability on sustainability commitments in the cocoa sector. There is a lack of understanding about what is meant by traceability, with different actors attributing different meanings to it. In addition to a common understanding of traceability, it is essential that all actors apply sufficiently harmonised approaches to traceability, ensuring the sharing and verification of data throughout the supply chain, and thus avoiding multiplication and falsification of data.

2.   **Traceability in the cocoa sector is driven by 3 types of supply chain actors: standard setting bodies, producing country governments and private sector actors who are all implementing traceability systems to some extent and in varying forms.**

The producing country governments featured in this Technical Brief, Cameroon, Côte d'Ivoire and Ghana, each have their own traceability practices ranging from minimal traceability practices in Cameroon to more extensive traceability requirements in Ghana. These producing countries are currently working to enhance their traceability systems with a focus on improving first mile traceability.

There are currently two main standard setting bodies in the cocoa sector, Fairtrade International and Rainforest Alliance. Lack of alignment between definitions, criteria and standards of traceability by standard setting bodies are leading to confusion on the value and meaning of certification labels. Further, the merits of the standard setting bodies in providing accountability on sustainability characteristics within a mass balance system is being challenged by some stakeholders.

Private companies work with either one of the standards or both standards at the same time or opt to apply their own company schemes. Over the last decade, multiple company-led traceability systems have emerged in the cocoa supply chain, with companies designing and implementing their own traceability systems based on their specific goals. While these private traceability initiatives are illustrative of an increased interest of the private sector in traceability for sustainability, the proliferation of the systems itself has led to an increased burden of reporting on farmers and cooperatives. Moreover, there is often little to no cooperation or information sharing between individual private sector traceability systems.

3.   **There is a need for more coordination and collaboration with regard to traceability and sustainability standards between supply chain actors across the cocoa sector.**

There is little to no coordination between traceability systems of different supply chain actors increasing the burden of reporting on producers, cooperatives and public authorities in producing countries. Integration and collaboration related to traceability data and sustainability standards would lead to more impact-oriented systems that are based on sharing of knowledge and best practices.

4.   **Current traceability systems are characterised by a lack of first mile traceability resulting in inadequate linkages between produced and processed cocoa batches, limited information on sustainability characteristics of cocoa and missing empowerment of producers at the start of the supply chain.**

While companies claim to have 100% traceability in their supply chains, the claim is limited to their direct supply chains and seldom accounts for the first mile. Since first mile traceability is often lacking in existing traceability systems, there is little to no information available on the origin of cocoa, which in turn makes it challenging to credibly link cocoa batches to sustainability characteristics of sourcing communities/areas. Even when companies have invested in maintaining fully segregated supply chains, the focus is on maintaining segregation and transfer of data that is linked to how segregation was achieved through the supply chain, rather than on obtaining and transmitting of data on the sustainability characteristics of the cocoa. In addition, data transfers within traceability systems are based on conditional interactions between producers and suppliers, and therefore incorporate unbalanced power relationships between supply chain actors. This ultimately contradicts the empowerment ambitions of fair and sustainable supply chains.

5.   **The emergence of new technologies is an opportunity for the cocoa sector to enhance traceability systems and increase its scale.**

In recent years, increasing numbers of actors in the cocoa supply chain, especially in the private sector, have been exploring how technology solutions can help improve their traceability systems, with the result that a majority of the current private sector traceability systems are strongly interlinked to digital/technology service providers. We may distinguish between:

- tools for gathering and verifying the geographical origin of cocoa at the source;

- tools enabling defining, measuring and linking sustainability characteristics to batches of produced or processed cocoa;

- tools enabling the forwarding of the data on origin and sustainability characteristics along the value and supply chain.

6.   Challenges to traceability ambitions in the field

There is increasing demand for improved traceability within the cocoa sector, with supply chain actors setting their own traceability objectives and designing and implementing their own traceability systems. Nonetheless, there are multiple practical difficulties in the field that render the current traceability systems susceptible to loopholes and thus less reliable data and traceability claims. For instance:

- Financial traceability is still weak and corresponding claims may not be trustworthy; information from desk research and interviews indicates that in practice, cooperatives may retain an undisclosed percentage of the premium meant to be paid to the farmers as collateral for the high risks they endure like armed robbery targeting the cash, theft of cocoa bags during transport, the poor state of roads, and the lack of insurance to cover such risks.

- It seems to be common practice for part of the cooperatives to meet quality standards of the buyers by mixing volumes of certified and conventional cocoa, which remains undisclosed and is not documented.

- The busy mid-January sourcing period of many clients in Europe leads some cooperatives to source cocoa from farms outside of their member list to meet the volume and quality needs of the client in a short sourcing period, while later on selling cocoa from their members as conventional cocoa.

8.7 Annex 7 – Preliminary ideas for a supply chain data collaboration initiative for sustainability in the cocoa sector

Based on principles of knowledge sharing and strategic collaboration, supply chain collaboration initiative is a term used to describe the coming together of two or more distinct organisations to work closely together with the aim of meeting shared objectives. To address the challenges of fragmented sustainability data collection and the existing silos of databases within companies, a supply chain collaboration initiative is an effective solution. The first step towards such a collaboration would be in establishing a digital database with data contributions from all the involved stakeholders. Algorithms can be written to allow the overlaying of different data sets pertaining to community characteristics (farmer income, demographics, projected yields etc.) and infrastructure characteristics (location of farm, forests, schools etc.) to allow the flagging of suspicious activity or problematic situations.

Comparing data about cocoa sourced from a farm with the community and infrastructure data would help identify sustainability issues or doubts about the reliability of the data. Targeted analysis of shared data would be essential in validating sustainability claims of value chain actors and contribute to evaluating the effectiveness of cocoa sustainability programs.

If a farm is located near a protected forest, a sudden increase in yield, particularly in comparison to other farms in its vicinity, could indicate that the additional cocoa might actually be grown in the forests or the farmer is acting as an intermediary for another farmer who is growing cocoa not meeting the same sustainability characteristics. If a farming household, which has produced high yields and claims not to be paying for additional help on a farm which is located 20 km away from the nearest school, has five children, this could be an indicator that child labour may be involved, and targeted intervention can take place for that specific farming household, etc.

Digitizing the supply chain in the first mile enables the movement of the cocoa downstream along with a digital record. When a specific batch of cocoa is sold to a cooperative, the quantity sold and promised price are recorded and linked to the farmer's unique ID. Since the farmer's ID contains information on social and environmental characteristics, that information gets permanently linked to the farmer's ID and the batches of cocoa sold by the farmer.

While further conceiving and implementing such concepts requires a great level of trust, interoperability and collaboration between the different stakeholders, it is probably a more economically viable and scalable system than the existing individual systems.