Data Collection Survey on the Prevention of Child Labor in Côte d'Ivoire Using Blockchain Technology

Final Report

February 2022

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Deloitte Tohmatsu Consulting LLC
Deloitte Tohmatsu Financial Advisory LLC
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Abbreviations

Abbreviation	Official name	English
ALICO	The Alliance for Living Income in Cocoa	
ARSO	African Organization for Standardisation	
CCC	Conseil du Café-Cacao	Coffee-Cocoa Board of Côte d'Ivoire
CCSCTE	Cadre intégré de Coordination des Systèmes public et privé de Coordination du Travail des Enfants	Integrated Framework of the Coordination of Public and Private Child Labor Coordination Systems
CFA	Child Friendly Award	
CFI	Cocoa and Forests Initiative	
CIM	Comité Interministériel de lutte contre la traite, l'exploitation et le travail des enfants	Inter-Ministerial Committee for the Fight against Trafficking, Exploitation and Child Labor
CLCCG	Coordination des actions de lutte contre le travail des enfants dans la cacao culture	Child Labor Cocoa Coordinating Group
CLMRS	Child Labour Monitoring & Remédiation System	
CNS	Comité National de Surveillance des Actions de Lutte contre la Traite, l'Exploitation et le travail des Enfants	National Committee for Monitoring Actions to Combat Trafficking, Exploitation and Child Labor
DISCO	The Dutch Initiative on Sustainable Cocoa	
DT-RCI	Deloitte Côte d'Ivoire	
ERP	Enterprise Resources Planning	
ESG	Environment Social Governance	
EU	European Union	
FAFCI	Fonds d'Appui aux Femmes de Côte d'Ivoire	Support Fund for Women of Côte d'Ivoire
GDP	Gross Domestic Product	
GISCO	The German Initiative on Sustainable Cocoa	
GPS	Global Positioning System	
ICI	International Cocoa Initiative	
ICO	Initial Coin Offering	ICO

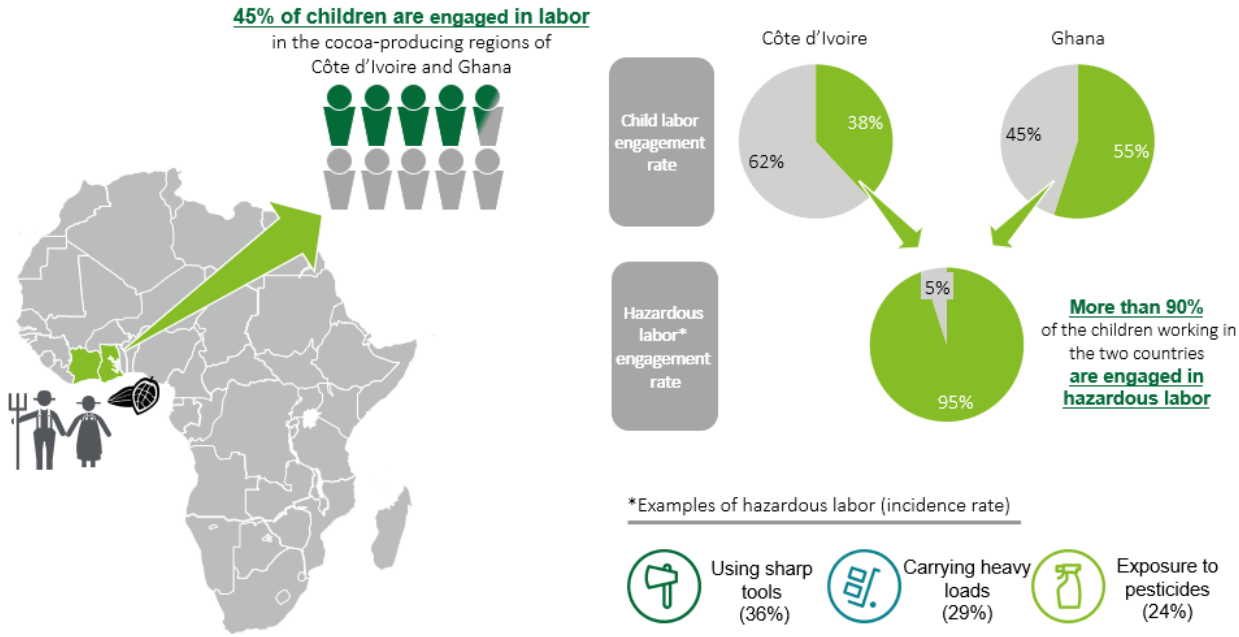
IDH	The Sustainable Trade Initiative	
ILO	International Labour Organization	
IMS	Internal Management System	
IoT	Internet of Things	
ISO	International Organization for Standardization	
LID	Living Income Differential	
MT	Metric Ton	
NCP	Nestlé Cocoa Plan	
NGO	Non-Governmental Organization	
OECD	Organisation for Economic Cooperation and Development	
OFIS	Olam Farmer Information System	
PoC	Proof of Concept	
PPPP	Plateforme de Partenariat Public-Privé	Public-Private Partnership Platform for the Cocoa Sector of Côte d'Ivoire
RFID	Radio Frequency Identification	RFID
RSBN	Responsible Sourcing Blockchain Network	
SD	Sustainability Differential	
SDGs	Sustainable Development Goals	
SI	Sustainability Investment	
SNS	Social Networking Service	SNS
SOSTECI	Système d'Observation et de Suivi du Travail des Enfants en Côte d'Ivoire	System for Observing and Monitoring Child Labor in Côte d'Ivoire
SSRTE	Système de Suivi et de Remédiation du Travail des Enfants	System for Monitoring and Remediating Child Labor
SWISSCO	The Swiss Platform for Sustainable Cocoa	
UI	User Interface	UI
UNDP	United Nations Development Programme	
UNICEF	United Nations Children's Fund	
UX	User eXperience	UX
WCF	World Cocoa Foundation	
XOF	West African CFA Franc	Côte d'Ivoire Currency Unit CFA Franc

Chapter 1: Background and Overview of this Survey

1. Background of this Survey

（1） Background

Since the 1970s, child labor has been banned by various international treaties and SDG Target 8.7 calls for the eradication of child labor in all its forms by 2025. Although the number of child laborers is on the decline thanks to efforts by the international community, 152 million children—9.6% of all children worldwide—are working as child laborers. According to a 2020 University of Chicago research report, 45% (1.56 million) of children age 5-17 from agricultural households in the cocoa growing areas of Côte d'Ivoire and Ghana, the world's two largest producers of cocoa, are engaged in child labor in cocoa production. As for country-specific data, 38% (approximately 790,000) of children in Côte d'Ivoire and 55% (approximately 770,000) of children in Ghana are engaged in child labor. Approximately 95% (1.48 million) of these children are engaged in hazardous labor, amounting to 37% (approximately 770,000) of all children in Côte d'Ivoire and 51% (approximately 710,000) of all children in Ghana.[1] Examples of the kinds of hazardous labor these children are engaged in for cocoa production include the use of machetes and other sharp tools (36%), carrying heavy loads (29%) and exposure to pesticides (24%); all are on the rise. Cocoa production accounts for 10% of Côte d'Ivoire's GDP, so the transition to sustainable cocoa production will have a considerable impact not only on the lives of the children, but also on those of many cocoa farmers and Côte d'Ivoire's economy.



Source: NORC at the University of Chicago, "Assessing Progress in Reducing Child Labor in Cocoa Growing Areas of Côte d'Ivoire and Ghana" 2020.

Figure 1: Present State of Child Labor in Cocoa-Producing Countries

Against this backdrop, interest in supply chain traceability in cocoa production is mounting. The European Union (EU) is preparing an EU due diligence law that will require human rights and environmental DD across

[1] NORC at the University of Chicago, "Assessing Progress in Reducing Child Labor in Cocoa Growing Areas of Côte d'Ivoire and Ghana" 2020.

the global value chain.[2] Additionally, companies and NGOs in the European cocoa sector issued a public statement in October 2021. The statement demands that the Justice and Consumers Department of the European Commission create legislation for human rights due diligence throughout corporate business and entire supply chains. According to the statement, each company should work together with producing-country suppliers and supply chain partners to identify, address and report risks in their supply chains, not to abandon and avoid high-risk cocoa suppliers. Companies should also strive to ensure full respect for the laws of producing countries, labor rights and human rights—including the right to an adequate standard of living—landholding rights and access rights and environmental sustainability. Additionally, the statement holds that these obligations should apply to companies operating in the EU as well as companies that sell cocoa, cocoa products and chocolate in the EU. Furthermore, according to the International Cocoa Initiative (ICI), the OECD is considering creating guidance for due diligence in the cocoa industry.

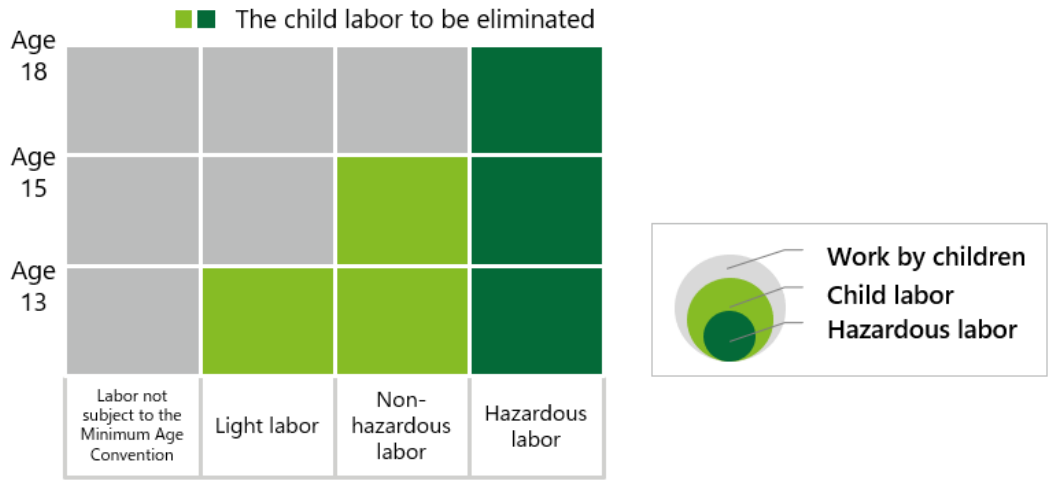
European and American companies in the cocoa industry have already implemented their sustainability programs and many are addressing child labor and environmental problems in their supply chains. In contrast, Japanese companies' efforts to resolve supply chain issues are only just underway; they tend to depend on the initiatives of their European and American suppliers. Additionally, efforts to link traceability systems to cocoa sustainability projects and social impacts are limited. If human rights due diligence becomes obligatory in future, or if Japanese companies are required to disclose social impacts, they will need to equip themselves to respond accordingly.

(2) Definition of Child Labor

The International Labour Organization (ILO) defines child labor as labor by children under age 15, the age of completion of compulsory schooling (under age 14 in the case of developing countries), or hazardous labor that could jeopardize the health, safety, or morals of children under age 18. However, children age 13-14 (12-13 in developing countries) are allowed to engage in light labor under certain conditions. Based on this definition, the Ivorian government established its own laws and regulations that define the nature, conditions and other details of hazardous labor for each industry as well as the light labor in which children age 13-16 are allowed to engage. Forty-five percent (1.56 million) of children age 5-17 from agricultural households in the cocoa growing areas of Côte d'Ivoire and Ghana are engaged in child labor in cocoa production. Approximately 95% (1.48 million) of these children are engaged in hazardous labor. The main emphasis of this survey centers on providing children with educational opportunities. Accordingly, the scope of the above definitions of child labor also excludes children attending school and receiving education, who help out with simple, everyday household chores after returning home from school. However, the child labor to be eliminated (corresponding to the light and dark green cells in Figure 2: Definition of Child Labor) - which the ILO defines in terms of children's age and the type of labor - should be prohibited in any and all cases (See Chapter 4 for details of definitions of the proof of concept (PoC)). In this survey, child labor is considered to be labor that inhibits compulsory schooling based on the globally accepted ILO definition; there is no problem having children who are receiving an education help out with simple, everyday household chores after returning home from school. However, the child labor to be eliminated (corresponding to the light and dark green cells in Figure 2: Definition of Child Labor)—which the ILO defines in terms of children's age and the type of labor—should be prohibited in any

[2] A resolution was passed by the European Parliament in March 2021 calling on the Commission to submit the bill (as drafted) without delay, but remained in preparation as of February 2022.

and all cases. The main problem with child labor is that it robs children of educational opportunities; schools play a major role in resolving this problem. Like other efforts, this survey is predicated on collaboration with schools.



Source: JICA Survey Team based on materials from the ILO.

Figure 2: Definition of Child Labor

Table 1: ILO Definition of Child Labor

Treaty name	Details
Minimum Age Convention, 1973 (No. 138)	・The minimum age for employing children is the age of completion of compulsory schooling and, in any case, shall not be less than 15 years. However, developing countries may specify a minimum age of 14 years for the time being. ・The minimum age for employing young people in work that could jeopardize their health, safety, or morals is raised to 18 years. Governments may allow children age 13-14 (age 12-13 in developing countries) to engage in light labor under certain conditions.
Minimum Age Recommendation	A complement to the Minimum Age Convention (No. 138) that asks governments to take immediate, effective measures to ensure the prohibition and eradication of the worst forms of child labor performed by children under age 18. The recommendation defines the worst forms of child labor as follows: ・Forced labor including trafficking and compulsory enlistment in armed conflict, debt bondage and other forms of slavery, or any analogous conduct ・Using, providing, or arranging for the use or provision of children for prostitution, producing pornography, or performing indecent acts ・Using, providing, or arranging for the use or provision of children for unlawful activity, including producing, buying, or selling drugs ・Labor that jeopardizes the health, safety, or morals of children.

Source: ILO website.

Table 2: Child Labor Laws and Regulations in Côte d'Ivoire

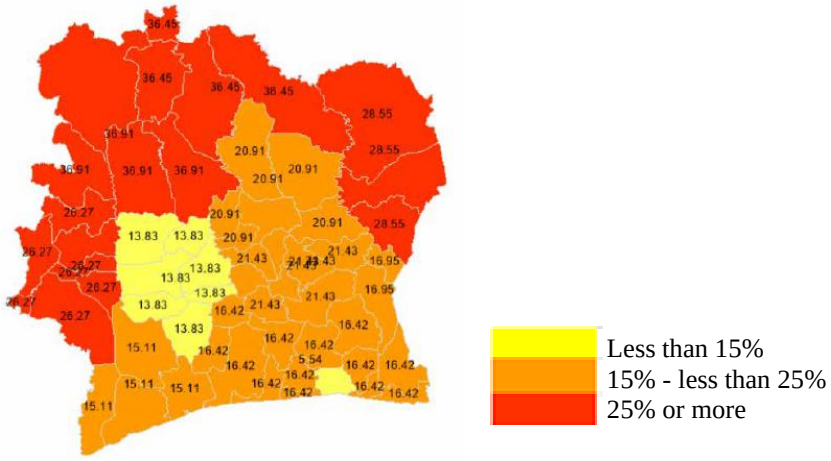
Name oflaw/ regulation	Details
Arrêté N°2017-017 MEPS/CAB du 02 Juin 2017 Hazardous labor from which children are prohibited	Article 2 - Defines hazardous labor from which children are prohibited as labor of a nature or entailing conditions that could jeopardize the health, safety, or morals of children Article 3 - This law applies to all economic activities in which children are engaged, regardless of whether the activities are remunerated, the intent of the children or other parties, whether the work takes place in the home or any facility and the nature of the work or industry thereof Article 4 - The minimum ages at which children may engage in labor are as follows: ・Hazardous labor: 18 years ・Permission to work: 16 years ・Permission to engage in practical training/apprenticeships: 14 years Article 7 - Children may not engage in the following types of hazardous labor: Agriculture/forestry ・Forest clearing ・Tree felling ・Plot burning ・Hunting using weapons ・Logging ・Charcoal production ・Stump removal ・Excavation ・Husk removal using sharp tools ・Harvesting using machetes or sickles ・Handling pesticides ・Operating machinery with engines Article 8 - Children age 16-18 may engage in the labor enumerated above only under the following conditions: ・When their health, safety and morality is sufficiently guaranteed ・When they are receiving special education or vocational training in fields that correspond to the activities Article 9 - Children shall not carry, push, or pull loads in excess of the following weights: <u>Weight limits for lifting</u> ・Boys age 14-15: 15 kg ・Boys age 16-17: 20 kg

	・Girls age 14-15: 8 kg ・Girls age 16-17: 10 kg Weight limits for transport by minecart ・Boys age 14-17: 500 kg including the weight of the vehicle ・Girls age 14-17: 300 kg including the weight of the vehicle Weight limits for transport by pushcart ・Boys age 14-17: 40 kg including the weight of the vehicle ・Girls age 16-17: 30 kg including the weight of the vehicle Weight limits for transport by three-/four-wheeled vehicle ・Boys age 14-17: 60 kg including the weight of the vehicle ・Girls age 14-17: 35 kg including the weight of the vehicle Weight limits for transport by (manually operated) pull cart ・Boys age 14-17: 130 kg including the weight of the vehicle Weight limits for transport by three-wheeled pushcart ・Boys age 14-15: 50 kg including the weight of the vehicle ・Boys age 16-17: 75 kg including the weight of the vehicle Article 10 - Prohibits labor in excess of 40 hours per week Article 11 - Prohibits late-night labor
Arrêté N°2017-016 MEPS/CAB du 02 Juin 2017 Light labor in which children are permitted to engage	Article 1 - The purpose of this law is to set out the types of light labor in which children age 13-16 are permitted to engage Article 2 - The following types of labor are considered light labor due to their nature and the conditions they entail ・Labor that does not jeopardize the health or physical, mental, moral, or social development of children ・Labor that by nature does not inhibit school attendance or participation in vocational training programs, or involve instruction that harms children's abilities Article 4 - Work performed by children age 13-16 that is not remunerated, performed under supervision of a statutory agent and in the final stages of educational curriculum or upon joining adult society is considered socialization when it carries no risk of inhibiting the following: ・The health and physical, mental, moral and social development of children ・School attendance, participation in vocational training programs, weekly days off Article 5 - Children age 13-16 who engage in socialization as defined in Article 4 are not child laborers Article 7

	- Children age 13-16 shall not engage in light labor before 7:00, after 19:00, or during regular school hours Article 8 - Children age 13-16 shall not engage in light labor for more than 14 hours per week - Children must have a minimum of 14 hours of uninterrupted rest per day and one day off per week - Children working during school breaks must have days off for at least half the length of the breaks Article 9 - The following restrictions apply to the working hours defined in Article 8: ・Children shall not work more than two hours on a school day or four hours on a non-school day ・Children shall not work more than 10 hours in a school week or 14 hours in a non-school week

Source: Materials from the Ivorian government.

Statistics show that 26.6%—more than one in four—of children age 5-17 in rural areas of Côte d'Ivoire are engaged in child labor;[3] the figure is 8.5% in urban areas. By region, child labor is lower in the south and southwest of the country (20%) than in the northwest (36.9%), north (36.4%), northeast (28.6%) and west (26.3%).



Source: Le Plan d'Action National (PAN) 2019-2021.

Figure 3 : Geographical Distribution of Child Labor in Côte d'Ivoire (%)

（3） Main Factors Behind Child Labor

The many factors that impact efforts to resolve the problem of child labor are inextricably intertwined, including the need to improve household incomes (wholesale price of cocoa beans) in addition to farming customs, agricultural productivity, educational environments, the executive functions of laws, supply chains and market prices.

[3] UNICEF, Multiple Indicator Cluster Survey (MICS) 2016

In many instances, past research pegs household income as the largest factor behind child labor (Edmonds 2001,[4] Admassie 2002,[5] Wahba 2002,[6] Grootaert and Patrions 1999). Parents' wage levels have an impact on child labor; when parents earn more money, their children are freed from having to work. The World Bank estimates that the poverty rate among cocoa farmers would decrease 3.6 percentage points if prices increased 10% and 20.7 points if prices increased 100%. Similarly, the poverty gap index would decline 1.5 and 7.9 points, respectively (World Bank, 2017[7]). Additionally, research shows that the impact of having performed child labor on an individual's wage level is positive in the short term, but negative in the long term; people who engaged in child labor make 11.5% less at age 30 than people who did not (Beegle, Kathleen and Dehejia, Rajeev H. and Gatti, Roberta, 2004[8]).

Additionally, when parents are impoverished, children have difficulty escaping poverty, causing an intergenerational transmission of poverty. One cause of this transmission is a lack of education. Parents who do not understand the importance of education use their children for labor instead of sending them to school, and even if parents are aware of how crucial education is, they may still be unable to send their children to school for various reasons. Children who do not receive an education are not able to obtain new knowledge or skills and are thus limited to unstable, low-wage jobs. When those children become parents themselves, they also fail to understand the importance of education and cannot earn money for their children's education. In this way, poverty often becomes inescapable, passing from generation to generation.

The main problem with child labor is that it robs children of educational opportunities; schools play a major role in resolving this problem. A study in India proved that there is a negative correlation between children's attendance at school and child labor (Alessandro Cigno Furio Camillo Rosati, 2005[9]). Notably, improving the quality of schools can reduce child labor. For example, existing research shows that heavily investing tax revenue into establishing high-quality schools incentivizes parents to recoup their tax expenditures by sending their children to school instead of work (Tanaka 2003,[10] Krueger and Tjornhom 2001[11]).

Stagnation of cocoa prices also impacts cocoa farmers' household incomes significantly. Global prices for cocoa fluctuate so frequently that producers are unable to accurately project annual revenue. Since 2000, the market for cocoa has been liberalized, but liberalization has failed to benefit cocoa producers and not improved their competitiveness (Gilbert 2009[12]). In fact, studies have shown cocoa farmers only receive 30%-50% of the market price (Kireyev 2010[13]).

Additionally, cocoa producers in Côte d'Ivoire earn less of the market price than producers in other countries because cocoa exports are taxed more heavily in Côte d'Ivoire. The taxes (export duties and other impositions) are so high that producers only receive approximately 60% of the market price. Although the figure has increased slightly to 60% from under 50% since 2011, it remains low compared to other producing countries.

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[4] Eric Edmonds, Nina Pavcnik (2002) "Does Globalization Increase Child Labor? Evidence from Vetnam"

[5] Assefa Admassie (2002) "Explaining the High Incidence of Child Labour in Sub–Saharan Africa"

[6] Jackline Wahba (2001) "Child Labor and Poverty Transmission: No Room For Dreams"

[7] World Bank (2017) "Welfare and Poverty Impacts of Cocoa Price Policy Reform in Côte d'Ivoire"

[8] Beegle, Kathleen and Dehejia, Rajeev H. and Gatti, Roberta (2004) "The Education, Labour Market and Health Consequences of Child Labour"

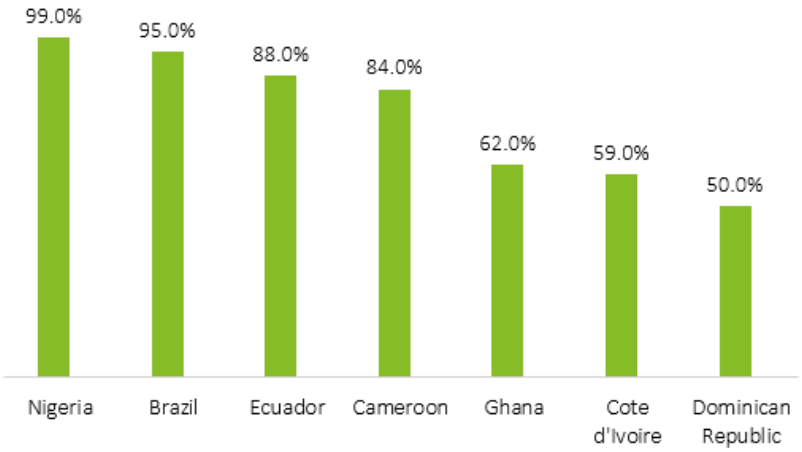
[9] Alessandro Cigno Furio Camillo Rosati (2005) The Economics of Child Labour

[10] Tanaka (2003) " Inequity as a determinant of Child Labor Economic Letters"

[11] Krueger, D., and J. Tjornhom (2001) ''Economic Inequality and the Emergence of Child Labor Laws''

[12] Gilbert (2009) "Cocoa market liberalization in retrospect"

[13] Kireyev (2010) "Export tax and pricing power: two hypotheses on the cocoa market in Côte d'Ivoire"



Source: World Bank.[14]

Figure 4: Producer Price as a Percentage of FOB Price (Trade Price) (2012-2017)

Factors behind the problem of child labor related to agricultural productivity include insufficient opportunities for training in agricultural technology and stubbornly low productivity due to a lack of investment in technology and technical assistance. Factors related to the executive functions of laws include insufficient supervision of labor by public institutions and loose monitoring of child labor. Factors related to supply chains include pressure to reduce labor costs and source raw materials at low prices to meet clients' demands to reduce costs, escalating consumer demand for low-priced products and underdevelopment of human rights legislation.

(4) Assumptions of this Survey

As explained previously, the many factors behind the problem of child labor are inextricably intertwined; however, over the medium and long term, children's ability to attend school and receive an uninterrupted education should help prevent child labor. In this survey, the phrases "lack of child labor" and "child labor-free" are used to describe situations in which multiple assessments find that children are attending school daily and not working on farms. However, these phrases are not an affirmation that there is a complete lack of child labor. The phrases only signify that the target farms are taking measures to eliminate child labor and that, as of the information-gathering phase of this survey, children were attending school and not working on the farms. In other words, the phrases describe situations in which children are very likely to be attending school, receiving an uninterrupted education and not engaging in work that is unsuitable for children on cocoa farms; the phrases do not prove that there is never any child labor on those farms. However, it should be kept in mind that the phrases "lack of child labor" and "child labor-free" are used for the sake of convenience in this report to describe the aforementioned situations.

Additionally, many serious cases of child labor involve children working in punishing environments for no pay, either because they were forcibly brought from other countries or were drawn under the pretense that good jobs awaited them and it is believed that many farms near the international borders in the north of the country engage in these practices. Cases like these must be addressed to truly eradicate child labor. However, the purpose of this survey is to shed light on cases of child labor as well as cases with a lack of child labor; thus, when focusing on the latter cases in particular, it is necessary to select areas in which communities and children's families are the target of public education activities regarding child labor. Such activities to create and spread

[14] World Bank (2019) "AU PAYS DU CACAO comment transformer la Côte d'Ivoire"

awareness are known locally as sensitization,[15] and farms in the south of the country at which survey collaborator ETG is engaging in sensitization are included in the scope of this survey. Accordingly, the basic scope of this survey is children of cocoa farmers residing in Côte d'Ivoire who should be attending school but are not for some reason; the fact that this survey does not cover child labor by the children of immigrants or by children forcibly brought from other countries as described previously is mentioned here as a limit of this survey. Accordingly, the basic scope of this survey is children of cocoa farmers residing in Côte d'Ivoire and notably excludes child labor by the children of immigrants or by children forcibly brought from other countries.

2. Overview of this Survey

（1） Summary of Issues and the Scope of this Survey

Issues regarding child labor in cocoa production are presented here in terms of supply and demand.

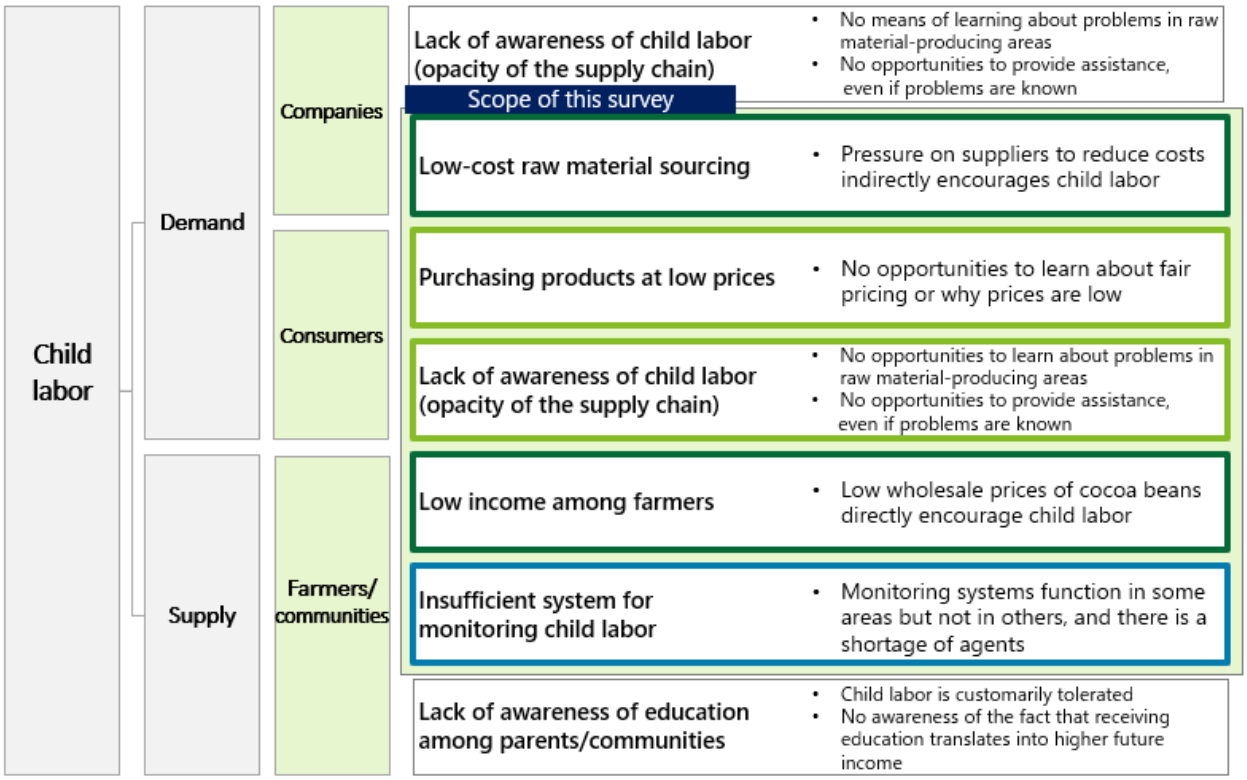
On the demand side, issues include companies' lack of awareness of child labor and pressure to source raw materials at low cost. Consumers' focus on low prices and lack of awareness are also problematic, with the latter likely rooted in the opacity of the supply chain. Supply-side issues include low income among farmers, an insufficient system for monitoring child labor and a lack of awareness in communities.

Making the supply chain transparent in response to these issues would bring to light other issues that are currently invisible and make it possible to hammer out countermeasures. Accordingly, a traceability system would be effective for remediating these problems.

In this survey, we aim to verify the viability of bringing appropriate stakeholders on board and obtaining accurate insights into child labor through a traceability system, by way of a demonstration experiment.

Note that although activities to create and spread awareness (sensitization) about child labor to counter the lack of awareness among farmers and parents are essential for resolving the problem and should be given proper time to implement, they are outside the scope of this survey. Similarly, although measures to counter companies' lack of awareness of child labor are outside the scope of this survey, they are all recognized as important issues.

[15] ILO " Sensitization module for school children and youth on child labour" and others



Source: JICA Survey Team.

Figure 5: Summary of Issues Regarding Child Labor

(2) Measures in Response to the Issues

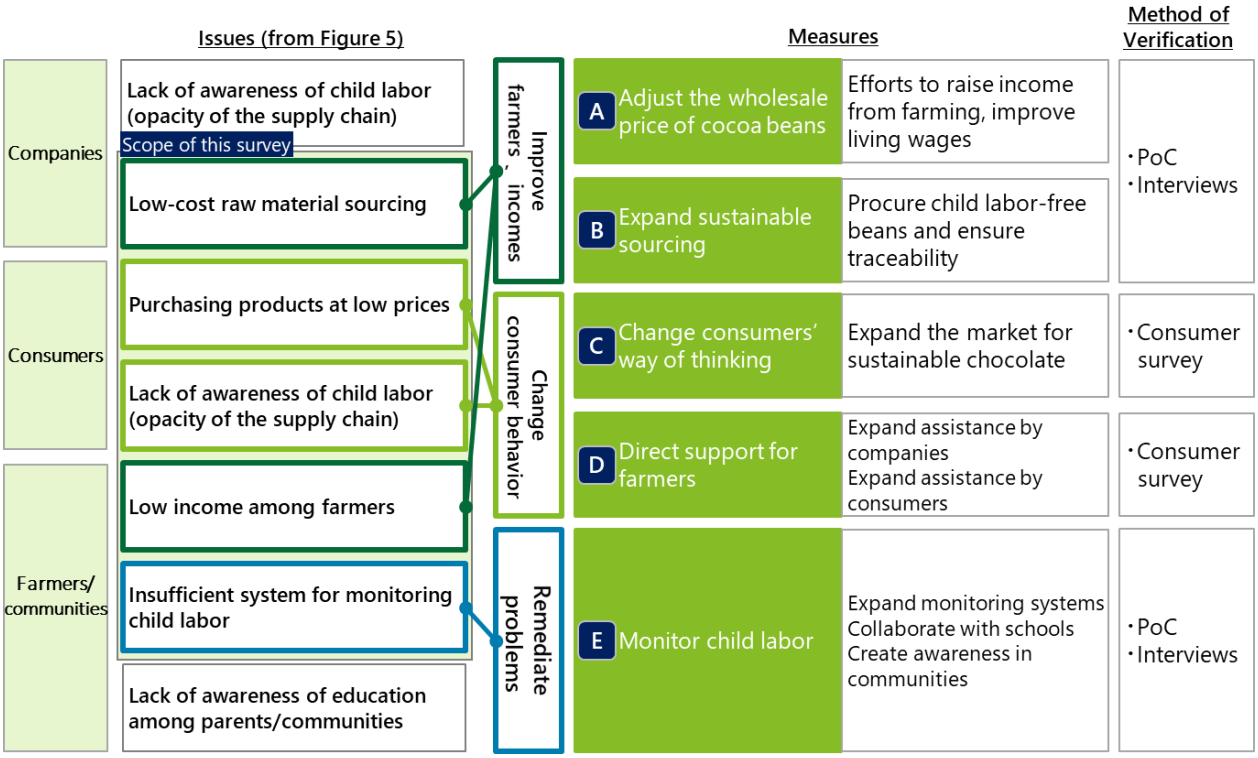
Measures in response to child labor can be broadly categorized into measures to improve farmers' incomes and measures to change consumer behavior and remediating problems.

Premiums on the wholesale price of cocoa beans are an effective measure to improve farmers' incomes and some major companies in the cocoa industry have already taken the initiative to raise wholesale prices. As shown in Figure 6, the wholesale price of cocoa beans must be adjusted (with a premium) ((A) in Figure 6), but to do so, it is necessary to ensure supply chain traceability to enable the management of child labor-free beans (B). Accordingly, this survey involves demonstrating PoC through the use of an app to provide accurate information about child labor.

Because consumer prices will ultimately reflect premiums on the wholesale price of cocoa beans, consumer behavior must change. Consequently, it is necessary to ascertain demand-side needs; this survey involves conducting a consumer survey about the present state of the sustainable chocolate market and possibilities for future expansion (C). Additionally, this survey involves exploring the possibilities of direct assistance measures for farmers (D) as a separate matter from premiums on the wholesale price of cocoa beans. This is because producer support is an essential first step for expanding the distribution of child labor-free beans. Accordingly, the consumer survey will gauge consumers' level of interest in the problem of child labor and their willingness to purchase sustainable chocolate, as well as their level of interest in assistance measures by companies and direct assistance from consumers to producers. Considerations regarding this point are underway and the focus of the discussion includes collaboration with companies participating in the Platform for Sustainable Cocoa in

Developing Countries led by JICA.[16]

To remediate problems among cocoa farmers, it is necessary to monitor child labor on a daily basis (E). Even if child labor disappears for a time, it may reappear. Given this prospect, to prevent child labor from reappearing, communities should take the initiative to remediate problems among cocoa farmers. This survey involves using existing systems for monitoring child labor and collaborating with schools to develop an accurate understanding of the present state of child labor. The aim is to use the information as the basis for developing measures to remediate the problem of child labor.



Source: JICA Survey Team.

Figure 6: Summary of Issues and Measures

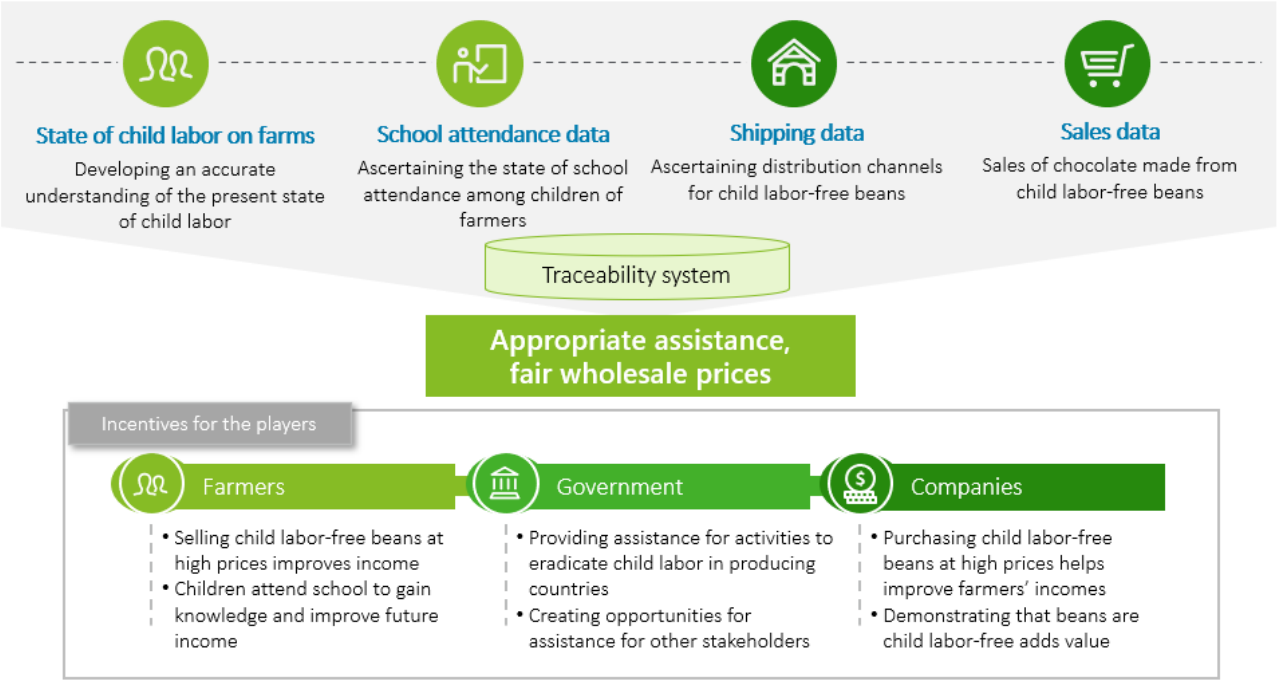
(3) Overview of Implementation

In light of the issues explained previously, the purpose of this survey is to gather and analyze basic information to pilot a system to properly record the reporting of child labor in the cocoa industry of Côte d'Ivoire and to ensure the traceability of information in the global value chain.

Specifically—and with the help of local companies and organizations—we will examine the methods of collecting reported data on the present state of child labor as well as what data is collected, which contributes to ensuring the accuracy and traceability of the data and we will develop and test an app using blockchain and other technologies. Additionally, we aim to propose concrete measures—such as designing incentives for the ongoing use of apps—to contribute to the establishment of a highly transparent value chain available to the entire industry in a wide range of areas in line with local circumstances.

[16] An organization that shares information and experience about matters such as assistance activities and responsible corporate behavior regarding sustainable cocoa in developing countries, engages in discussion and coordination for promoting cooperation, and disseminates information inside and outside Japan. The organization was established by JICA in January 2020, and has more than 100 members (companies) as of December 2021.

We will also conduct a consumer survey on sustainable cocoa and provide suggestions to Japanese companies in the cocoa industry. Interviews will be conducted with each of the stakeholders, the survey results will be reported to members of the Platform for Sustainable Cocoa in Developing Countries and policies for the future will be discussed.

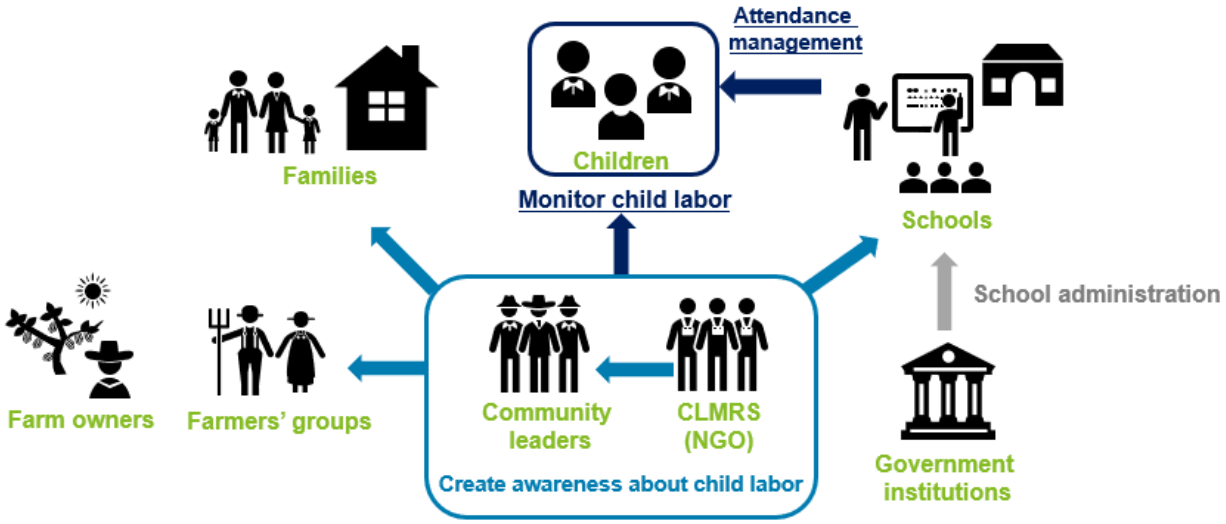


Source: JICA Survey Team.

Figure 7: Project Overview

(4) PoC Target Stakeholders and Area

This survey exists to ascertain information on an individual farmer level, ensure educational opportunities for children and promote efforts to establish a system for returning profits to producers and also to involve companies participating in platforms in efforts to provide assistance to producers in future. PoC involves incentivizing multiple targets (farmers, schools, community leaders) to use the app. Given the background explained previously, we selected Gagnoa as the target area for its location in the south of Côte d'Ivoire. Details about PoC are discussed in Chapter 4.



Source: JICA Survey Team.

Figure 8: PoC Target Stakeholders

Source: JICA Survey Team.

Figure 9: PoC Target Area

Chapter 2: The Present State of Child Labor and Market Analysis

1. Policies of the Ivorian Government

The Coffee-Cocoa Council (CCC, Conseil du Café-Cacao), a government institution established in 2011, reports to both the Ministry of Agriculture and Rural Development and the Ministry of Economy and Finance. The CCC's objective is to improve productivity, ensure income for producers and develop sustainable Côte d'Ivoire cocoa and coffee. They set cocoa farm gate prices, manage transactions and issue export licenses. The Ivorian government has been continually working over the past decade to reduce child labor through three national action plans (2012-2014, 2015-2017, 2019-2021).[17] For example, educational system reform and the large-scale construction of schools in rural areas dramatically increased school attendance from 59% to 85%. The government has strengthened child labor laws and has allocated additional financial and material resources to activities for monitoring child labor. The National Committee for Monitoring Actions to Combat Trafficking, Exploitation and Child Labor (CNS, Comité National de Surveillance des Actions de Lutte contre la Traite, l'Exploitation et le travail des Enfants) and the Inter-Ministerial Committee for the Fight against Trafficking, Exploitation and Child Labor (CIM, Comité Interministériel de lutte contre la traite, l'exploitation et le travail des enfants), which were established in 2012, play a central role in these efforts. Presently, two systems for monitoring child labor are in operation in Côte d'Ivoire. They are the System for Observing and Monitoring Child Labor in Côte d'Ivoire (SOSTECI, Système d'Observation et de Suivi du Travail des Enfants en Côte d'Ivoire)[18] operated by the Ministry of Employment and Social Protection and the System for Monitoring and Remediating Child Labor (SSRTE, Système de Suivi et de Remédiation du Travail des Enfants) operated by the cocoa and chocolate industries. Relevant institutions include the Support Fund for Women of Côte d'Ivoire (FAFCI, Fonds d'Appui aux Femmes de Côte d'Ivoire), the Child Labor Cocoa Coordinating Group (CLCCG, Coordination des actions de lutte contre le travail des enfants dans la cacao culture), the Public-Private Partnership Platform (PPPP, Plateforme de Partenariat Public-Privé) and the Integrated Framework of the Coordination of Public and Private Child Labor Coordination Systems (CCSCTE, Cadre intégré de Coordination des Systèmes public et privé de Coordination du Travail des Enfants). Notably, the PPPP manages tools for automating the collection and processing of social data among other operations.

In September 2019, the National Action Plan for 2019-2021 (PAN 2019-2021) was formulated with the CNS and CIM at its head. One of the plan's specific goals (3.2.3.3) is to ensure the traceability of the cocoa value chain on a national scale (routes from farms to markets, farm location information and national census of farmers). Although the plan mentions the start of efforts to create a system to ensure cocoa value chain transparency and traceability in or after 2019, as of yet there are no signs that the system is operational.

Because the problem of child labor originates from the low incomes of cocoa producers, the governments of Côte d'Ivoire and Ghana instituted the Living Income Differential (LID, a minimum pricing system for cocoa beans) in June and July 2019. Under the new system, a premium of USD 400 per ton was to be added to the wholesale price of cocoa beans and the premium was to be allocated to assist cocoa producers. However, the actual premium has not reached USD 400 because buyers may have been paying discounted premiums in the market for cocoa (as of December 2019, the price had increased only USD 120 per ton[19]). In April 2021, the official price of cocoa from Côte d'Ivoire was reduced 25% as a result of a decline in global demand for

[17] Plan d'action national de lutte contre la traite, l'exploitation et le travail des enfants
[18] Ministère de l'Emploi et de la Protection Sociale
[19] JICA Co-Creation Workshop Towards Sustainable Cocoa (December 17, 2019)

chocolate.[20] Therefore, instead of relying on the policies of producing countries, a system that directly involves the industrial sector and allows them to actively engage with these issues must be constructed.

Given this background, the Ivorian government formulated the National Action Plan to Combat Trafficking, Exploitation and Child Labor 2019-2021 (Plan d'Action National 2019-2021 de lutte contre la traite, l'exploitation et le travail des enfants).

Overview	■ The elimination of child labor has been a national priority since 2011, when President of Côte d'Ivoire Alassane Ouattara advocated it to combat the problem of children's exposure to trafficking, hazardous labor, and other risks. That same year, the country established laws and regulations and two committees (the CIM and the CNS) to tackle the evils. ■ However, the problems remain despite these efforts, and children continue to engage in unacceptable forms of labor. Therefore, the Ivorian government formulated the National Action Plan to Combat Trafficking, Exploitation and Child Labor to bolster efforts and expedite progress. ■ National Action Plan for 2019-2021 was formulated with the aim of achieving the UN's Sustainable Development Goals (SDGs), particularly 8.7, 8.8, and 16.2
Vision	■ By 2025, eliminate child labor in Côte d'Ivoire, and have families, communities, and the government expend every effort to fulfill their obligation to protect children as well as children's rights so that they can develop in good health, free from discrimination, and shielded from all forms of exploitation
Goals	■ Overall goal: Substantially reduce child labor in Côte d'Ivoire ■ Specific goals: ① **Enhance fulfillment of international obligations (particularly the following conventions) in the fight to protect children's rights and end child labor** • Convention on the Rights of the Child • Minimum Age Convention, 1973 • Convention Concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour • SDG 8.7, etc. ② **Continue and strengthen government efforts to eliminate child labor** • Sensitization of the people of Côte d'Ivoire • Improve children's access to education, and young people's access to vocational training • Improve socioeconomic circumstances in socially vulnerable communities, etc. ③ **Combat issues inhibiting efforts in the fight against child labor** • Problems tracing products in the cocoa supply chain from farms to the market • Effectively apply agreements with neighboring countries for combating child trafficking • Remediate child labor in designated forests, children's housework, etc.

Source: JICA Survey Team based on the National Action Plan 2019-2021 to Combat Trafficking, Exploitation and Child Labor (Plan d'action national 2019-2021 de lutte contre la traite, l'exploitation et le travail des enfants).

Figure 10: Efforts to Combat Child Labor in Côte d'Ivoire

2. Cocoa Production in Côte d'Ivoire

(1) Main Players in the Supply Chain

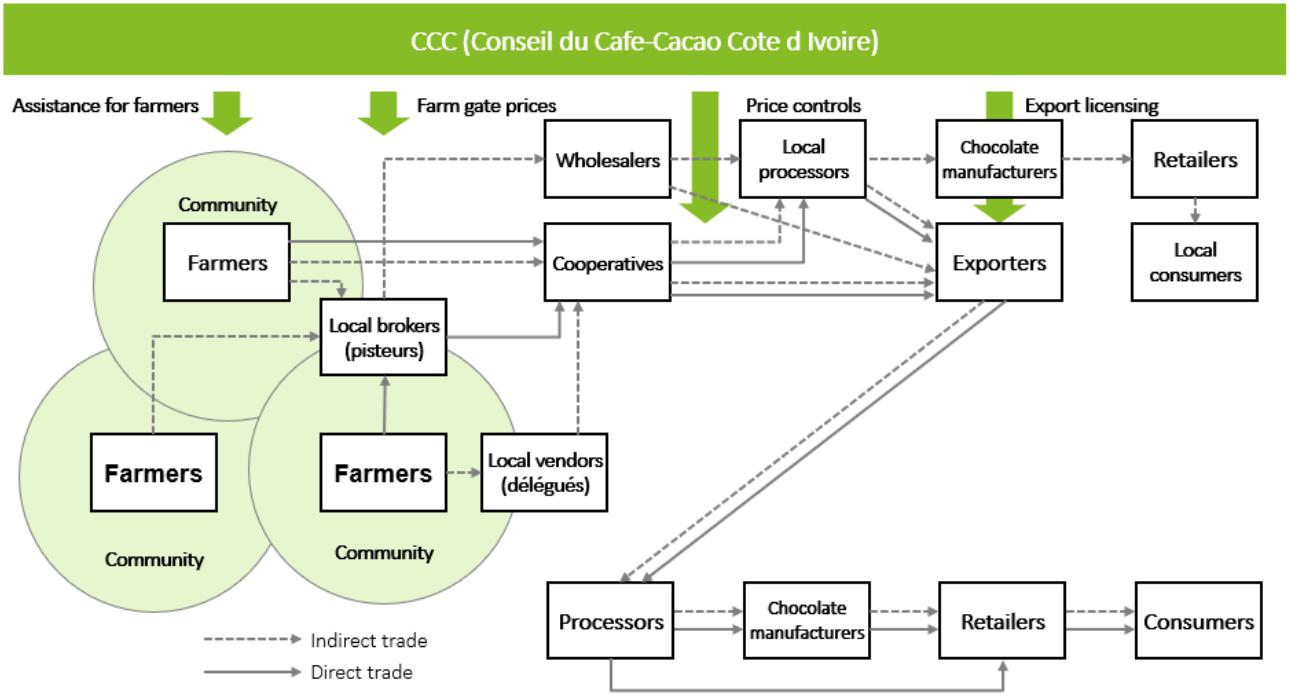
Cocoa production in Côte d'Ivoire is managed by the CCC. The CCC's objective is to improve productivity, ensure income for producers and develop sustainable Côte d'Ivoire cocoa and coffee. They set cocoa farm gate prices, manage transactions and issue export licenses.

The cocoa supply chain starts with its farmers. If a farmer belongs to a cooperative or farmers' organization, they are identified and registered by the cooperative. There are two types of initial broker from farms in the cocoa sector: local brokers known in French as pisteurs and vendors known as délégués. Farmers may sell directly to cooperatives, or indirectly to cooperatives through délégués. Délégués work directly with cooperatives while pisteurs buy cocoa from farmers, transport it and then sell it to cooperatives. Pisteurs are approved by the CCC based on recommendations from local approval committees (comités locaux d'agrément). As a condition for pisteur approval, yearly inspections are conducted on the details of their work. Each cooperative and broker must verify their identity and obtain delivery codes for inspections and confirmation procedures regarding the delivery of products to factories. After cooperatives or wholesalers transport and sell

[20] Bloomberg 2021/3/31

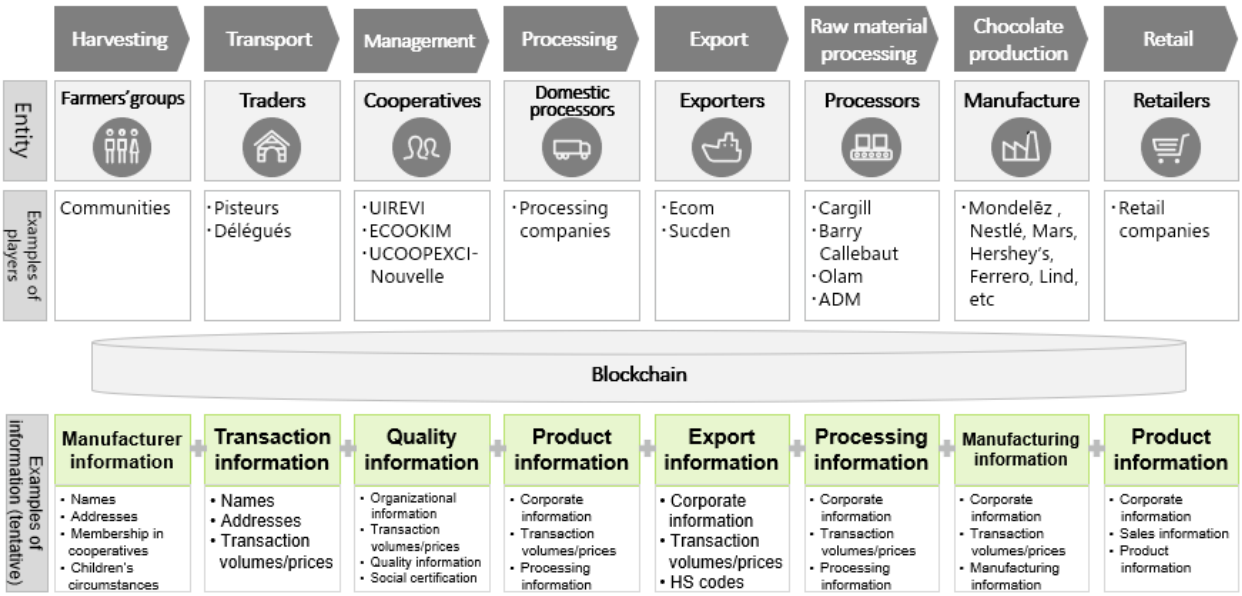
the cocoa beans, they process a certain amount locally and then either export them or put them on local consumer markets; however, the majority of cocoa beans are exported and processed overseas.

The figure below shows the players in the cocoa supply chain of Côte d'Ivoire.



Source: JICA Survey Team based on materials from the CCC.

Figure 11: The Cocoa Supply Chain of Côte d'Ivoire

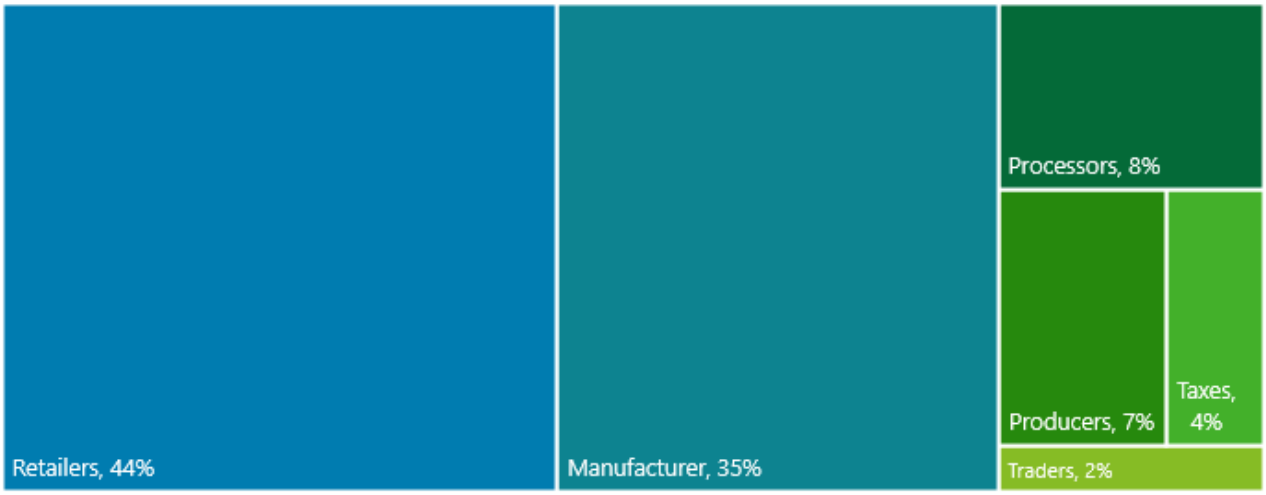


Source: JICA Survey Team.

Figure 12: Examples of Information from the Cocoa Supply Chain of Côte d'Ivoire

This survey involves identifying the needs and problems of various stakeholders to consider how to design incentives for obtaining accurate information on child labor.

Notably, as the breakdown of added value in the cocoa sector along the supply chain below shows, just 7% of added value is returned to producers.



Source: JICA Survey Team based on Cacao Barometer 2015.

Figure 13: Breakdown of Added Value in the Cocoa Sector of Côte d'Ivoire

(2) Details of the Supply Chain

The cocoa supply chain of Côte d'Ivoire is complex, involving various stakeholders shown below.

Industry		Activities	Performers	Products/services	
Production/ processing in cocoa-producing areas	Harvesting	Obtain agricultural materials, establish and manage farms, produce, and protect farmland	Farm owners, laborers, tenant farmers	Cocoa pods, raw cocoa beans	Dried cocoa beans
	Fermenting/ drying	Ferment, dry, bag, and store beans; conduct business with cocoa-producing areas	Farm owners, laborers, tenant farmers	Unprocessed cocoa (dried cocoa beans)	
	Price setting	Set benchmark prices (wholesale prices) for cocoa-producing areas	Conseil du Café-Cacao (CCC)	Unprocessed cocoa	
Domestic Commerciali-zation	Wholesale purchasing/ storing	Purchase beans wholesale from producing areas, conduct business at storage locations	Local brokers (pisteurs), wholesalers, producers' cooperatives	Unprocessed cocoa	Certified cocoa beans
	Transport	Transport beans to factories	Transporters, Coffee and Cocoa Industry Guarantee Fund (FGCC)	Unprocessed cocoa, certified cocoa	
Processing cocoa for export	Quality inspections	Classify beans, conduct free fatty acid (FFA) inspections	Quality inspectors*	Unprocessed cocoa, certified cocoa	
	Drying/ repackaging	Dry/sort beans and repackage (in 1-ton units)	Factories (e.g. TORRICAF)	Unprocessed beans for export, certified cocoa beans for export	
	Tagging	Tag beans/separate beans into lots	Exporters	Lot products for export	
	Storage	Store beans	Transit goods handlers	Lot products for export	
Processing	Quality inspections	Classify beans, conduct free fatty acid inspections	Quality inspectors*	Lot products for export	
	Domestic processing	Grind and package/wrap beans	Foreign cocoa companies**	Cocoa mass, cocoa butter, chocolate/liquor, lees, cocoa paste	Cocoa beans/ semi-processed products
Export	Storage/ measuring	Store, measure, and pack beans (into containers)	Transit goods handlers, Chamber of Commerce and Industry of Côte d'Ivoire (CCI-CI), CCC/Customs, cargo contractors	Processed cocoa beans for export Lot products (in bulk)	
	Customs/ taxation	Undergo customs clearance procedures, pay taxes			
	Shipping	Take beans to docks, ship beans			
Overseas Commerciali-zation	Receiving/ storage	Receive and store beans	Overseas clients, freight companies	Cocoa beans for export or semi-processed products	
	Quality inspections	Classify beans, conduct free fatty acid inspections	Quality inspectors*	—	
	Chocolate processing	Processing	Grinding companies	Cocoa mass, cocoa butter, chocolate and liquor, lees, cocoa paste	Certified chocolate
	Packaging/ distribution	Package/label products	Chocolate manufacturers	Labeled chocolate products	
	Distribution/ consumption	Distribute and consume products	Major retailers, consumers	Chocolate products	

*Quality inspectors: UNICONTROL, SCEVE, BUREAUVERITAS and others.
**Foreign Cocoa companies: SACO (subsidiary of Barry Callebaut), UNICAO (subsidiary of Olam), CEMOI-CI, MICAO (subsidiary of Cargill).
Source: JICA Survey Team based on JETRO's report "Research on the cocoa industry in Cote d'Ivoire; value chain and commercialization mechanisms"

Figure 14: Details of the Cocoa Supply Chain

(3) Summary of Stakeholders

The figure below shows the stakeholders in the cocoa supply chain of Côte d'Ivoire. Each country has platforms and other mechanisms with the aim of cooperation between government institutions, international agencies, NGOs, corporations and companies and organizations in the cocoa industry. Under these platforms, stakeholders work together to combat the problem of child labor. Note that in this report, the term "platform" refers to venues for cooperation aiming to resolve a variety of issues—including child labor but also dealing with the destruction of forests, improving productivity with regard to cocoa beans and responsible corporate behavior—with the common theme of popularizing sustainable cocoa. In Europe, Germany, Switzerland, Belgium, the Netherlands and France are taking the lead in promoting platform activities. Japan's aforementioned Platform for Sustainable Cocoa in Developing Countries can be regarded as a Japanese version of the platforms in these European countries.

Table 3: Summary of Stakeholders in the Côte d'Ivoire Cocoa Industry

Category	Name
Government	CCC, CNS, CIM, Ministry of Employment and Social Protection, FAFCI, PPPP, CCSCTE, Ministry of Agriculture and Rural Development (MINADER, Ministère de l'Agriculture et du Développement Rural)
International agencies	ICCO, Child Labor Cocoa Coordinating Group (CLCCG, Coordination des actions de lutte contre le travail des enfants dans la cacao culture), World Cocoa Foundation (WCF), CocoaAction, Cocoa and Forests Initiative (CFI), Sustainable Trade Initiative (IDH), ILO, UNICEF, The Alliance for Living Income in Cocoa (ALICO)
NGO	International Cocoa Initiative (ICI), World Cocoa Foundation (WCF), Fairtrade International, Rainforest Alliance, Oxfam, MightyEarth, Solidaridad, Be Slavery Free, ACE, etc.
Companies	Barry Callebaut, Olam, Cargill, Ecom, Sucden, Touton, Blommer, ETG-Beyond Beans, Cemoi, etc
Platforms	The German Initiative on Sustainable Cocoa (GISCO), the Swiss Platform for Sustainable Cocoa (SWISSCO), Beyond Chocolate (The Partnership for a Sustainable Belgian Chocolate Industry) (BISCO), the Dutch Initiative on Sustainable Cocoa (DISCO), French Sustainable Cocoa Initiative (FRISCO)

Source: JICA Survey Team.

Table 4: Overview of the Platforms of European Countries for Sustainable Cocoa

Country	Germany	Switzerland	Belgium	The Netherlands
Name	German Initiative on Sustainable Cocoa (GISCO)	Swiss Platform for Sustainable Cocoa (SWISSCO)	Beyond Chocolate (BISCO)	Dutch Initiative on Sustainable Cocoa (DISCO)
Date founded	June 2012	January 2018	December 2018	September 2020
Executive office	GIZ (German Society for International Cooperation)	Federal Department of Economic Affairs	IDH (Sustainable Trade Initiative)	IDH (Sustainable Trade Initiative)
Governmental involvement	Federal Ministry of Food and Agriculture, Federal Ministry for Economic Cooperation and Development	Federal Department of Economic Affairs	Federal Public Service Foreign Affairs, Foreign Trade and Development Cooperation	Ministry of Foreign Affairs, Ministry of Agriculture, Nature and Food Quality, Netherlands Enterprise Agency
Number of member organizations	77	70	60	38
Industry participation rate	Covers 80% of the national chocolate market	Almost all main manufacturers and retailers participating	Covers 95% of the national chocolate market	Almost all major players on the national chocolate market participating
Membership Structure	77 organizations (2 government agencies, 50 cocoa trading companies and chocolate manufacturers, 7 retailers, 1 academic and research institution, 15 CSOs, 2 certification bodies)	70 organizations (1 government agency, 37 cocoa trading companies and chocolate manufacturers, 7 retailers, 4 academic and research institutions, 13 CSOs and international organizations, 2 certification bodies, 6 industry organizations)	60 organizations (4 government agencies, 17 cocoa trading companies and chocolate manufacturers, 5 retailers, 7 academic and research institutions, 6 CSOs, 5 labor unions, 5 investment institutions, 4 certification bodies, 2 others)	38 organizations (3 government agencies, 15 cocoa trading companies and chocolate manufacturers, 5 retailers, 4 academic and research institutions, 9 CSOs and international organizations, 2 certification bodies)
Operating funds and financial resources	€500,000 (from annual membership fees). The fees for the corporate sector are calculated based on annual sales.	35 million Swiss francs, including 8 million Swiss francs contributed by the Ministry of Economic Affairs and annual membership fees (except for governmental organizations)	€2 million government funding + €4 million investment from the public and private sectors	N/A
Management	Two members from each sector are elected to the Board of Directors. Equal voting rights.	Two members from the industrial sector and one member from each of the other sectors are elected to the Board of Directors. The Ministry of Economy is also involved.	One member from each sector is elected to the Steering Committee.	One member from each sector is elected to the Steering Committee and appointed at the Annual General Meeting (2-year and 4-year terms).

Source: JICA Survey Team based on JICA Sustainable Cacao Platform 2021/12/15, ACE presentation materials.

3. Traceability: Present State and Issues

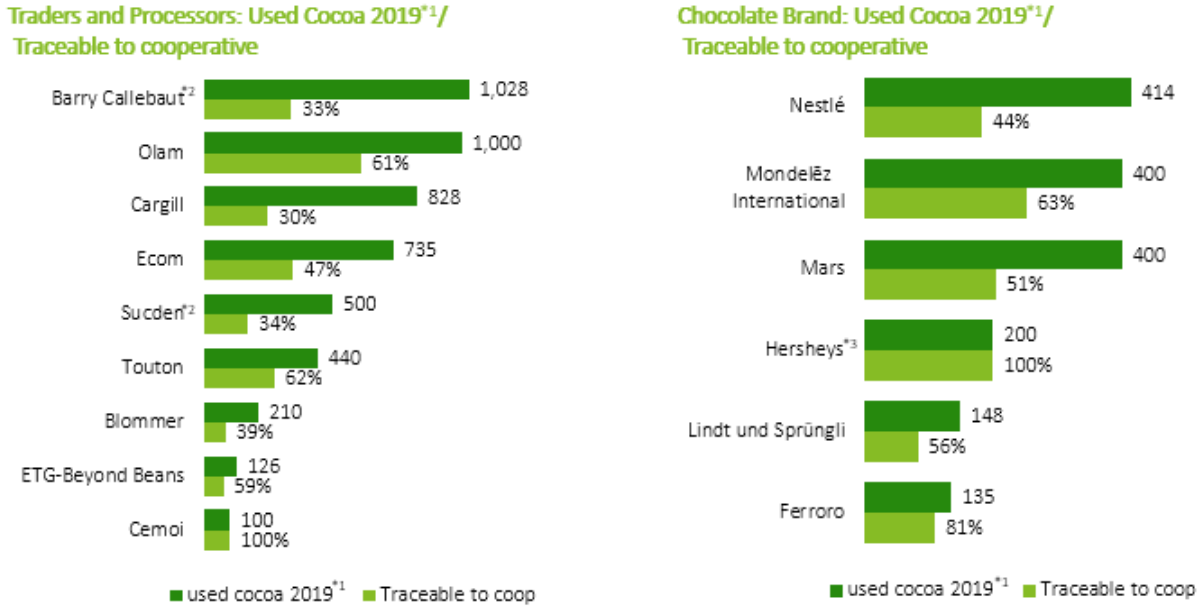
（1） Present State of Traceability

Present state of the Ivorian government

At present, there is no national-level cocoa traceability system in Côte d'Ivoire. However, some obligations exist; for example, all cooperatives and purchasing centers are required to report to the CCC and register all sales of cocoa beans using SYDORE,[21] traceability software introduced by the Ivorian government. As of the second half of 2020, SYDORE contains records of the name of production areas and estimated production volumes of more than 900,000 producers. Additionally, in 2020 the CCC conducted a feasibility study for an integrated cocoa traceability system and plans to pilot a dual physical-financial traceability system throughout the country in 2021.

Present state of companies

At present, many cocoa traceability systems focus on traceability in terms of the timing of initial purchases (from cooperatives and others). As for the present state of cocoa traceable to the cooperative level as a percentage of the worldwide supplies of individual companies, Barry Callebaut has achieved approximately 33% traceability, with Olam at 61% and Cargill at 30%. Among trading companies, ECOM has reached 47%, while ETG (formerly Cocoannect) has achieved 59% and Cemoi 100%. Among brands for consumers, Nestlé has reached 47%, with Mondelez at 63%, Mars at 51%, Lindt & Sprüngli at 56% and Ferrero at 81%.[22]



Source: Cocoa Barometer 2020
*1: using ICCO conversion rates: cocoa butter 1.33, cocoa paste/liquor 1.25, cocoa powder and cocoa cake 1.18
*2: using the reporting year 01/09/2018～31/08/2019
*3: cocoa demand estimated, tracebility data for 2020
Note: The authors also requested data on traceability to farm level, but the variance in answers coupled with a lack of reliability in data means that we cannot provide that information.

Source: JICA Survey Team based on Cocoa Barometer 2020.

Figure 15: Present State of Traceability at European and American Companies

[21] AU SYDORE DU CONSEIL CAFE CACAO
[22] IDH (2021)

There are two problems in traceability. The first is the difficulty of tracing information given the complexity of the supply chain. Chocolate manufacturers do not have direct knowledge of the present state of the cocoa industry because approximately half of cocoa is purchased through local brokers, wholesalers and trading companies. In other words, it is often impossible to tell whether the ingredients sourced involve child labor. The second problem is the inconsistency of traceability control items and scopes among companies. For example, some companies rely completely on the control items set out by NGOs such as Fairtrade International, while others set their own control items and manage traceability based on their own standards.

The Sustainable Trade Initiative (IDH), an organization that promotes sustainable trade through collaboration between major companies, NGOs and governments, sets out standard origin transparency levels and traceability levels (see below).[23] Many major European and American cocoa companies have achieved scores of 4 or 5. One aim of this survey is to ascertain at least which farms had an origin transparency level score of 4 or higher. However, it must be noted that even companies with high origin transparency level scores may mix in vast amounts of beans from other sources at later stages (transport, processing). Although most major companies that handle cocoa have adopted mass balance sourcing, some are using the segregation model.

IDH Cocoa Origin Transparency Levels

- Score 1: Country of origin specified
- Score 2: Country and region of origin specified
- Score 3: Country, region and local government/community of origin specified
- Score 4: Country, region, local government/community and farm of origin specified
- Score 5: Origin specified to the farm level, with each farm's coordinates specified (farm mapping)
- Score 6: Origin specified to the farm level, with each farm's polygonal boundaries specified, verifying that the farms are not located in protected forests or on land from which forested area was cleared and do not include land from which forested area was cleared in or after 2018

IDH Traceability Levels of Cocoa Sourced

- Level 0 (Conventional): Non-certified beans
- Level 1 (Mass balance): Certified and non-certified beans are mixed together in the manufacturing process. Although non-certified beans are included in the mixture, the volume of certified beans sourced is guaranteed.
- Level 2 (Segregation): Mixtures comprise certified beans obtained from multiple certified farms, with no non-certified beans mixed in and certified beans are delivered to the producers of final products. Individual producing farms cannot be identified, but the fact that the ingredients were produced at certified farms is guaranteed.
- Level 3 (Identity Preserved): Cocoa beans from individual certified farms were completely isolated from other beans until they were delivered to the producers of final products. Farms that produced the certified cocoa can be identified.

[23] IDH (2021)

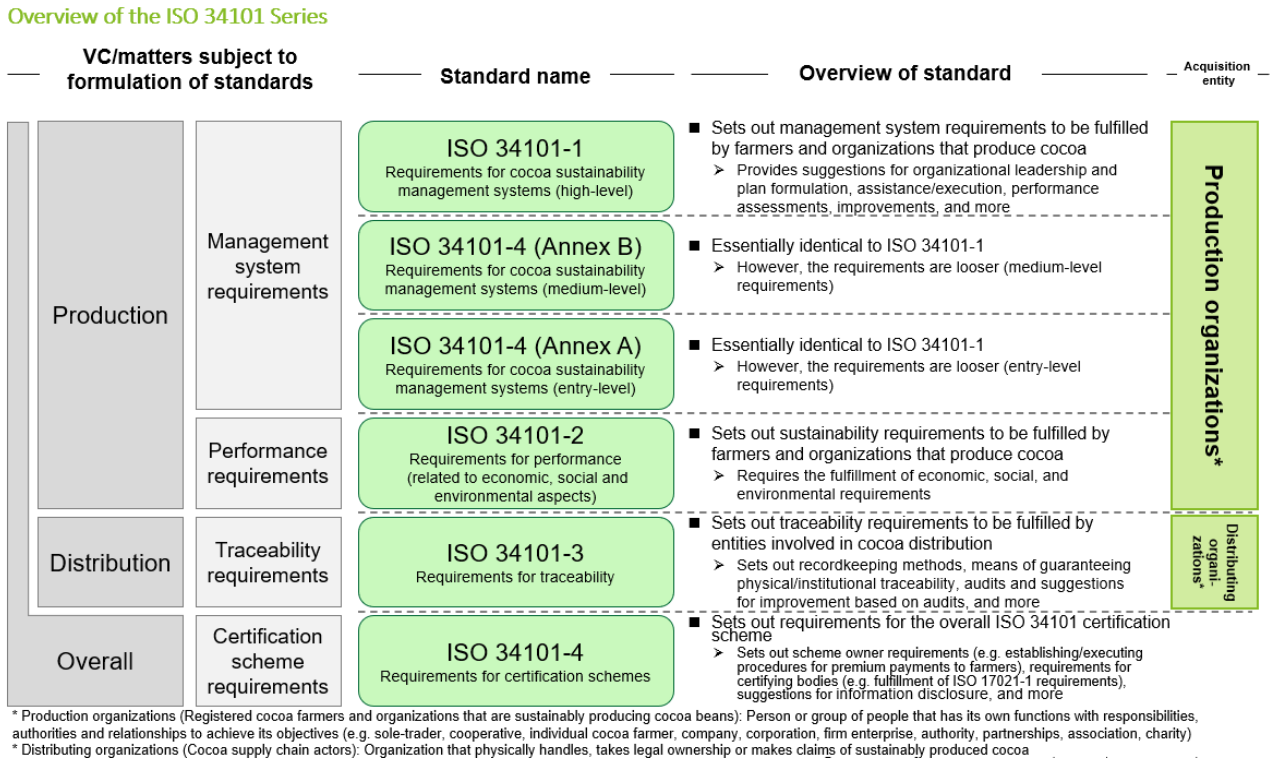
（2） Traceability Standards

Improving cocoa traceability is a critical means of improving accountability and sustainability in the chocolate and cocoa industries. The International Organization for Standardization (ISO) released the ISO 34101 series in May 2019 with the aim of improving the competitive strength of cocoa farmers and standardizing the definition of sustainability. With the dual aims of improving the competitive strength of cocoa farmers and standardizing the definition of sustainability, the standard sets out requirements for sustainable, traceability-guaranteed cocoa to be met by production and distribution systems.

The ISO 34101 series defines traceability as "the ability to follow the physical movement and/or mass conformity of sustainably produced cocoa through specified stages of production, processing and distribution." ISO 34101-2 (Requirements for performance) requires all producing organizations to fulfill economic, social and environmental performance requirements and ISO 34101-3 (Requirements for traceability) sets out four levels of traceability requirements and requires all producing organizations to guarantee traceability to an identical or lower level than their suppliers. The series also sets out recordkeeping methods, means of guaranteeing physical/institutional traceability, audits and suggestions for improvement based on audits and more.

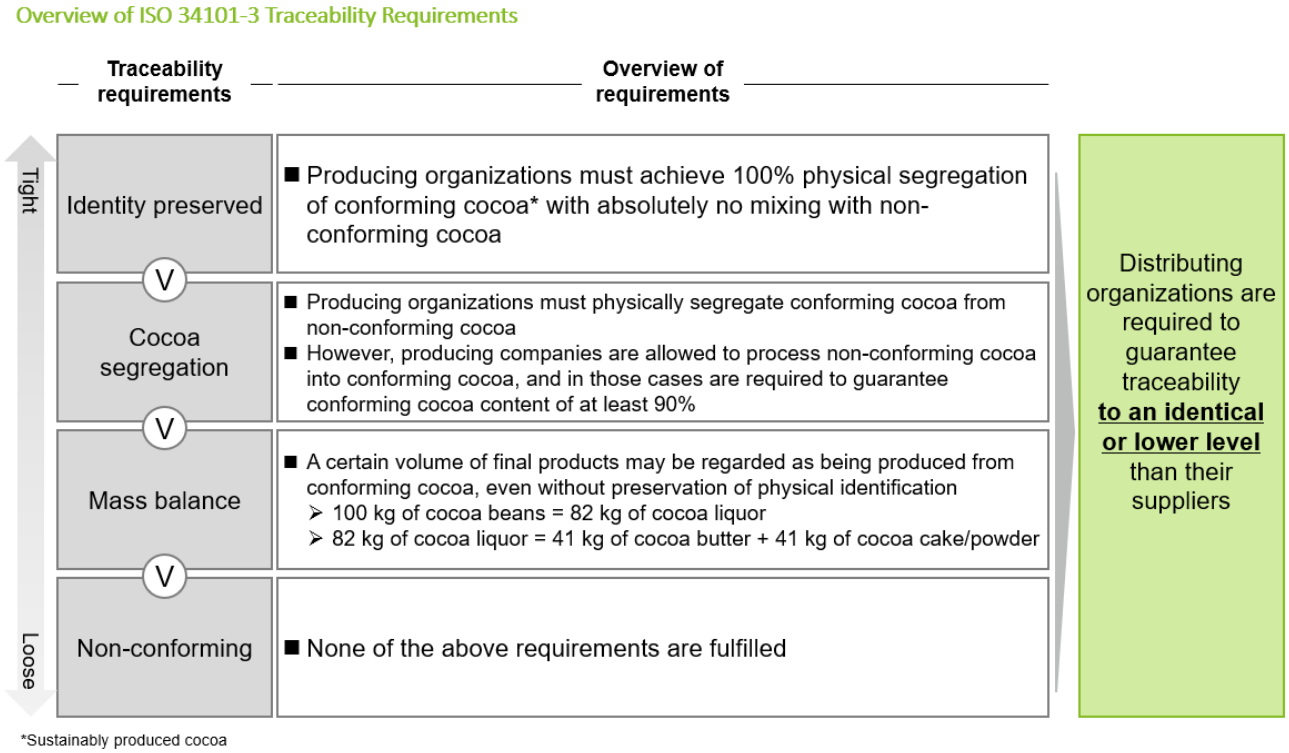
However, the levels required of Internal Management Systems on the farm and cooperative level are impossible to achieve in reality. Accordingly, in March 2019, Ghana and Côte d'Ivoire issued a joint declaration expressing their opposition to the ISO 34101 series in which they indicated that, although they do not oppose the standards themselves, they feel that the requirements do not take the circumstances of small-scale farmers into account. In response, producing countries are making efforts to develop a regional standard based on the ISO 34101 standards. Like the ISO standards, this standard—known as African Standard ARSO/DARS 1001 Sustainable Cocoa[24]—is very loose in the area of environmental protection and does not feature very stringent requirements for child labor or laborers' rights; however, it is highly likely that the governments of producing countries will attempt to operate the system on their own. Accordingly, in the course of conducting this survey, it is necessary to develop an understanding of these standards as well before making efforts to help producing companies expand traceable cocoa in an autonomous and sustainable manner.

[24] https://members.wto.org/crnattachments/2020/TBT/GHA/20_6088_00_e.pdf



Source: JICA Survey Team based on the ISO website.

Figure 16: ISO 34101



Source: JICA Survey Team based on the ISO website.

Figure 17: Traceability Requirements

Awareness of fair trade—including support for eradicating child labor—is high in Europe, the main export destination for Côte d'Ivoire cocoa; European companies that import and use cocoa produced in Côte d'Ivoire are very interested in child labor-free cocoa. Accordingly, progress has been made in Côte d'Ivoire toward establishing a system to ensure traceability in distribution to enhance value chain transparency; in contrast, not much progress has been made toward establishing a system for rightfully returning profits generated from the global cocoa value chain to producers.

4. Efforts by NGOs and Companies

To eradicate child labor, capacity building must be established over time, including raising awareness of child labor in communities and providing agricultural training. Both incentivizing the results of efforts to reduce child labor and the support to reduce child labor are required, the support should take precedence. Accordingly, it is unfair to focus only on incentivizing efforts to reduce child labor because doing so would exclude areas where awareness of the child labor issue has not been raised and those efforts are not being made.

The problem of child labor has an extremely complex background and cannot be solved overnight. It is crucial to cooperate with farmers—the source of traceability system data—and the initial priority is to get a clear picture of the situation of child labor so that appropriate countermeasures can be considered. At the same time, measures to prevent it are required.

(1) Efforts of NGOs and Civil Society

A) International Cocoa Initiative (ICI)

The International Cocoa Initiative (ICI) is a Swiss-based NGO established in 2002. The Harkin-Engel Protocol initiated by the US Congress was signed in 2001 and the ICI was established the following year to meet the goal of eradicating the worst forms of child labor on cocoa farms. As a foundation funded by players in the cocoa and chocolate industries, the ICI works with governments, the ILO, labor unions, NPOs, NGOs, consumers' associations and others to develop and implement child labor prevention projects, conduct fact-finding surveys and more. Meiji Co.,Ltd. became the first Japanese company to join the ICI in October 2021 and is set to begin working to eradicate child labor on cocoa farms in Ghana.

A typical ICI initiative involves working to develop and introduce the Child Labour Monitoring & Remediation System (CLMRS). As Figure 18 shows, the CLMRS is a system to eradicate child labor that works to identify, address and prevent its recurrence and is integrated into corporate supply chains. First, Community Liaison People (CLPs), who are often selected from the target farming communities, collect basic information on each household and monitor child labor through regular visits. The information thus obtained is then compiled in a database using such as mobile applications and analyzed by the ICI, whereupon appropriate measures to be taken in each case are considered. Based on this analysis, working children, their parents and the community then get support. The first example of this support is to boost the educational environment. This includes assistance in procuring birth certificates for school registration, provision of school supplies, opening of bridging classes to help children having dropped out of school to return and construction and renovation of schools and cafeteria facilities. Another means of support is to create an environment where children need not work by increasing the income of farmers and communities. This includes teaching the children's parents to read and write, supporting activities to diversify income sources by growing crops other than cocoa and supporting communal savings within the community called Village

Savings and Loans (VSLA).

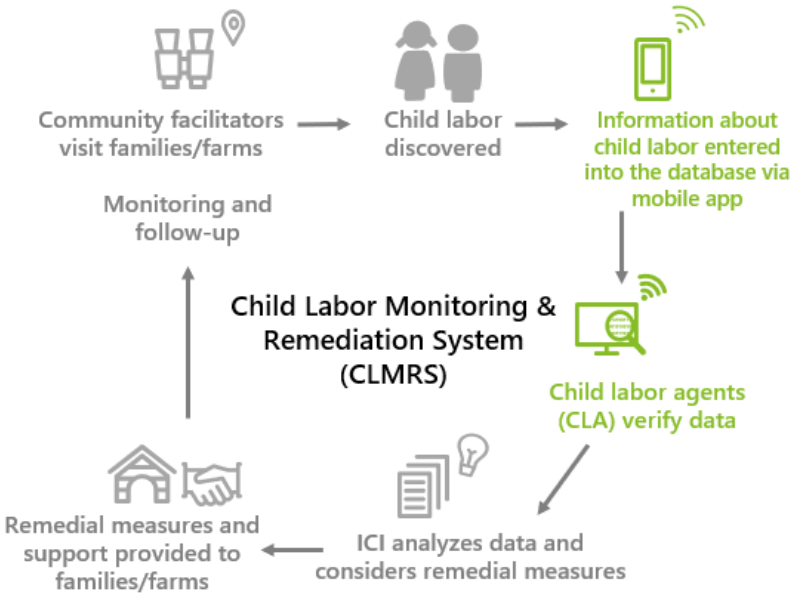
As of 2016, ICI has supported more than 160,000 cocoa farmers and 194 farmer cooperatives in Ghana, Côte d'Ivoire and Cameroon. The ICI provides technical assistance to companies for introducing this system to their supply chains and also conducts surveys and prepares reports about child labor in cocoa-producing areas.

To reduce illegal child labor, the ICI monitors and makes remedial approaches to 10% to 20% of cocoa farmers. The initiative plans to expand the scope of the system to 25% of the entire cocoa supply chain within the next several years.

The number of households that can be monitored on one occasion and the target number of visits to make to each household each year (anywhere from three times per year to once every two years) varies considerably by project; however, from the second follow-up visit onward, ongoing follow-up at least once every three months is recommended until there are no more reports of children engaging in hazardous labor. Ongoing visits are necessary because a survey revealed that 24% of child laborers whom reports say are not engaged in hazardous labor at a given time were found to be engaged in hazardous labor again during subsequent visits.

Although the ability to consistently attend school is an absolute requirement for eradicating child labor, there are three main reasons that children are unable to consistently attend school.[25] First, in some cases, parents are considered to be in the right when they force children to work. In Côte d'Ivoire and Ghana, it is customary for parents to make children help with work on cocoa farms in the same way that they were made to help when they were children. The underlying factor here is poverty; to resolve poverty, parents must be provided with livelihood support and they must be given proper time to change their way of thinking. Second, in some cases, children do not have birth certificates and thus are not allowed to enroll in school because their names do not appear on enrollment lists. To address this problem, the ICI is providing assistance for registering birth certificates; as a result, more children are now able to attend school. Third, schools are often too far away for children to feasibly attend. More schools must be constructed to address this problem. Local schools typically split their classes into a morning session and an afternoon session. Some children return home to eat lunch during the lunch break between sessions, but others are not able to bring lunch, either because their parents are too busy with farm work or for other reasons. The latter have nothing to eat until the evening. Enhanced school and school kitchen facilities incentivize children to consistently attend school, leading to a reduction of child labor.

[25] These include activities carried out through a child labor monitoring improvement system, of which the SSRTE carried out by the International Cocoa Initiative (ICI, shown below) is a representative example.



Source: JICA Survey Team based on the ICI website.

Figure 18: ICI Child Labor Monitoring System

B) Fairtrade International

Fairtrade International was established in 1997 in Bonn, Germany to function as the umbrella organization of Fairtrade organizations around the world. Under its control are Producer Networks in three regions (Africa/Middle East, Asia Pacific, Latin America/Caribbean) and Fairtrade Organizations and Fairtrade Marketing Organizations in 25 countries. Fairtrade International's vision is "a world in which all producers can enjoy secure and sustainable livelihoods, fulfill their potential and decide on their future," and the organization provides assistance to producers through Fairtrade International certification labels and many individual projects.

Fairtrade Standards and the Fairtrade Premium

The standard rules[26] of Fairtrade International have been prepared in terms of the following three criteria:

- Economic criteria
  - Fairtrade Minimum Price guarantee
  - Payment of the Fairtrade Premium
  - Promotion of long-term trading partnerships, etc.
- Social criteria
  - Safe working environments
  - Democratic operation
  - Prohibition of discrimination
  - Prohibition of child labor, forced labor, etc.
- Environmental criteria
  - Reduced/proper use of pesticides/agrochemicals
  - Promotion of organic production
  - Preservation of soil/water resources/biodiversity
  - Prohibition of genetically modified organisms, etc.

[26] Fairtrade International website

Fairtrade International created its certification standards based on the aforementioned principles and they are audited by Flocert, a third-party certifying body for Fairtrade International. Certification standards for small-scale cocoa farmers are as follows:

- General requirements
  - Requirements pertaining to the certification process and scope of standards
- Trade
  - Requirements when selling Fairtrade products
- Production
  - Requirements pertaining to environmental and social systems for guaranteeing sustainable lifestyles and proper working environments
- Business and development
  - Approaches pertaining to development specific to Fairtrade. Explanations of how social groups can build the foundations for empowerment and sustainable lifestyles

Producers found to be in observance of the aforementioned certification standards are certified, becoming able to sell their products at minimum prices set by Fairtrade International and also to receive the Fairtrade Premium. Organizations with Fairtrade certification subsequently submit reports every six months and are audited every one or two years.

Certifications for cocoa farmers are generally issued to cooperatives. The reason for this is that small-scale farmers increase their production volumes by associating with cooperatives and are able to negotiate prices from a stronger position with the brokers who visit Fairtrade-certified companies and towns. Additionally, when the Fairtrade Premium is paid to cooperatives rather than individuals, it serves as a type of funding that can be used for a wider range of purposes. For these reasons, Fairtrade believes in the utility of awarding certifications and paying the premium to cooperatives in terms of what communities need in the medium and long term. However, in these cases, cooperatives are required to be operated democratically; accordingly, audit agendas include items pertaining to cooperative operation.

One issue with the certification system is that the infrequency of audits makes it difficult to prove that all certified entities are always abiding by the standards. Therefore, in the case of child labor, it is necessary to be aware of potential problems. For example, children may not be working on the day the audit is conducted, but may be working on other days. To address problems like these, efforts like those to be explained later in this report must be made to provide assistance to producers outside of certification.

Additionally, separate from the audits conducted by Flocert, Fairtrade International and member organizations[27] also work to improve worksites and maintain certification as well as implement other measures to offer support to producers. Teams reportedly exist for fulfilling roles such as implementing workshops and conducting interviews and gap analysis of organizations seeking to become certified. In terms of activity layers as well, some activities are implemented for individual producers' cooperatives, while in other cases, such as the case of child labor, workshops are provided to a broader audience based on programs created to address problems.[28]

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[27] Referring to Fairtrade Africa, Network of Asia and Pacific Producers (NAPP), Latin American and Caribbean Coordinator of Small-cap producers and Fair Trade Workers (CLAC, Coordinadora Latinoamericana y del Caribe de Pequeños Productores y Trabajadores de Comercio Justo), and others

[28] From interviews of Fairtrade Label Japan

Table 5: Advantages Enjoyed by Producers

Advantage	Details of incentives
Fairtrade Minimum Price	Advantages common to all crops: ・Certified companies are obliged to pay minimum wholesale prices ・Producers' standard of living is guaranteed because fair wholesale prices are paid even when markets collapse ・Minimum prices are revised periodically Advantages limited to cocoa: ・A higher minimum wholesale price is applied to organic products ・Minimum price of cocoa beans: USD 2,400/MT (since September 2019)
Fairtrade Premium	Advantages common to all crops: ・Premiums on crop prices paid to Producer Networks ・Premiums used for the economic, social and environmental development of cooperatives and communities Advantages limited to cocoa: Premium for cocoa beans: USD 240/MT

Source: JICA Survey Team based on information from the Fairtrade International website and interviews.

Traceability system

For a product to bear the Fairtrade label, all actors in its supply chain must be certified, abide by Fairtrade Standards and make purchases at Fairtrade prices (Fairtrade Minimum Price + Fairtrade Premium). In other words, a product is not recognized as a Fairtrade product if its supply chain contains even one uncertified company or process, or if any purchase (even by a certified company) is not made at Fairtrade prices. Therefore, in addition to the aforementioned certification standards, Fairtrade records all crop transactions on Fairtrace,[29] a system introduced in 2017. All Fairtrade-certified organizations are obliged to report trading volumes, prices and other information to the system. All cocoa transactions in Côte d'Ivoire by local and multinational trading companies as well as downstream transactions are reportedly recorded in the system. Payments of the Fairtrade Minimum Price and the Fairtrade Premium to cooperatives—or lack thereof—are managed on Fairtrace; records of overseas remittances, contracts and other downstream transactions are subject to audit.

Efforts to provide assistance to cooperatives

Fairtrade works with Producer Networks and Fairtrade Organizations around the world on various efforts in addition to providing assistance to producers using the certification system. In Côte d'Ivoire, Fairtrade has implemented a project to help cooperatives manage information independently since 2019. As for the background of the project, a survey by Fairtrade Africa found that Fairtrade-certified cocoa cooperatives were having difficulty establishing Internal Management Systems (IMS) for managing business as they are required to do within three years of becoming certified. In response Fairtrade created IMS software tools and decided to implement a project to help cooperatives collect and utilize data on their own.[30]

[29] Flocert website
[30] From interviews of Fairtrade International

One problem cocoa cooperatives were facing was the requirement to submit crop information in different formats to the multiple companies to which they sold cocoa. In most cases, they prepared and submitted the information on paper or Excel spreadsheets. Additionally, cooperatives were unable to use their own data because they lacked systems for amassing it. Efforts to combat this problem involved providing IMS software to the five existing cooperatives and implementing a pilot project to enhance their capacity for data collection and analysis, a project Fairtrade ultimately intends to implement for all certified cooperatives.

Several challenges are involved in the course of introducing and operating IMS. The first is the problem of cost. Fairtrade offers assistance for the expense of IMS software licensing and installation in the first year, but cooperatives must pay their own expenses from the second year onward. However, because cooperatives lack the financial strength to shoulder these expenses and the capacity to make payments, they must take it upon themselves to find donors. The second challenge is to improve capacity for data analysis. Training for system operation is provided in the first year with assistance from the French government and other sources, but to sustain these efforts, it is necessary for the members of the cooperatives to understand the value of the data they have collected and to develop the skills to apply it in future risk analysis and investment programs.

C) Rainforest Alliance

The Rainforest Alliance is an international nonprofit environmental production organization established in 1987 with headquarters in New York, USA. With a vision and mission to "create a more sustainable world by using social and market forces to protect nature and improve the lives of farmers and forest communities," the organization is presently providing sustainable agriculture training and Rainforest Alliance certification in 70 countries worldwide.

Rainforest Alliance certification standards and premiums

In 2020, the Rainforest Alliance unveiled the Rainforest Alliance 2020 Certification Program to restructure its certification system. The new program is designed to support sustainable agricultural production and supply chains under new standards and an updated guarantee system with relevant data and technological systems. The program sets out the following requirements in its certification standards:

- Main requirements (for farms/supply chain actors)
  - Basic requirements for sustainable agriculture
  - Fulfillment of requirements must be constant to acquire certification in the pass/fail system
- Improvement requirements (for farms)
  - Stages defined for requirements for three-year certification periods
- Continuous improvement requirement: Smart meters (for farms)
  - Producers conduct baseline assessment and determine benchmarks for set periods of time
  - Plan/implement efforts to achieve benchmarks and monitor progress
- Self-selected requirements
  - Certified farms/organizations select requirements based on their own risk assessment and visions

Rainforest Alliance certification is awarded to individual farmers in some cases if their operations are large enough. Family-operated farms and other small-scale farms must form an organization and seek certification as an organization.[31] Audits for certification are conducted on a three-year cycle and certified organizations are

[31] From interviews of Rainforest Alliance

investigated (to verify based on objective evidence that they are fulfilling the designated requirements) each year.[32]

Like Fairtrade, Rainforest Alliance pays premiums to organizations that comply with their standards including the above.

Table 6: Advantages Enjoyed by Producers

Advantage	Details of incentives
Sustainability Differential (SD)	Additional cash premiums on crop market prices that are paid to certified producers. Advantages common to all crops: ・The SD is always paid directly to producers/laborers; organization managers cannot subtract any portion of the SD ・Producers cannot be regulated as to how they use the SD ・Large-scale farms must use the SD on laborers' benefits Advantages limited to cocoa: ・Minimum differential for cocoa: USD 70/MT (starting July 2022)
Sustainability Investment (SI)	Investments in individual farms or cooperatives by buyers of RA-certified products with the aim of improving farms. Advantages common to all crops: ・Cash payments and in-kind contributions are possible and installments are possible if agreed to by producers' organizations and primary buyers ・Payments and contributions are made based on investment programs formulated by producers seeking investment to fulfill key standards and achieve improvement requirements ・The SI cannot be used as an alternative to cash payments of the SD

Source: JICA Survey Team based on the Rainforest Alliance website and interviews.

The Sustainability Differential (SD) is a cash payment separate from the provision of capital for investment. The purpose of this is to provide reliable remuneration to individual producers instead of premiums because it is unclear how premiums have been used to date.

The SD is paid at different times for different crops. It is generally paid within one year, but in the case of cocoa, it is paid within six months. These periods are determined based on input such as discussions with producers and major companies in each sector.

As for the payment method, if commonly used monetary payments are to be made, there are no particular stipulations and payments are made by bank transfer or other means in line with producers' circumstances. Payments to cooperatives are made using a system in which individual farmers receive the SD commensurate with the volumes they sold to the cooperatives.

Traceability system

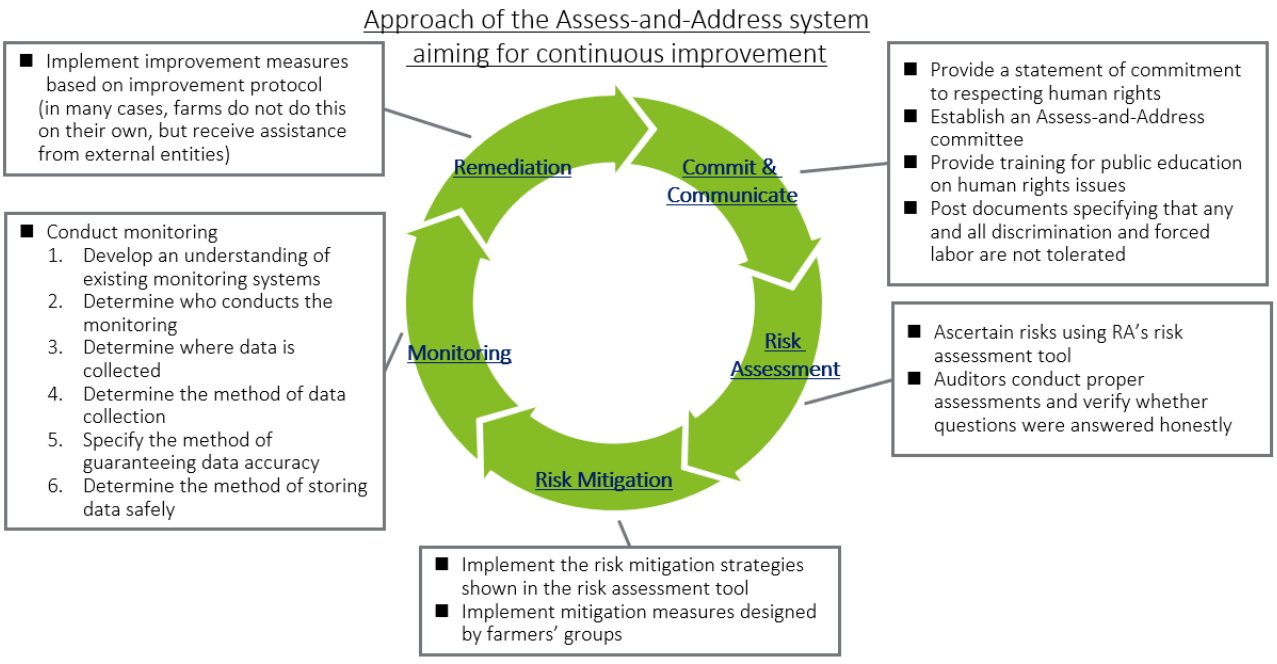
Like Fairtrade International, the Rainforest Alliance requires all actors in a product's supply chain to be

[32] Rainforest Alliance 2020 Certification and Auditing Rules

certified organizations in order for that product to be certified. To manage these transactions, the organization introduced MultiTrace, a digital platform for crop traceability. All certified entities (producers and companies) are required to register product types, trading volumes and dates and type of traceability (e.g. mass balance or segregation) on MultiTrace within the designated period of time. In the case of producers' organizations, representatives are required to take responsibility for entering their own data; however, if there is no internet connection or there is some other obstacle to doing so, they can delegate a primary buyer to enter the data for them. Auditors go out into the field to conduct audits in which they compare the data on MultiTrace to materials from the field (e.g. invoices) to check whether the transactions are being conducted properly.

The Assess-and-Address system

Many years of experience with these activities to date has revealed that simply prohibiting child labor, forced labor and other human rights violations not only prevents laborers and their families from improving their lives, but also forces illegal practices underground, making them more difficult for auditors to identify. To address these concerns, the Rainforest Alliance introduced the Assess-and-Address system, a more sustainable method focusing on prevention, engagement and improvement. Under Assess-and-Address, information is gathered via risk assessment and monitoring and then used to implement improvement activities with the aim of resolving problems in stages.



Source: JICA Survey Team based on the Rainforest Alliance website.

Figure 19: Overview of the Assess-and-Address System

Accordingly, global certification systems Fairtrade and Rainforest Alliance conduct audits according to their own certification standards and protect the rights of producers, promote sustainable farming and otherwise broadly promote measures to resolve environmental and human rights issues. They also have their own systems into which they require all certified entities to enter transaction information, guaranteeing the origins of certified products by achieving traceability (albeit to the cooperative level in many cases). However, the infrequency of

audits means it is not always possible to say that farms producing certified beans have met all of the audit criteria in full and similarly difficult to say that certified beans are completely free from forced labor or child labor. To address these problems, the organizations are providing assistance to communities, working on monitoring systems that make it easier to measure benefits and making other efforts toward measures that are more aligned with circumstances and make a more direct approach to problem-solving.

(2) Efforts of Companies

A) Cargill

In 2012, American trading company Cargill instituted the Cargill Cocoa Promise, a commitment to cocoa farmers and their communities to help them achieve better incomes and standards of living while engaging in sustainable production. In 2017, the company introduced goals for sustainability aligned with the UN's SDGs. Specific efforts include providing agricultural training to farmers in its direct supply chain, establishing traceability from farms to factories, providing assistance to communities and GPS mapping for farmers to prevent the destruction of forests. The following subsection describes the company's traceability efforts and measures against child labor.

Traceability efforts

In 2017, Cargill started introducing Farmforce for small-scale cocoa farmers in Côte d'Ivoire as part of the Cocoa Promise program. The four main aims of this effort are listed below:

- Traceability for each bag of beans
  - Barcodes are used to provide information about the origin of each bag of beans in the supply chain. The information is linked to GPS mapping, enabling Cargill to trace individual bags and prove that the cocoa was not produced in protected reserves.
- Managing certified beans
  - Each farmer's volume of certified beans is managed and actual volumes are checked to ensure that they are within the permitted and allotted volumes.
- Promoting fair sourcing relationships between farmers and cooperatives
  - Cargill guarantees that sourcing relationships between farmers and cooperatives are based on the provision of cocoa certified for premiums and that the premiums actually reach small-scale farmers. The company also quantitatively assesses the impact of these relationships and monitors and assesses farmers' livelihoods with a high degree of transparency
- Assistance for cooperative management work
  - Cargill provides cooperatives with advanced systems for daily management based on collected data

Farmforce started as a pilot project for four cooperatives and is presently used by more than 130 cooperatives, helping them visualize what is happening in the fields of 250,000 small-scale cocoa farmers.

In the course of introducing a traceability system, it is critical first and foremost to involve local authorities and stakeholders and then to embark on a campaign to raise awareness on the community level. These activities deepen farmers' understanding of the efforts and can minimize challenges that arise when introducing the new system.

Challenges faced by Cargill when introducing its traceability system include insufficient electricity and clean water, unreliable internet connections and a lack of schools and other basic infrastructure.

B) Barry Callebaut

The Barry Callebaut Group, which has headquarters in Zürich, Switzerland, is a manufacturer that handles everything from sourcing and processing cocoa beans to manufacturing chocolate products. The group provides assistance to cocoa producers through Cocoa Horizons, a nonprofit organization founded in 2015. Cocoa Horizons aims to improve the lives and communities of cocoa producers and protect children and the environment by promoting sustainable, commercial agricultural management, improving productivity and promoting community development. The foundation is audited each year by an audit firm and the details of its activities and allocations of premiums gained from the sale of Cocoa Horizons-certified chocolate and cocoa products are also investigated.

Traceability efforts

Since 2016, Barry Callebaut has used an app named Katchilè, which was developed on the SAP platform, to trace cocoa and manage data. The group's main objective in introducing the app was to prove that the cocoa and chocolate products it sources and produces are free of forest destruction, child labor and forced labor.

Katchilè collects various types of data on farmers and cooperatives and enables the measurement of the effects of programs implemented by Cocoa Horizons. Specific types of data collected include details about farmers' activities and households, child labor risk assessment, cocoa yields, farm information and agricultural training and certification-based premiums received by farmers. The app includes a traceability module that makes it possible to record and trace cocoa trading volumes and verify whether they match the yields of individual farmers. Additionally, as part of its efforts to protect forests, the company has mapped nearly 100% of farms and storehouses located in protected reserves and monitors the cocoa in its supply chain to ensure that it does not come from protected reserves.

Challenges in establishing traceability

Barry Callebaut indicated the difficulty of identifying, registering and mapping farmers that work in forests and protected reserves as a challenge faced during the introduction of Katchilè. Other major challenges include insufficient discipline and digital literacy among farmers and infrastructure problems, namely unreliable networks and hardware. Sensitization is extremely important for resolving challenges pertaining to farmers. The company recognizes the need to provide training on child labor and climate change to farmers in the supply chain and to provide opportunities to create awareness by gathering farmers, community members, medical personnel and others, thereby deepening understanding in these communities.

C) Olam

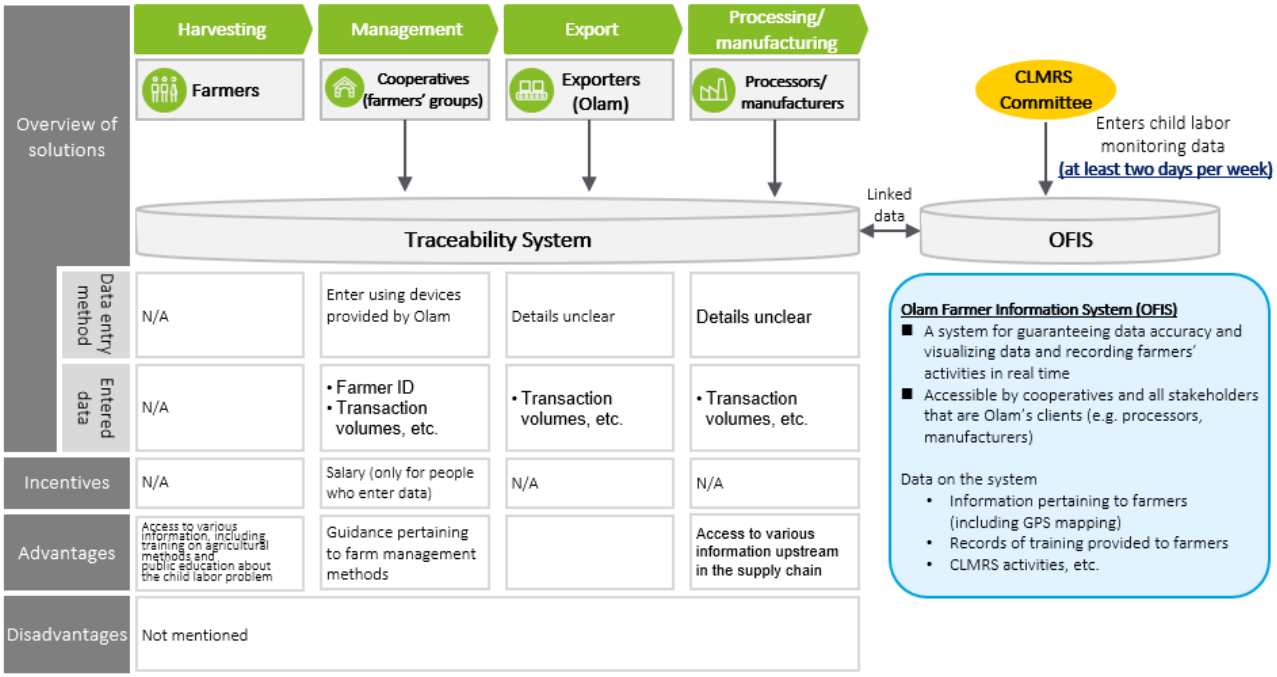
In 2019, Olam, a food ingredient and agricultural commodity company with headquarters in Singapore, launched Cocoa Compass, a program for providing assistance to cocoa-producing communities. The program consists of various efforts to combat key issues in the cocoa supply chain. Specific efforts include assistance for farmers (agricultural training, providing seeds for improving yields), empowerment activities (CLMRS, assistance for women to participate in society) and investment in nature (using GPS mapping and satellites to monitor the state of forest destruction in its direct supply chain).

Traceability efforts

In addition to a system that traces beans, Olam uses a database with various information on farmers to

implement measures for achieving sustainability. Olam manages the sources of its beans by obtaining transaction information at the cooperative level. The company envisions that the scope of the system will eventually expand to include payments made using the tool

In contrast, Olam manages information pertaining to farmers using a digital platform known as the Olam Farmer Information System (OFIS). The system was developed to guarantee the accuracy of the data and also to visualize field activities conducted by Olam in real time. OFIS contains polygon mapping and other farm information, information on agricultural and other training received by farmers, CLMRS activities and more. Linking OFIS with the aforementioned traceability system enables all stakeholders in the Olam supply chain to access the information on OFIS. For example, chocolate manufacturers can verify the origin of the cocoa they source as well as the sustainability efforts of the farmers there.



Source: JICA Survey Team based on interviews.

Figure 20: Image of Traceability at Olam

Challenges in establishing traceability

The following are the two major challenges Olam faced in the course of introducing the aforementioned system:

- Infrastructure environment: OFIS and other systems are designed to be able to function offline as well as online. However, an internet connection is needed to upload data and unreliable connections present challenges each time real-time data is collected.
- Stakeholder involvement: In the course of collecting data from farmers, it is sometimes difficult to gain their understanding and trust as to the intent of the data collection and it can also be difficult for them to set aside time for the surveys in the first place. Additionally, to gain farmers' trust and get them to provide the data, data must be collected by people from their communities. However, this presents challenges such as the inability to find the proper people for mastering data collection and the tools thereof and overburdening the few suitable people who are indeed found.

Collaboration with farmers and cooperatives is vital for executing this type of sustainable program. Accordingly, establishing traceability always starts with obtaining information from farmers. Specifically, this means obtaining information about farmers, such as the size and location of their farms, their certification status, whether their families include children and adjacent infrastructure. Additionally, cooperatives must be surveyed to ascertain information such as their methods of management (e.g. democratic management, whether they are actually improving farmers' lifestyles) and compliance with laws.

D) Nestlé

Since 2009, Nestlé, a food and beverage manufacturer with headquarters in Switzerland, has implemented the Nestlé Cocoa Plan, a set of activities for addressing various problems in the cocoa industry, namely the aging of cocoa trees. The company's vision is to build a bright future for cocoa farmers and produce high-quality cocoa and it aims to source 100% of cocoa used in confectionery products under the Nestlé Cocoa Plan by 2025. The company's main efforts include assistance for farmers, namely providing agricultural training and high-yield cocoa seedlings and humanitarian assistance, namely introducing the CLMRS, activities for gender equality, establishing a traceability system for better cocoa and forest protection activities.

Traceability efforts

Nestlé sources its cocoa for confectionery products through Tier 1 suppliers—mainly Cargill and Barry Callebaut—that have commercial relationships with cooperatives and manage certification processes and sustainability activities. Nestlé created the Nestlé Responsible Sourcing Standard,[33] and encourages its suppliers to comply. Although the company forms relationships with cooperatives and provides assistance to some farmers through the Cocoa Plan, as things stand, suppliers are largely responsible for traceability efforts.

In January 2022, the company announced its intention to invest a total of 1.3 billion Swiss francs (about 159.9 billion yen) in the sustainable procurement of cocoa by 2030, more than three times the current annual investment. At the same time, the company is changing the traceability of its products over the next five years; moving from a mass balance system, in which certified and non-cacao products are mixed, to one of segregation, in which products cannot be produced when mixed.[34]

Efforts to combat child labor

In 2012, Nestlé teamed with the ICI to introduce the first CLMRS in the cocoa industry and since then has provided assistance for addressing the problem of child labor and giving children access to better education. The CLMRS assigns an ID to each and every child and Nestlé has managed these IDs in its processes as well as the communities and cooperatives with which it is affiliated, enabling follow-up through the years. The CLMRS has expanded its scope and the scale of its remédiation activities over the years. In particular, the system has devoted energy to improving access to and the quality of education in recent years.

[33] Nestlé Responsible Sourcing Standard

[34] Nestlé's press release (2022/1/27)
https://www.nestle.com/media/pressreleases/allpressreleases/tackle-child-labor-risks-farmer-income-cocoa-traceability

Table 7: Results of CLMRS Activities by Nestlé, 2012-2019

Farmers 	Number of participating cooperatives	87
	Number of farmers monitored	73,248
Communities 	Number of participating communities	1,751
	Number of members that have received training on child labor	593,925
Children 	Number of children monitored	78,580
	Number of children confirmed to be working	18,283
	Rate of child labor	23%
	Number of children who have been the beneficiaries of remedial measures at least once	15,740

Source: JICA Survey Team based on Nestlé's "Tackling Child Labor 2019 Report".

E) Japanese Companies

In Japan, companies are beginning to take action in response to the increasing global focus on "business and human rights" in recent years. In line with the UN Guiding Principles on Business and Human Rights and the SDGs, Japan's major chocolate manufacturers have formulated sustainability policies and ESG goals and are implementing their own initiatives. However, there are still no examples of companies having established their own traceability systems to trace the cocoa beans they procure.

The following are some of the sustainability efforts of each company. The first is formulating procurement policies and supplier guidelines with the aim of procuring sustainable raw materials and building responsible supply chains. The companies involved declare their commitment to fair, impartial and transparent procurement practices, supplier selection and implementation of procurement activities that take social issues like the environment and human rights into account and also request that their suppliers understand and cooperate in these activities through the guidelines. In addition, some companies have also set specific targets for the ratio of so-called "sustainable" cocoa beans, palm oil and other raw materials to be procured, which they are striving to achieve. In addition, some companies are implementing their own programs or collaborating with other organizations (WCF, NGOs, NPOs, etc.) to support production areas and producers. Specifically, they provide technical guidance and seedlings to improve farmers' productivity, monitor child labor and support the development of educational environments in cocoa-producing areas through donations based on product sales.

Accordingly, private companies in the cocoa industry in Japan and around the world are engaged in various efforts toward sustainable cocoa production. Specifically, the world's major trading companies have already developed their own traceability systems and some are even able to trace each farm and bag of beans. Additionally, the companies are implementing various measures to combat environmental and human rights problems—namely the destruction of forests, forced labor and child labor—and in some cases have even linked problem-related data to traceability data. In contrast, although Japanese companies have established sustainability-related targets and are aiming for goals such as cocoa bean sourcing that respects human rights and the environment, they are still developing their own traceability systems and none have put them into practice yet.

Non-Japanese companies are leading the way with their efforts, but the plethora of systems that serve similar

functions and the requirement for farmers to submit the same information multiple times to different companies in different formats can be burdensome to the farmers. Looking ahead, it will likely be necessary to explore the possibility of interoperability between existing systems and to improve traceability systems to make them more convenient for farmers rather than companies.

Table 8: List of Traceability Systems

Organization name	Certification/traceability systems			
	Overview	Advantages to farmers	Characteristics	Issues
Fairtrade International	Certification-based on the following requirements: - General requirements - Trade - Production - Business and development Fairtrace - Fairtrade's own management system - All local and multinational trading companies as well as downstream certified entities are obliged to enter information and purchasing at appropriate prices and premium payments are monitored	Fairtrade Minimum Price guarantee - All payments are made to Producer Networks at a guaranteed fair price - Minimum price of cocoa beans: USD 2,400/MT (since September 2019) Receiving the Fairtrade Premium - Premiums on crop prices paid to Producer Networks - Premiums used for the economic, social and environmental development of cooperatives and communities - Premium for cocoa beans: USD 240/MT	Assistance for producers - Producers' standard of living is guaranteed because fixed wholesale prices are paid even when market prices fluctuate - Certifying cooperatives enhances strength in negotiations with companies and payment of premiums in lump sums broadens the range of purposes for which the money is used	Limits of audits - One issue with the certification system is that audits are conducted for just a few days per year; it is difficult to fully guarantee a lack of violations of the certification standards Cost - The fact that the price is higher than other certification systems can make companies hesitant to participate
Rainforest Alliance	・Certification-based on the following requirements: - Main requirements (for farms/supply chain actors) - Improvement requirements (for farms) - Continuous improvement requirement: Smart meters (for farms) - Self-selected requirements MultiTrace	Sustainability Differential guarantee - Premiums on crop market prices are paid to certified producers - The SD is always paid directly to producers/laborers; organization managers cannot subtract any portion of the SD - Producers cannot be regulated as to how they use the SD - Large-scale farms must use the SD on laborers' benefits	Assistance for producers - The new Sustainability Investment holds entire supply chains responsible for sustainable agriculture and provides assistance for farms and cooperatives	Limits of audits - It is a challenge to resolve child labor and other problems that cannot be fully comprehended with infrequent audits. Therefore, a system that assesses efforts toward improvement rather than making pass/fail judgments is operated concurrently

	- Rainforest Alliance's own management system - All certified entities (producers and companies) are required to register product types, trading volumes and dates and type of traceability (e.g. mass balance or segregation) in the system	- ・Minimum differential for cocoa beans: USD 70/MT (starting July 2022) Sustainability Investment - Investments in individual farms or cooperatives by buyers of RA-certified products - Cash payments or in-kind contributions - Investments are used to fulfill key standards and achieve improvement requirements		
Cargill	Farmforce - Barcodes are used to provide information about the origin of each bag of beans in the supply chain	Receiving premiums	Promoting fair sourcing relationships - System guarantees the appropriateness of premium amounts and payments to farmers - Quantitative assessment of the impact of farmer-cooperative relationships and highly transparent monitoring	Infrastructure development - Insufficient electricity and clean water - Unreliable internet connections - Lack of schools
Barry Callebaut	Katchilè - An SAP-based system for cocoa traceability and data management - Collects various types of data on farmers and cooperatives and measures programs implemented by Cocoa Horizons	Receiving premiums - Participation in Cocoa Horizons, which is run by Barry Callecaut, provides access to cash premiums and project assistance for community development	Certifies that cocoa is free of forest destruction, forced labor and child labor - Possible to record and trace cocoa trading volumes and verify whether they match the yields of individual farmers - Mapping the locations of nearly 100% of farms and storehouses and monitoring cocoa in the supply chain to ensure that it does not come from protected reserves Practicality of the system	Understanding of farmers in protected reserves - Difficulty identifying, registering and mapping farmers that work in forests and protected reserves Capacity building - Insufficient discipline and digital literacy among farmers Infrastructure development - Unreliable networks and hardware

			- Can be used offline as well as online	
Olam	Original traceability system - Sources of beans managed by obtaining transaction information at the cooperative level - Future aim: Expand the scope of the system to include payments made through the system Olam Farmer Information System (OFIS) - Contains farm information, GPS mapping data, information on training received by farmers, information on CLMRS activities and more - Child labor monitoring data is recorded at least two days per week	Access to various types of information - Participating in the sustainable program operated by Olam provides access to training on agricultural methods, child labor and other human rights-related issues and more	Practicality of the system - Can be used offline as well as online Provides information to stakeholders - Linking OFIS with the traceability system enables relevant stakeholders to view information about supplier farms	Infrastructure development - Unreliable internet connections during data uploads Stakeholder involvement - In the course of collecting data from farmers, there is some difficulty gaining their cooperation and understanding as to the intent of the data collection - Data must be collected by community members, but it is difficult to find the proper people and the few who are indeed found can be overburdened
Nestlé	Unclear whether Nestlé has established its own traceability system (the company mainly relies on the efforts of its Tier 1 cocoa suppliers)	N/A	N/A	N/A
Tony's Chocolonely	A blockchain pilot project - Jointly implemented with Accenture in Côte d'Ivoire in 2018 - Involved recording cocoa bean transaction and transport information from cooperatives to local exporters	None in particular	Not mentioned (*However, the possibility of future introduction is under consideration because the advantages of blockchain (e.g. managing personal information) will increase as the number of stakeholders increases)	Limits of blockchain - Difficulty reflecting actual information (e.g. loss of bags of beans in transit, mistakes in storehouses) in real time - Data reliability issues because the technology was not robust enough during the project - Data entry is difficult in areas with unreliable networks

				Cost - Immense cost and time required to introduce
DLT Labs	Pilot project for cobalt mining - An original blockchain system was used in the Democratic Republic of the Congo to record cobalt transaction information from mining companies to exporters - Initial input was done by hand at mines and quarries, but downstream data entry was automated to the extent possible by linking to IoT, sensor devices, RFID tags and ERP systems	*Advantages to miners: Introduction of the management system ensured safe working environments	Establishment of highly reliable traceability - Minerals traceable throughout entire supply chains - All participants had end-to-end access and could share transaction data Improved work efficiency - The system incorporated the concept of responsible sourcing and a due diligence framework, reducing costs such as the expense of creating reports about ethical sourcing - Plant operations and mill processes optimized, recovery rates improved, costly transport mistakes eliminated - The use of smart contracts automated standard transactions between supply chains and reduced payment-related problems	Infrastructure development - Reliance on IoT devices and other technology is required to guarantee proper data entry - Unreliable internet connections and other infrastructure - Required investment in security and collaboration with local security forces Stakeholder involvement - Understanding and acceptance must be enhanced to introduce solutions
Ford	Pilot project for cobalt monitoring - Used blockchain developed by IBM to monitor cobalt mined in the Democratic Republic of the Congo until it was used in lithium-ion batteries for motor vehicles	*Advantages to miners: Not mentioned	Data transparency guaranteed - If data is entered properly and audits are conducted, subsequent data transmission is highly reliable Ease of audits - Checking information between stakeholders is easier than checking certification and audit results	Guaranteeing scalability - Given the large number of suppliers, the inability to guarantee transaction speeds if the number of users increases, for example, is recognized as a key issue Reliability of initial input

				- Third-party audits and risk assessment must be conducted to verify the accuracy of data from initial input. Stakeholder involvement - Time is required to ensure that all stakeholders understand and properly use the new technology

Source: JICA Survey Team based on interviews.

Chapter 3: Verification Items and Vision for this Survey

（1） Verification Items

In this survey, we will examine the methods of collecting reported data on the present state of child labor as well as what data is collected, which contributes to ensuring the accuracy and traceability of the data and we will develop and test an app using blockchain and other technologies (Chapter 4). We will also conduct a consumer survey on sustainable cocoa and provide suggestions to companies in the cocoa industry (Chapter 5). The report concludes with a technical discussion as to whether supply chain stakeholders are capable of introducing blockchain-based traceability systems (Chapter 6). In this survey, we will interview stakeholders while concurrently striving to collaborate with the Platform for Sustainable Cocoa in Developing Countries in considering policies for the future.

Table 9: Verification Items

Method of verification	Objective	Verification items
PoC (Chapter 4)	Develop an accurate understanding of information about child labor	・Appropriateness of incentive design ・Verification of infrastructure environment ・Viability
	Strengthen measures to prevent child labor	・Examine measures to increase the number of children attending school ・Feasibility of creating awareness among farmers
	Stakeholder involvement	・Appropriateness of target stakeholders ・Considerations for collaboration (platform utilization)
Consumer survey (Chapter 5)	Expand the market for sustainable cocoa	・Willingness to purchase sustainable chocolate ・Recognition of certification logos, awareness of the problem of child labor, etc.
Desktop survey (Chapter 6)	Blockchain usage policy	・Possibility of using blockchain in traceability systems ・Ideal state of traceability systems and challenges pertaining to linking supply chain information
Other (outside scope)	・Collaboration with governments ・Collaboration with financial systems for farmers ・Measures against intruders from neighboring countries	—

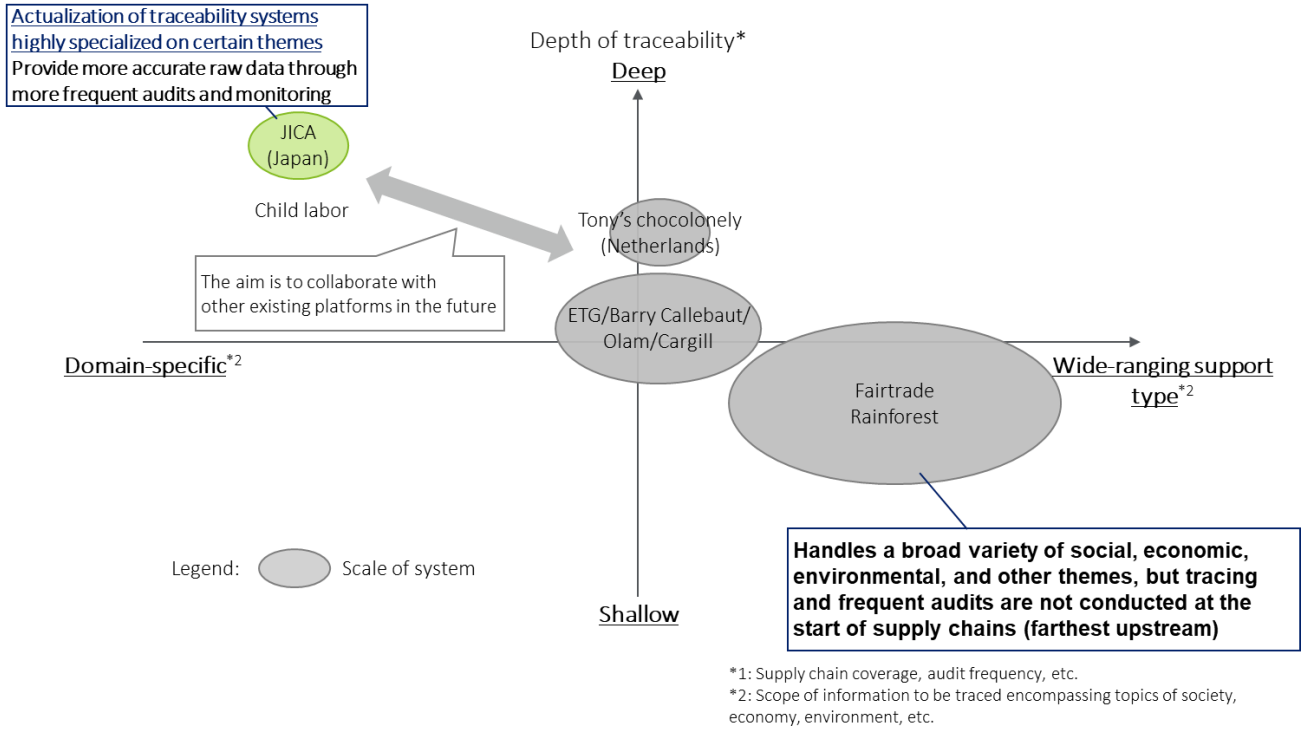
Source: JICA Survey Team.

（2） Vision for Traceability Systems

We will examine issues pertaining to traceability system pilot projects and upcoming measures based on the results of the PoC. We will exchange opinions with multiple supply chain stakeholders and interview them about the feasibility of traceability systems in terms of social system establishment as well as the possibility of support

through legislation.

Although existing traceability systems are widely used to combat child labor and environmental problems, the information processed through them is not very deep (reliable or high-frequency); for example, in some cases, it is possible to develop an understanding of information only a few times per year or once per few years. Therefore, our vision is for a traceability system that specializes in child labor, tracing information with higher accuracy, precision and frequency farther upstream to the individual farmer level in an effort to differentiate from existing traceability systems. Specifically, the aim is to provide more accurate raw data through more frequent audits and monitoring, including collaboration with schools.



Source: JICA Survey Team.

Figure 21: Positioning of each organization and the direction this system aims to take

(3) Considerations for Collaboration between Companies

At present, European and American companies are attempting to establish their own traceability systems for traceable cocoa in specific areas, but the plethora of efforts by individual companies could increase the burden on farmers and is not desirable in terms of efficiency. Accordingly, collaboration between companies—that is, collaboration between consuming countries—would be ideal.

As explained previously, in Japan in February 2020, JICA took the lead in establishing the Platform for Sustainable Cocoa in Developing Countries, which promotes collaboration between NGOs and companies toward resolving the problem of child labor in the cocoa industry. In future, through dialog with companies participating in the platform, the policy on the mechanism of a return to producers and the viability of using the blockchain platform may be considered.

Chapter 4: Proof of Concept (PoC)

1. Purpose

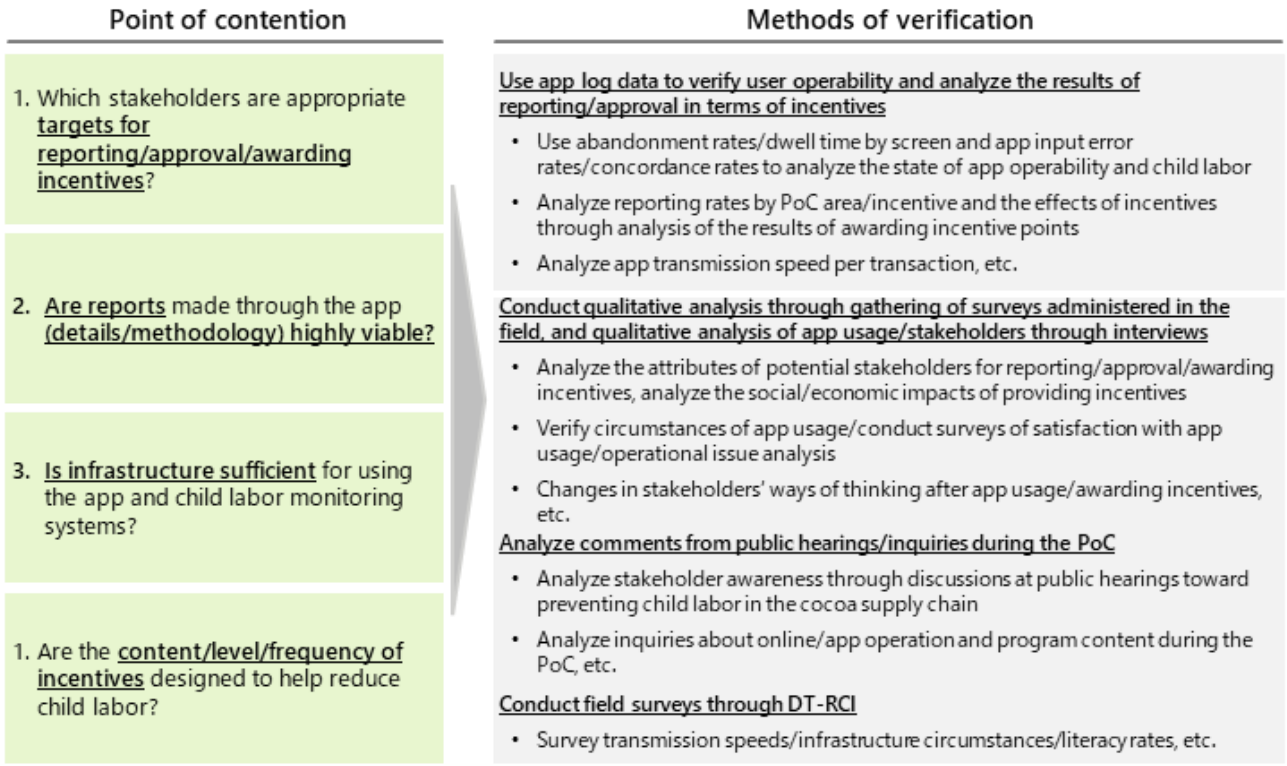
（1） Points of Contention

The purpose of this demonstration of PoC is to verify the possibility of obtaining accurate information about child labor through an app. There are four major points of contention in this demonstration of PoC:

1. Which stakeholders are appropriate targets for reporting/approval/incentives through the app?
2. Are the details/methodology of reports through the app highly viable?
3. Is infrastructure sufficient for using the app and child labor monitoring systems?
4. Are the content/level/frequency of incentives designed to help reduce child labor?

（2） Methods of Verification

1. Use log data from the app (app usage rates, rates of accurate data entry) and interviews conducted in the field to analyze which stakeholders have the capability and motivation to enter accurate information.
2. Conduct an interview survey to ascertain the circumstances in which the stakeholders use the app and inquire about and analyze their app usage to analyze the app's UI and UX, their level of satisfaction with how the app works and whether they are able to operate it free of problems.
3. Conduct a field survey to verify whether local communications infrastructure is capable of withstanding the demands (transaction volumes) of child labor systems to be installed in future. Additionally, conduct interviews in the field and the like to verify the present rate of stakeholder literacy.
4. In terms of content, conduct interviews in the field to verify which incentives are best for the target stakeholders. In terms of level, use the status of reports through the app and interviews conducted in the field to conduct an economic analysis of stakeholders and verify the level of incentives at which stakeholders will use the app system and at which child labor is effectively reduced. In terms of frequency, verify the frequency at which stakeholders will consistently and continuously use the app.



Source: JICA Survey Team.

Figure 22: Verification Issues and Methods

2. Points to be Considered During the PoC

Points to remember while demonstrating the PoC are clarified based on initial surveys of stakeholders in the cocoa industry (harvest phase) and cases in which blockchain-based supply chain systems were introduced and PoC was demonstrated.

（1） Analysis of Stakeholders in the Cocoa Harvesting Phase

The cocoa harvesting phase mainly involves six stakeholders.

Children are the performers of child labor and thus have an accurate understanding of whether they are working; however, they likely lack the capability to report highly reliable information given their relationships with farmers and their parents. Similarly, parents have an accurate understanding of information, but believe that child labor is necessary for their livelihoods,[35] and thus likely lack incentives to report highly reliable information. Livelihood support is likely necessary to motivate parents to eliminate child labor.

Schools have attendance records and thus know about children who attend. Schools also desire to have children attend. Thus, schools are likely to report highly accurate and reliable information. However, the lack of school facilities such as cafeterias and school supplies (textbooks and notebooks) means the need to support school facilities through the use of the system is assumed, given the inability to provide sufficient support to allow children to attend school.

CLMRS agents are tasked with monitoring child labor as described in Chapter 2, Section 4. Since their role is to audit child labor, it is assumed that they are reliable and that the audit office standpoint is appropriate.

[35] Parents who have a need for child labor likely believe this.

Stakeholder	Overview of initial survey	Points for the PoC
Children	• Approximately 30% of children are engaged in child labor on average in Côte d'Ivoire, and the issue extends to the cocoa industry • Whether a child engages in child labor depends on their parents' economic circumstances	• Children have accurate information about whether they are engaged in child labor, but they are not suitable reporters due to the low reliability of information reported • Children require assistance for attending school
Parents (farmers)	• Some parents/farmers are unable to send their children to school because their incomes from work in the cocoa industry are too low	• Parents have accurate information about whether their children are engaged in child labor, but they are not suitable reporters due to the low reliability of information reported • Parents require assistance for improving their livelihoods
Schools	• Schools have a strong desire to encourage attendance • Schools have difficulty approaching parents about having their children attend, and providing adequate assistance (e.g. providing school supplies to children)	• Schools have accurate information about whether children are engaged in child labor, and are suitable reporters due to the higher reliability of information reported • Schools require assistance with equipment (e.g. providing school supplies)
CLMRS agents	• Agents are responsible for monitoring to ensure that child labor is not occurring • At present, agents conduct audits approximately once per year; they are expected to fulfill more roles and responsibilities	• Agents are suitable auditors of information
Cooperatives	• Cooperatives are responsible for managing the cocoa production of all affiliated farmers	• Cooperatives have a certain level of understanding of the prevalence of child labor among individual farmers, and higher reliability of information reported, and thus are likely to be suitable self-reporters
Buying centers	• Buying centers want to source child labor-free cocoa ingredients because that is what manufacturers/consumers want, and are motivated to pay higher wholesale prices • Some buyers are working with CLMRS agents to promote community development and programs to prevent child labor	• Suitable auditors of information and providers of incentives (Consider separately the extent to which they can provide incentives)

Source: JICA Survey Team.

Figure 23: Stakeholder Analysis Results

Cooperatives are responsible for selling to buying centers and managing farmers. They must also monitor child labor when asked to do so by buying centers and are motivated to report highly accurate and reliable information; thus, they are likely to be suitable reporters of information about child labor.

Buying centers are motivated to source child labor-free cocoa because that is what manufacturers and consumers want; thus, we envision that buying centers will contribute to incentives for preventing child labor. ETG, the cooperating company in the PoC, is the buyer, but the JICA survey team was responsible for auditing the information and providing incentives in this project.

（2） Case Studies on the Introduction of Blockchain-Based Traceability Systems

We designed the PoC while referencing cases in which blockchain-based traceability systems were introduced (details in Chapter 6).

The advantages of introducing blockchain include easy access to information by many stakeholders with a

low risk of falsification. However, issues include stakeholder involvement, guaranteeing the accuracy of initial input and ensuring scalability. We interviewed various businesses about countermeasures for these three issues and used them as a reference for the PoC design.

Issue 1: Stakeholder involvement

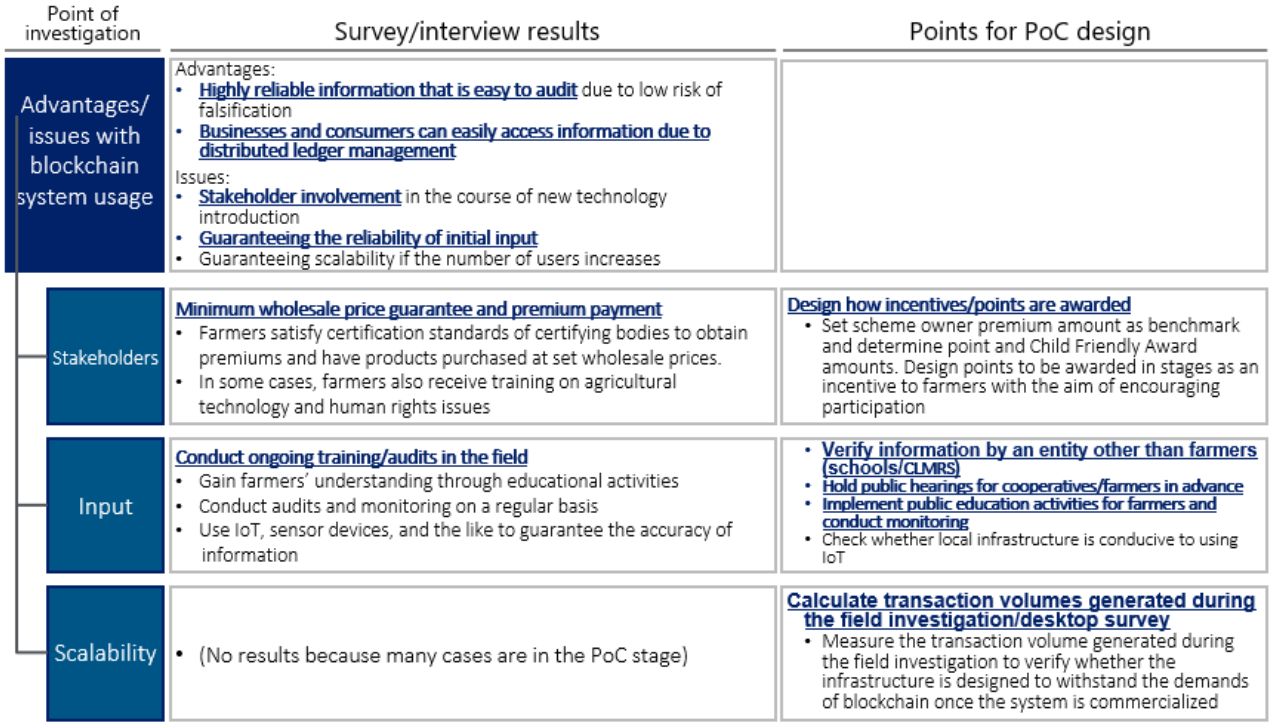
As explained in Chapter 2, there exist certifying bodies and businesses that purchase agricultural products at premium prices to involve farmers and engage in other activities such as providing technical assistance to farmers and assistance for community development. Using their cases as a reference, we designed this PoC such that incentives for reporting information and points awarded in stages corresponding to the accuracy of the information reported are provided to participating stakeholders as incentives to encourage participation, rather than settling for the conventional cocoa industry scheme in which minimum wholesale prices are guaranteed.

Issue 2: Guaranteeing accuracy of input

Before and during system introduction, we found businesses that provide training to farmers for preventing child labor and using the system and businesses that use the CLMRS and other means to conduct monitoring on a regular basis. We also found businesses that use biometrics to automatically collect accurate data. Given these circumstances, this PoC incorporates prior training for information reporters for preventing child labor. Additionally, the CLMRS was assigned the role of auditing and monitors input to verify the accuracy of the information and ensure that reporters are entering accurate information. We also conducted a field investigation to verify whether the infrastructure environment is conducive to using IoT.

Issue 3: Ensuring scalability

Nearly all businesses are in the demonstration phase of utilizing blockchain; therefore, we were unable to interview them about countermeasures. The aim of this PoC is to measure the transaction volume generated during the field investigation to verify whether the infrastructure is designed to withstand the demands of blockchain once the system is commercialized.



Source: JICA Survey Team.

Figure 24: Advantages of Using Blockchain and Points for the PoC

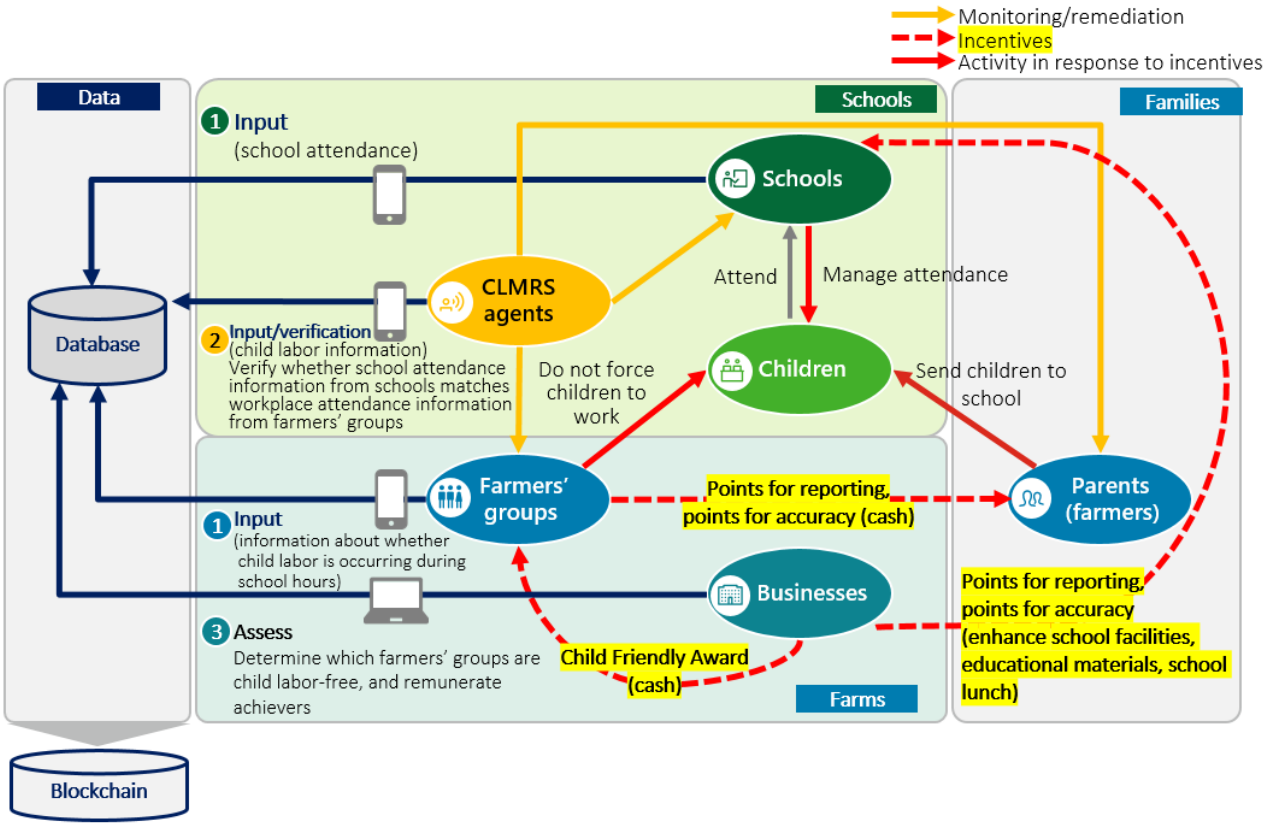
3. Implementation Requirements

（1） Use Case

Farmer's groups and schools enter primary data during the PoC. For the farmer's groups, group leaders voluntarily report information on behalf of the groups about whether and what kinds of child labor are taking place within the groups; schools enter information about children's attendance on a daily basis ((1) in the figure below). When discrepancies in the information arise in either case (e.g. when students who do not attend school are reported as not engaging in child labor), the CLMRS visits the communities and interviews the children to investigate the circumstances ((2) in the figure below).

If the children did in fact attend school, they clearly did not engage in child labor that day ((3) in the figure below). If the children did not attend school and CLMRS interviews reveal that the children missed school because they were ill or for some other reason, they clearly did not engage in child labor that day ((3) in the figure below).

Parents (farmers), farmers' groups and schools are offered incentives to encourage their participation in the PoC. Details are discussed in (4) Overview of Incentives; in sum, parents are offered cash commensurate with the number of times they enter data as well as the accuracy of the data. Farmer's groups are offered an award called the Child Friendly Award only when they satisfy certain requirements based on the overall results of the PoC. Schools are offered goods that help them enhance school facilities, educational materials and school kitchen facilities.



Source: JICA Survey Team.

Figure 25: Use Case

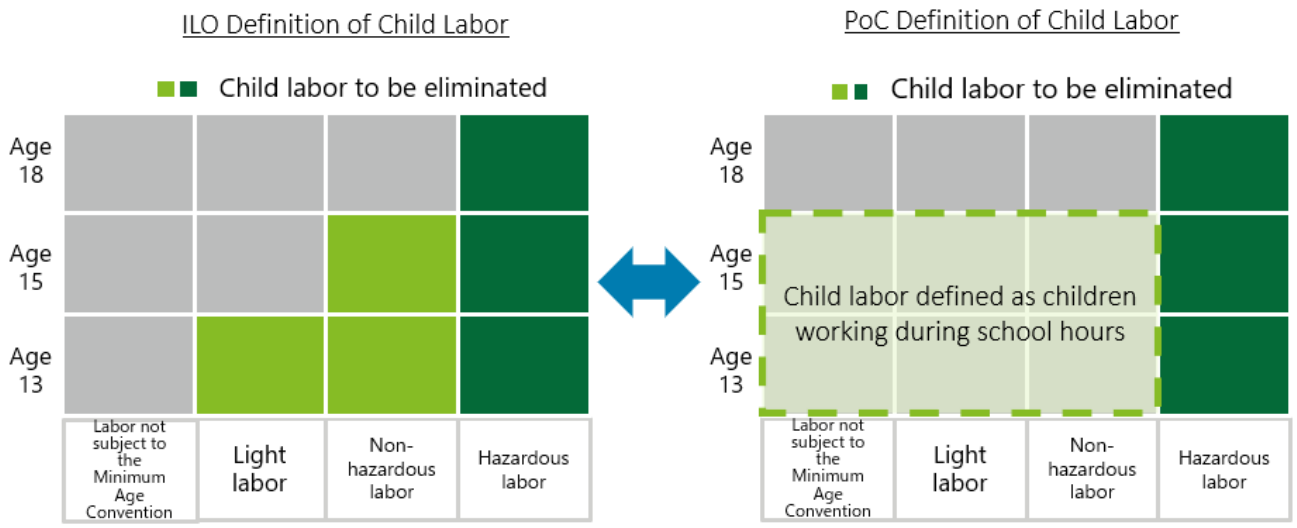
This use case has two defining characteristics. First, teams known as farmers' groups are formed and team performance (rather than individual performance) is assessed. Families are not solely responsible for child labor; limiting child labor is an issue to be tackled by entire communities. We changed the incentives such that teams are assessed and rewarded for their performance with the aim of recasting child labor as a problem to be tackled by everyone, even farmers who do not have children. Relatively well educated farmers were selected as farmer group leaders and the design was configured such that each leader would collect data from group members and enter child attendance information.

Second, primary data is obtained not only from school attendance records, but also from farmers' groups. This is done in an effort to educate people by having them consider whether hazardous labor is occurring when they enter information about the nature of labor and through voluntary daily reports about the status of child labor.

Although the strengths of this use case include the granularity of data tied to individual farmers and children and the ability to grasp the status of child labor on a daily basis, its weakness is that only limited information can be captured. First, it is not possible to corroborate data input by farmers on weekends or other non-school days. Voluntary reporting by farmers is the only basis for assessing whether child labor is occurring on non-school days. Similarly, hazardous labor can only be assessed based on data about the nature of labor input by farmers; we must keep in mind that there is no school input data or the like with which to compare to corroborate data about hazardous labor.

（2） PoC Definition of Child Labor

Chapter 1 contains the definition of child labor. In this project, we focus on school attendance rather than the ILO's strict definition of child labor. For example, we do not consider light work on weekends and holidays to be child labor, or work on weekdays during spare time (e.g. early morning, lunch break) as long as children are attending school. In contrast, we define work during elementary and junior high school hours as child labor, regardless of the nature of the labor. Additionally, we define hazardous child labor as child labor regardless of school attendance, which matches the ILO's definition of child labor.



Source: JICA Survey Team based on materials from the ILO.

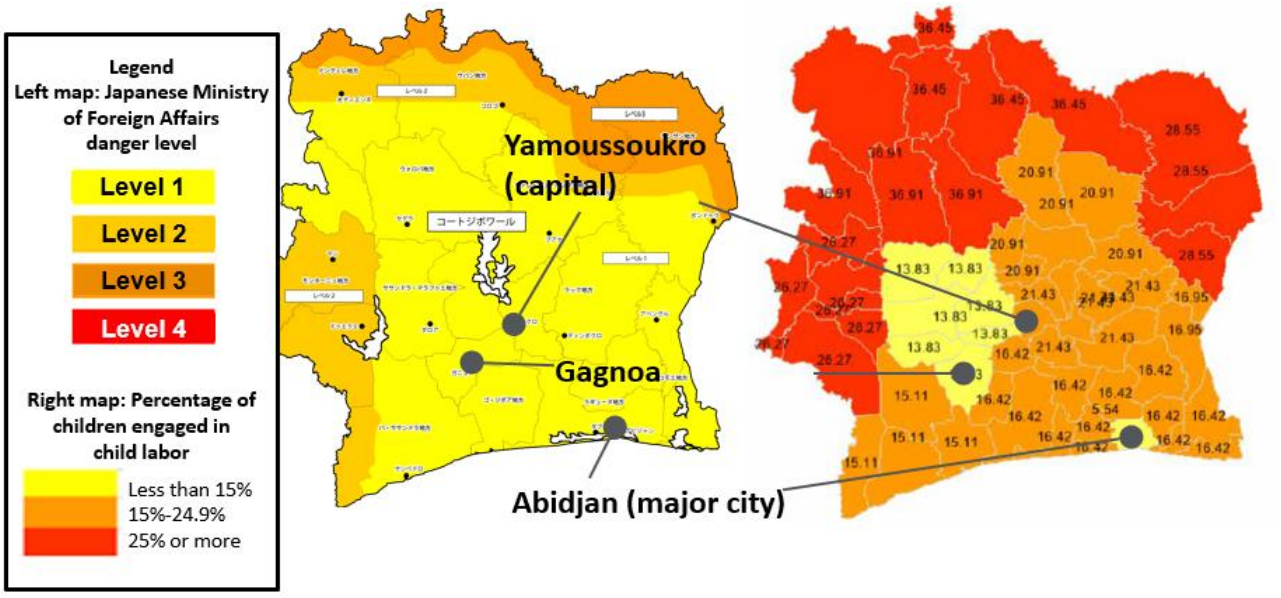
Figure 26: ILO and PoC Definitions of Child Labor

（3） Overview of PoC Communities

Three communities near Gagnoa, located roughly 200 km northwest of the major city of Abidjan, were chosen as the location of the PoC. The city of Man and other potential areas were mentioned in discussions with PoC collaborator ETG, but Gagnoa was ultimately chosen because the Japanese Ministry of Foreign Affairs danger level was too high (Level 2) in the other locations and due to good accessibility from Abidjan.

Statistics show that 26.6%—more than one in four—of children age 5-17 in rural areas of Côte d'Ivoire are engaged in child labor;[36] the figure is 8.5% in urban areas. By region, child labor is lower in the south and southwest of the country (20%) than in the northwest (36.9%), north (36.4%), northeast (28.6%) and west (26.3%), where it is high. In sum, although child labor is more prevalent in the northern part of the country, the region was excluded from consideration as the location for the PoC because of the high danger levels (Level 2 and Level 3).

[36] UNICEF, Multiple Indicator Cluster Survey (MICS) 2016



Source: JICA Survey Team based on National Action Plan for 2019-2021 (PAN 2019-2021, Le Plan d'Action National 2019-2021) and the Japanese Ministry of Foreign Affairs Travel Information website (https://www.anzen.mofa.go.jp/info/pcinfectionspothazardinfo_101.html as of 11/21/2021).

Figure 27: Location of the PoC

To divide the three communities into four farmers' groups, communities were defined as one to four farming villages, depending on the size of the villages. The communities are not administrative districts; they were artificially created for the PoC and thus are named Community A, Community B and Community C.

Some villages have no schools; children in those villages often attend schools in nearby villages. Petit Toumodi Elementary School in Community A is a relatively large school with 334 students; it is attended by many children from Community B. Notably, none of the communities have junior high schools in village limits or within walking distance. Junior high school students stay with relatives living in a neighboring town with a junior high school and attend school there. Because a certain number of junior high school students are physically and economically unable to attend school and because they represent such a small percentage of the student body at the junior high school in question, the scope of the PoC was limited to elementary schools.

Table 10: Basic Information about PoC Communities

Community name	Village name	Elementary school name	Number of target farmers*	Number of target children
Community A	Petit Toumodi	Petit Toumodi	51	51
Community B	Nanafoue	Nanafoue	48	9
	Djekro	Petit Toumodi		21
	Somlakro			
	Amani Kouassikro			
Community C	Petit Bouake	Petit Bouake	54	11
	Koffikro	Kouakoukankro		6
	Behibro	Behibro		18

*The number of target farmers includes farmers who do not have children
Source: JICA Survey Team.

*Left: Elementary school of Petit Toumodi. Right: Elementary school of Nanafoue
Source: JICA Survey Team.

Figure 28: Target School

As for the state of infrastructure in the villages, both communication networks and access to electricity are unreliable. In villages with communication networks marked as “unreliable” on the table below, the app is usable only during certain times and with certain carriers; they are not suitable environments for using the app online. The communication network is provided by operators such as Orange/MTN/Moov via base stations. Communication conditions are expected to worsen as the user traffic peaks and weather conditions deteriorate. Within such villages with a poor network environment, bicycles were provided to the farmer group leaders as a means of accessing nearby villages and towns with a good network environment to improve the convenience of data entry.

Additionally, none of the farming villages are connected to the electric power grid. In some of the villages, small-scale solar power generation panels and storage batteries have been introduced and are used by individuals for charging mobile phones in some cases, but they are still not widespread. Farmers who do not own solar panels travel to neighboring towns (approximately 10 km) to charge their mobile phones. Solar panel and storage battery sets were offered to farmers’ group leaders to enable them to charge their tablets for the PoC.[37]

Farmers use mobile phones at high rates; nearly all farmers use feature phones (a class of mobile phone that retains the form factor of previous generations). In contrast, only 10% of farmers own smartphones and many are perplexed as to how to use apps on a tablet. Across the entire Côte d'Ivoire, the average smartphone penetration rate is 83%,[38] which highlights the low smartphone penetration rate in rural areas.

[37] Teachers generally live in towns, and thus are able to charge their devices. Solar panel and storage battery sets for tablet charging were offered to teachers who live in the villages.

[38] Ministry of Internal Affairs and Communications, "FY 2018 Information Collection and Survey Results for the Information and Communication and Postal Sectors in Africa," 2019.

Table 11: Infrastructure in PoC Communities

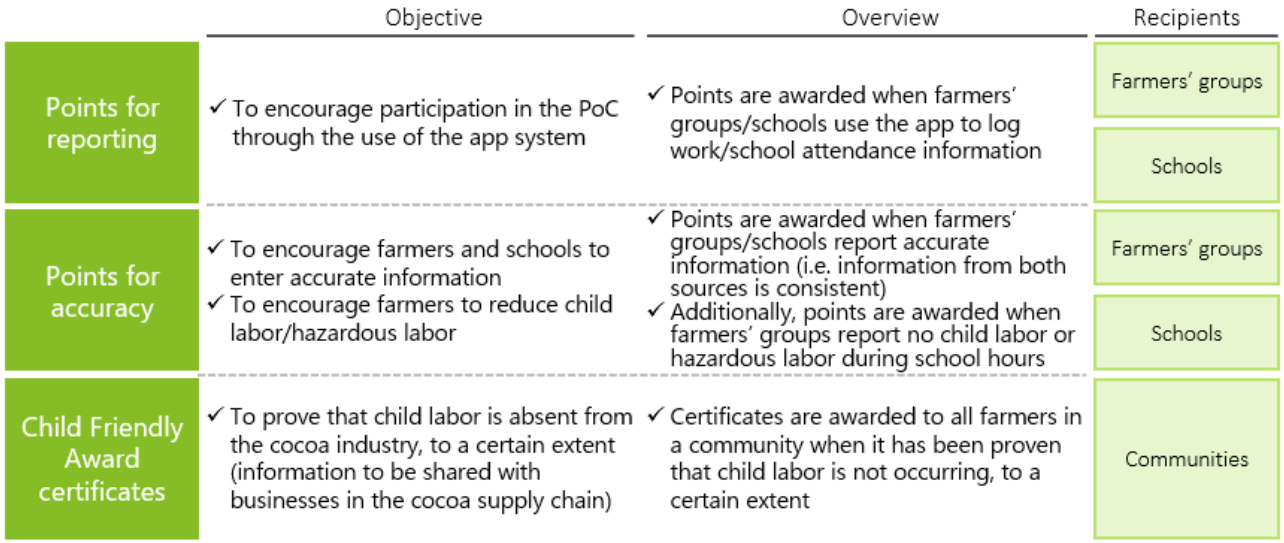
Community name	Village name	Communication network	Electricity grid
Community A	Petit Toumodi	Exists (unreliable)	None
Community B	Nanafoue	Exists (unreliable)	None
	Djekro	None	None
	Somlakro	Exists (unreliable)	None
	Amani Kouassikro	None	None
Community C	Petit Bouake	Exists (unreliable)	None
	Koffikro	Exists (unreliable)	None
	Kpangbakro	Exists	None
	Behibro	Exists	None

Source: JICA Survey Team.

(4) Overview of Incentives

There are three main types of incentive for farmers. The first type of incentive is points for reporting, which are awarded on a daily basis when data entry is verified. The primary aim of this incentive is to encourage farmers to use the app. The second type of incentive is points for accuracy, which are awarded on a daily basis if the information entered is accurate (consistent with data entered by schools) and reveals no hazardous labor. Points for reporting and points for accuracy are awarded to farmers' groups, a strategy to promote team efforts within the groups. The third type of incentive is an award called the Child Friendly Award, which is awarded only for the achievement of a certain level of performance during the PoC and throughout entire communities.

The Child Friendly Award should be considered akin to Fairtrade International certification and a scheme in which buyers pay premium wholesale prices when purchasing cocoa beans for which a Child Friendly Award has been earned is under consideration for the future. In terms of economic rationality, the aim is to award certification to organizations of a certain size; therefore, the decision was made to present the awards to communities rather than farmers' groups.



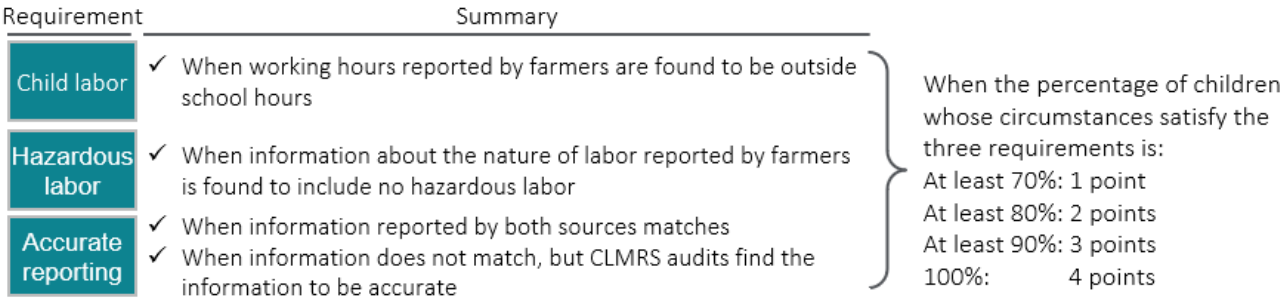
Source: JICA Survey Team.

Figure 29: Overview of Incentives

One application point will be awarded daily for every data entry and each farmer in the farmer group who is awarded one point will later receive 10 XOF (equivalent to about 2 yen). The appropriateness of the amount is discussed later in this section.

Points for accuracy are awarded commensurate with the percentage of children whose circumstances satisfy three requirements.[39] As discussed in Chapter 3, child labor is not something that can be reduced in a single bound. First and foremost, incentives must be awarded in stages to encourage incremental improvement. Specifically, one point is awarded when at least 70% of children's circumstances satisfy the three requirements, two points are awarded when that figure is at least 80%, three points are awarded for at least 90% and four points are awarded for 100%.

Each farmer affiliated with a farmers' group that has been awarded four points is eligible to receive XOF 40 (approximately JPY 8) at a later date.



Source: JICA Survey Team.

Figure 30: Definition of Points for Accuracy

The Child Friendly Award is awarded to communities in which all farmers' groups have received at least three points for accuracy every day. In other words, communities can earn this award when their school attendance rate is at least 90% (or, conversely, their child labor rate is no more than 10%). Notably, to account for envisioned problems such as the difficulty of entering data and connection troubles, communities are allowed an exception of one day on which data was not entered.

The Child Friendly Award is XOF 4,000 times the number of farmers for a single term.

Incentives for farmers are regarded as a cost of the project and is estimated to be USD 57 per ton of cocoa beans in light of expected yields by farmers.[40] The cost is projected to be USD 27 per ton for points for reporting

[39] Each of the following three requirements must be satisfied for each child: The child must have (1) attended school, and (2) not engaged in hazardous labor, and (3) the information must be accurate (if inconsistent with data entered by schools, the CLMRS must conduct interviews to verify that data entered by farmers is mistake-free).

[40] Calculations were made based on the following assumptions and preconditions:
Average area of a cocoa farm in Côte d'Ivoire: 3 ha (according to the World Cocoa Foundation)
Average yield per unit in Côte d'Ivoire: 450 kg/ha/yr (according to FAOSTAT)
Average yield per farmer based on the two figures above: 1.35 MT/yr
Yield per farmer in Term 2 (16 days) 1.35 MT x 20%* = 0.27 MT
*The main harvest season is late October to late December. There is a secondary harvest season around May.
A 16-day period in the main harvesting season is assumed to constitute approximately 20% of the annual yield.
Maximum annual value of points for reporting/points for accuracy (per farmer): XOF 50 x 365 days = Approximately XOF 1,800
Annual value of Child Friendly Awards (per farmer): XOF 4,000 ÷ 20% = XOF 20,000
Therefore, dividing the maximum value of the points and awards by the average annual yield (1.35 MT) gives XOF 13,300/MT (approximately USD 27/ton) and XOF 15,000/MT (USD 30/ton), respectively.

and points for accuracy and USD 30 per ton for the Child Friendly Award. These incentive prices were determined after considerations were made to make the costs lower than the premiums offered by Rainforest Alliance (at least USD 70 per ton) and Fairtrade International (USD 240 per ton).

Conversely, the level of incentives is determined from the perspective of the cocoa bean procurers, such as chocolate manufacturers and buyers and is thus set very low from the farmers' perspective. For example, the price level of the application point and fair point (peaking at 50 XOF per day) can only boost the annual income by about 0.2%.[41] The success of the PoC hinges on the extent to which farmers are on board with the project and cooperate despite the meager incentives.

Table 12: Price Comparison Between Project Incentives and Fairtrade International and Rainforest Alliance Premiums

Name		Price
Fairtrade International		USD 240/ton
Rainforest Alliance		At least USD 70/ton
Project		USD 57/ton
	Points for reporting/points for accuracy	USD 27/ton
	Child Friendly Awards	USD 30/ton

Source: JICA Survey Team.

Although schools are highly motivated to reduce child labor, certain incentives are required given the effort required to enter attendance information.

Schools can earn one point for reporting and one point for accuracy each day. One point for accuracy is awarded based only on an assessment of whether the information was reported accurately.

The budget for points for schools was considered based on a value of XOF 4,000 per point; schools make requests and are provided with goods within that budget.

(5) Implementation Schedule

The PoC implementation term was divided into two parts. Term 1 is a 10-day period from 11/10 to 11/19 and Term 2 is a 16-day period from 11/29 to 12/14. In Term 1, the aims are to narrow down target communities, verify the usability of the app and the flow of the PoC and search for points to improve upon.

The time between the terms is for improving the usability of the app.

Community A will participate in both Term 1 and Term 2; thus, the frequency of incentive awarding will be changed in Term 2 to study the impact of incentive awarding frequency on motivation. In addition, child labor rates and attendance rates for each village and community are checked for differences that correspond to distances to school; previous public education activities by the CLMRS, trading companies, or other entities for preventing child labor; and state of infrastructure.

[41] Annual maximum amount of application points and fairness points earned (per farmer): 50 XOF x 365 days = about 1,800 XOF
On the other hand, the average annual income of a cocoa farmer is 1.35 MT/yr x 750 XOF/kg (farm gate price) x 1,000 kg/MT = about 1 million XOF. Application points and fairness points are limited to boosting the annual income by about 0.2% at most.

Table 13: Comparison of Term 1 and Term 2

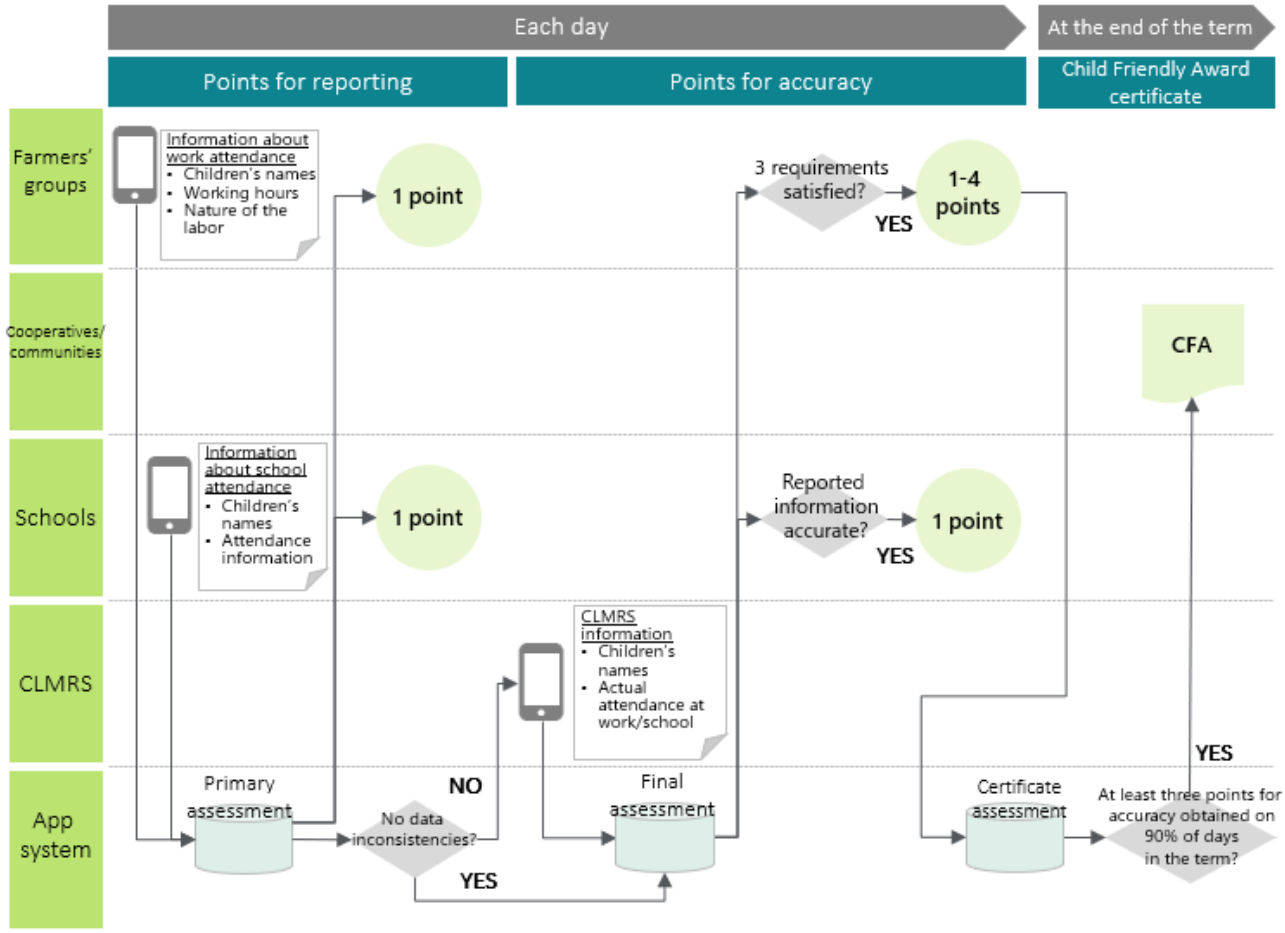
	Term 1	Term 2
Duration	10 days (11/10 to 11/19)	16 days (11/29 to 12/14)
Target communities	Community A only	All communities (A, B, C)
Assumptions	- Incentives to be awarded once during the term - Villages contain schools - Public education activities implemented previously	- Frequency of incentive awarding raised to once per week in some cases - Villages do not contain schools in some cases - Public education activities not implemented previously in some cases

Source: JICA Survey Team.

4. Requirements for the App Used in the PoC

（1） Flow of Application Usage/Logic for Assessing Child Labor

When farmers' groups and schools report information about children's attendance at work or at school, the system outputs a primary assessment for each child and awards points for reporting to the farmers' groups and schools. In the primary assessment, the system checks the reported information for discrepancies (inconsistencies/lack of clarity). If information is inconsistent or unclear, the CLMRS conducts an onsite audit and then updates the children's status of attendance at work or school. (Details in Figure 32) After the CLMRS updates the information, the system checks whether the farmers' groups and schools reported accurate information and whether children were engaged in hazardous labor or worked during school hours to determine which farmers' groups and schools are eligible to receive points for accuracy. (Details in Figure 33) Farmers' groups and schools are awarded points for accuracy based on the final assessment results. (See the definition of points for accuracy) Additionally, farmers' groups' records of points for accuracy are assessed to determine eligibility for Child Friendly Award (CFA) certificates and cooperatives issue CFA to groups that satisfy the requirements.



Source: JICA Survey Team.

Figure 31: System Flow

Primary assessment logic					CLMRS action policy	
		Information reported by schools				
		Attendance reported	Absence reported	Non-school day reported		
Information reported by farmers' groups	No child labor reported	Match (no child labor)	Unclear	Non-school day	1	✓ No action
	Child labor outside school hours reported	Match (no child labor)	Unclear	Non-school day	2	✓ CLMRS conducts a field survey and updates the final assessment with accurate information about work/school attendance
	Child labor during school hours reported	Inconsistent	Match (child labor occurred)	Non-school day		

Source: JICA Survey Team.

Figure 32: Primary Assessment Logic

	CLMRS audit details		Assessment results (eligibility for awarding of points for accuracy)	
	Question 1: Was the child at a farm?	Question 2: Was the child at school?	Farmers' groups	Schools
Inconsistent	YES	YES	Not eligible	Eligible
	YES	NO	Not eligible	Not eligible
	NO	YES	Not eligible	Eligible
	NO	NO	Not eligible	Not eligible
	No input	No input	Not eligible	Eligible
Unclear	YES	YES	Not eligible	Not eligible
	YES	NO	Not eligible	Eligible
	NO	YES	Eligible	Not eligible
	NO	NO	Eligible	Eligible
	No input	No input	Eligible	Eligible

Source: JICA Survey Team.

Figure 33: Final Assessment Logic

(2) Functional Requirements of the App

In the course of demonstrating the PoC, we created three app systems: a farmers' group app, a school app and a CLMRS verification app.

The farmers' group app is equipped with a function that enables farmers to check points acquired, a function that enables cooperatives to check certificates acquired and a function that enables users to report and check information about the work attendance of children working on farms (hours worked, nature of labor).

The school app is equipped with functions that enable teachers to check points acquired and report and check information about children's school attendance.

The CLMRS app is equipped with a function that enables users to check the results of comparisons of information about children and, if there are inconsistencies, to update the information after conducting audits; and a function for checking children who have engaged in hazardous labor and farmers' groups and schools that are not reporting information.

App	Function	Overview
Farmers' group app	Reporting information about attendance at work	• A function enabling farmers' groups to report information about each child's work attendance (hours worked, nature of labor)
	Acquiring points	• A function that enables users to acquire points for reporting/points for accuracy commensurate with their reports and the details thereof
	Issuing/viewing certificates	• A function that issues Child Friendly Award certificates commensurate with reported details, and allows users to check the details of the certificates
	Viewing attendance information/points	• A function for viewing information about children's attendance at work and points for reporting/points for accuracy received each day
School app	Reporting information about attendance at school	• A function that enables teachers at schools to report information about each child's attendance at school ()
	Acquiring points	• A function that enables users to acquire points for reporting/points for accuracy commensurate with their reports and the details thereof
	Viewing attendance information/points	• A function for viewing information about children's attendance at school and points for reporting/points for accuracy received each day
CLMRS app	Checking results of comparison of information about children	• A function that enables CLMRS agents to check information about children reported by farmers' groups/schools that could be inconsistent (when both report that children attended/did not attend work/school)
	Updating information about children	• Enables CLMRS agents to update accurate work/school attendance information after interviewing children when inconsistency is possible
	Checking information about children engaged in hazardous labor	• A function that enables users to check information about children engaged in hazardous labor as reported by farmers' groups • This function is used to provide safety education to children engaged in hazardous labor
	Checking information about farmers' groups/schools that are not reporting	• A function that enables users to check a list of which farmers' groups/schools are missing reports of work/school attendance information
Common functions on all 3 apps	Login/logout	• A function that enables users to log into their accounts with an ID/password
	Language display	• A function that enables users to switch between English and French

Source: JICA Survey Team.

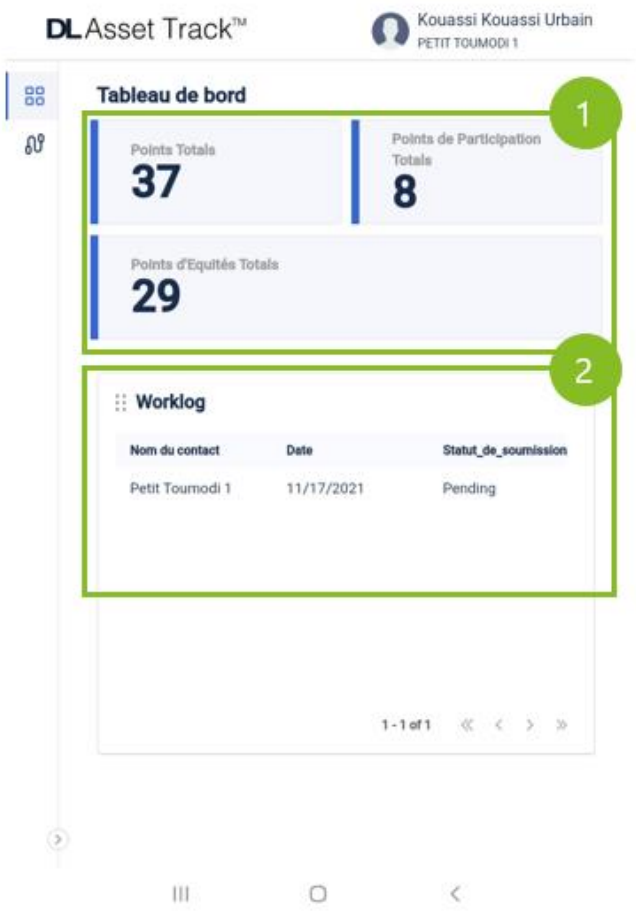
Figure 34: List of App Functions

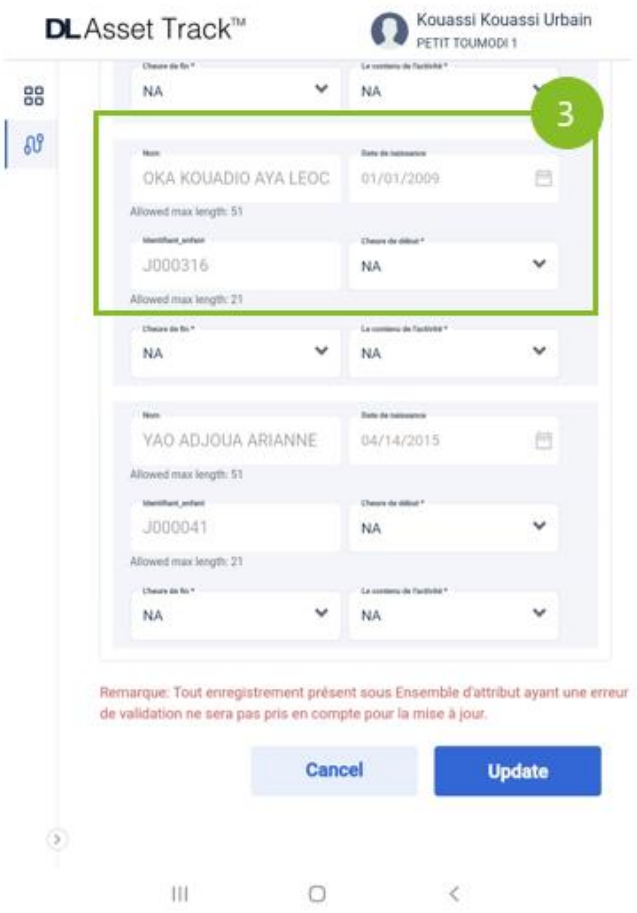
（3） Screen Images and Points about UI/UX

Images of farmer's group app screens

The farmers' group app is designed to motivate farmers' groups to report information about children's attendance at work, with a large display and breakdown of personal points acquired (1) on the top of the splash screen. The bottom of the splash screen (2) features a list of days for which work attendance information was not reported; this design feature makes it easy for farmers' groups to understand the work they need to do (i.e. report work attendance).

Additionally, the report screen features a list of children for whom work attendance information must be reported and users are able to select work start and end times for each child from drop-down menus (3); this design feature minimizes the work of inputting data for farmers' groups.





Source: JICA Survey Team.

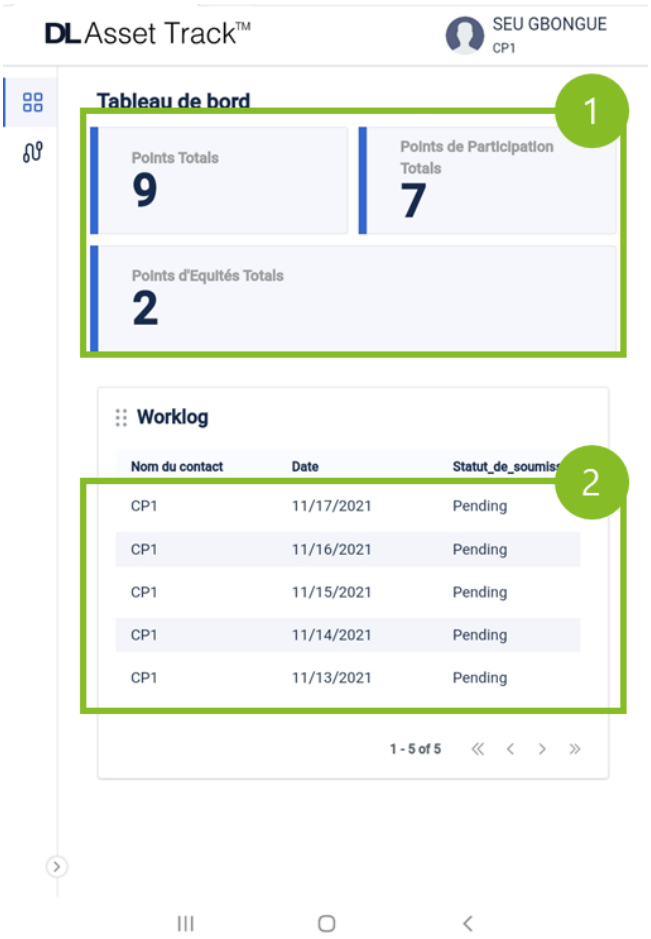
Figure 35: Farmers' Group App Splash Screen

Figure 36: Farmers' Group App Report Screen

Images of school app screens

The school app is designed to motivate teachers to report information about children's attendance at school, with a large display and breakdown of personal points acquired (1) on the top of the splash screen. The bottom of the splash screen (2) features a list of days for which school attendance information was not reported; this design feature makes it easy for teachers to understand the work they need to do (i.e. report school attendance).

Additionally, the report screen features a list of children for whom school attendance information must be reported and users are able to select whether children have a school to attend and their attendance status (present/absent) from drop-down menus (3); this design feature minimizes the work of inputting data for teachers.



Source: JICA Survey Team.

Figure 37: School App Splash Screen

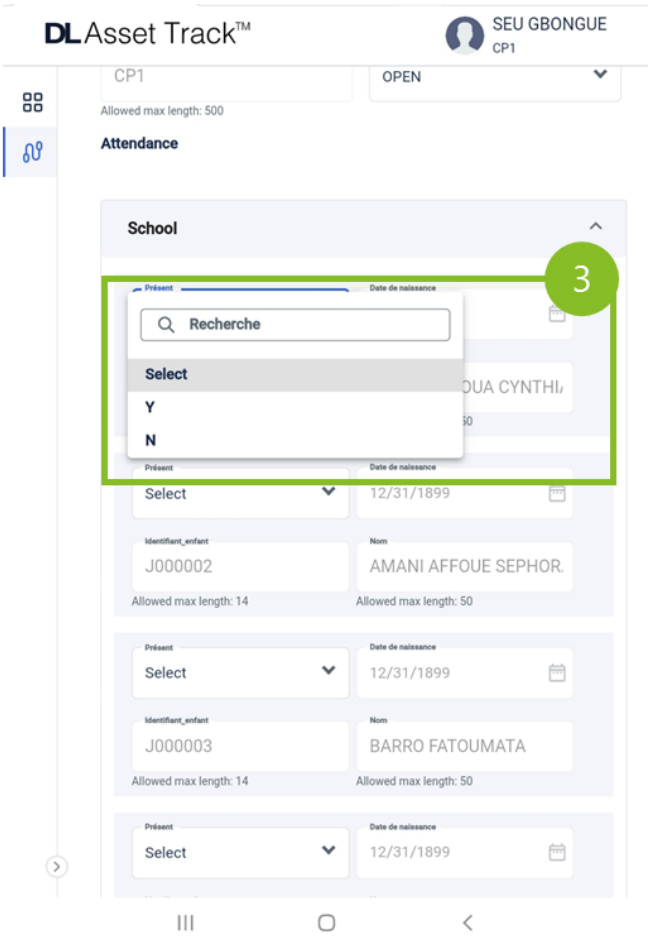
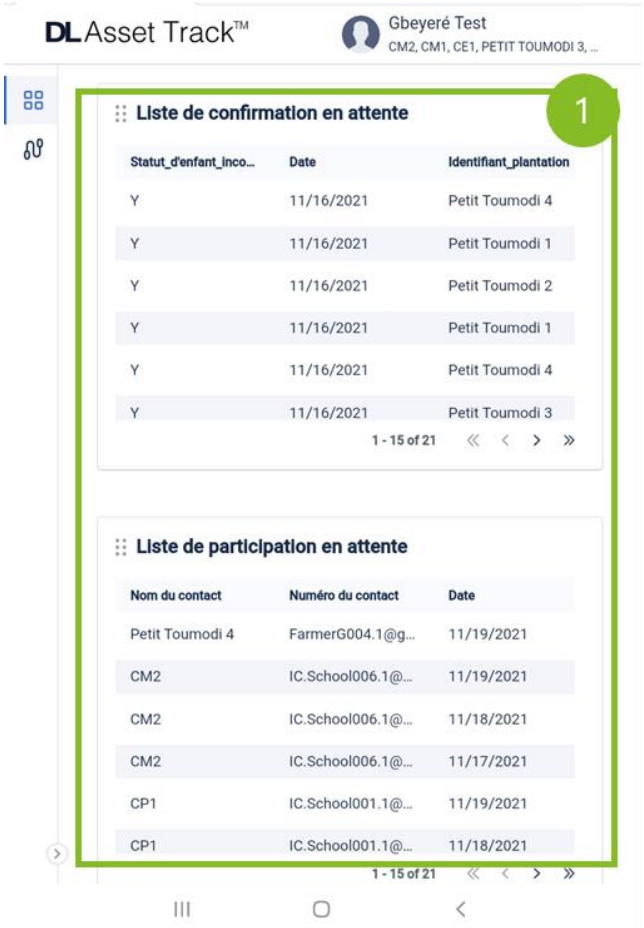


Figure 38: School App Report Screen

Images of CLMRS app screens

The splash screen of the CLMRS app features a list of children for whom information reported by farmers' groups and schools could be inconsistent, a list of children reported to be engaging in hazardous labor and a list of farmers' groups and schools that are not reporting work or school attendance information (1); this design feature makes it easy for CLMRS agents to understand the work they need to do (i.e. audit children, educate people about preventing child labor, encourage people to report).

Additionally, the top of the screen for updating information about children features detailed information about children and details about the farmers' groups and schools that reported it (2) to provide the CLMRS with the information it needs to audit children. The screen also features fields for logging children's actual activities (fields for answering Yes or No to Questions 1 and 2 and corresponding fields for notes) (3); this design feature enables users to view children's actual activities in detail.



Source: JICA Survey Team.

Figure 39: CLMRS App Splash Screen

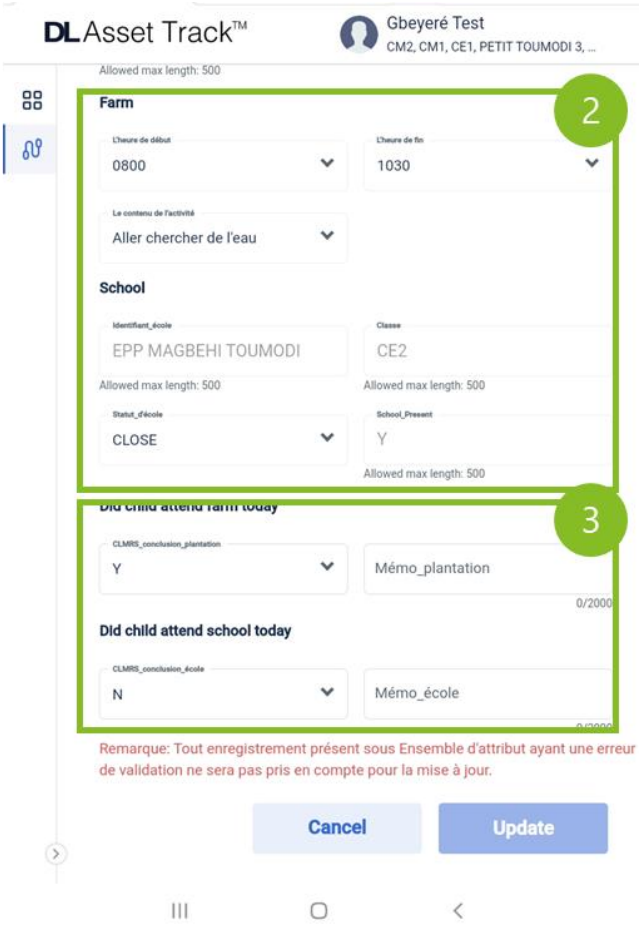
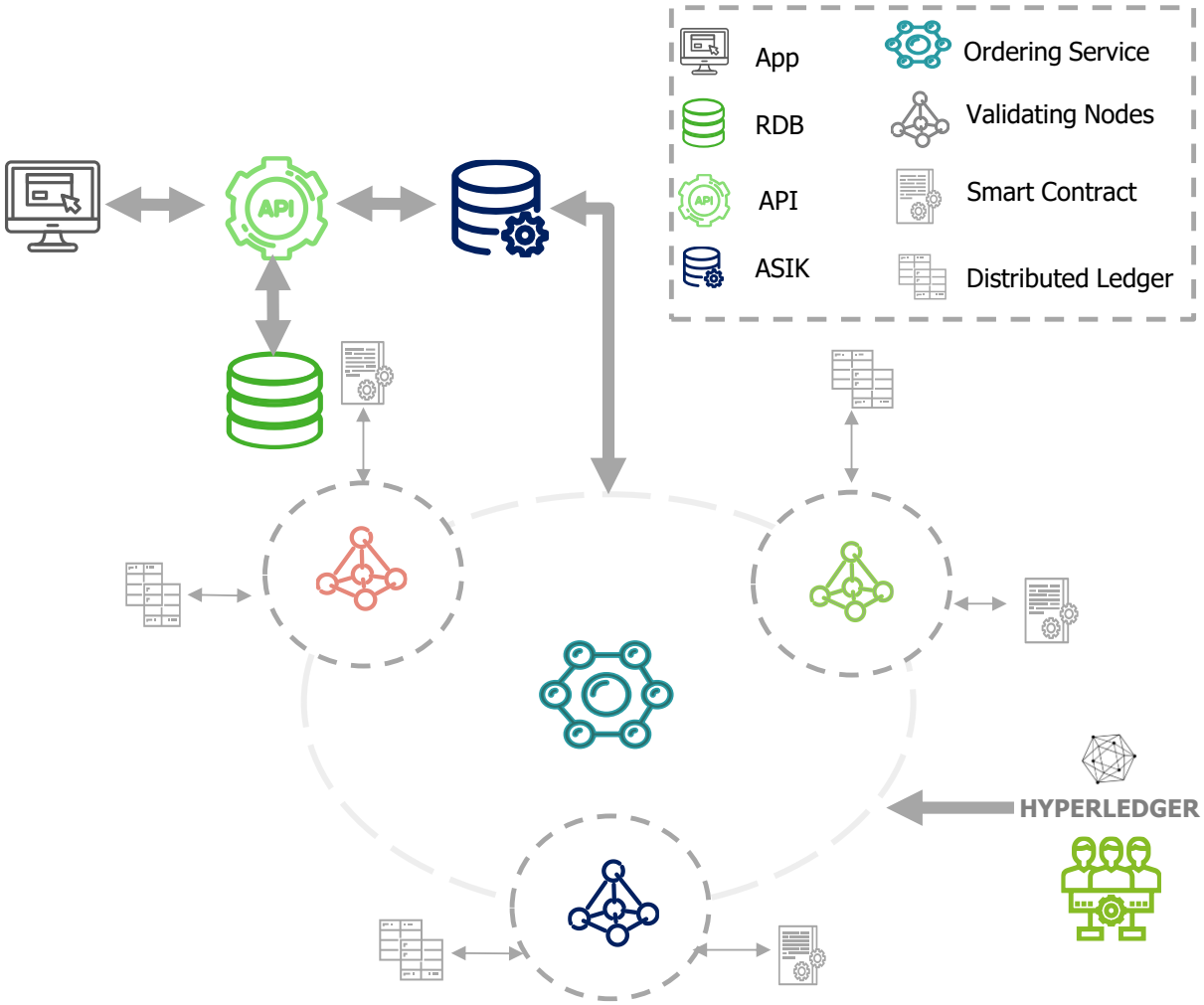


Figure 40: CLMRS App Screen for Updating Information about Children

(4) System Configuration

The system is configured based on DL Asset Track, a blockchain platform provided by DLT Labs. Data input into the app (e.g. information about work/school attendance, records of points, certificates) is stored on a blockchain platform (Hyperledger Fabric), but personal information (e.g. children's names) are managed off-chain (RDB) to fulfill the standards set out in the guidelines of the General Data Protection Regulation (GDPR). We adopted a flexible system design to enable sharing of information via API publishing in the event that the number of stakeholders increases in future and structured the system such that it is compatible with other types of blockchain and not only Hyperledger Fabric.



Source: Prepared by DLT Labs.

Figure 41: Image of System Configuration

5. PoC Results

（1） Results of Application Usage

Overall trends in application usage

The following is a breakdown of the reports filed by stakeholders—farmers' group representatives and schools—for the 2,366 cases (510 cases (10 days x 51 people) in Term 1, 1,856 cases (16 days x 116 people) in Term 2) for which reports should have been filed during the PoC.

Farmers' group representatives achieved a 100% reporting rate. In contrast, schools failed to provide reports in 103 cases.

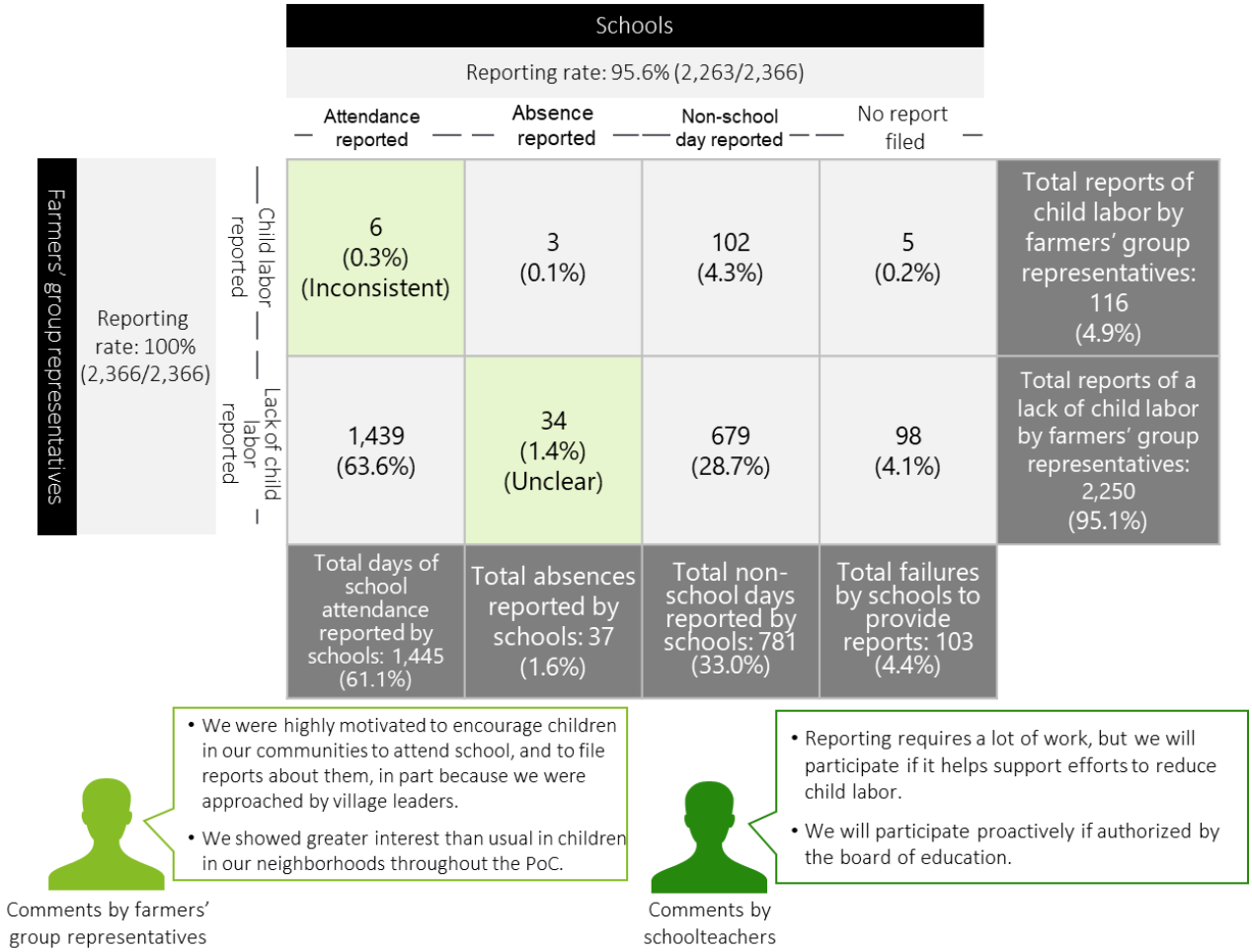
The perfect rate of farmers' groups can be explained by heightened motivation to file reports about children in their communities, in part because of their strong solidarity with the communities and in part because they were approached by village leaders. Schools likely failed to file some reports due to the administrative burden—filing requires a stable internet connection and some teachers had to file reports on behalf of classes other than their own. In either case, we learned that farmers' group representatives and schools will make proactive efforts if they have the approval of their leaders. This means that pilot projects require skilled efforts to reach a consensus among leaders.

Overall, a total of 116 cases of child labor were reported, 102 of which were reported on non-school days, meaning that hardly any child labor is occurring on school days.

Additionally, reports filed by farmers' group representatives resulted in 40 cases requiring audits.[42] In these cases, CLMRS agents visited the villages and interviewed both the schools and the farmers.

Additionally, because reports revealed discrepancies between communities, we will analyze how the reports came to differ between communities in a later section.

[42] Two types of cases require audits. The first case involves inconsistent results, when reports show that children were both attending school and working during school hours. The second case involves unclear results, when reports show that children were neither attending school nor working during school hours.



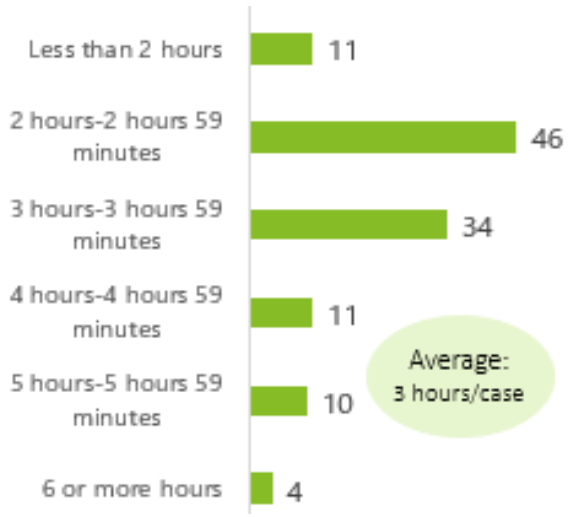
Source: JICA Survey Team

Figure 42: Breakdown of Reports of Information about Children

Breakdown of hours/nature of child labor reported

Approximately 80% of the 116 cases of child labor reported involved labor lasting less than four hours per day. Children worked an average of three hours per case.

In terms of the nature of child labor, there were no reports of labor that constitutes hazardous labor. Many cases involved labor pertaining to cocoa harvesting because the PoC occurred during cocoa harvesting season. Additionally, many cases involved girls caring for young children because that is customary in these communities.



Nature of child labor	Number of cases reported
Caring for young children	39
Counting cocoa pods	28
Collecting cocoa beans from pods	20
Gathering harvested cocoa pods	15
Splitting cocoa pods with a wooden mallet or by bashing them against the ground	6
Planting seedlings	2
Watering seedlings	2
Preparing pods for seedlings	2
Other	2
Total	116

Source: JICA Survey Team.

Figure 43 : Breakdown of Child Labor Hours in 116 Reported Cases

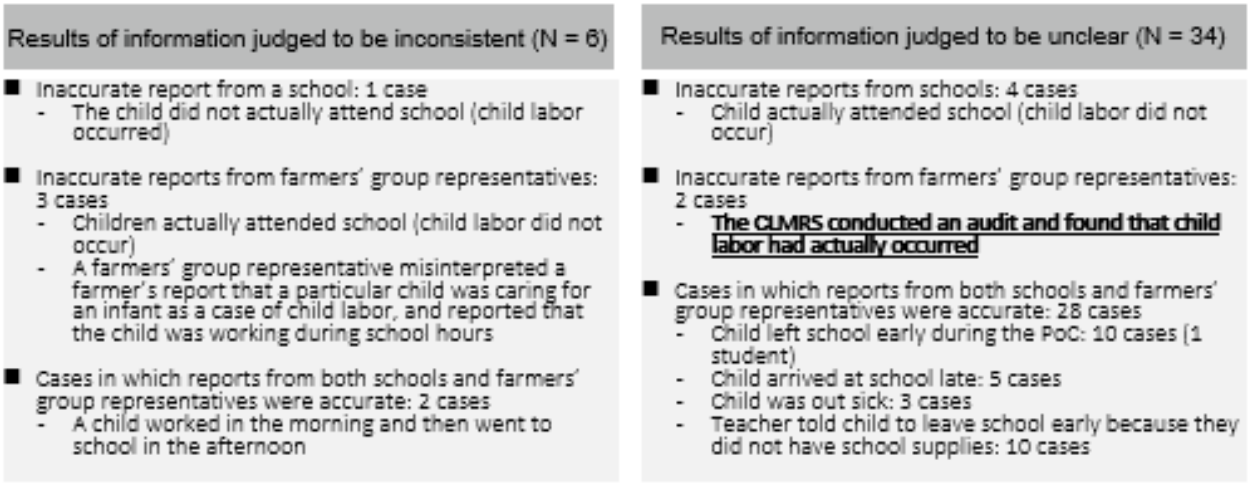
Figure 44 : Breakdown of the Nature of Child Labor in 116 Reported Cases

Details about inconsistent/unclear reports

The following is a breakdown of the number of inconsistent and unclear reports. Many reports marked as inconsistent or unclear stemmed from incomplete or incorrect entries by schools and farmers' group representatives.

Reports of attendance were particularly inconsistent because schools were not very clear on how they handled students who arrived late or left early. A challenge to be tackled in future is achieving more detailed reports (having reports include whether and why students arrived at school late or left early).

Additionally, there were two cases in which farmers reported a lack of child labor regardless of whether or not children were actually working. This confirmed the lack of reliability of information reported by farmers alone, as well as the auditing capacity of the CLMRS.



Source: JICA Survey Team.

Figure 45: Breakdown of 40 Cases of Inconsistent/Unclear Information

Trends in the status of reports by community

On an individual community level, whether sensitization[43] (a set of child labor awareness activities) was implemented resulted in a difference in the number of cases of child labor reported. The rate of child labor on non-school days was strikingly high in the village of Behibro (94%). This is because the farms are far away from the village, so it is customary to take the entire family to the farms on non-school days to avoid leaving children at home alone; when this happens, children end up working as well.

We selected farmers for this PoC after companies introduced them to us, so the communities had low rates of child labor during school hours (i.e. sensitization had made some progress in these communities), but we presume we would have observed higher rates of child labor in communities where sensitization for preventing child labor has not made progress. This suggests that introducing the application is not enough to effectively reduce child labor and that sensitization for preventing child labor is also necessary.

Additionally, some villages do not have schools, meaning that children must travel to neighboring villages to attend school. When school is too far away, children lose the motivation to attend; this is one factor behind children's decision to work rather than attend school. The villages of Amani Kouassikro and Somlakro reported child labor on school days, although it was not very much.

Term	Community	Village	School in village?	Sensitization implemented?	Reported number of cases of child labor on school days	Reported number of cases of child labor on non-school days	Points earned
Term 1	A	Petit Toumodi	Yes	Yes	0 case (0%)	12 cases (8%)	50/50
Term 2	A	Petit Toumodi	Yes	Yes	0 case (0%)	12 cases (6%)	80/80
	B	AMANI KOUASSIKRO	No	Yes	2 cases (2%)	0 case (0%)	76/80
		DJEKRO	No	Yes	0 case (0%)	0 case (0%)	80/80
		SOMLAKRO	No	Yes	3 cases (2%)	0 case (0%)	77/80
		NANAFOUE	Yes	Yes	0 case (0%)	0 case (0%)	80/80
	C	PETIT BOUAKE	Yes	Yes	1 case (1%)	5 cases (11%)	79/80
		KOFFIKRO	No	No	0 case (0%)	3 cases (17%)	80/80
		BEHIBRO	Yes	No	10 cases (5%)	68 cases (94%)	71/80

Source: JICA Survey Team.

Figure 46: Information Reported about Child Labor in Individual Communities

(2) Satisfaction with App UI/UX and Reporting Workload

The following are the results of a questionnaire survey administered to farmers' group representatives and teachers who actually used the app, inquiring about their level of satisfaction with the UI/UX of the app pertaining to the method of reporting and the work of reporting. Nobody responded that they were dissatisfied with the method of reporting through the app and both representatives and teachers were highly satisfied overall.

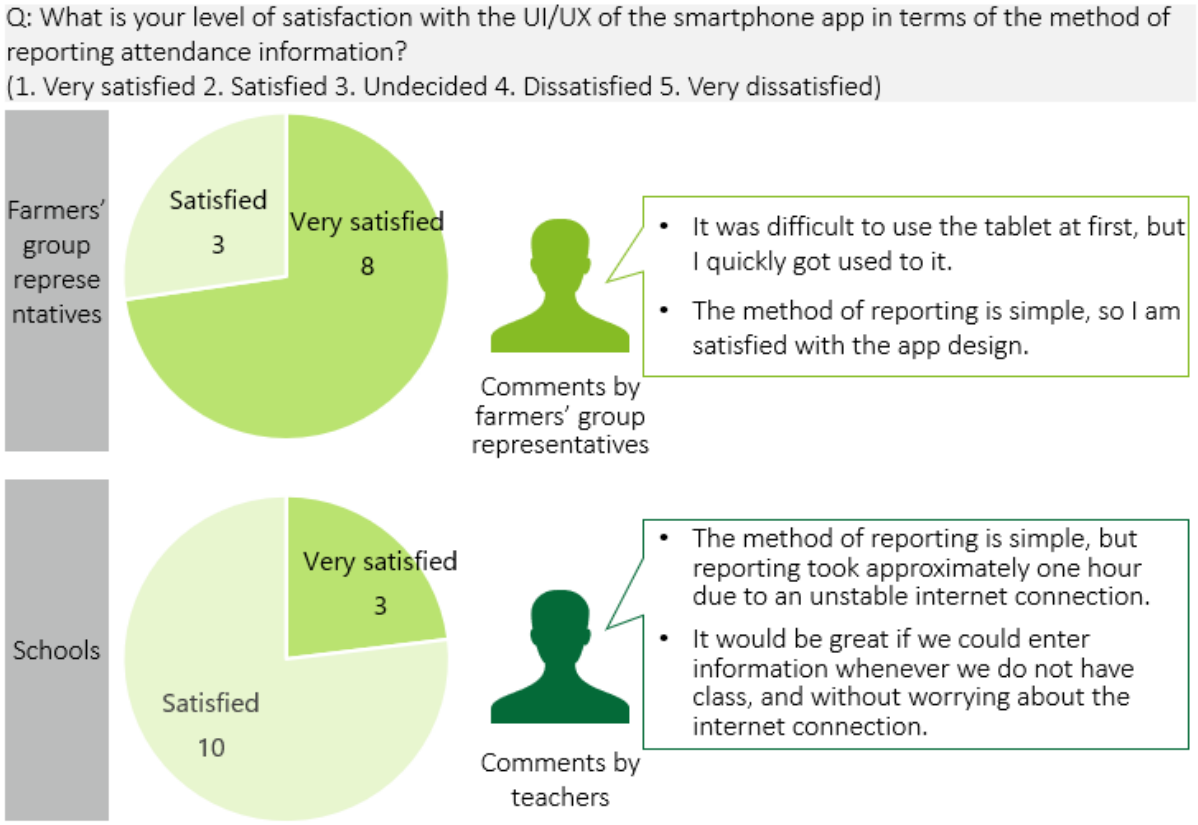
[43] Sensitization is public education activity to enhance awareness of child labor

Comments from farmers' group representatives

Nearly all farmers' group representatives were using tablets for the first time. Therefore, with regard to the UI/UX of the app, they were not speaking from a position of familiarity and we were unable to confirm any dissatisfaction with the app design. At first, they required assistance with filing reports due to their unfamiliarity with scrolling on the tablets, but they were able to continue using the app with ease after receiving training. Additionally, as farmers tend to go into town in the afternoon and evening to use the internet, they did not find it particularly burdensome to travel from their farming villages to file the reports.

Comments from teachers

Teachers had more experience using tablets and thus had no difficulty and expressed no dissatisfaction with the method of reporting. However, teachers indicated that reporting attendance information poses a substantial workload due to unstable internet connections, requiring them to input the information at home late at night or early in the morning. When even home internet connections are unstable, reporting takes roughly 30 to 60 minutes; dealing with the app's internet connection is a challenge.



Source: JICA Survey Team.

Figure 47: Satisfaction with the App Among Farmers' Group Representatives and Teachers

Source: JICA Survey Team.

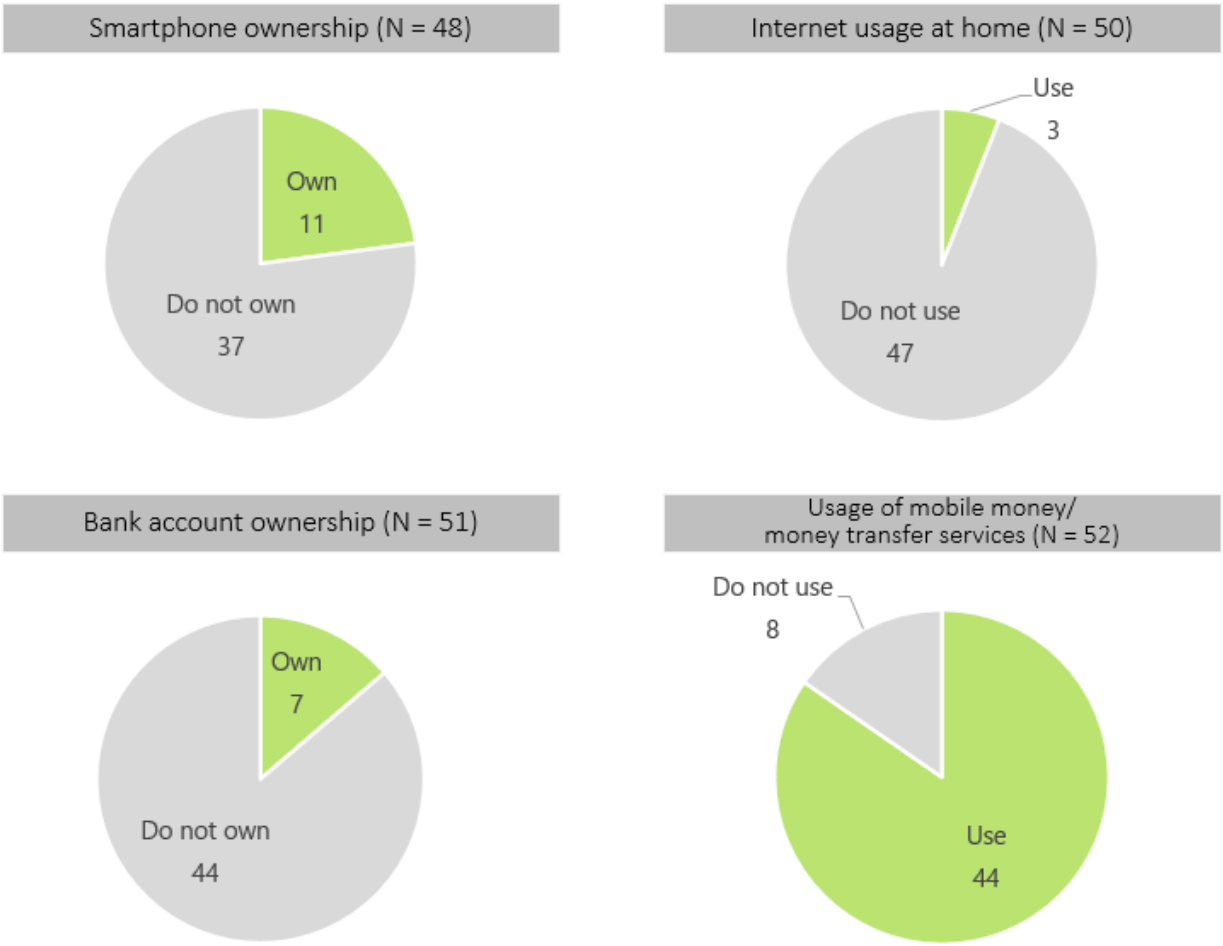
Figure 48: Training on the Use of the App for Farmers' Group Representatives

（3） State of Infrastructure

The field survey conducted before the PoC revealed that approximately 90% of farmers have mobile phones, that they do not always have access to electricity and that communication networks are unreliable; a questionnaire survey pertaining to the use of infrastructure and services was administered to ascertain the availability and usage of other services.

Smartphone usage (23%: 11/48) and internet access at home (6%: 3/50) were low, indicating the difficulty of using smartphones in farming villages and highlighting the challenge posed by the unreliability of communication networks.

Additionally, few people have bank accounts (14%: 7/51), meaning that most farmers do not have access to financing or other financial services. Given farmers' great need for financing (e.g. securing funds for purchasing farming equipment and tools, securing money for living expenses outside of harvest season), efforts must be made so that financial services reach these communities. However, mobile money and mobile phone-based money transfer services (e.g. Orange, MTN) are used at a high rate (85%: 44/52) and cell phones are expected to constitute a contact point with which to provide financial services such as loans and deposits to farmers.



Source: JICA Survey Team.

Figure 49: State of Infrastructure Used by Farmers

(4) Satisfaction with Incentives

The following are the results of the questionnaire pertaining to user satisfaction with the conditions, amounts, frequency and details of incentives.

Farmers' satisfaction with incentives

In general, farmers were very satisfied with the incentives.

More than 80% of respondents indicated that they were satisfied or very satisfied with the conditions for awarding points for reporting, points for accuracy and Child Friendly Awards (CFA).

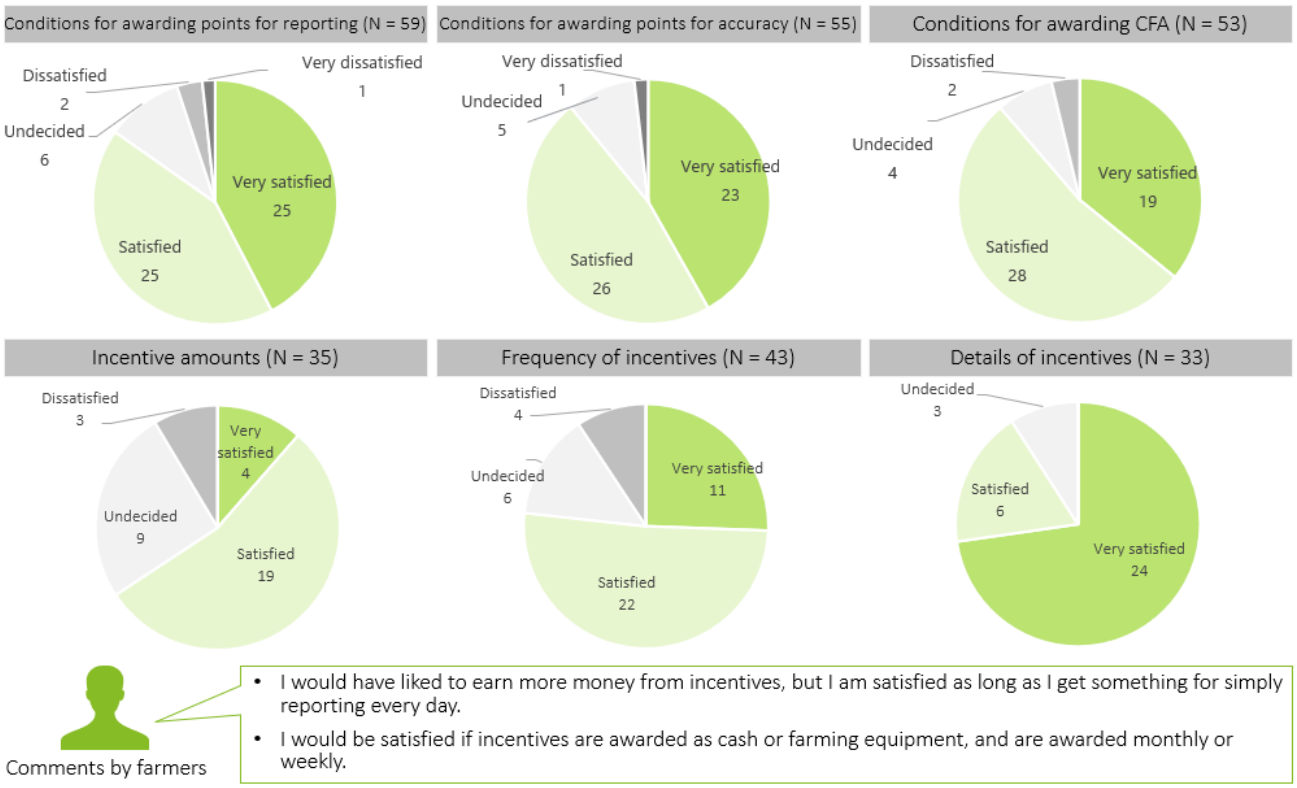
Although satisfaction with the amount of incentives awarded was lower than for other indices, more than 65% of respondents indicated that they were satisfied or very satisfied with the amounts. Interviews with farmers revealed that they would continue using the app if incentives—no matter how small—were awarded, if only to encourage their children to attend school and to get something simply by reporting information every day. This demonstrates that farmers would continue reporting information even if the incentives were less than the premiums paid on wholesale prices under programs by Fairtrade International and other certifying bodies.

However, on a different questionnaire, more than 80 respondents stated that they would need more than 60,000 XOF (12,000 yen) to eradicate child labor. The annualized maximum additional income available under the PoC was approximately JPY 10,000, well short of the incentive amount required to eradicate child labor.

Regarding the frequency of incentives, many respondents would prefer receiving incentives weekly or monthly. We altered the frequency of transfers during the PoC, but only from one to two weeks; we did not note any significant differences.

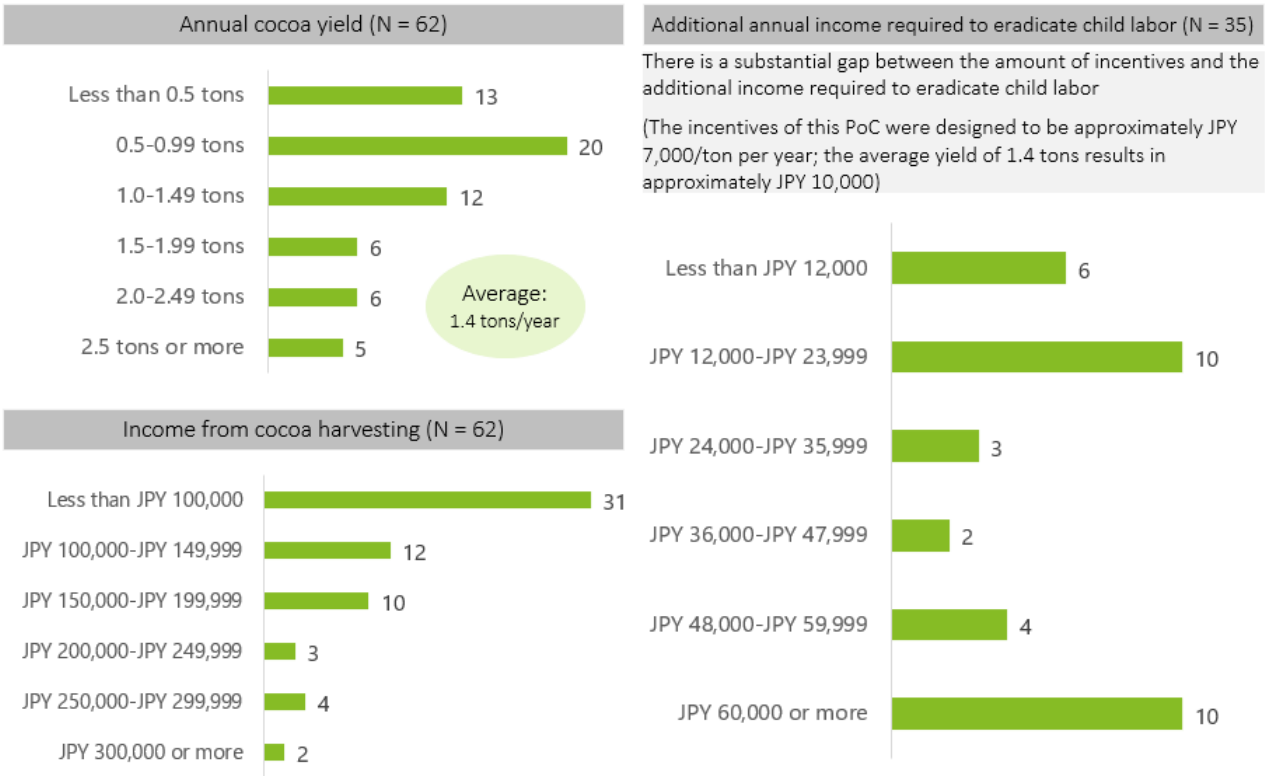
Cash was the most commonly preferred mode of incentives, followed by farming equipment and tools.

Additionally, many farmers were satisfied with the way incentives were paid directly to them in cash rather than passing through cooperatives.



Source: JICA Survey Team.

Figure 50: Farmers' Satisfaction with Incentives



Source: JICA Survey Team, exchange rate of 5 XOF to 1 JPY.

Figure 51: Farmers' Cocoa Yields, Annual Incomes and Amount of Additional Income Required to Eradicate Child Labor

Source: JICA Survey Team.

Figure 52: Questionnaire Survey of Farmers

Schools' satisfaction with incentives

Schools' level of satisfaction with incentive amounts was low.

This is likely due to the substantial gap between the actual incentive amounts and the incentives they desired to supplement insufficient school infrastructure and school supplies (during the PoC, enough pens and paper for all students were distributed).

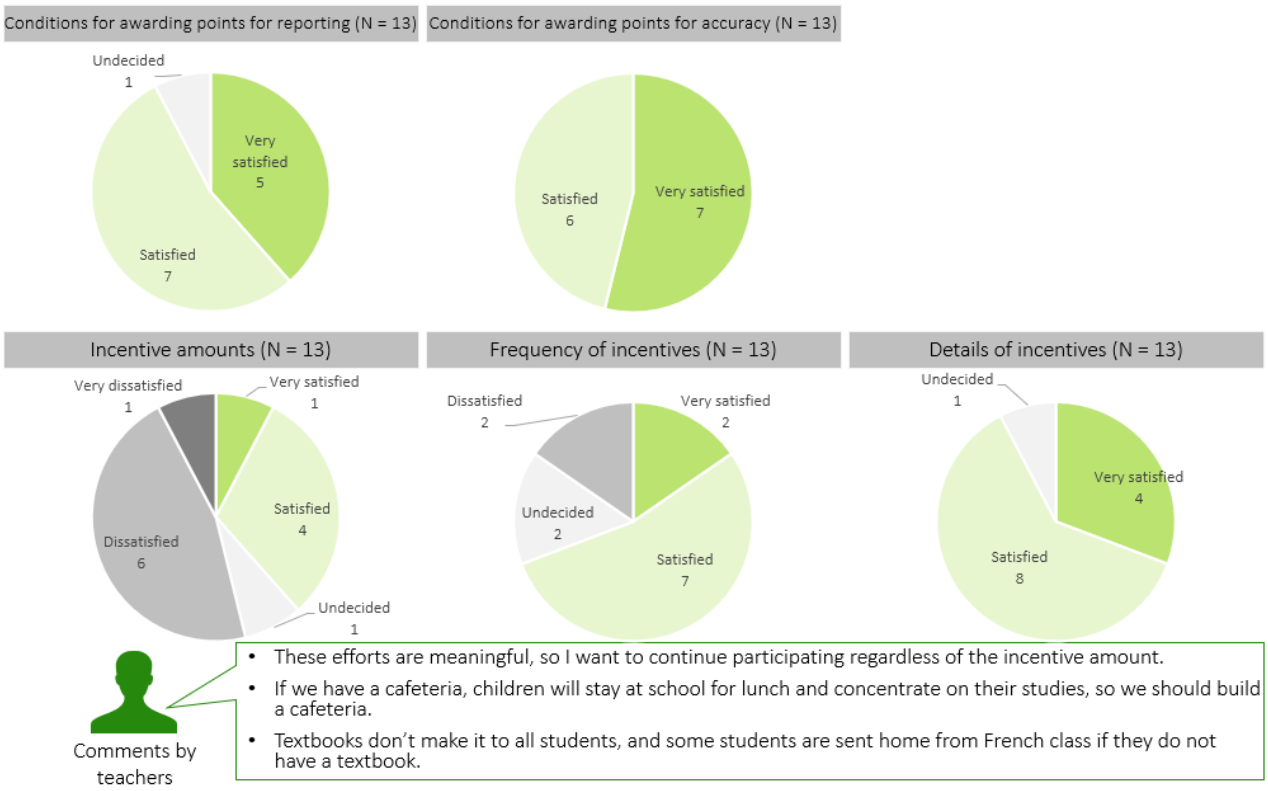
When asked in interviews what schools were lacking, teachers gave many answers, including a cafeteria, textbooks, paper and pens and computers and training materials for teachers.

Many teachers want a cafeteria to be built so that students do not have to return home for lunch (some students

travel 90 minutes each way to go to school), thus gaining the ability to concentrate on their studies. Government assistance is available, but many schools have no prospect of building a cafeteria because they lack the facilities required to qualify for the assistance.

The interviews also revealed a shortage of textbooks. The government is supposed to distribute textbooks free of charge, but parents end up purchasing textbooks because schools are unable to secure enough for all students. Children are sometimes sent away from classes where there is no point in attending without a textbook,[44] indicating the importance of securing enough for all students.

Accordingly, the need for support was confirmed, not only to farmers but also schools, to eliminate child labor, given the very low level of sufficiency for school infrastructure and supplies. In future, it will be crucial to collaborate with the government of Côte d'Ivoire to support schools.



Source: JICA Survey Team.

Figure 53: Schools' Satisfaction with Incentives

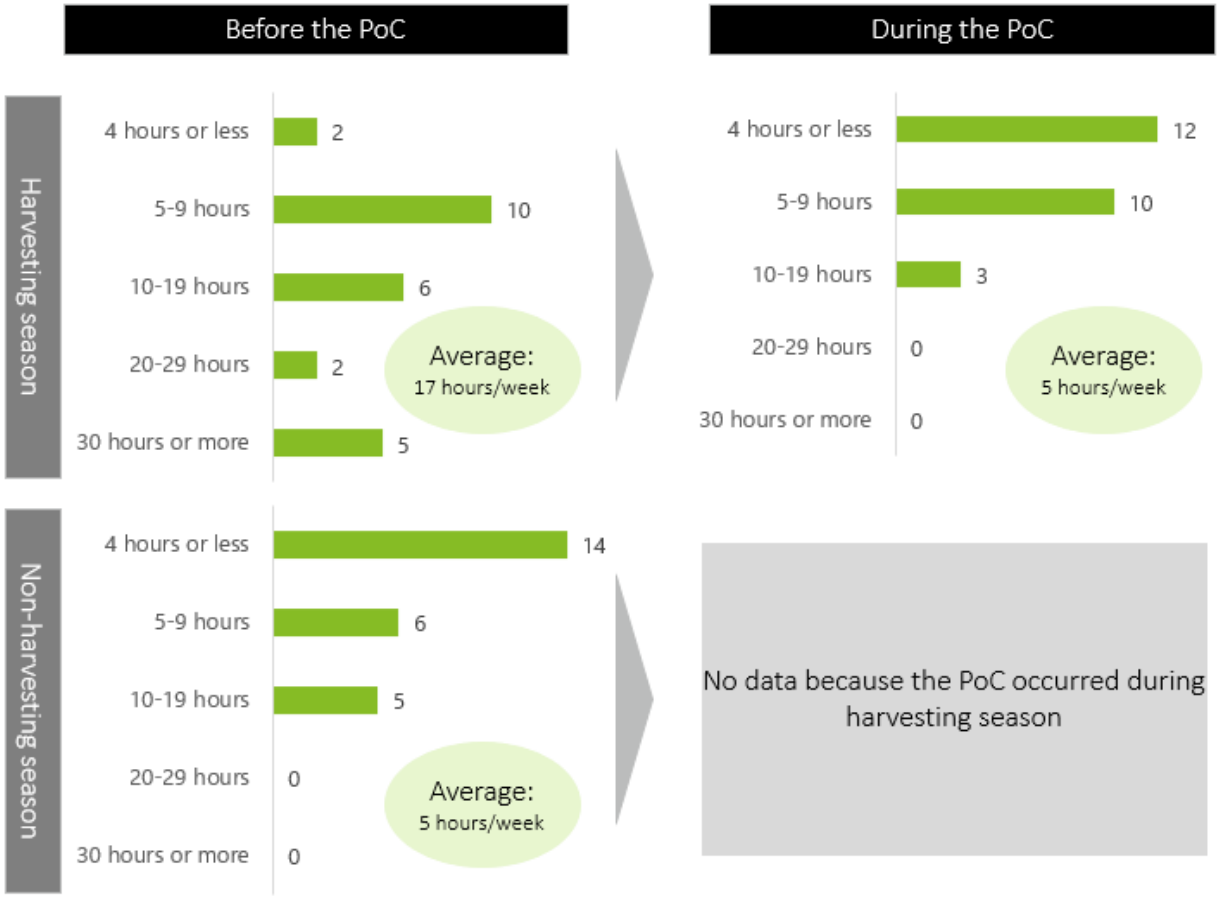
(5) Effect of These Efforts in Curtailing Child Labor

We administered a questionnaire survey to 25 children and compared the state of child labor before and during the PoC and learned that the PoC contributed to curtailing child labor.

Before the PoC, children worked an average of 17 hours per week during the harvesting season and other busy times and an average of five hours per week during other times. In contrast, during the PoC, children worked an average of five hours per week. Given that the PoC took place during the cocoa harvesting season,

[44] Interviews with teachers revealed that, when children do not have textbooks, sending them home at the beginning of a new school term makes them and their parents aware of the need to purchase textbooks.

the PoC had the effect of reducing child labor by 12 hours per week. Although the PoC did not eradicate child labor, it did have a noticeable effect on it.



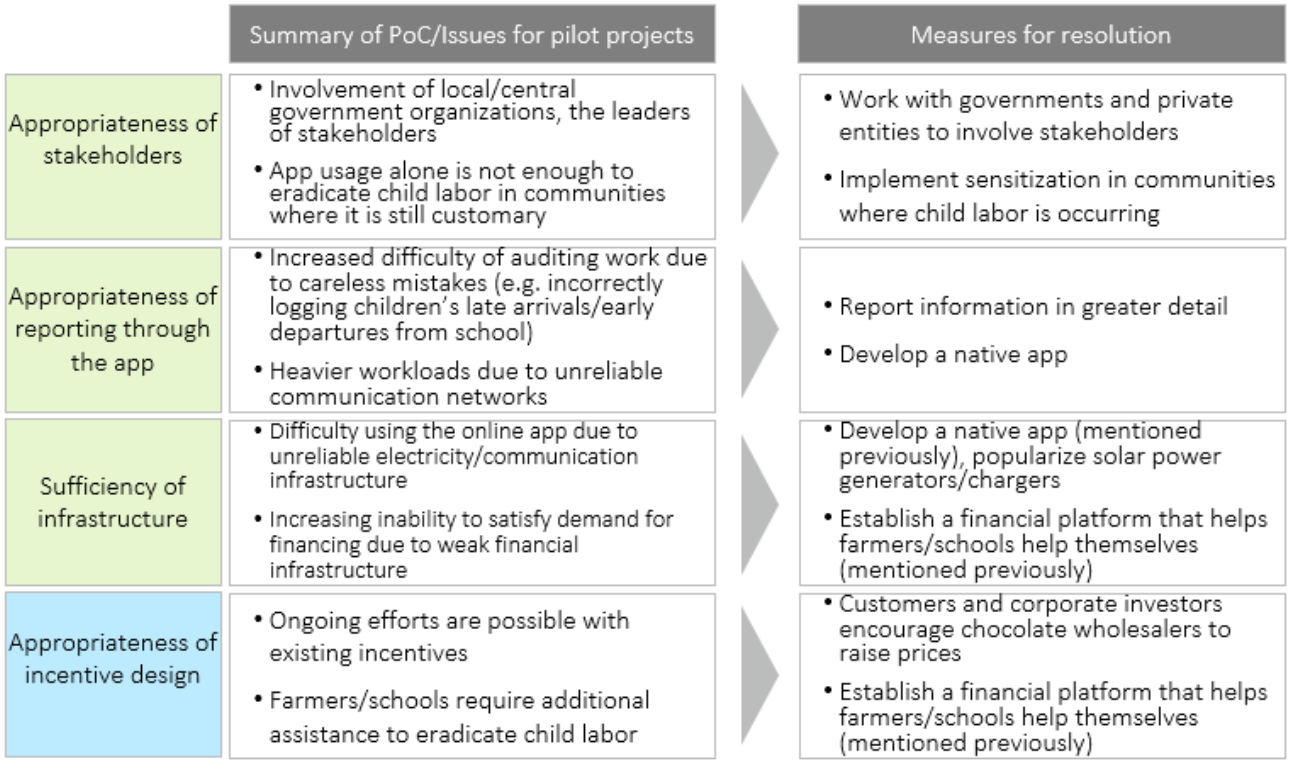
Source: JICA Survey Team, 5XOF = 1 yen.

Figure 54: Difference in Weekly Child Labor Hours Before and During the PoC

（6） Summary of PoC Results and Issues and Measures for Resolution for Pilot Projects

Overall summary

We summarized the remaining issues for each point of contention and measures for resolving them.



Source: JICA Survey Team.

Figure 55: Summary of PoC, Issues and Measures for Resolution

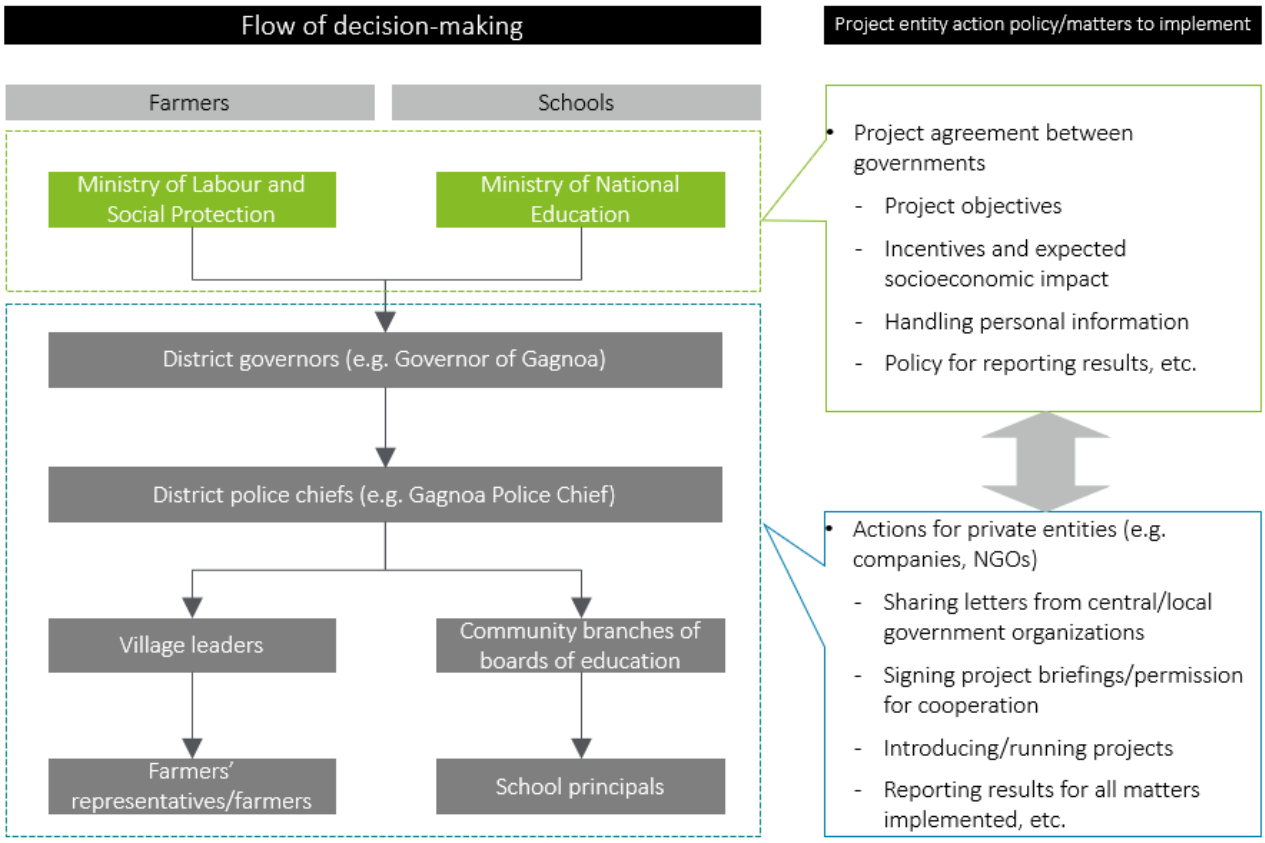
Appropriateness of stakeholders

Farmers, schools and the CLMRS participated proactively in this PoC. Relatively few careless mistakes (e.g. failure to file reports) were noted during the PoC; stakeholder selection was appropriate in terms of their desire to participate in the efforts. Additionally, in terms of reliability, some farmers intentionally filed false reports, signaling the need for verification data from schools and audit data from the CLMRS to supplement data from farmers. Accordingly, stakeholder selection was likely appropriate.

The stakeholders participated willingly because village leaders and local boards of education—the leaders of farmers and schools, respectively—approved of the efforts. Additionally, it may have been difficult for the village leaders and boards of education to agree to participate without the backing of their superiors, namely the governor of the Gagnoa district and central government organizations. Accordingly, we learned that leaders are customarily involved in decision-making in Côte d'Ivoire and that people have difficulty participating in efforts if that is not the case. To implement pilot projects, agreements must be reached with central government organizations and arrangements must be made for matters such as handling personal information, details of assistance and policies for reporting results. To do so, as well as the private sector, governmental organizations of Côte d'Ivoire and other countries will also need to take the initiative. (See Figure 56)

Sensitization is also necessary to increase farmers' willingness to participate in these efforts, ensure a certain level of reliability and curtail child labor. We selected the target communities for this PoC after private entities

introduced them to us and sensitization had already made progress there. Therefore, relatively little child labor was observed in these communities; it is unclear whether these results are attainable in communities where this is not the case. In these other communities, there is probably a greater need for sensitization to accompany system and incentive introduction.



Source: JICA Survey Team.

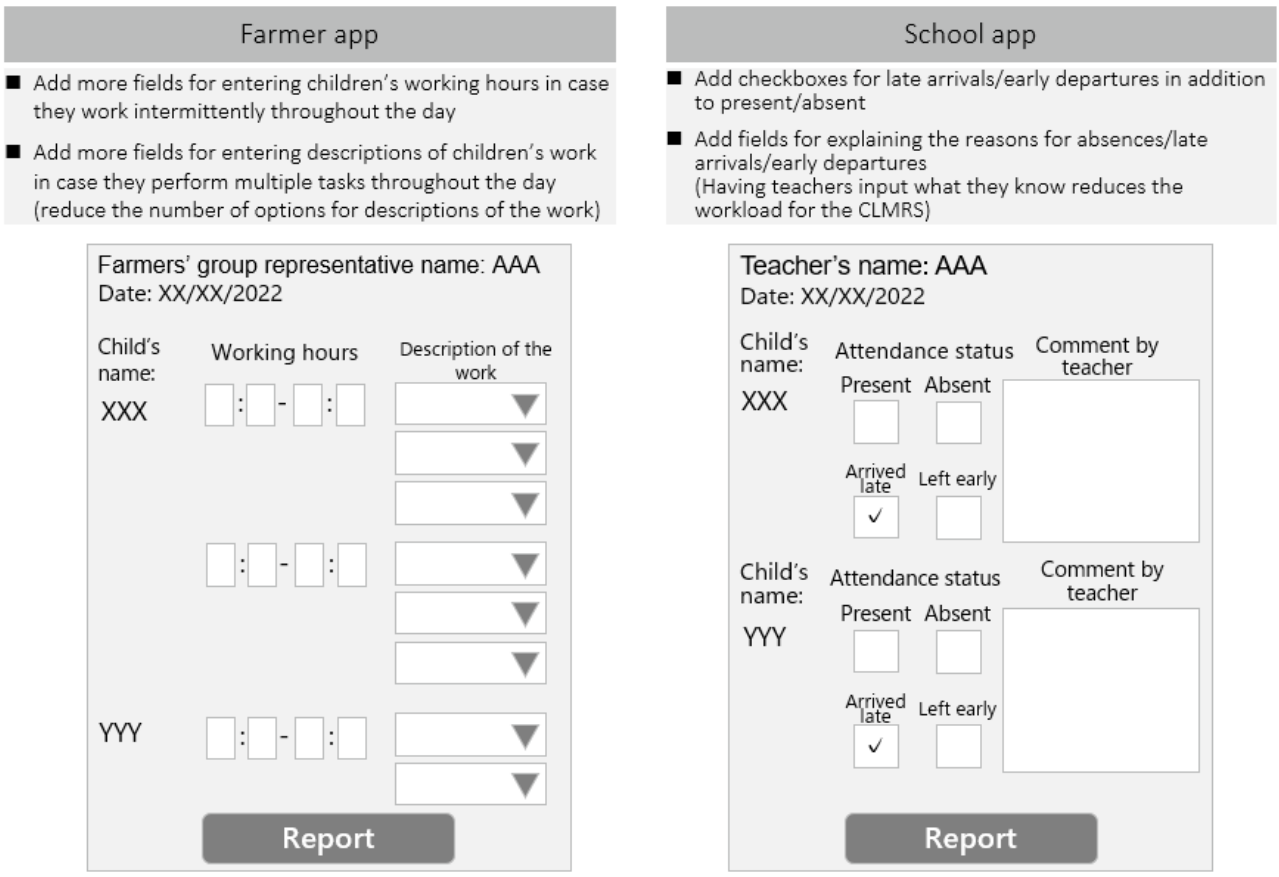
Figure 56: Flow of Decision-Making for Project Participation in Côte d'Ivoire and Action Policy

Appropriateness of reporting through the app

The high reporting rate during the PoC demonstrated the feasibility of reporting through the app. However, children's late arrivals, early departures and absences from schools increased the auditing workload of the CLMRS and teachers were also burdened by the restrictions of their communication networks because the app requires an internet connection.

One solution for reducing the auditing workload is to enable more detailed reports from farmers and schools. The CLMRS can carry out their audits more efficiently if farmers are able to input children's working hours multiple times per day and if fields for late arrivals, early departures and reasons for late arrivals, early departures and absences are added to the school attendance information section of the app.

Another method for reducing the workload is to introduce a native app that works offline. Introducing a native app should enable teachers to input information during breaks in school, which will make the work manageable even if the app asks for more information than it does now.



Source: JICA Survey Team.

Figure 57: Potential App Improvements to Reduce the Auditing Workload of the CLMRS

Sufficiency of infrastructure

Most rural villages in Côte d'Ivoire have unreliable communication and electricity infrastructure, if they have any at all. Given the existing hurdle of establishing communication and electricity infrastructure, it is not possible to use advanced, IoT-based (e.g. biometrics, drones) methods of reporting and auditing at this time. However, these communities do have basic infrastructure for reporting if a native app into which farmers' group representatives and schools enter data manually is developed; thus, the lack or unreliability of infrastructure does not preclude these communities from participating in pilot projects. Additionally, in terms of issues with electricity, we learned during the PoC that the work is feasible with the use of solar power generators or the like.

The underdevelopment of financial infrastructure is a major issue (to be discussed in detail in the next subsection); thus, introducing simple community financing for agriculture should create an ecosystem in which farmers' incomes increase and improve their ability to afford school supplies.

Appropriateness of incentive design

Although the PoC proved that it is possible to sustain reporting work with incentives set at lower amounts than those of other certifying bodies, it also demonstrated that incentives at this level are not enough to eradicate child labor. The PoC also revealed the need to provide support for developing school infrastructure concurrently with efforts to increase farmers' incomes.

Incentive amounts can be increased to provide more assistance to schools and further increase farmers' incomes, but doing so would require private entities to pay higher fees. Increasing ESG investment and

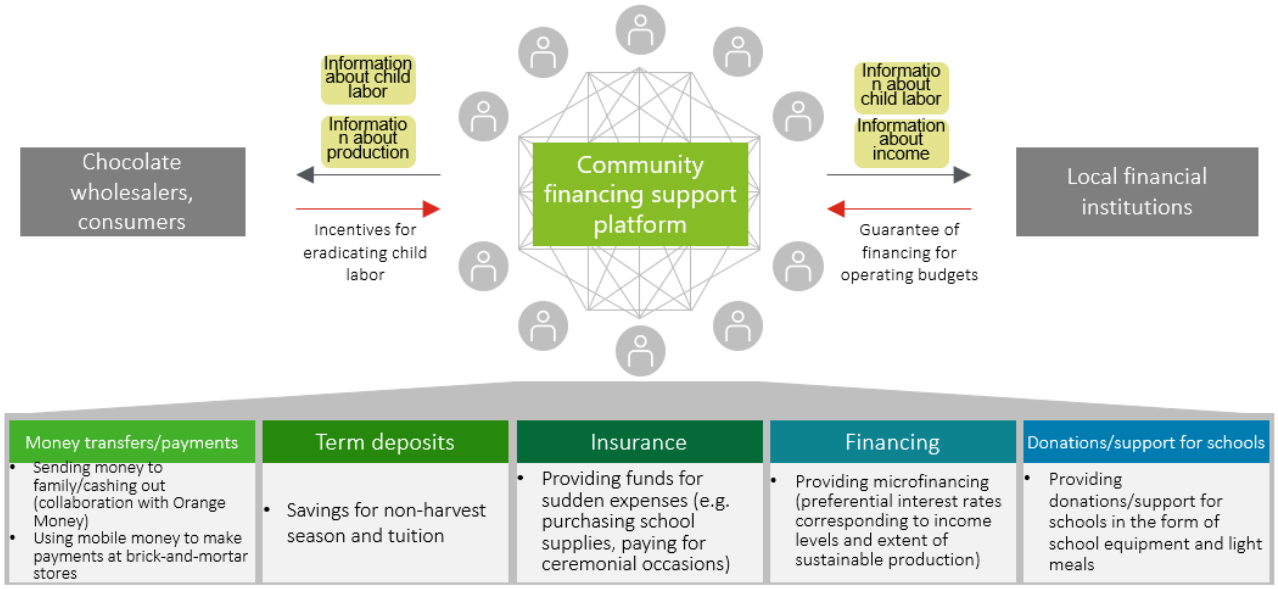
sustainable consumption could drive investors and consumers to encourage companies to further increase wholesale prices of cocoa, which would be effective, but farmers and schools still need to be able to help themselves.

The village of Antonio in Côte d'Ivoire is one example of providing support to help farmers help themselves. In this village, cocoa farmers and women's groups each raised funds for efforts to improve children's rate of attendance at school. The cocoa farmers' fund was used to establish a system enabling farmers to request help from fellow villagers at discounted prices. This effort has resolved the labor shortage, thereby reducing child labor. The women's groups created an Okra Fund to allocate income generated by selling okra to a fund for purchasing school supplies, provide financing for obtaining incomes from secondary employment and provide light meals to schoolchildren. Introducing community financing schemes like these can enable communities to solve problems such as labor shortages, insufficient income and insufficient funds for purchasing school supplies on their own. Financial infrastructure is underdeveloped in rural areas of Côte d'Ivoire; thus, when implementing pilot projects, it is extremely important to create blockchain-based community financing platforms to accompany app-based reporting systems.

	Entity	Description of activities	Source of funding
Fund for assistance with farming work	Cocoa farmers (men)	**Resolving labor shortages in agriculture through mutual assistance** • Established a system in which volunteers are recruited from communities and sent to farms to help during the cocoa harvesting season—the busy season—so that children are not forced to work • Distributed 85% of funds to community volunteers **Purchasing school supplies to promote children's education** • 15% of funds used to purchase school supplies (e.g. chalk, balls for physical education)	• Farmers requesting help with farming work (Easy to collect due to greater affordability than the cost of paying outside laborers)
Okra Fund	Women's groups	**Securing income independent from cocoa farming** • Used microfinancing to provide support for producing alternative crops and retail business (selling attiéké) • Distributed fund investment profits commensurate with contributions **Financial aid for unexpected expenses** • Provided donations to pay for ceremonial occasions and school materials **Support for schools** • Provided light meals for schoolchildren on a daily basis	• Profits from selling okra • Women's group membership fees (Investment profit adjusted once annually commensurate with contributions) • Interest income (10% per quarter) • Penalties collected by women's groups (FCFA 100-500 collected as a fine for being late to group activities)

Source: JICA Survey Team

Figure 58: Example of Introduction of Community Financing (Village of Antonio, Côte d'Ivoire)



Source: JICA Survey Team.

Figure 59: Proposed Blockchain-Based Community Financing Platform

Chapter 5: Survey of Consumer and Manufacturer Demand

1. Overview of Ethical Consumption and Sustainable Chocolate in Japan and the World

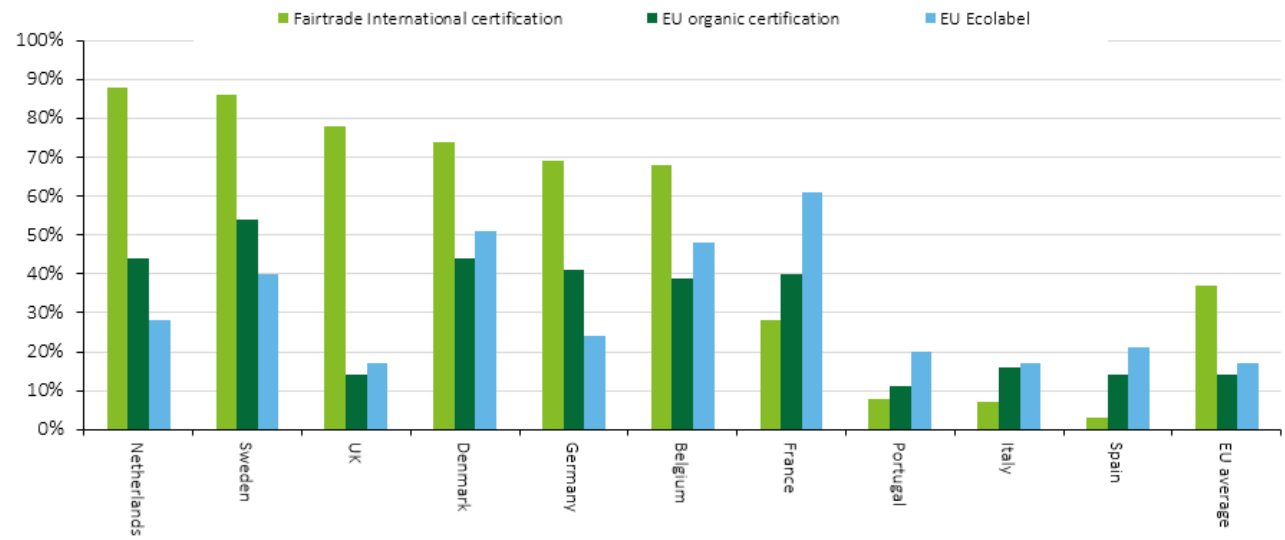
The market for Fairtrade-certified products in Japan is said to have grown more than sixfold in the past 10 years; in 2018, the scale of the Japanese market for Fairtrade-certified products was estimated to be JPY 12.436 billion. The global market is approximately EUR 8.5 billion (approximately JPY 1.0742 trillion), with markets in the UK and Germany at approximately JPY 255 billion (more than 21 times the Japanese market) and JPY 168 billion (more than 14 times), respectively. In terms of fair trade standards, in addition to using independent, objective third-party standards and certification such as Fairtrade International, companies have begun creating their own standards and programs.

One factor behind the lack of expansion of the fair trade market in Japan compared to Europe and the Americas is the sizeable difference in prices between fair trade and non-fair-trade products in light of the scarcity of the former. Additionally, Japanese consumers have difficulty knowing for sure whether Fairtrade products actually help people in local producing communities. To resolve these issues, it is essential to make supply chains transparent and develop systems for returning profits to local producing communities.

At present, Japanese consumers lack the means to determine whether products are child labor-free and some consumers are not even aware that child labor is a problem. In Europe and the Americas, education about Fairtrade and the problem of child labor is a part of school curriculum. Even in Japan, SDGs are becoming more prevalent in elementary schools in recent years; therefore, Japanese consumers should have a greater interest in child labor-free cocoa in future, provided that information is conveyed explicitly because supply chains are transparent and we have systems for returning profits to local producing communities.

（1） Trends in Ethical Consumption in Europe

What about recognition of certification labels and logos and inclination to provide support for producing countries in European countries, where consumption of fair trade products is higher than Japan? The figure below shows recognition of certification labels and logos in eight European countries published in Eurobarometer, a publication containing analysis of public opinion surveys conducted by the European Commission. Recognition of Fairtrade International certification is 37% on average across the EU, but it is nearly 90% in Denmark, the Netherlands and Sweden and 70% to 80% of consumers in the aforementioned UK and Germany recognize the label. In contrast, recognition in Spain and Portugal trails the EU average. Additionally, consumers in France—and to a lesser extent in Spain, Portugal and Italy—are more familiar with the EU Ecolabel than Fairtrade International certification. These figures demonstrate that, despite variation between European countries in terms of their approach to and interest in ethical consumption, people in Northern European countries have a particularly strong interest in fair trade.



Source: Special Eurobarometer 473, Special Eurobarometer 468.[45]

Figure 60: Recognition of Certification and Logos

Next, we turn our attention to the inclination to provide support to developing countries and tolerance for additional fees for providing support to producing countries in these eight European nations. Figure 61 shows answers to the question "Are you personally involved in efforts to help developing countries using any of the following methods?" (multiple answers possible). Giving donations to NGOs was the most popular form of involvement and support in most of the countries, but the second-most common response was making ethical choices when shopping, particularly in the Netherlands, Sweden and Germany, where 30% to nearly 50% of people gave that response. In contrast, in France and countries south of France, more than half of respondents indicated that they were completely uninvolved in providing support to developing countries.

Figure 62 shows answers to the question "When purchasing food or other products produced in developing countries, would you pay an additional fee to help people living in those countries?" Similar to the previous question, more than 70% of respondents from the Netherlands, Sweden and Germany said they would tolerate additional fees, while only 18% from Portugal said the same and the majority in each of Italy and Spain indicated that they would not pay the fees.

Additionally, according to a survey about the credibility of fair trade labels,[46] nearly 80% of respondents in Sweden, Germany and the UK said they trusted labels, with the figure dropping to 57% in France and falling further in Eastern Europe, for example to 43% in Poland.

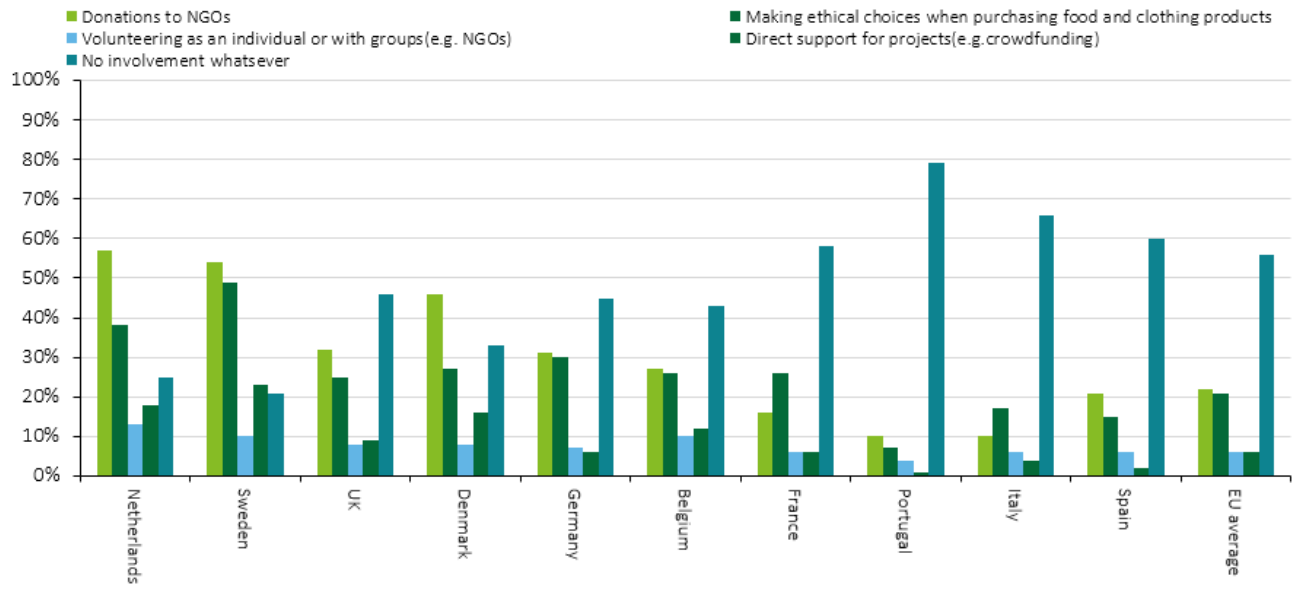
These results show that both recognition of and trust in fair trade labels is high in Europe, especially in Northern and Western European countries. This correlates to those countries' high numbers of consumers who take action to provide support to producing countries and are amenable to paying premiums for products from those countries. This strong inclination toward fair trade and ethical consumption in Northern and Western European countries is likely due to multiple factors, including income and education levels and access to accurate information.[47] In light of these facts, assistance programs run by certification labels and companies

[45] The service targeted approximately 28,000 citizens in the 28 EU member countries, with a sample size of approximately 1,000 people in each country

[46] Globalcad "Literature Review on Public Attitudes to Fair Trade and ethical consumption"

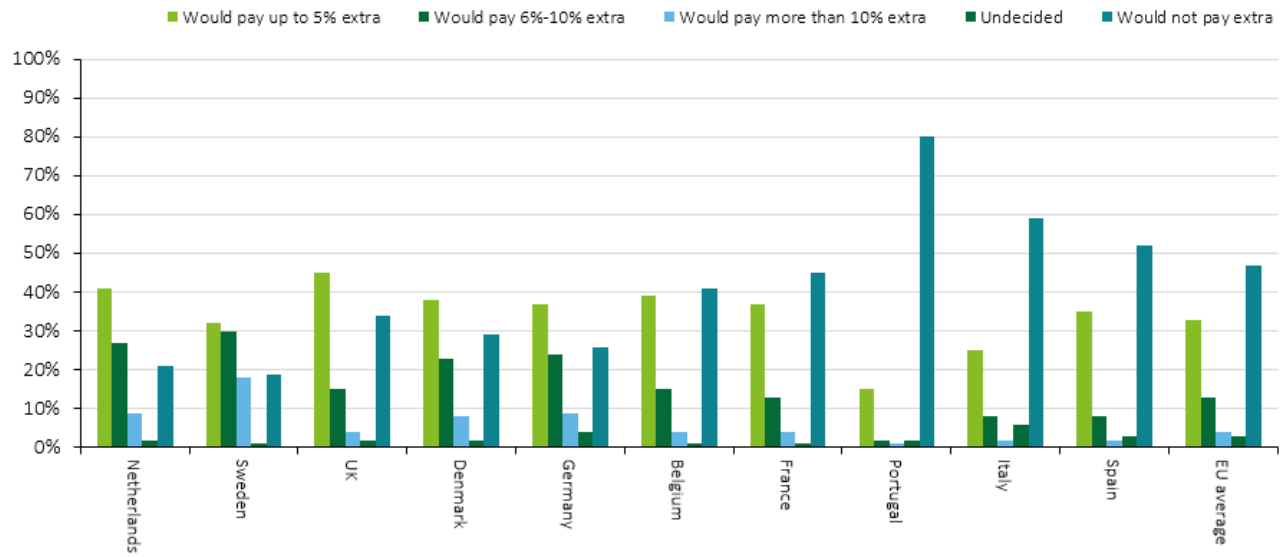
[47] Globalcad "Literature Review on Public Attitudes to Fair Trade and ethical consumption"

and other efforts to increase recognition of the logos as a first step toward changing consumer behavior and awareness may be an effective way to popularize fair trade products in Japan.



Source: Special Eurobarometer 476.[48]

Figure 61: Personal Involvement in Assistance for Developing Countries



Source: Special Eurobarometer 441.[49]

Figure 62: Tolerance for Additional Fees when Purchasing Products Produced in Developing Countries to Provide Support for the Producers

On a 2020 Cargill survey of consumer awareness of chocolate-related products administered to more than

[48] The service targeted approximately 28,000 citizens in the 28 EU member countries, with a sample size of approximately 1,000 people in each country

[49] Same as above

7,000 consumers in 10 European countries,[50] nearly three out of four frequent purchasers of chocolate indicated a desire to purchase sustainable products. The survey also showed that respondents age 18-34 demonstrated the strongest interest in social issues, with 76% indicating that they had placed a greater emphasis on sustainability when choosing chocolate products in the last year. Additionally, most millennial and Gen Z respondents said they were purchasing more sustainable products.

Of the social issues associated with cocoa, respondents indicated the strongest interest in child labor, followed by farmers' incomes and deforestation. Consumers have a positive impression of companies working to combat these issues and also tend to trust these brands more and consider them to be of higher quality.

However, challenges remain with respect to these products, even in Europe. Six of ten respondents to the aforementioned survey do not always have access to sustainable products and 59% said it was too difficult to look into whether products are truly sustainable. Although approximately 40% of respondents look at certification labels to determine whether products are sustainable, there is clearly room for improvement in Europe in terms of recognition and popularity of these products.

Thus, amid a burgeoning awareness of sustainability in Europe, particularly among the younger generations, efforts to combat social issues are creating mature consumers capable of discerning corporate value. However, there remains space for expansion in future in countries that are in the earlier stages of exposure to sustainable products and recognition of labels.

2. Consumer Survey

（1） Survey Overview

In this section, we conduct a consumer analysis to consider measures for expanding the distribution of child labor-free cocoa and chocolate products in Japan predicated on the realization of the app demonstrated in this survey, which enables users to check whether child labor is occurring.

The following is an overview of the consumer survey.

Table 14: Consumer Survey Overview

Methodology	Online survey
Duration	October 29-November 1, 2021
Survey company	Rakuten Insight
Scope	1,400 people (100 each in 14 categories of men and women in their teens, 20s, 30s, 40s, 50s, 60s and 70s and older) who registered for monitoring with Rakuten Insight and responded that they purchase chocolate products at least once per year

（2） Survey Items

The questionnaire in this consumer survey was designed based on verification items set out for each step in the flow of consumer buying behavior: attention, interest, desire, memory and action.

- Attention: Recognition of trademarks (e.g. Fairtrade) and the nature of the organizations' efforts, recognition of sustainable chocolate (brand recall), awareness of human rights/environmental problems
- Interest: Interest in sustainable chocolate, interest in assistance for human rights/environmental issues

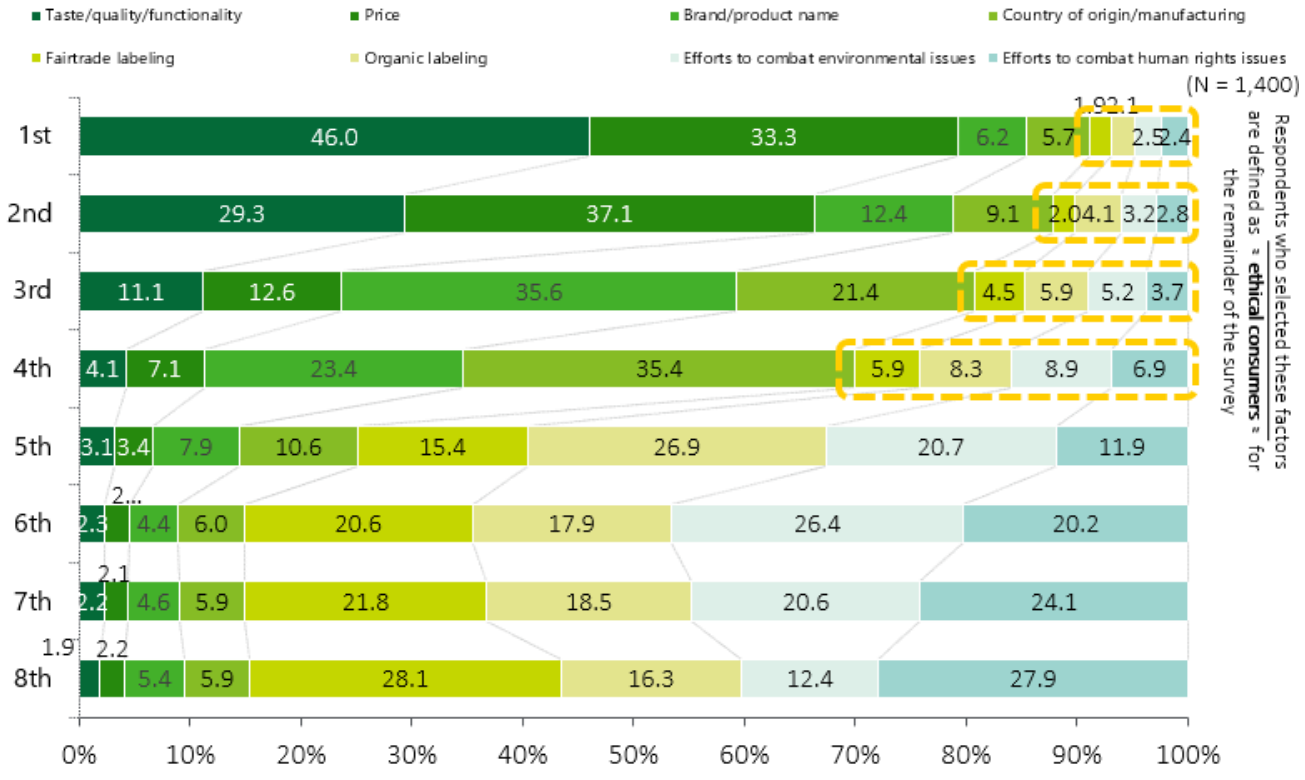
[50] Cargill "European Consumer Research conducted by Savanta for Cargill" (N = 7412, 10 countries)

- Desire: Willingness/reasons to purchase sustainable chocolate
- Memory: Incidental conditions that motivate people to make purchases (e.g. assistance for producing regions, checking tracing information, information about local areas, donation-with-purchase)
- Action: Prices/locations at which people make purchases

（3） Survey Results

Normal buying behavior

First, all respondents were asked what they focus on when they go shopping in general, not only for chocolate products. The most important factor overall (in terms of most selections as the top factor) was taste/quality/functionality, followed by price, brand/product name, country of origin/manufacturing, efforts to combat environmental issues, efforts to combat human rights issues, organic labeling and fair trade labeling. However, point totals[51] corresponding to responses from 1st to 8th place change the bottom four rankings; the order in terms of point totals is organic labeling, efforts to combat environmental issues, fair trade labeling and efforts to combat human rights issues. Therefore, in normal shopping, Japanese consumers pay less attention to fair trade and human rights issues than the other factors. However, the 47% of respondents who ranked at least one of the environment, human rights and fair trade or organic labeling in the top four potentially represent a segment that understands efforts toward a sustainable society and are considered “ethical consumers” for the remainder of the survey.



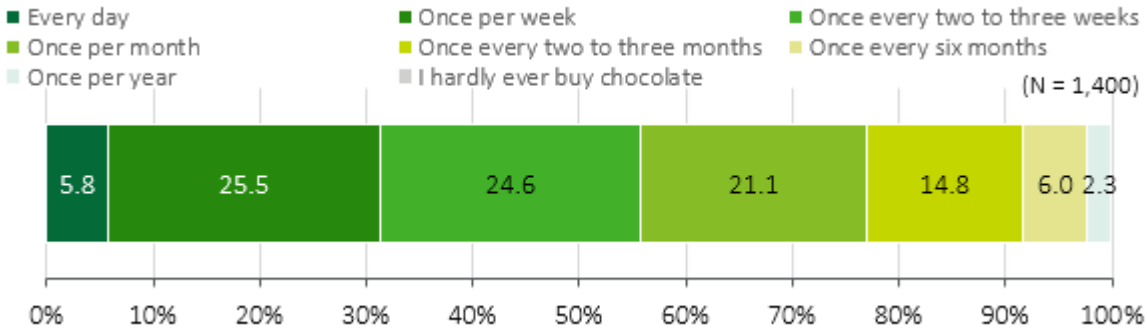
Source: JICA Survey Team.

Figure 63: Emphasis in Normal Shopping

[51] Points were assigned and calculated as follows.
The point total for each option was calculated by multiplying the point total assigned to each ranking (8 points for 1st, 7 points for 2nd, 6 points for 3rd, and so on) by the number of respondents who chose that ranking.

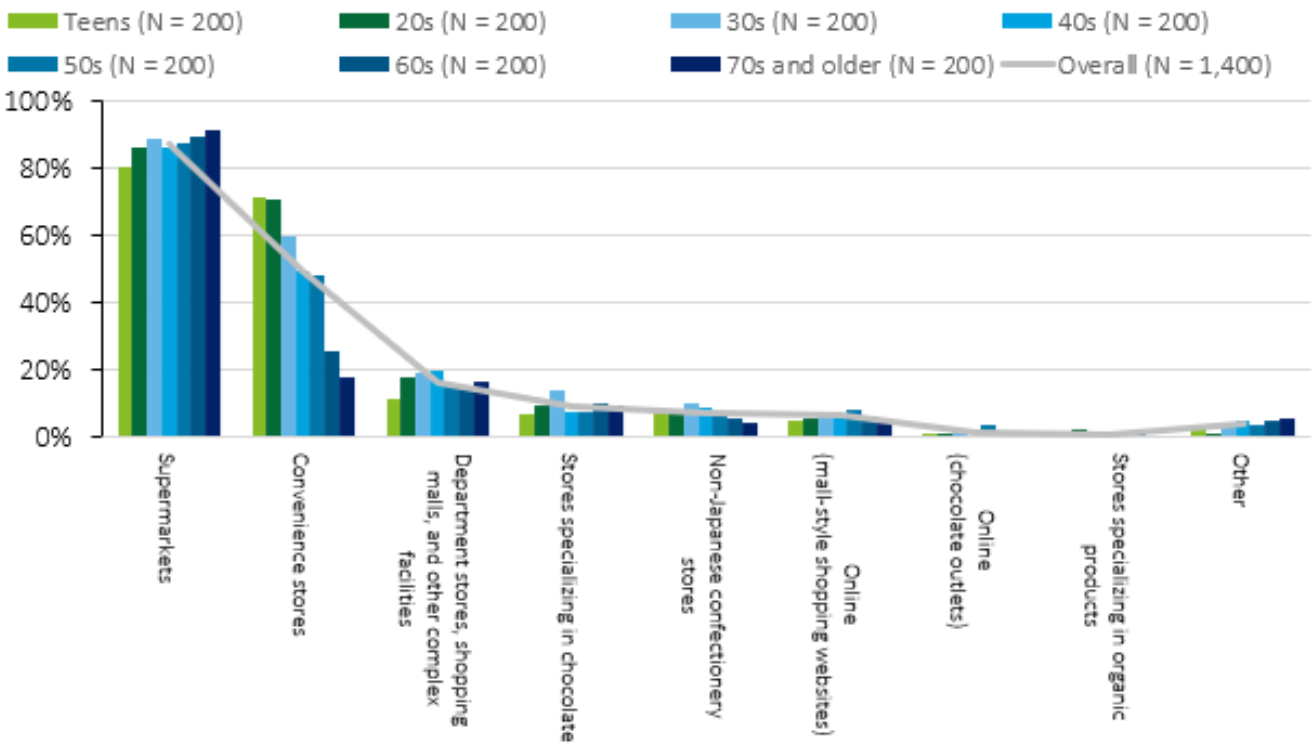
Buying behavior for chocolate products

Next, respondents were asked how frequently they normally purchase chocolate. The most common response was once per week (25.5%), followed by once every two to three weeks (24.6%) and once per month (21.1%). When asked where they purchase chocolate, an overwhelming majority (87.3%) gave supermarkets as their response, followed by convenience stores (49.1%) and department stores, shopping malls and other complex facilities (16.4%); respondents who purchase chocolate online or from stores specializing in chocolate or organic products were in the minority. By age, the younger generation tended to make purchases at convenience stores at higher rates; 70% of respondents in their teens and 20s and 60% of respondents in their 30s indicated that they purchased chocolate at convenience stores.



Source: JICA Survey Team.

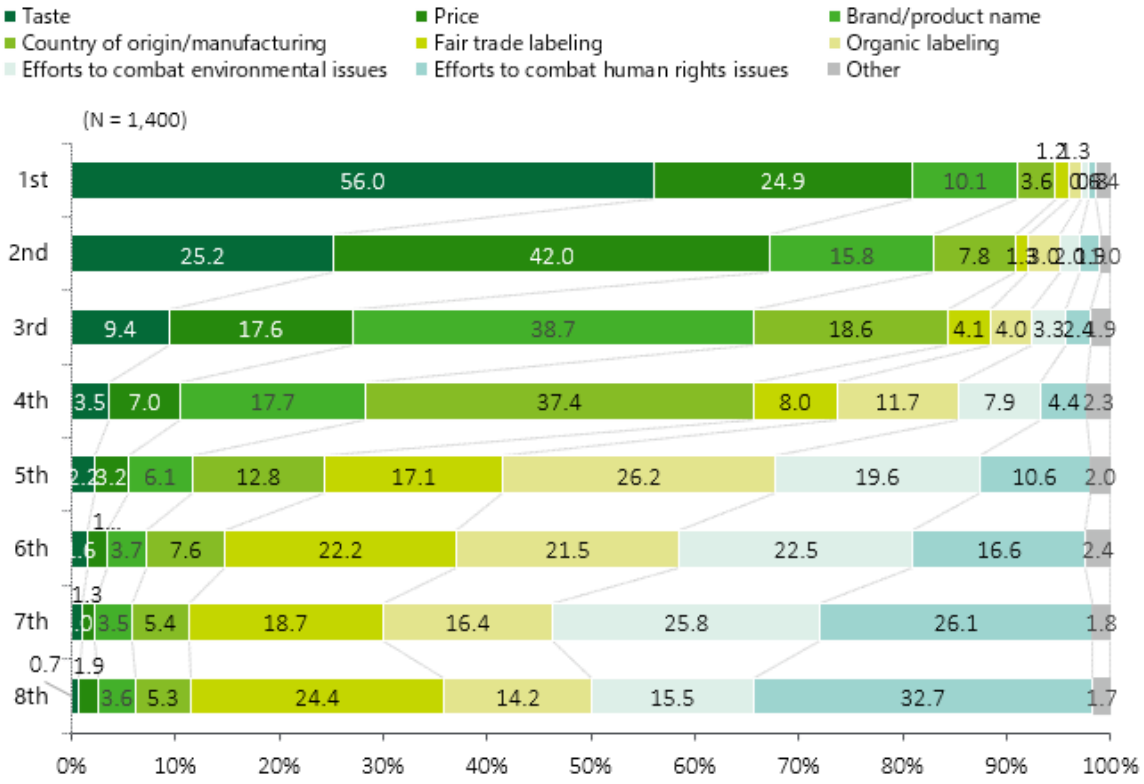
Figure 64: Frequency of Chocolate Product Purchases



Source: JICA Survey Team.

Figure 65: Locations of Chocolate Purchases

After the aforementioned questions, respondents were asked what they focus on when purchasing chocolate products. The factor with the most selections as the top factor was taste, followed by price, brand/product name, country of origin/manufacturing, organic labeling, fair trade labeling, efforts to combat human rights issues and efforts to combat environmental issues. When converted to points as described previously,[52] the bottom four rankings changed, again to organic labeling, efforts to combat environmental issues, fair trade labeling and efforts to combat human rights issues; this demonstrates that an extremely small number of consumers think about fair trade and human rights issues when purchasing chocolate as well as during normal shopping. The percentage of consumers who chose taste as the top factor when shopping for chocolate was 10 points higher than for normal shopping, demonstrating that taste has a greater impact on chocolate product selection than price, brand name, or other factors.



Source: JICA Survey Team.

Figure 66: Emphasis when Purchasing Chocolate Products

The survey shows that a majority of consumers prioritize taste/quality and price during normal shopping and when purchasing chocolate products and that consumers who consider the impact on the environment and human rights are firmly in the minority. In terms of the work to be done to create a sustainable society, the survey reveals that respondents are slightly more interested in the environment than human rights. In terms of labeling, the survey shows that respondents are more interested in organic labeling than fair trade labeling, possibly due to factors such as increasing interest in personal health. This suggests that further sensitization are

[52] Points were assigned and calculated as follows.
The point total for each option was calculated by multiplying the point total assigned to each ranking (8 points for 1st, 7 points for 2nd, 6 points for 3rd, and so on) by the number of respondents who chose that ranking.

needed to persuade consumers other than ethical consumers—who are already very interested in these topics—to purchase sustainable products, particularly those made with respect for human rights. The following and subsequent pages contain discussion as to specific methods of public education.

Additionally, the fact that nearly all respondents purchase chocolate at supermarkets, convenience stores and other places where they likely do their normal shopping is something to keep in mind when considering sales strategies in future.

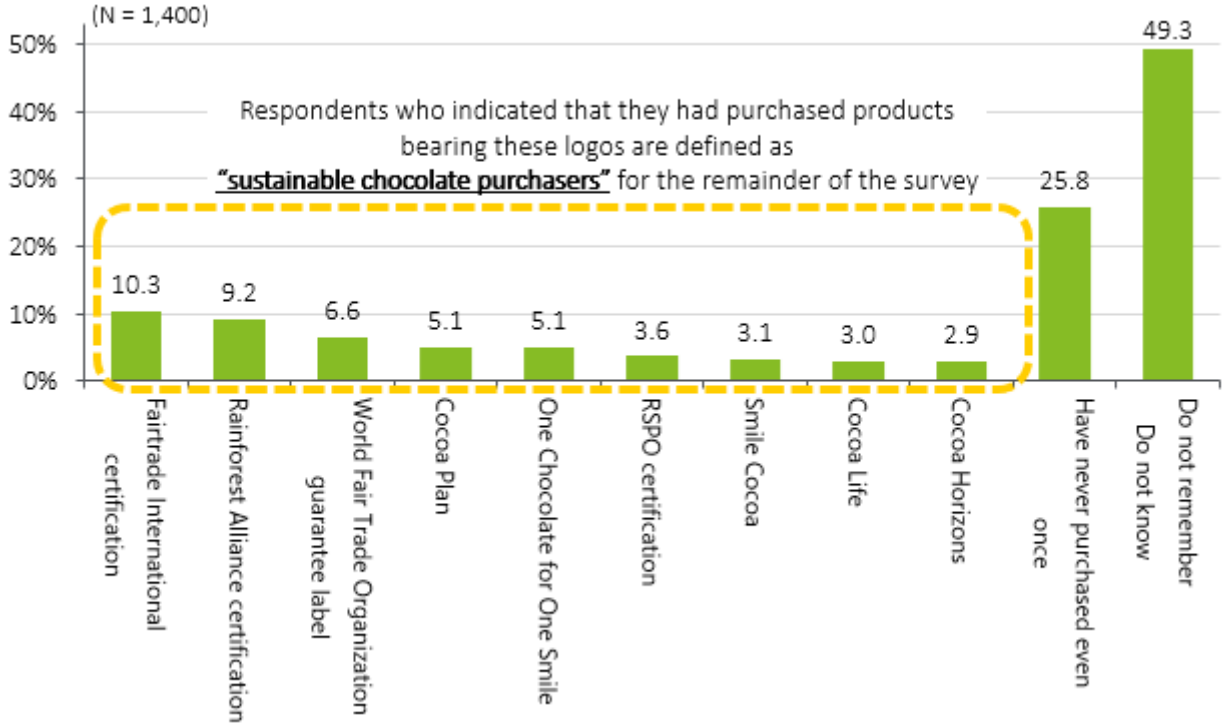
Recognizing and purchasing sustainable chocolate

For this consumer survey, the chocolate products bearing the logos listed below were defined as sustainable chocolate and respondents were asked about their recognition and experience purchasing these chocolate products made with consideration for environmental and human rights issues.

- Fairtrade certification label (Fairtrade International)
- World Fair Trade Organization guarantee label (World Fair Trade Organization)
- Rainforest Alliance Certification logo (Rainforest Alliance)
- Cocoa Life (Mondelez International)
- Cocoa Plan (Nestlé)
- Cocoa Horizons (Cocoa Horizons)
- One Chocolate for One Smile (Morinaga)
- RSPO certification (Roundtable on Sustainable Palm Oil)

Of all respondents, 349 (approximately 25%) indicated that they had purchased sustainable chocolate at least once in the past. The highest percentage of purchases involved products bearing the Fairtrade International certification label, followed by the Rainforest Alliance certification logo and the World Fair Trade Organization guarantee label, indicating broader recognition and more purchases of products approved by world-renowned certification systems than as a result of efforts by private companies. Respondents who made these purchases are referred to as “sustainable chocolate purchasers” for the remainder of the survey.

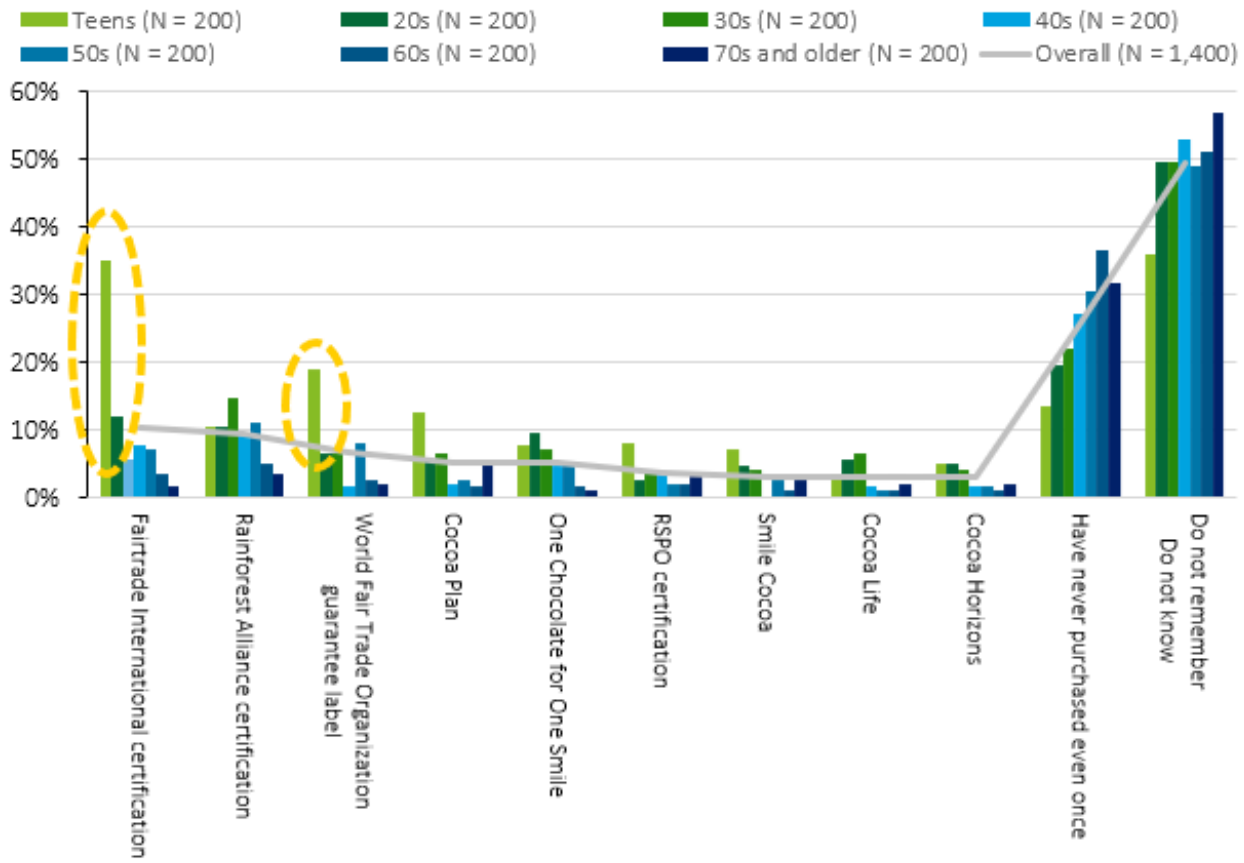
More than 49% of respondents who are not sustainable chocolate purchasers indicated that they either did not remember or did not know whether they had in fact purchased sustainable chocolate, suggesting that half of consumers have never noticed the aforementioned labels when purchasing chocolate.



Source: JICA Survey Team.

Figure 67: Percentage of Sustainable Chocolate Purchasers (Multiple Responses Possible)

By age group, more sustainable chocolate purchasers are in their teens than any other age group, followed by people in their 20s and 30s; the younger the age group, the greater the percentage of sustainable chocolate purchasers. In particular, more than twice as many teens had purchased products bearing the Fairtrade International certification or the World Fair Trade Organization guarantee label than any other age group.

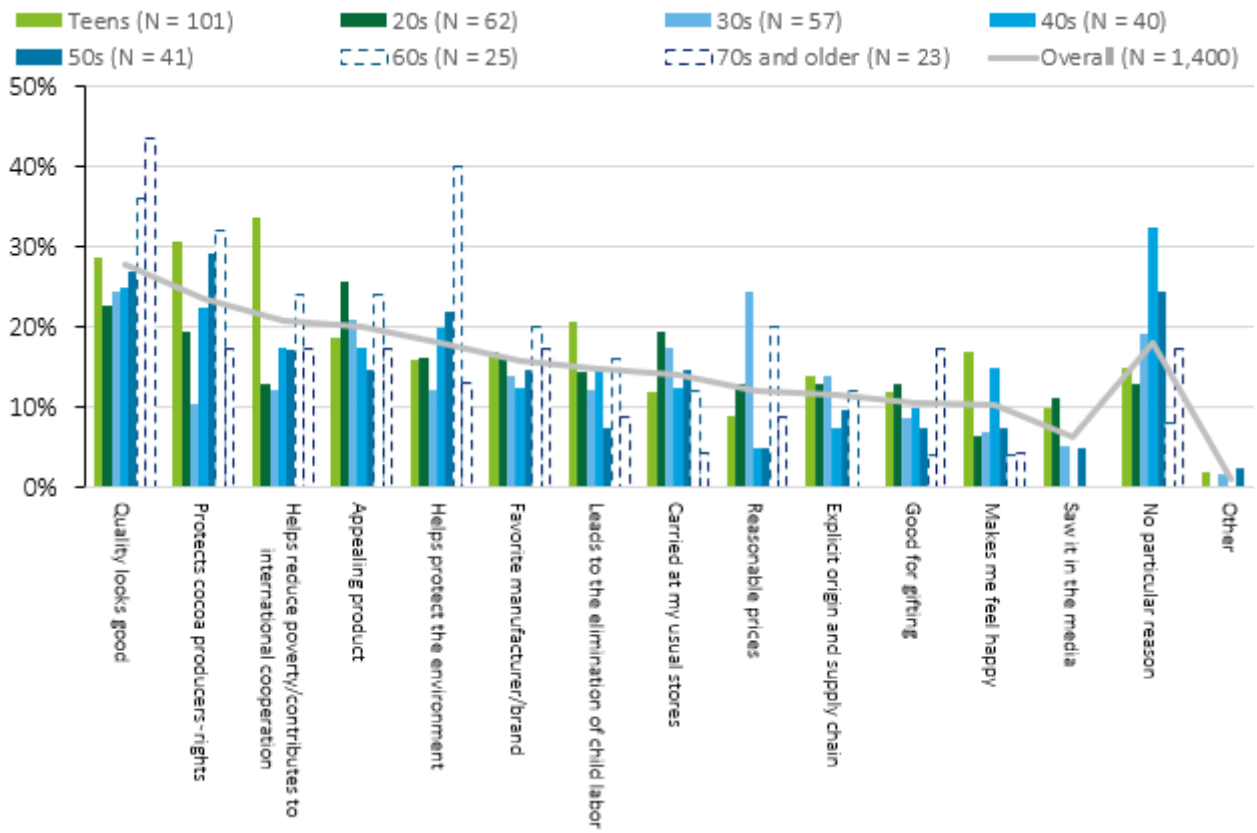


Source: JICA Survey Team.

Figure 68: Respondents who had Purchased Sustainable Chocolate (Multiple Responses Possible)

The most common reason given for these purchases of sustainable chocolate was the apparent high quality (27.8%), followed by protection of cocoa producers' rights (23.5%) and reducing poverty and contributing to international cooperation (20.9%). By age group, a higher percentage of teens indicated reducing poverty and protecting producers' rights than quality as the reason for their purchases.

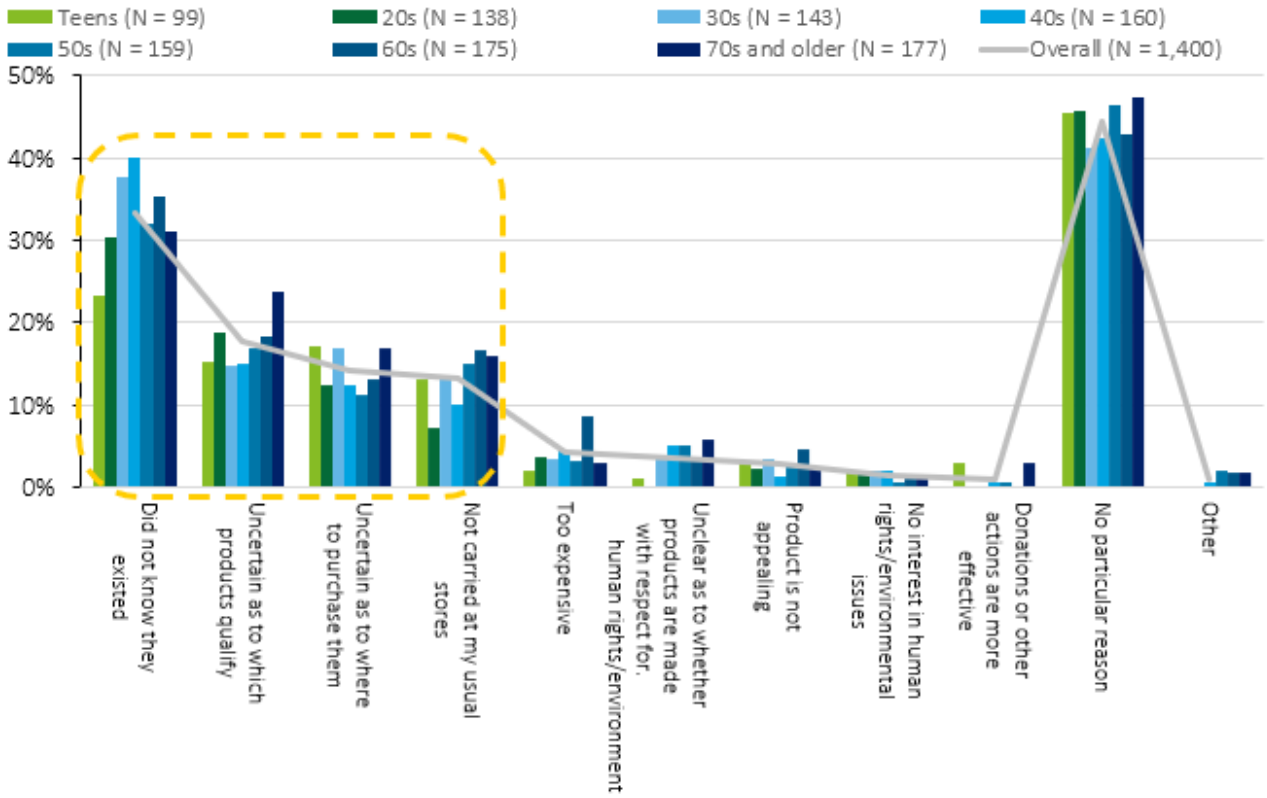
These results show that, although the logos on sustainable chocolate do not necessarily indicate better quality than other products, consumers turn to them as one indicator for judging quality. However, we can infer that younger age groups have a deeper understanding of efforts to support producers and combat human rights issues—the true aims of sustainable chocolate—than older age groups.



Source: JICA Survey Team.

Figure 69: Reasons for Purchasing Sustainable Chocolate

Next, respondents who are not sustainable chocolate purchasers were asked why they had never purchased sustainable chocolate. Excluding responses indicating that there was no particular reason, these respondents were most commonly unaware of the very existence of sustainable chocolate (33.4%), followed by uncertain as to which products qualify as sustainable chocolate (17.8%), uncertain as to where to buy them (14.2%) and their usual stores not carrying them (13.2%). This indicates that, in addition to an absence of interest rooted in a lack of awareness of the products themselves, lack of recognition of the products and the scarcity of locations at which to purchase the products were also among the reasons why a majority of survey respondents have never purchased sustainable chocolate.

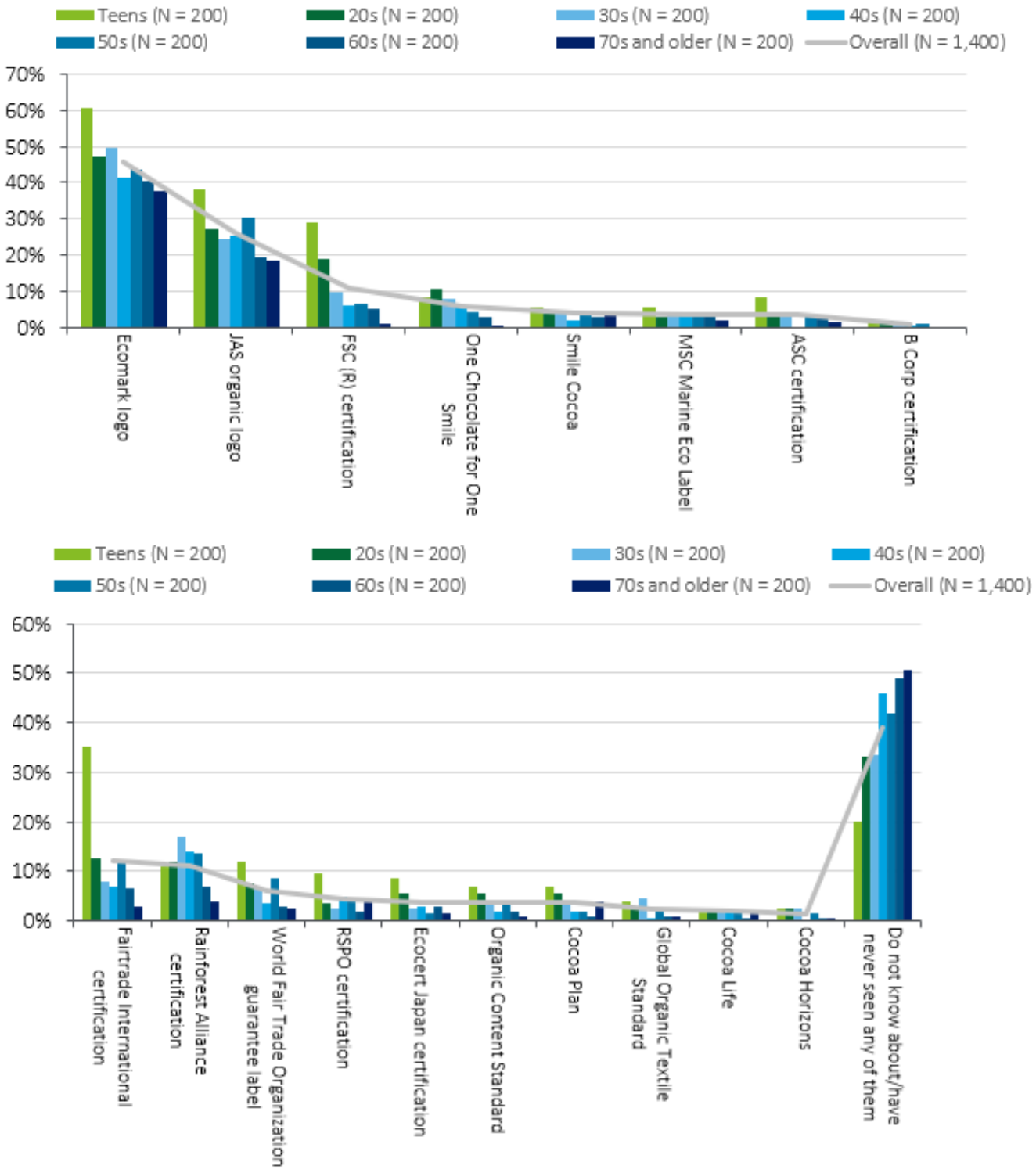


Source: JICA Survey Team.

Figure 70: Reasons for Not Purchasing Sustainable Chocolate

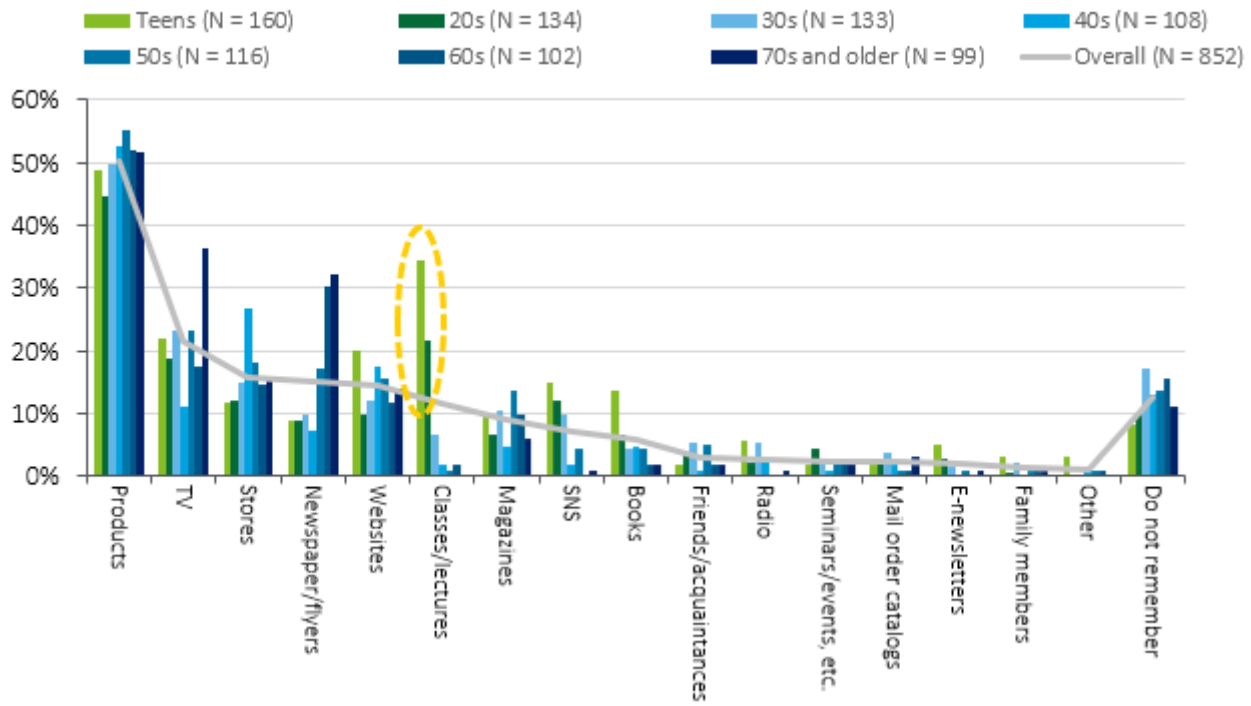
Respondents were also surveyed for their recognition of Japanese and non-Japanese logos for other products in addition to logos for sustainable chocolate. Recognition of the Ecomark logo (45.8%) and the JAS organic logo (26.2%) was high overall, but was also highest among teens and tended to decline into the older age groups. Recognition of the FSC logo for paper products and the like was also high among people in their teens and 20s. Recognition of chocolate-related logos essentially matched whether people had purchased products in the past. However, recognition of Fairtrade International certification among teens—the group with the highest recognition—was approximately the same as the overall average of 37% for Europe, signifying that recognition in Japan is far lower than in Northern and Western European countries, the most advanced countries in Europe in terms of sustainability.

Respondents who indicated that they recognize any of these logos were asked how they came to know about them. Most commonly, they saw them on product packaging (50.4%), followed by on TV (21.6%) and in stores (15.8%). Notably, a high percentage of respondents in their teens and 20s indicated that they had seen the logos in classes or lectures, demonstrating the effects of school education in recent years. Additionally, the fact that approximately 10% to 20% of respondents across all age groups said that they had seen the logos online and that the percentage of people from their teens to their 30s who had seen logos on social media was well above 10% suggest that the importance of digital marketing is increasing.



Source: JICA Survey Team.

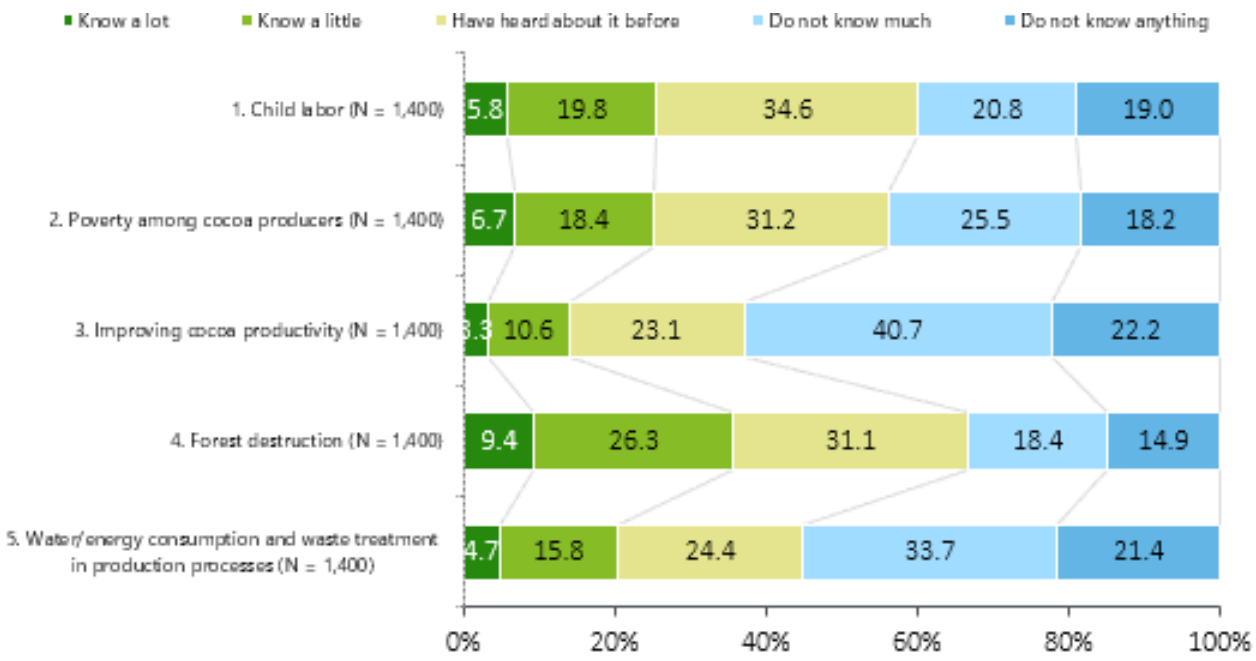
Figure 71: Recognition of Logos for Non-Chocolate Products



Source: JICA Survey Team.

Figure 72: Sources of Knowledge of Logos for Non-Chocolate Products

Next, respondents were asked about the extent to which they know about the various social issues surrounding cocoa beans and the percentage of responses indicating medium- and high-level knowledge was highest for forest destruction (35.7%), followed by child labor (25.6%) and poverty among cocoa producers (25.1%). A higher percentage of people indicated that they had heard about (but did not know anything more about) the problem of child labor than the other four issues, suggesting that many consumers have heard something about the problem, but do not know about it in detail.



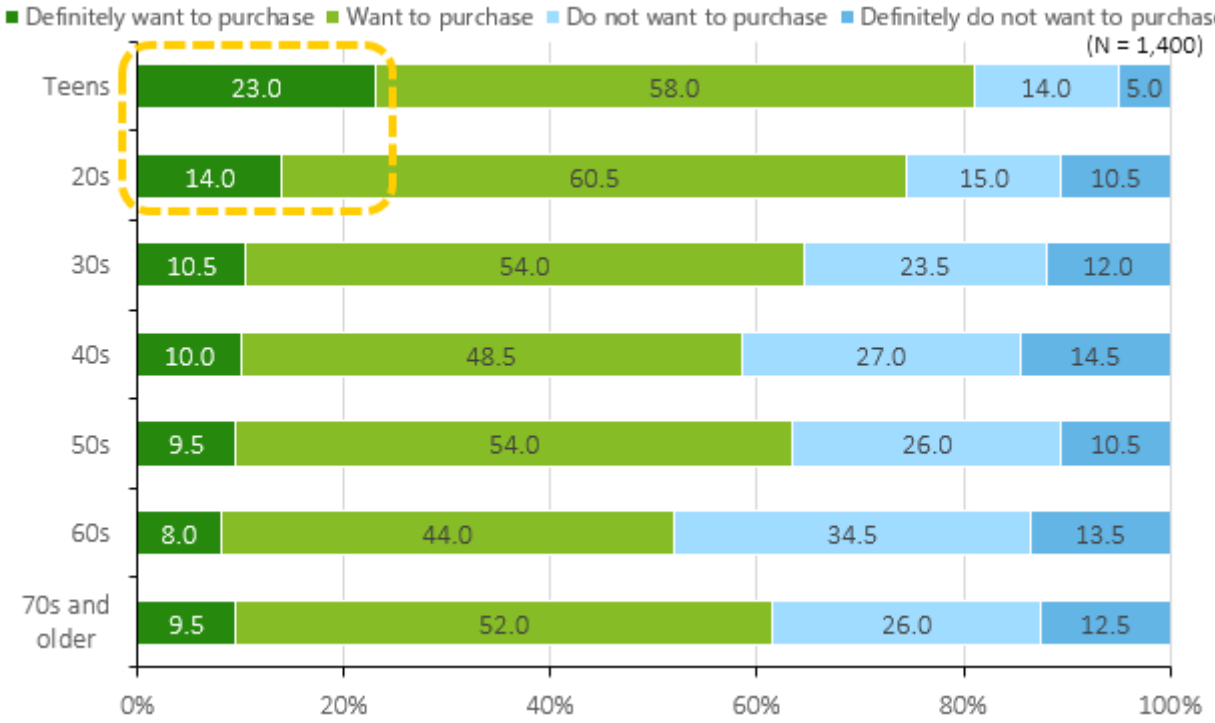
Source: JICA Survey Team.

Figure 73: Recognition of Social Issues Surrounding Cocoa Beans

These results demonstrate that, although overall recognition of sustainable products is low compared to Europe, Japanese people in their teens, 20s and 30s are the main purchasers of sustainable chocolate; in particular, many teenagers purchase sustainable chocolate and are very familiar with efforts to combat human rights issues, one of the true objectives of sustainable chocolate. One factor behind this high recognition among the younger generation is a greater focus on topics such as the environment and fair trade in school curriculum in recent years; as people who received this kind of education grow up and become the leaders of society, we should be able to expect the market for sustainable products in Japan to expand to a certain extent. Furthermore, depending on the education, children who learn about environmental and human rights issues at school can share the information with their families, which could have a secondary effect of educating a generation of parents that still has a relatively low level of interest in sustainability. Additionally, given that many in the segment of consumers with no experience purchasing sustainable chocolate and low interest therein learn about the logos by seeing them on products and in stores, the priority should be to increase recognition of the products through efforts such as increasing the number of locations where they are sold and implementing sales promotion campaigns at stores. Accordingly, it is essential to involve not only manufacturers but also retailers in the development of strategies.

Willingness and motivation to purchase sustainable chocolate

To continue, all respondents were asked whether they have a desire to buy sustainable chocolate. More than half of respondents in all age groups indicated the desire, led by 81% and 74.5% of respondents in their teens and 20s, respectively. By gender, the desire to purchase sustainable chocolate was high among men and women in their teens and women in their 20s and 30s, but men in their 40s and 60s demonstrated the lowest desire.



Source: JICA Survey Team.

Figure 74: Willingness to Purchase Sustainable Chocolate

Table 15: Willingness to Purchase Sustainable Chocolate (by Gender and Age)

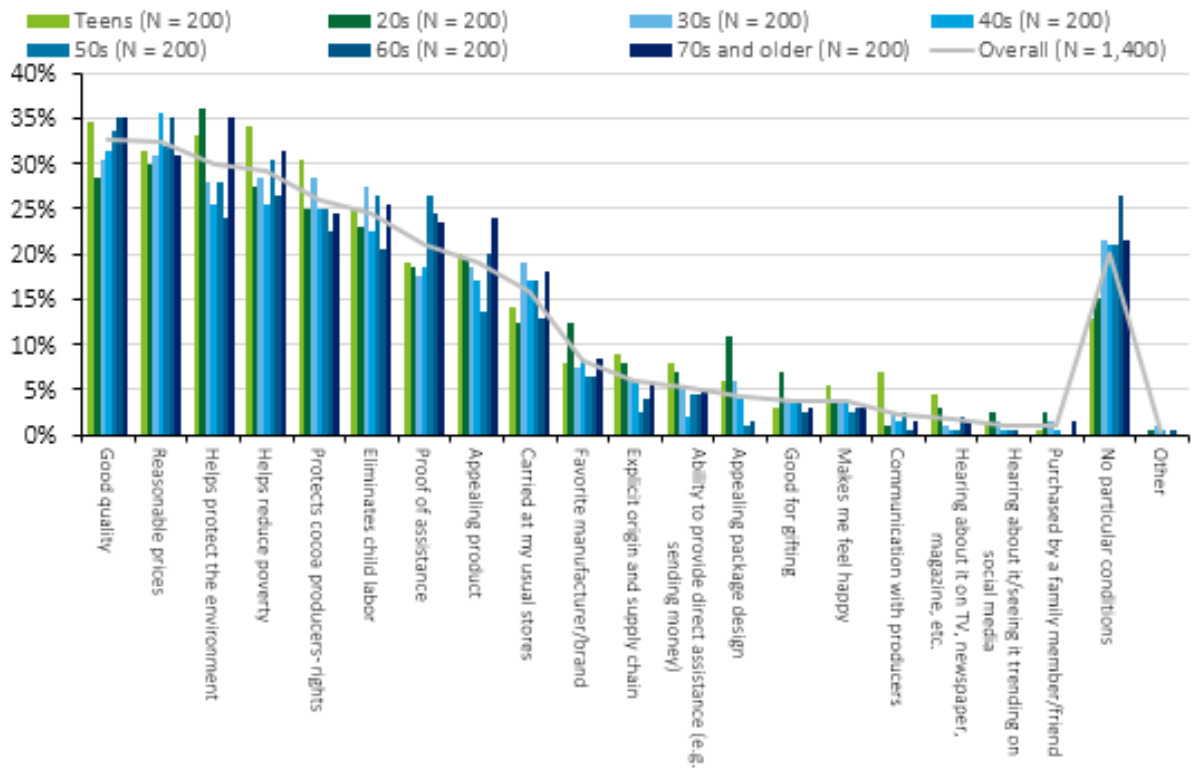
		Definitely want to purchase	Want to purchase	Do not want to purchase	Definitely do not want to purchase
Total		169	742	332	157
Gender /Age	Men 10-19	21	56	17	6
	Women 10-19	25	60	11	4
	Men 20-29	12	56	17	15
	Women 20-29	16	65	13	6
	Men 30-39	10	46	31	13
	Women 30-39	11	62	16	11
	Men 40-49	3	46	27	24
	Women 40-49	17	51	27	5
	Men 50-59	12	48	25	15
	Women 50-59	7	60	27	6
	Men 60-69	7	36	40	17
	Women 60-69	9	52	29	10
	Men 70 and older	9	50	28	13
	Women 70 and older	10	54	24	12

Source: JICA Survey Team.

average + 10 points or more
+ 5 points or more
-10 points or less
-5 points or less

Next, respondents were asked what circumstances would increase their desire to purchase sustainable chocolate. The most common responses overall were good quality (32.6%) and reasonable prices (32.3%), followed by helping to protect the environment (29.9%) and reducing poverty and contributing to international cooperation (29.1%). By age, teens were generally very interested in assistance for human rights and environmental issues and people in their 20s and 70s were very aware of environmental issues. A notable

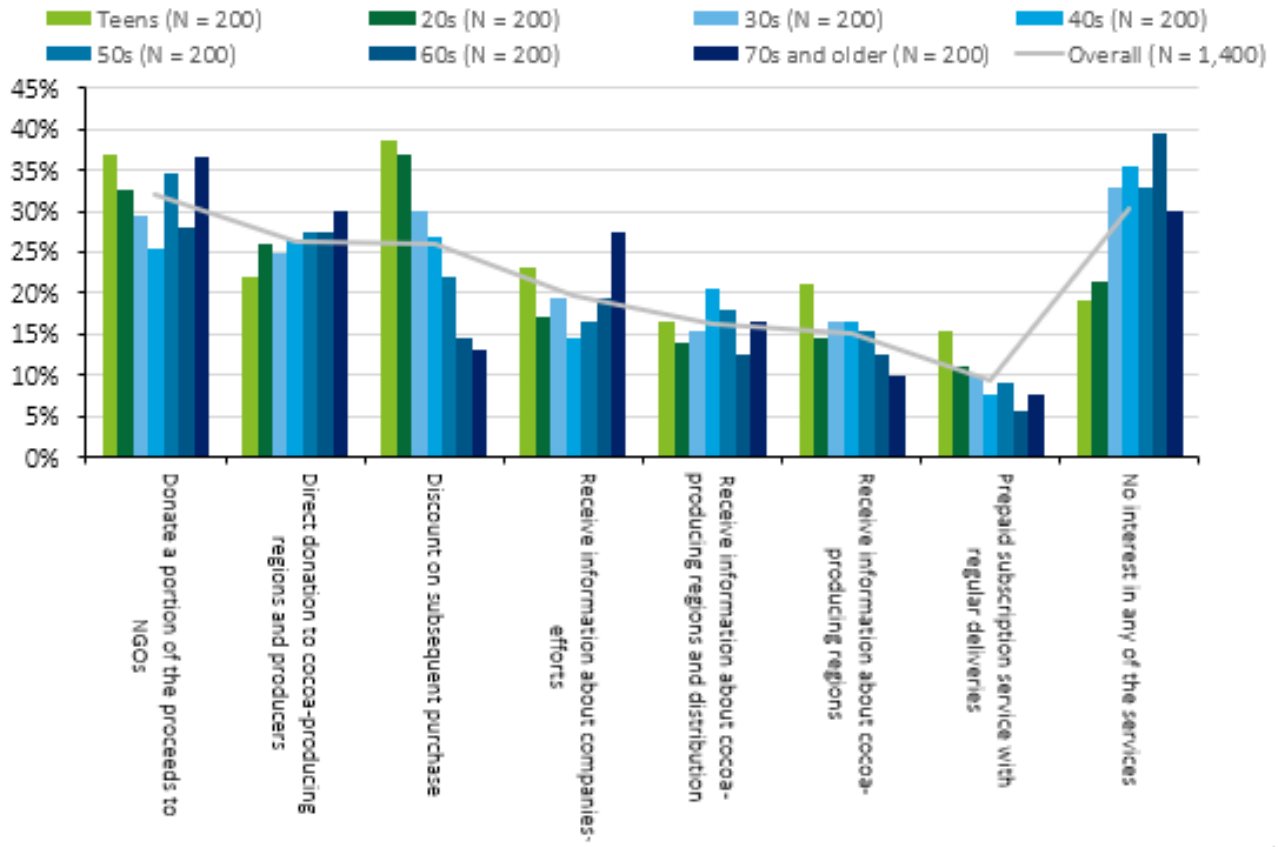
characteristic of respondents age 50 and older was that they demanded proof that their purchases actually lead to the provision of assistance at a higher rate than the younger age groups.



Source: JICA Survey Team.

Figure 75: Conditions for Purchasing Sustainable Chocolate (by Age)

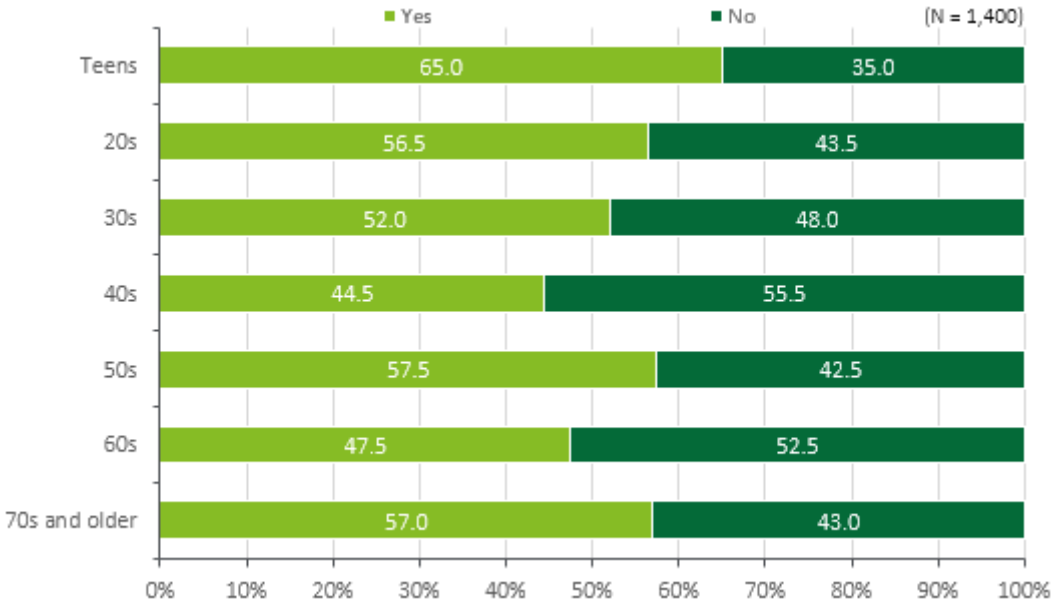
Respondents were then asked which services they were most interested in among those for providing assistance to producers through their purchases of sustainable chocolate. The most common response was donation of a portion of the proceeds to NGOs (31.9%), followed by direct donations to cocoa-producing regions and producers (26.4%) and discounts on subsequent purchases (26%), illustrating relatively low interest in receiving information about cocoa-producing regions and distribution compared to donations, the most readily imaginable method. Additionally, a higher percentage of respondents sought information about companies' efforts than about cocoa-producing regions, suggesting that many consumers expect companies to make efforts.



Source: JICA Survey Team.

Figure 76: Motivation to Purchase Sustainable Chocolate

To continue, Figure 77 shows answers to the question "Sustainable chocolate is sometimes more expensive than normal chocolate due to premiums charged to cover the cost of providing environmental and social assistance. Would you pay an additional fee to provide support to cocoa-producing regions?" In terms of the results, approximately 54% of respondents—lower than the figure for desire to purchase sustainable chocolate—indicated that they would pay additional fees. This is higher than the average figure of 50% for Europe, indicating the existence of a sizeable group of consumers who would tolerate additional fees even though overall recognition of sustainable products is low. By age, as expected given their high interest in sustainability from previous questions, teens were the most amenable to paying additional fees. Conversely, the highest percentage of people who would not accept having to pay additional fees were in their 40s and 60s, the age groups with the lowest desire to purchase sustainable chocolate.



Source: JICA Survey Team.

Figure 77: Willingness to Pay Additional Fees for Sustainable Chocolate

The group of respondents who indicated a willingness to pay additional fees was asked what price they pay for normal chocolate and what price they would pay for sustainable chocolate of the same quality and volume. Figure 78 shows the range of price tolerance for sustainable chocolate and the number of respondents for each range based on their answers. Based on their responses, more than 70% of consumers would pay 20% to 40% more for sustainable chocolate and approximately half are prepared to pay 60% to 80% more.

Source: JICA Survey Team.

Figure 78: Price Tolerance for Sustainable Chocolate

Finally, respondents were asked for the reasons behind their answers to the question about price tolerance for sustainable chocolate (Figure 79). The most common response among people who were amenable to paying the fees was that they wanted to provide assistance or contribute to the global community in some way (255 votes), although they were not particular about the targets or nature of the assistance. The next-most common response was that it was self-evident or unavoidable that assistance would require additional expenses (136 votes), followed by the expression of a desire to provide assistance to cocoa-producing regions and producers (72 votes). In contrast, the most common response among people who would not pay the fee was that they did not have the extra money or would no longer have the desire to purchase the products if the prices were higher (240 votes), possibly due to their circumstances-or other factors. Additionally, the third-most common response (33 votes), which we wish to highlight for the purposes of this survey, dealt with uncertainty as to whether additional fees actually lead to the provision of assistance. As observed in the question discussed previously, many people age 50 and older demanded proof that their purchases actually lead to the provision of assistance; providing these age groups with certification that the proceeds of their purchases of sustainable chocolate and payment of additional fees are actually used to provide assistance could be an effective means of stimulating their desire to purchase sustainable chocolate.

Reason for answering Yes	
1st (255 votes)	Desire to provide assistance or contribute to the global community in some way
2nd (136 votes)	It is self-evident/unavoidable to raise prices in order to provide assistance
3rd (72 votes)	Desire to provide assistance to cocoa-producing regions/producers
4th (48 votes)	Desire to pay within a reasonable range
5th (30 votes)	Desire to provide assistance to combat environmental issues
6th (24 votes)	Paying is fine if payments actually lead to the provision of assistance

Reason for answering No	
1st (240 votes)	No desire to pay if the price were to increase No extra money
2nd (64 votes)	No interest in assistance
3rd (33 votes)	Uncertain as to whether the money actually leads to the provision of assistance
4th (20 votes)	Will not purchase as much chocolate
5th (17 votes)	Will decide based on the extent of the price increase
6th (16 votes)	The expense of assistance should not be passed on to consumers

Source: JICA Survey Team.

Figure 79: Reasons for Willingness to Pay Additional Fees for Sustainable Chocolate

In terms of respondents' willingness and motivation to purchase sustainable chocolate, they were receptive overall, but many clearly desire high-quality products in a reasonable price range. Interviews with manufacturers revealed that most of the cocoa beans produced in Côte d'Ivoire are used as base beans, which have low added value; consequently, there are many challenges to overcome to improve quality. Although chocolate manufacturers' processing technology may prevent consumers from intuitively understanding the quality of cocoa beans, producing cocoa beans with higher added value is effective in terms of improving farmers' incomes. Therefore, agricultural training on aspects such as fermentation technology must be enhanced to improve cocoa bean quality; these and other efforts are likely necessary in future in addition to efforts to reduce child labor.

Additionally, regarding increasing consumer prices, given that uncertainty as to whether additional fees actually lead to the provision of assistance was indicated as a part of the decision-making process—by both respondents who are and are not amenable to paying additional fees—and that there is a strong need for proof of assistance among the older age groups, which are relatively less interested in sustainability, systems to certify assistance using blockchain or other technologies are likely an effective way to encourage people to purchase sustainable chocolate.

Suggestions obtained from the consumer survey

This section discussed consumers' recognition of sustainable chocolate and their willingness and motivation to purchase it. The results are the basis for the following description of the present circumstances surrounding sustainable chocolate in Japan and suggestions for courses of action to take to popularize it.

First, the consumer survey made it clear that the greatest factor preventing sustainable chocolate from becoming popular in the Japanese market is and always has been a lack of recognition. This state of affairs is not limited to chocolate products; recognition of fair trade and organic products is also much lower than that of European countries. The correlation between recognition of certification labels and logos and consumer behavior and awareness in Europe suggests that measures to increase recognition are essential. The survey revealed that many people come to know about these products by actually holding them in their hand or seeing them in brick-and-mortar stores, indicating the importance of increasing consumers' points of contact with the products through efforts such as implementing sales promotion campaigns in stores and working with chocolate manufacturers and retailers to expand the number of locations where the products are sold. At present, a small minority of people in Japan recognize sustainable chocolate; overcoming this issue should have a substantial impact on the market for sustainable chocolate.

Second, there is a need for measures to pique consumers' interest in sustainable products by disseminating accurate information after recognition has improved. Providing accurate, real-time data about the present state of cocoa-producing regions and the like to the survey group known as ethical consumers—respondents who had previously purchased sustainable chocolate or were already familiar with human rights and environmental issues—should increase their desire to purchase sustainable chocolate. Young people in their teens and 20s are prevalent in this group; therefore, it could be effective to share information about assistance and solutions to social issues on the internet and social media, which this generation frequently uses, to enhance the lineup of products in price ranges that are affordable for young people, to implement campaigns that lead to subsequent purchases, to sell relevant products at convenience stores frequented by people in this age group and to partner with schools. Additionally, given that a majority of survey respondents who did not know about sustainable chocolate before the survey indicated a desire to purchase it later, we can expect sustainable products to become more popular in future. In contrast, consumers age 30 and older and respondents with low sensitivity to these kinds of social issues tended to place a greater emphasis on product quality, proof that the money they pay is being appropriately used for assistance and whether the products are sold at their usual stores. Therefore, using blockchain and other technology to enable the disclosure that assistance is actually reaching the farmers farthest upstream in supply chains and increasing sales opportunities in supermarkets and the other retail channels where they shop on an everyday basis should increase their interest in sustainable chocolate.

Third, additional services—an added value of products—must be provided to translate consumers' interest in sustainable chocolate into actual buying behavior. Direct donations to NGOs and producers and other support services that consumers can easily understand readily translate into motivation to make purchases; therefore, it

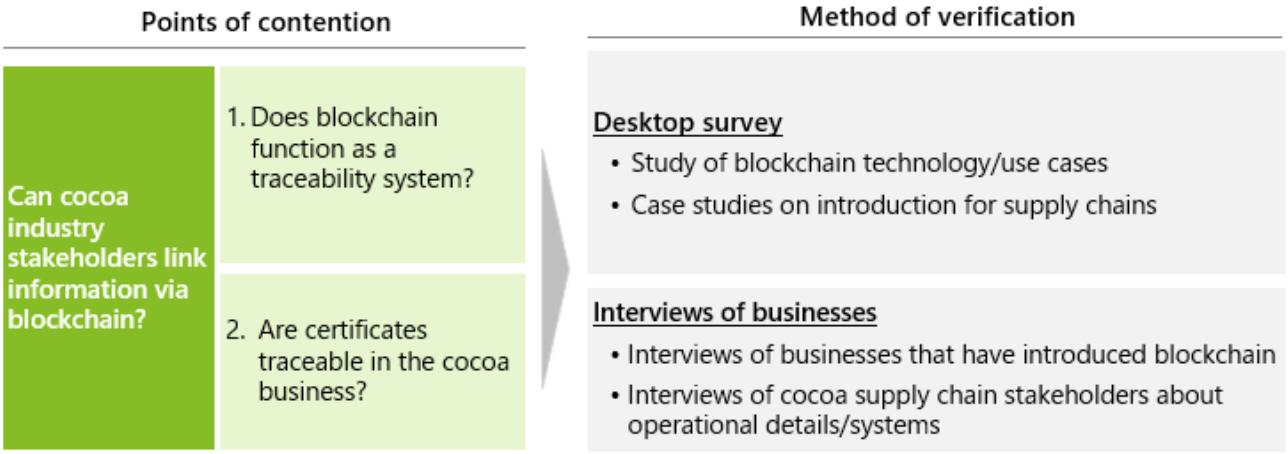
is necessary to establish and provide systems linked with supply chains to connect purchases to assistance for reducing poverty and protecting the environment, two areas of high consumer interest. The survey suggests that a majority of consumers are receptive to premiums on retail prices, but additional surveys and investigations (e.g. in-depth interviews, events) are probably necessary in the course of actually setting prices.

Chapter 6: Blockchain Usage in the Cocoa Supply Chain

In this chapter, a verification survey is conducted to make sure that cocoa industry stakeholders can link information via blockchain, specifically by investigating (1) whether blockchain functions as a traceability system and (2) the issues pertaining to linking information in the cocoa business.

For the first point, a desktop survey involving a technical study of blockchain and case studies of blockchain introduction explores whether blockchain fulfills the requirements to function as a traceability system.

For the second point, the ideal traceability system (initial theory) is defined in reference to the attributes of the cocoa business and blockchain investigated in Chapter 2 and then businesses are interviewed, after which challenges pertaining to practical implementation are organized.



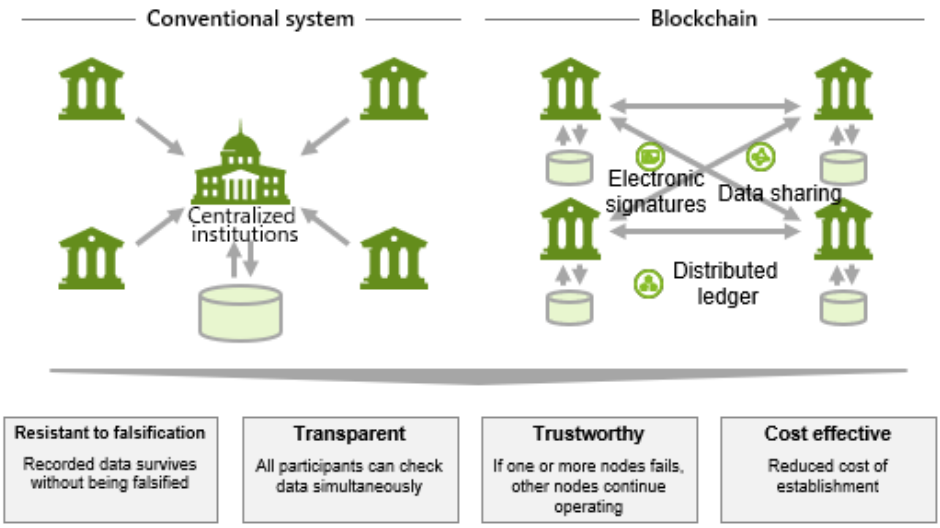
Source: JICA Survey Team.

Figure 80: Points of Contention and Methods of Verification

1. Blockchain Technology and Examples of its Use

（1） What is Blockchain?

Blockchain is a technology that originated with the cryptoasset Bitcoin in October 2008 and efforts to apply it in business as well as for cryptoassets are gathering momentum. Additionally, legislation has been established in light of high-profile hacking incidents such as the failure of Mt. Gox (February 2014) and attacks on the DAO (June 2016) and Coincheck (January 2018), as well as greater speculative and fraudulent use of the technology in initial coin offerings (ICOs). A blockchain contains trustworthy data based on electronic signatures and its distributed ledger system in which different networks contain the same transaction information enables organizations to directly share information with each other. This makes blockchain resistant to falsification, transparent, trustworthy and cost effective; of particular importance in this case are the advantages offered by the ability to circulate goods between relevant parties in a highly transparent manner while maintaining resistance to falsification.

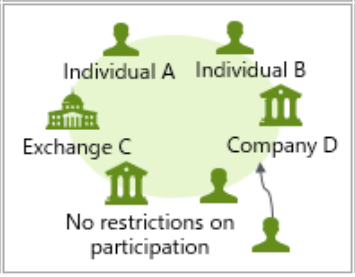


Source: JICA Survey Team.

Figure 81: Attributes of Blockchain

（2） Types of Blockchain

Broadly speaking, there are two types of blockchain and because issues such as processing speed and hacking are associated with the public type, the consortium/private type is used to establish supply chains and tends to deliver better results.

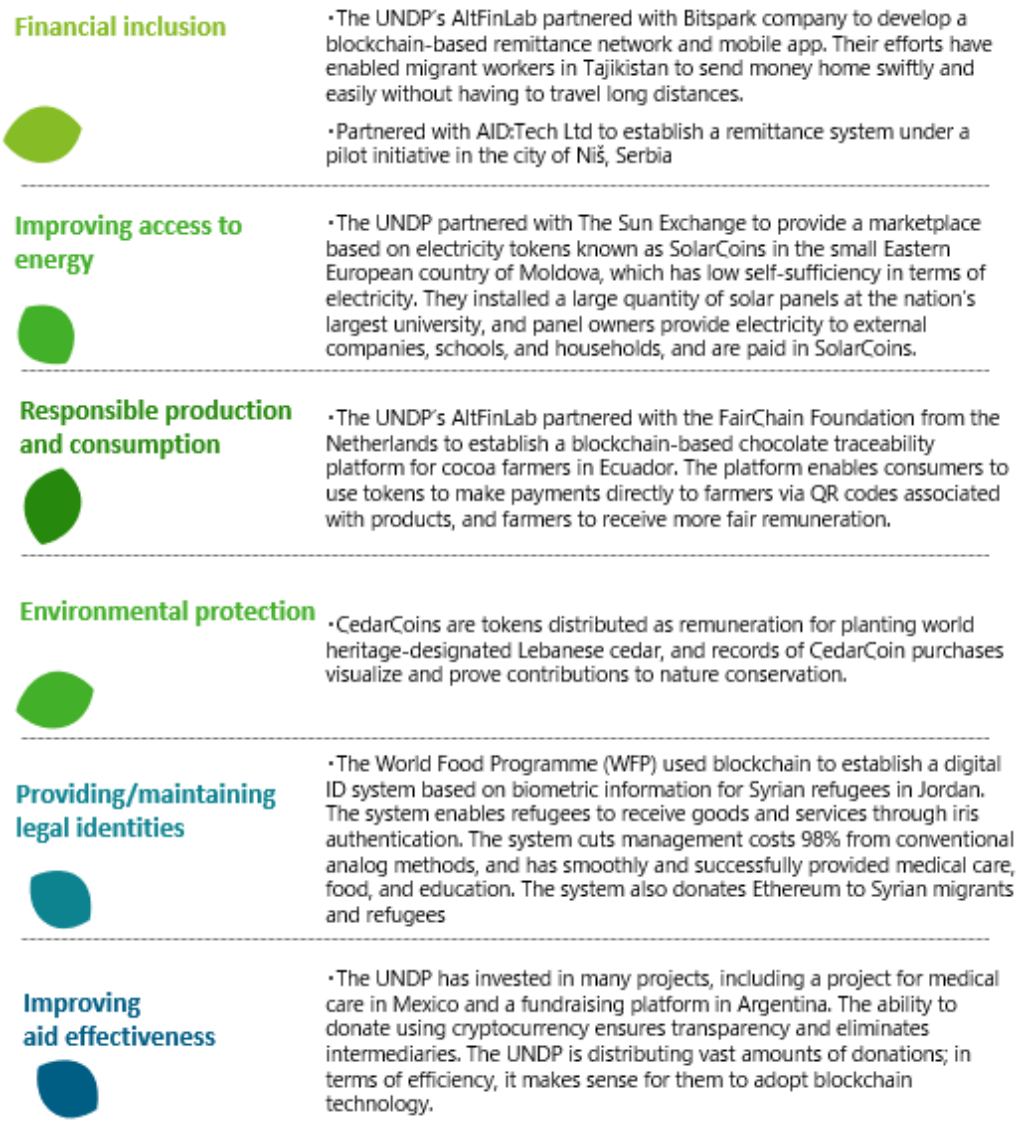
	Public type	Consortium/private type
Network participants	No restrictions on participants	Specific companies/organizations
Attributes	Takes time to approve transactions	Transactions approved only on pre-selected nodes, takes less time
Examples of application	Cryptoassets	Interbank transfers, for the remittances, supply chains
Image of network		

Source: JICA Survey Team.

Figure 82: Types of Blockchain

（3） Examples of Blockchain Usage

The United Nations Development Programme has identified six domains in which blockchain can be used to achieve SDGs; anticipation as to how blockchain can be used in supply chains (e.g. tracing certificates of origin and carbon emissions) has mounted in recent years.



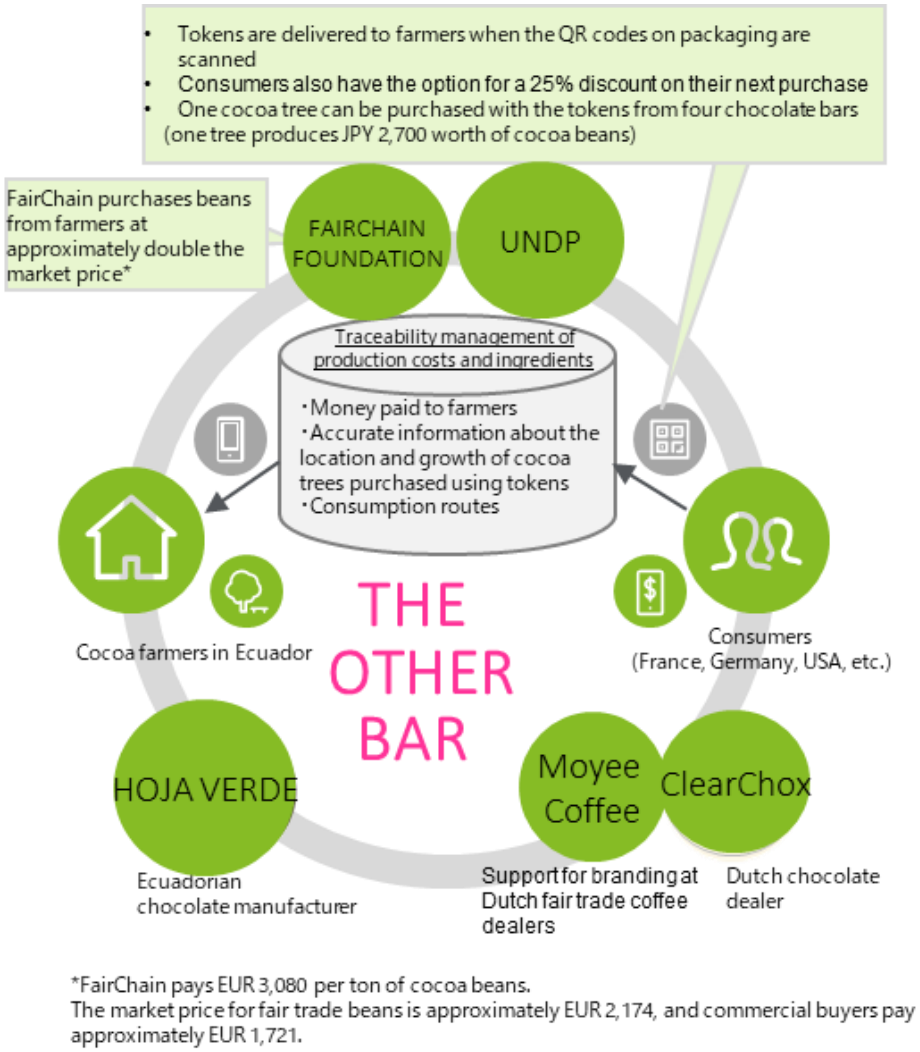
Source: JICA Survey Team.

Figure 83: UNDP "Beyond Bitcoin"

The case in which the UNDP and the FairChain Foundation established a blockchain-based system for managing cocoa traceability and enabling consumers to send tokens to farmers was particularly useful as a reference.

Overview of The Other Bar

A blockchain-based PoC for cocoa bean production that began in December 2019 (one-year analysis/verification of consumer behavior) in which QR codes were printed on the packages of The Other Bar—a chocolate confection produced using cocoa produced in Ecuador—to enable consumers to use tokens to make donations to producers.



Source: JICA Survey Team based on the website of The Other Bar.

Figure 84: How The Other Bar Works

Systems involving blockchain-based guarantees of authenticity have already been put into place for diamonds, wine and other goods for which authenticity has a substantial impact on the price.

Diamonds: Overview of Everledger (a British blockchain venture company)

Information about the manufacturing process (e.g. origin, names of workers who cut the diamonds) and information for identifying diamonds (e.g. engraved serial numbers, number of carats) are recorded on blockchain. Banks, insurance companies, dealers and consumers are free to view information about the history of each diamond. To date, information about more than 1 million diamonds has been recorded.

Wine: Overview of Cantina Volpone (an Italian premium winemaker)

Grape varieties and growing conditions and winemaking and distribution information is entered. Consumers can view this information on their smartphones thanks to QR codes affixed to wine bottles. The inability to overwrite information—a key attribute of blockchain—is leveraged to prevent the distribution of counterfeit goods and disclose information about merchandise to customers.

Tony's Chocolonely

Blockchain efforts

Tony's Chocolonely is a Dutch chocolate manufacturer with the brand mission to distribute 100% slave-free chocolate throughout the world. In 2018, the company partnered with Accenture to implement a pilot project for the use of blockchain-based on the concept of "slave-free chocolate by blockchain." One cooperative, 63 délégués and one exporter in the Tony's supply chain in Côte d'Ivoire participated in the initiative, which was implemented over a six-week period with a focus on the supply chain from the cooperative to the local exporter.

The following three processes were registered in blockchains:

1. Cooperative managers collect cocoa beans from délégués and enter data
2. Local traders purchase the beans from cooperatives and transport them to ports
3. International traders purchase the beans and export them to Europe

Source: JICA Survey Team based on materials from Tony's Chocolonely.

Figure 85: The Tony's Supply Chain

The initiative resulted in the successful registration of 400 transactions for 900 kg of cocoa beans, 35 entries of transit records between cooperatives and exporters and 12 entries of transit records between exporters and trading companies.

Blockchain issues

Through the pilot project, the company unearthed the following types of issues with blockchain.

- Limits of blockchain
  - Cocoa traceability is not fully contained in a virtual world like Bitcoin; it requires the acquisition of information from physical bags of beans. Examples of common problems include bags of beans falling from trucks during transit and mistakes in storehouses. The fact that records do not reflect everything that occurs due to problems like these has a substantial impact on data sets.
  - As of 2018, when the project was implemented, blockchain technology was not robust and was unstable in terms of operational reliability.
  - Data entry is difficult in places where networks are unreliable.
- Cost
  - Introducing blockchain requires a surprising amount of money and time

In light of the above points, Tony's concluded that using Beantracker—a non-blockchain-based system already in operation at the time—for tracing was sufficient to meet their needs and as of 2021 is still using

Beantracker.

However, the company feels there is a definite possibility that it will reconsider introducing blockchain in future to work toward its goal to further popularize slave-free cocoa beans. This is because Tony's expects the distributed management function of blockchain to be beneficial for managing information pertaining to farmers' privacy and other data, which will become more necessary the more entities participate in the company's supply chain. Additionally, as of now, Beantracker does not contain data about child labor or incentives; if the company wishes to trace that kind of information in future, blockchain would be a more suitable option.

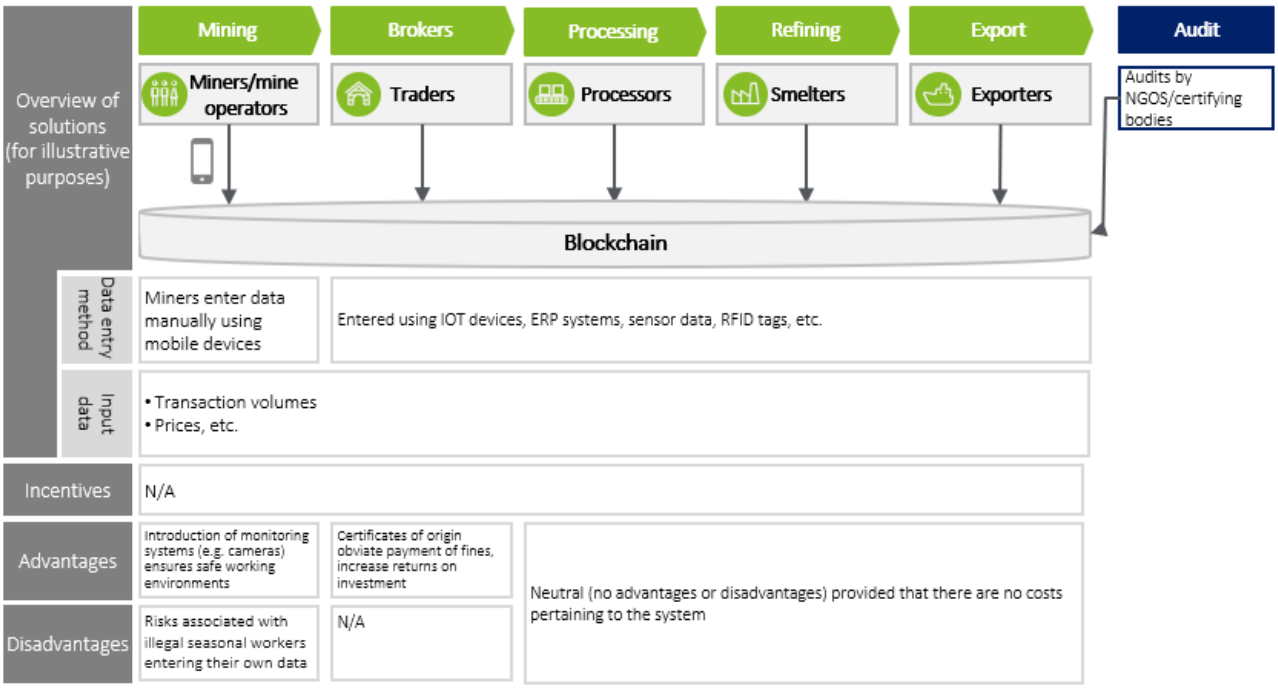
DLT Labs

Blockchain efforts

Countries in Europe and the Americas have established standards for ethical sourcing to combat problems pertaining to conflict minerals and mineral traders face the risk of having to pay fines of 6.5% under EU regulations if they are unable to prove the origin of their minerals. Additionally, the government of the Democratic Republic of the Congo has indicated its intent to combat issues such as improper taxation of cobalt that is exported after being refined and stored and to enumerate tasks such as improving citizens' livelihoods, ethical sourcing and improving treatment of seasonal workers for organizations that support the government. Given the need to establish multiple cobalt traceability systems, DLT Labs decided to implement a pilot project for introducing blockchain.

Although miners and mine operators used mobile devices to enter information manually as the very first point of input for the pilot project, all downstream data entry was automated to the extent possible through links to IoT, sensor devices, RFID tags and ERP systems, guaranteeing the accuracy of the data. Additionally, information about child labor and other issues was monitored using cameras installed in the mines and audits were also conducted in conjunction with local NGOs.

As explained previously, mineral traders benefited most from this system because they gained the ability to certify the origin of their minerals. Introducing blockchain enabled the establishment of highly reliable traceability and gave all stakeholders end-to-end access to the data. Additionally, the incorporation of frameworks for responsible sourcing and due diligence should reduce the cost of creating reports about ethical sourcing and the like and the use of smart contracts should improve operational efficiency, namely by automating standard transactions between supply chains and reducing payment-related problems. Another advantage to miners is the assurance of safe working environments through the introduction of the system that enables a certain level of management.



Source: JICA Survey Team based on interviews.

Figure 86: DLT Labs' Traceability System (Illustration)

Blockchain issues

One issue amid DLT Labs' efforts is dependence on IoT devices and other tagging technology (e.g. RFID tags, isotopic tracers) to guarantee that accurate data is entered throughout the processes of multiple stakeholders. This requires all supply chain stakeholders to have the infrastructure and capacity to automate data entry in this manner, which could be an issue when working toward actual operation in future.

Additionally, although blockchain technology itself is not an issue, the company identified unreliable internet connections and other infrastructure vulnerabilities, investment in security, collaboration with local security forces and other circumstances in the Democratic Republic of the Congo, where the pilot was implemented, as issues. It is also necessary to enhance stakeholders' understanding in the course of introducing the technology.

Ford

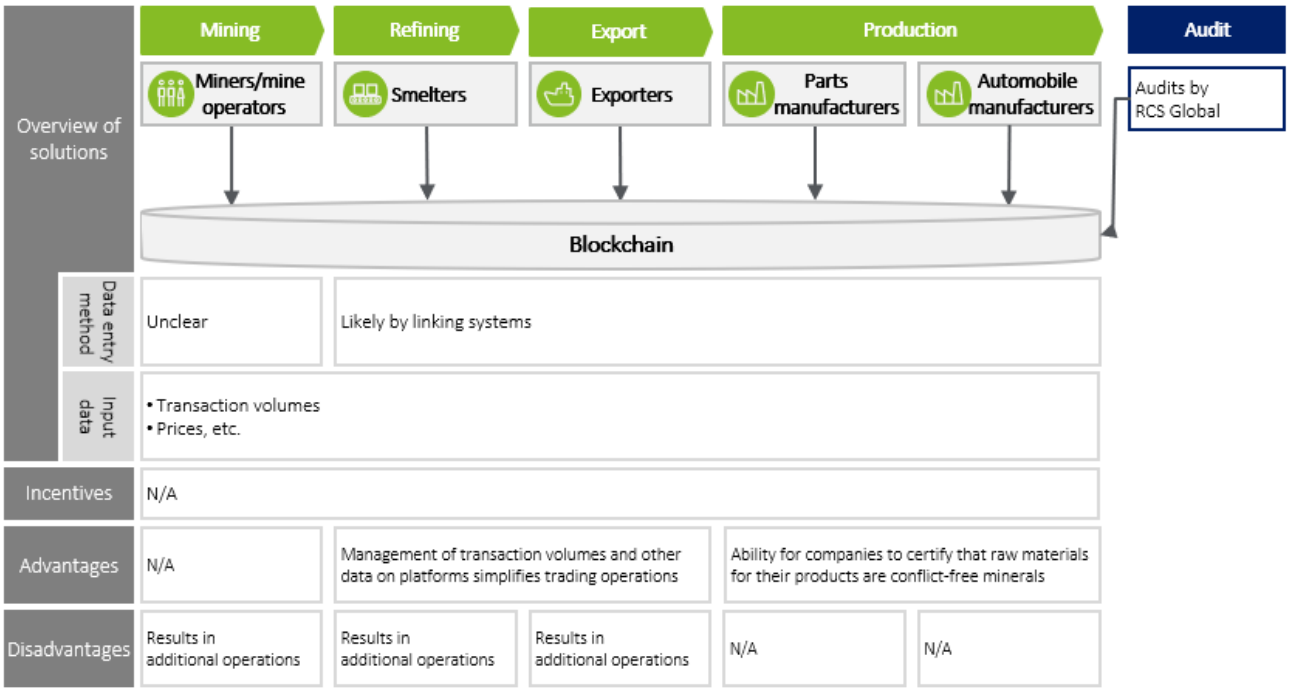
Blockchain efforts

Major US automaker Ford participates in a project called Responsible Sourcing Blockchain Network (RSBN), which was launched by RCI Global with the aim of using blockchain and other technologies to resolve multiple problems in mining and supply chains. Ford began its efforts within the framework by cooperating with IBM on cobalt, a crucial raw material for lithium-ion batteries. They were later joined by upstream mining company Huayou Cobalt and battery supplier LG Chem, which are working to ensure visibility and traceability throughout the entire mining supply chain.

In 2019, Ford used a blockchain platform developed by IBM to implement a project for monitoring cobalt from the time it was mined in the Democratic Republic of the Congo until it appeared in the lithium-ion batteries of the company's automobiles.

Advantages of using blockchain in this project include the reliability of data transmission—provided that the

initial data was input properly and that audits were conducted—and the ease of checking data between stakeholders compared to checking certifications, audit results and other information.



Source: JICA Survey Team based on interviews.

Figure 87: Ford's Traceability System (Illustration)

Blockchain issues

The following are some issues in the establishment of blockchain-based traceability.

- Scalability
  - Given the large number of suppliers in the automotive industry, the inability to guarantee transaction speeds if the number of users increases, for example, is recognized as a key issue
- Reliability of initial input
  - Audits are always necessary, even when blockchain has been introduced. Third-party risk assessment and the like must be conducted to verify the accuracy of data from initial input.
- Stakeholder involvement
  - Time is required to ensure that all participants understand and properly use emergent technology

Additionally, Ford considers blockchain to be just one approach to establishing traceability. In pilot projects to date, blockchain has not been robust enough and is still developing; therefore, the company intends to keep an eye on subsequent efforts.

(4) Conclusion

In terms of its technical attributes, blockchain is a promising technology for supply chain management and this survey examines cases in which blockchain has already been put to practical use for traceability.

We were unable to find any cases in which it has been put to practical use in the cocoa business or similar industries; however, we can expect to see the commercialization of the technology if challenges such as

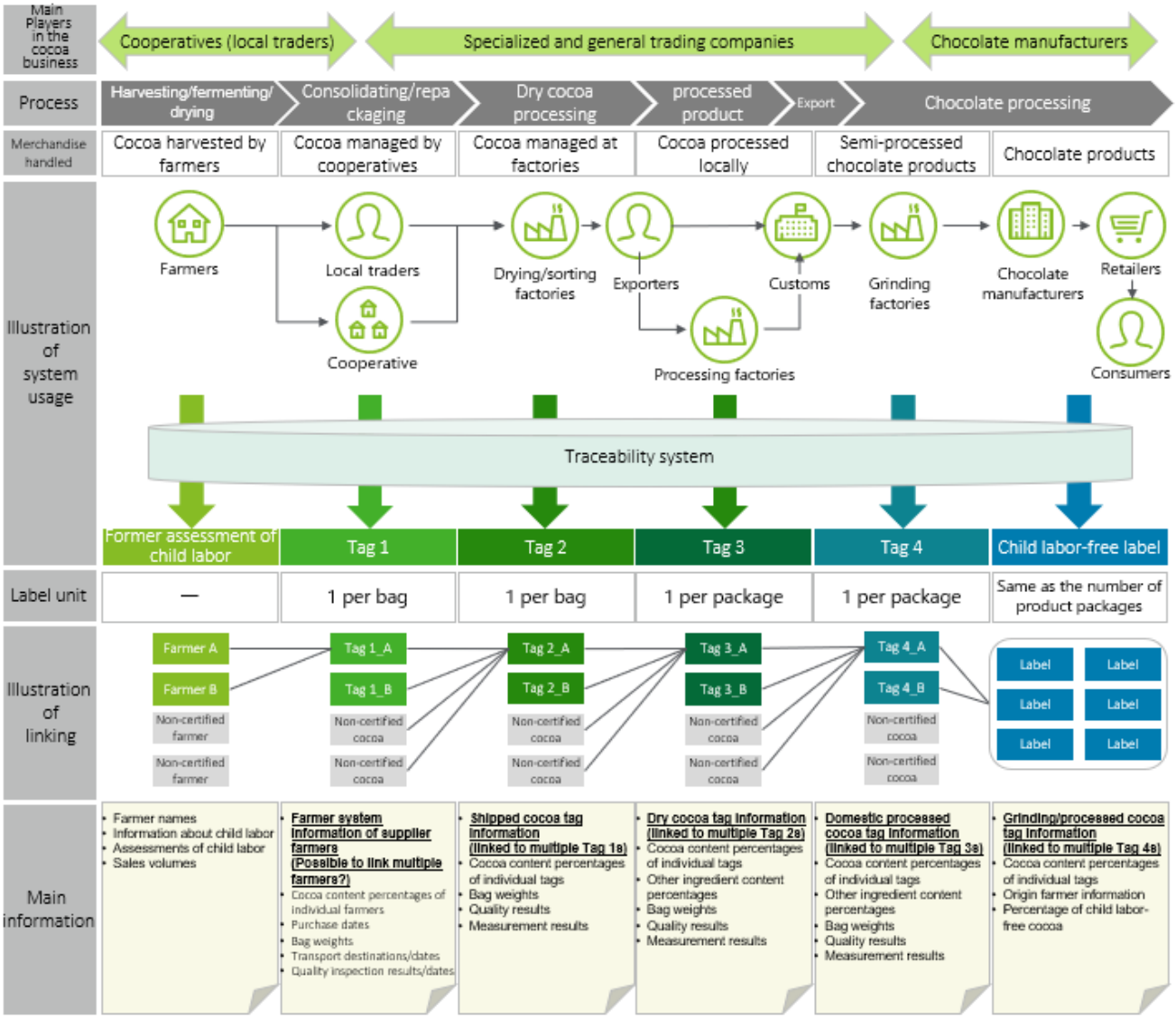
guaranteeing the accuracy of initial input, coordinating toward participation by all stakeholders and guaranteeing scalability are overcome.

2. Examination and Investigation of Introducing Traceability Systems in the Cocoa Business

（1） Traceability System (Initial Theory)

Here, we define the ideal traceability system (initial theory) based on the overview and survey of the cocoa business in Chapter 2 and case examples of blockchain-based traceability systems. Under the envisioned traceability system, tracing information is managed such that it is linked to the packaging of the cocoa ingredients or merchandise handled in each phase (cocoa harvested by farmers, cocoa managed by cooperatives, cocoa managed at factories, cocoa processed locally, semi-processed chocolate products and chocolate products).

We interviewed the major players involved in each transaction—between cooperatives, specialized and general trading companies and chocolate manufacturers—as to whether they would introduce such a system and confirmed the feasibility of introducing a blockchain-based traceability system to the cocoa supply chain and identified introduction-related challenges.



Source: JICA Survey Team.

Figure 88: Traceability System (Initial Theory)

（2） Interview Survey of Businesses

Cooperatives

Interviews in the field revealed that cooperatives—if they exist—are operated and managed differently in different cocoa-farming regions. Cocoa-farming regions generally fall into one of three categories: regions either do not have cooperatives, in which case farmers deal directly with local traders, or they do have cooperatives and the cooperatives either deal with multiple trading companies or a single trading company. Cooperatives that deal with a single trading company have worked with that company to develop systems for managing farmers' production information and certification requirements and thus have the capability to use the traceability system we propose.

Notably, regions that lack cooperatives and cooperatives that deal with multiple trading companies struggle to manage child labor-free cocoa ingredients (certification is difficult to manage in dealings through local traders and if deliveries are accepted from multiple trading companies, multiple types of beans must be managed in

storehouses and certified beans may be mixed with non-certified beans) and still have issues to resolve to achieve traceability.

Specialized and general trading companies

In interviews with specific businesses, we learned that they are positioned to respond flexibly to the desires of their suppliers provided that there is a certain level of business between them and that they believe it is possible to use the traceability system we propose. However, if the traceability system is to be introduced, it must be linked to the systems of the businesses managed by trading companies. Trading companies manage multiple businesses in all phases from purchasing from cooperatives to exporting and select businesses with easily linkable systems; thus, they indicated the need to introduce and provide training on the operation of the system we propose at these businesses. There are two major ways to implement traceability: creating and rolling out a new system, or implementing an API in the current system and accessing the blockchain infrastructure. However, which implementation method matches each supply chain area remains to be seen, in terms of development costs and ease of system specification.

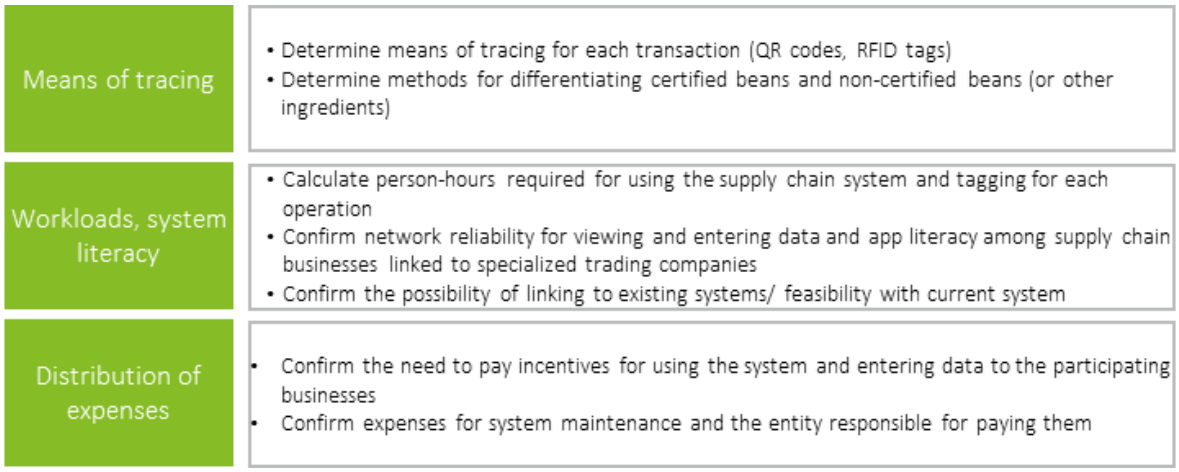
Chocolate manufacturers

The interviews revealed that chocolate manufacturers generally source ingredients from trading companies and rely on them for upstream traceability. Therefore, if a traceability system for transactions between cooperatives and specialized and general trading companies can be introduced, it is highly likely that it can also be introduced for chocolate manufacturers. Notably, chocolate manufacturers have already introduced systems for managing cocoa ingredient sourcing and indicated both the possibility and the need for linking existing systems with the traceability system we propose; this continues to be an issue. Additionally, regarding the burden of introducing the traceability system and the economic requirements for the wholesale price of certified cocoa beans (details in Chapter 5), reaching agreements with chocolate manufacturers remains a matter to consider in future.

（3） Issues and Remaining Points of Contention in Cocoa Supply Chain Traceability

The interview survey revealed the high likelihood that the traceability system we propose can be introduced throughout the cocoa supply chain. The feasibility of introducing the traceability system is also high given the cases of certifying bodies such as Fairtrade International and Rainforest Alliance.

However, issues include the means of tracing, workloads and system literacy of stakeholders and distribution of expenses; if the system is to be introduced, these issues must be resolved.



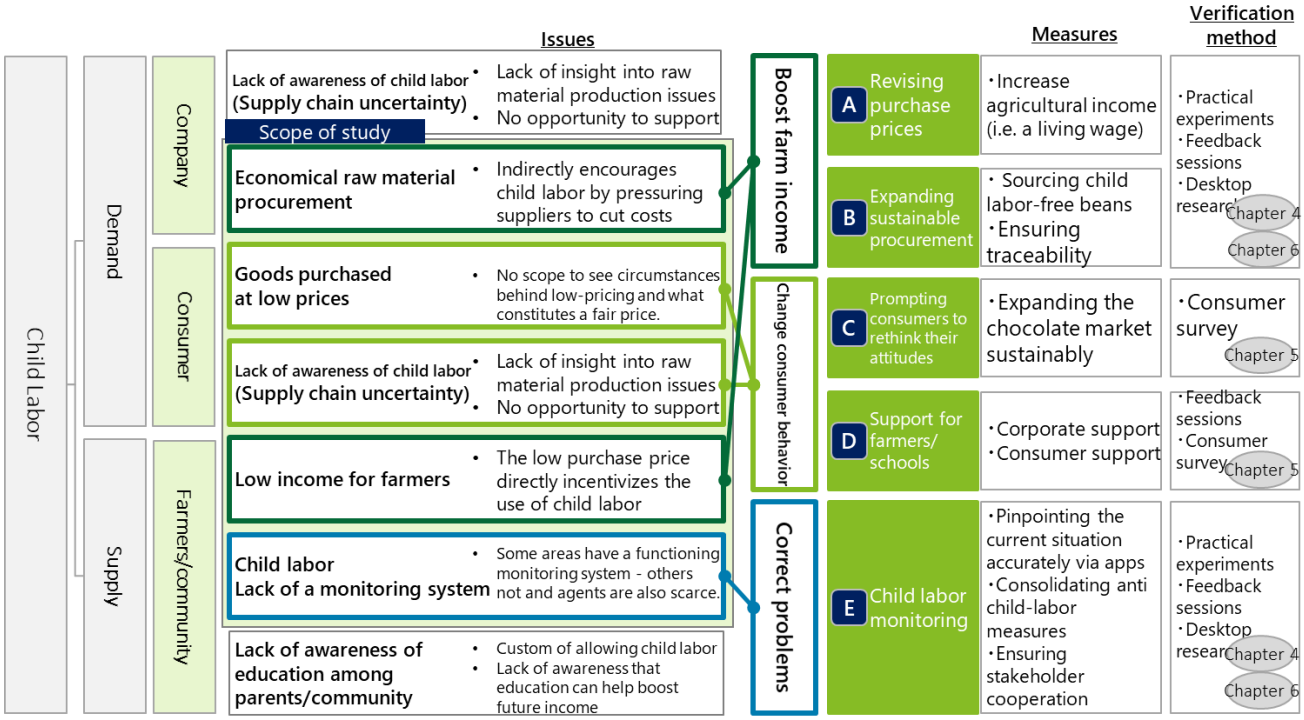
Source: JICA Survey Team.

Figure 89: Traceability System Introduction-Related Challenges Revealed in Interviews

Chapter 7: Potential to Deploy Traceability Systems in the Cocoa Supply Chain

This chapter addresses the ideal configuration of any future traceability system and what its development should entail to enable its establishment going forward.

Reiterating what was already described in Chapter 1, measures to address child labor can be broadly divided into boosting farm income, changing consumer behavior and resolving the problem (as shown in the following figure). The role of traceability systems will be discussed from each perspective.



Source: JICA Survey Team.

Figure 90 : How Issues and Measures Should be Organized (Review)

1. The Role of Traceability Systems in Resolving Child Labor Issues

（1） Improving Farm Income

One effective means of boosting farm income is increasing the purchase price of beans. Indeed, some major cocoa-related companies have already been certified by fair trade organizations after striving voluntarily to increase the purchase price and guarantee minimum wages for workers. Countries producing cocoa are also implementing the Living Income Differential (LID, the minimum price system for cocoa beans). As things stand, however, this has yet to translate into a sufficient increase in farm income. On average, the household income for cocoa farmers in Côte d'Ivoire is US$2,707/year (median US$1,919/year), which is well below the subsistence income level of US$5,676/year and only just exceeds the extreme poverty benchmark of US$2,276/year.[53] Moreover, cocoa farmers earn only US$0.78 per day, one third of the living wage set by Fairtrade International (US$2.51 per day).[54]

[53] IDH (2021) “SDM Analysis Cargill Cocoa and Chocolate” p. 26
[54] Fairtrade International

Although European and US companies working in the cocoa sector are engaged in various initiatives to support production areas, Japanese companies have only just begun efforts. Scope to push up prices and boost support is contingent on the companies involved reaffirming their legitimacy, but in this context, external pressure from institutional investors and NGOs may help influence corporate behavior. As discussed in Chapter 5, changes in consumer behavior may also indirectly drive purchase prices up.

Conversely, even if companies do increase the purchase price, whether producers will receive a fair reimbursement remains questionable, since the funds are transacted via multiple institutions and organizations (intermediaries, agricultural cooperatives, etc.) before being received by the producers. Feedback from farmers suggest that they do not necessarily trust the agricultural cooperatives and consider receipt of funds directly as the most reliable method. Reflecting this, farmers were happy to receive proceeds directly, via cash or electronic money, during the demonstration experiment in this survey, regardless of the amount.

Another effective way of securing income that does not depend on cocoa farming is diversification, namely growing and selling other crops during the off-season. As described in Chapter 4, the farms visited by the research team use the proceeds of okra sales to help fund the purchase of school supplies, as well as providing snacks to schoolchildren. Using a traceability system when introducing a community finance scheme like this one is considered effective.

Establishing a traceability system will give farmers handling child labor issues the support they need as well as paving the way to pay and reward farmers directly. As mentioned in Chapter 2, some overseas companies in the cocoa sector have already rolled out their own traceability systems, which, in some cases, can even trace individual plantations and bean bags. In contrast, however, none of the Japanese companies have yet followed suit. And while overseas companies are ahead in this area, the fact that many systems with similar functions have been rolled out imposes extra effort on the farmers, since they have to submit the same information to each company in their own designated format.

（2） Changes in Consumer Behavior

Companies in the cocoa sector are currently ensuring they source sustainably by aligning themselves with buyers' needs. One example is the way trading companies procure sustainable cocoa to meet the requests of chocolate manufacturers with whom they do business. Chocolate manufacturers then, in turn, develop and sell sustainable products by responding to consumer needs. Accordingly, pinpointing the needs of consumers at the end of the supply chain is a key component of the efforts to combat the child labor issue. With that in mind, our focus will remain on consumer behavior – a key factor to ensure corporate policies remain credible in the area of sustainable procurement.

As noted in Chapter 5, we conducted a consumer survey to examine the status quo of the sustainable chocolate market and its potential for future expansion. Among the criteria checked in the consumer survey: the level of interest in the child labor issue, the intention to purchase sustainable chocolate, the level of interest in support measures from a corporate perspective and the level of interest in direct support from consumers to producers. Although this translates into a generally low awareness and purchase intention of sustainable chocolate among Japanese consumers, interest among younger consumers remains high. As for tolerance of chocolate pricing, more than 70% of consumers are willing to accept up to 1.2-1.4 times the price and around half would tolerate 1.6-1.8 times the price. Whether such figures are compatible with actual purchasing behavior remains open to question, but a potential market does exist. While direct donations to NGOs and producers may be a motivating factor for these consumers, traceability systems and transparency in the supply chain can also be used to prove

support. Indeed, a higher percentage of those aged 50 or more were keen to see "proof that the support was properly getting through" compared to younger generations, which supports the theory that establishing a traceability system may correspond to what consumers require.

(3) Resolving Child Labor Issues

Monitoring on a daily basis is needed to resolve the problem issue of child labor among cocoa farmers. If you proceed on the assumption that child labor may still recur, even if absent for the moment, resolving the situation through voluntary community activities to prevent any recurrence is advisable. Most existing systems to monitor child labor check for it several times a year or once every few years. Meanwhile, there is no coordination with schools and those contacts that do exist are limited and informal in nature.

In this survey, we utilized a child labor monitoring system operated by a trading company managing the target farm and worked with a farmers' group to find a solution to determine the current child labor status among farmers on a daily basis. We also emphasized cooperation with schools – reflecting our conviction that school attendance represents the optimal solution to the child labor issue and worked with teachers to monitor children's attendance, also on a daily basis. As described in Chapter 6, the demonstration experiment showed how the system used to identify the current child labor situation functioned to a certain extent and the results showed that the frequency and amount of incentives provided and target stakeholders were appropriate.

Going forward, issues include the need for native applications usable even in weak communication environments and application designs that can ease the burden on the inputter while enabling more specific details to be input. Getting the local municipality and government on board is another must to elicit the cooperation of the farming community. As well as farmers, the need to support schools to reduce the child labor problem was also confirmed.

Awareness building activities around child labor have already been implemented in the area where the survey was conducted and not a single case of work that could be categorized as hazardous labor was reported. In future, however, it will be vital to conduct activities and raise awareness in areas where such awareness is still lacking. Moreover and as Chapter 1 covered, the focus of this survey was the children of cocoa farmers living in Côte d'Ivoire and the scope excluded child labor among children forcibly brought from other countries or children of migrants. Future implementation should center on activities to educate and raise awareness of child labor issues, while keeping the time and cost involved top of mind.

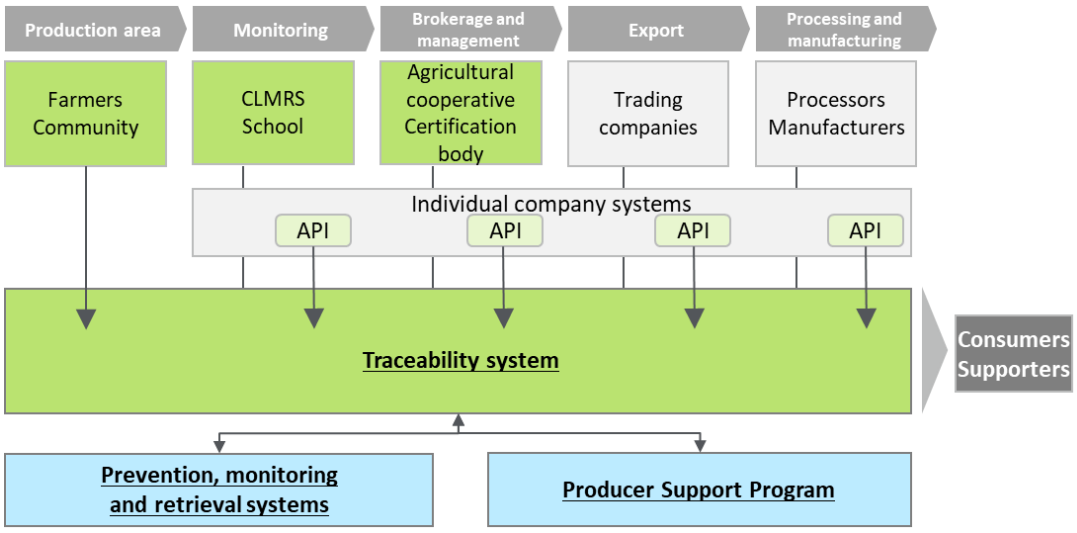
Given that traceability will not necessarily elicit a direct solution to child labor issues, collaborating with systems to prevent, monitor and resolve such issues is all the more important. Concrete and noteworthy examples include CLMRS by ICI, but government-led initiatives also exist. In the case of a government-led initiative, information is collected on a community basis rather than on a supply chain basis, which makes it possible to address child labor issues comprehensively, including areas where companies are not directly involved. In the case of a company-led initiative, it is difficult to make a comprehensive approach because it is limited to their supply chain, but compared to a government-led initiative, it is possible to proceed quickly because the area is limited. In the context of Côte d'Ivoire, examples include SOSTECI by the Ministry of Employment and Social Protection and SSRTE from the cocoa and chocolate industry and collaboration with both is worth considering.

2. Toward the Implementation of a Traceability System

The ideal traceability system to target is one that helps resolve the issue of child labor among cocoa farmers as well as incorporating a means to improve farmers' income. In other words, as well as establishing traceability systems, there is a need to implement systems to prevent, monitor and resolve child labor issues, alongside producer support programs. Of course, no single company alone will be unable to handle all of this abut requires the participation of multiple players in the supply chain.

The traceability system in question is depicted in Figure 91. The process of tracing information on child labor in production areas, with a scope ranging from production areas to agricultural cooperatives, intermediaries, processors/manufacturers and consumers, must be confidential and amounts transacted and suppliers of individual companies must remain undisclosed. As well as details of the current state of child labor, the information shared includes details of producers (family composition, household income, school attendance status of children), farmland information (location information, holder information) and authentication information by certification bodies among others. Information on organic farming and the environment must also be added, such as fertilizer inputs, soil quality, forest conservation and biodiversity.

The system is also designed to facilitate info sharing to ensure compatibility with the logistics management systems operated by each company by releasing an API, although the issue of interoperability needs to be addressed going forward. The European Sustainable Cocoa Platform is already addressing the topic of interoperability and there are hopes that Japanese companies will join the discussion and help brainstorm efficient and effective operations.



Source: JICA Survey Team.

Figure 91: Proposed Traceability System

The two types of traceability system feasible for an operating entity are as follows: one operated mainly by private companies and the other operated mainly by government agencies or international organizations. And in terms of participants, the two types of cases involve those completed by a series of corporate groups in the supply chain and those involving multiple corporate groups and addressed industry-wide. These patterns, shown in the following table, can be classified into three types (1) to (3):

Table 16: Patterns of Traceability System Operators and Participants

		Participants	
		Within corporate groups	**Industry-wide**
Operating entity	**Private company**	(1)	(2)
	Govt./Intl. organization	*	(3)

* Omitted because it is unlikely that a government or international organization would operate specifically on behalf of a particular corporate group.

Source: JICA Survey Team.

(1) When a private company is the main operator and a corporate group features a limited number of participants

In this context, the corporate group is assumed to collectively encompass the transfer of information between existing business partners in a series of supply chains, such as trading companies, processors and manufacturers. Here, the advantage is the ease of starting up the process, given that exchange of transaction information is already underway. Conversely, the closed nature of the network hampers scalability and could make it difficult to resolve the child labor issue. To start off, rules governing the interoperability of existing systems and data protection must be agreed between the companies. The more limited the number of participants and the more relationships already in place, the faster this process will be. The first step would be to start with a configuration like that mentioned and the next step would be to apply it industry-wide as mentioned in (2).

(2) When a private company is the main operator, the scope is industry-wide and multiple corporate groups participate

Efforts to resolve the child labor issue will be more effective if the private sector spearheads the program and ensures an industry-wide scope. When multiple corporate trading groups handle beans from the same production area, information on child labor could be shared to streamline operations. However, one stumbling block could well be reluctance on the part of certain companies to share information among multiple corporate groups. All companies involved will have to engage in dialog to decide on standards for interoperability and data protection between public and private databases, but agreement is expected to take some time. It is worth reiterating that this point has been discussed and remains a topic of ongoing debate within the European platform. The hope is that Japanese companies will also consider an optimal solution while leveraging lessons learned from the Western companies. Since the number of participating companies will increase compared to (1), it will become cheaper to participate and the impact of support for the farmers will increase.

Moreover, companies participating from an early stage and establishing their presence as operating entities will be well-placed to formulate rules commensurate with their own preconditions. They may also be capable of forming a business model as a platform to benefit their company and levy participation fees on companies becoming involved later on.

(3) When a governmental or international organization takes the lead, the scope is industry-wide and multiple corporate groups participate

Finally, another option would involve governmental or international organizations taking the lead in managing the platform, rather than business entities, to make it easier for businesses to participate. Despite progress on the part of Côte d'Ivoire and Ghana in establishing traceability systems at a government level, they will need to adopt a complementary approach to maximize impact if international organizations are to participate. The government of Côte d'Ivoire has also expressed interest in such a system and further discussion will take place.

Within the global supply chain, interoperability and data protection standards between public and private databases will have to be coordinated at regional and national levels and the critical criterion will be the extent to which the public sector can facilitate this.[55] With this in mind, governments and international organizations taking the lead is the preferable option.

As described in Chapter 6, ongoing issues to resolve when rolling out a traceability system include how the tracing can be ensured, workload and system literacy issues and cost sharing, which are common issues across all configurations.

If the private sector takes the initiative in operating the system, one realistic approach would be to start by launching the system in the form of (1), then bringing companies that agree with the system on board until (2) is established. For example, one idea would be to conduct a demonstration experiment tracing upstream to downstream for multiple companies within an existing trading group. Subsequently, leveraging the findings of the current survey, we will develop a native application, operate and improve info sharing rules and implement a system to prevent, monitor and resolve child labor and a producer support program to verify its effectiveness.

Conversely, it is also conceivable that government agencies and international organizations could take the lead in operating the system as (3), which would be most effective from a scalability perspective. For example, a consortium could be formed to involve more participants in developing rules for sharing information and system construction guidelines and collaborate with the governments of producer countries to support the rolling out of prevention, monitoring and remediation systems and study support programs. As things stand, all options remain on the table and the hope is that many stakeholders will participate and engage in active discussions going forward.

[55] FAO Issue paper (2020) “Emerging opportunities for the application of blockchain in the agri-food industry”