



Positive Influence of Certification on the Financial Performance of Cocoa Production Models in Cameroon

Guillaume Lescuyer^{1,2*} and Simon Bassanaga³

¹ CIRAD Forêts et Sociétés, University of Montpellier, Montpellier, France, ² CIFOR, Bogor, Indonesia, ³ Consultant, Yaounde, Cameroon

OPEN ACCESS

Edited by:

Kaysara Khatun,
University of Greenwich,
United Kingdom

Reviewed by:

Eric Brako Dompheh,
The University of Tokyo, Japan
Nyong Princely Awazi,
The University of
Bamenda, Cameroon
Ingrid Fromm,
Bern University of Applied
Sciences, Switzerland

*Correspondence:

Guillaume Lescuyer
guillaume.lescuyer@cirad.fr

Specialty section:

This article was submitted to
Land, Livelihoods and Food Security,
a section of the journal
Frontiers in Sustainable Food Systems

Received: 17 July 2021

Accepted: 25 October 2021

Published: 25 November 2021

Citation:

Lescuyer G and Bassanaga S (2021)
Positive Influence of Certification on
the Financial Performance of Cocoa
Production Models in Cameroon.
Front. Sustain. Food Syst. 5:743079.
doi: 10.3389/fsufs.2021.743079

Cameroon plans to double its cocoa production in the coming decade in line with international requirements for sustainable and deforestation-free cocoa. Private certification, which has developed considerably in recent years, should help achieve this objective. Based on a literature review and 63 individual interviews with farmers, we identified four archetypes of cocoa production using the criteria of plantation size, degree of shade, and support from public or private extension services. We analyzed the average operating accounts of the four archetypes. Our findings show that the net profit rates obtained by small-scale certified producers are 14% (in the savannah zone) and 24% (in the forest zone). These rates are much higher than for the other two production models. Certification schemes provide technical and financial support, which has a positive influence on the practices of many small-scale producers and compensates for the lack of public services, which are now almost non-existent. A hybrid governance of the cocoa sector in Cameroon could clarify and improve the organization of the interactions between public regulation and private certification systems.

Keywords: rainforest alliance, agroforestry, zero deforestation, profit, value added, Congo Basin

INTRODUCTION

Old and New Challenges for Cocoa Production in Cameroon

The cocoa (*Theobroma cacao*) sector has been undergoing significant changes over the past 15 years in response to growing global demand for chocolate and new consumer demands to reduce its environmental footprint and maximize its socio-economic impact on producers (Kroeger et al., 2017; Lernoud et al., 2018). Much of the debate on these issues is based on the experiences of the Republic of Côte d'Ivoire and Ghana (Ingram et al., 2017; Ruf and Varlet, 2017). However, in both countries the tremendous expansion of cocoa farming in recent decades has severely damaged natural forest. Indeed, the area of natural forest is now very limited (Louppe, 2013). In other countries, cocoa development poses a greater risk for deforestation and forest degradation. This is the case for several countries in the Congo Basin with extensive forest cover and where policies aim to boost cocoa production. For example, Cameroon is in an ideal position to analyse the approaches likely to set the development of cocoa production on a path of sustainability and zero deforestation. In Cameroon, 41% of land is covered by dense forests (Ernst et al., 2012). However, the rate of deforestation is increasing (Vancutsem et al., 2021), of which 53% occurs in primary and mature secondary forests and is mainly due to the expansion of food and cocoa crop production (Tyukavina et al., 2018).

Cameroon has a long tradition of cocoa production. Between 1963 and 1993, annual production was ~110,000 tons (Pédélahore, 2014b). The global economic crisis of the 1980s and the sharp decline in primary commodity prices marked the beginning of a sectoral reform. In the early 1990s, structural adjustment measures led to the dissolution of the main public agency regulating the sector, the liberalization and deregulation of trade, and the privatization of export quality control (Pokam and Sunderlin, 1999; Ruf, 2000). Although the withdrawal of public support measures and the opening of the market exposed producers to world market price volatility and increased competition, it also contributed to a revival of cocoa production in Cameroon. The marketed volume doubled between 1993 and 2013 and production exceeded 200,000 tons as of 2009 (Pédélahore, 2014b). Although production increased, bean quality deteriorated because smallholders received less and less technical support from public extension services (Beckett, 2009).

The increase in production over the past 30 years has not fundamentally changed the farming system. It is still characterized by a very large number of small individual cocoa plantations. According to the Ministry of Agriculture and Rural Development (MINADER), between 300,000 and 500,000 households produce cocoa. There is no homogeneous data on the area currently cultivated with cocoa. Estimates vary from 375,000 ha according to Gockowski et al. (2010) to 600,000 ha according to MINADER. We lack accurate information on how much land is actually being used for growing cocoa and on the corresponding cocoa production practices.

Cocoa production in Cameroon increased until 2016 and has since been affected by the fall in international prices and unrest in the South West region. Annual production has stagnated at around 250,000 tons of dry beans. Cameroon is the fifth largest cocoa-producing country in the world. In the 2018–19 season, 241,000 tons of dry beans were sold on the market. According to data from the National Cocoa and Coffee Board (NCCB), 186,000 tons of unprocessed beans were exported and 55,000 tons were sold to local processors.

In the past decade, the Cameroonian government has been faced with the major challenge of reviving this sector. Recently, the National Development Strategy (MINEPAT, 2020) reiterated the objective of producing 600,000 tons of dry beans annually. This target already figured in the plan to revive the sector in 2014, but with a timeframe of 2030. Cameroonian cocoa farming is also under new international pressure, particularly from the European Union (Brack, 2019; Burkhardt, 2020), to demonstrate its sustainability and zero impact on forests. The cocoa sector in Cameroon will therefore have to adapt in the medium term if it wants to avoid a partial or total closure of its main export market.

Which Governance Models for the Cocoa Sector?

Combining increased cocoa production with meeting new environmental requirements is no easy matter. Among the governance systems that are being considered to promote sustainability in agricultural and forestry value chains

(Lambin et al., 2014; Wardell et al., 2021), three approaches have the potential to achieve this dual objective in Cameroon.

The first option is to strengthen public governance, i.e., allow the state to carry out its planning, regulatory and support functions. Although the cocoa sector has been liberalized for 25 years, the public authorities are particularly interested in the sector because it affects the livelihoods of many farmers and generates export earnings. Since the 1990s, the state has delegated most regalian functions to a number of public organizations. As their fields of intervention partly overlap, it is difficult to identify their specific tasks, which do not involve prior consultation or external audit. Overall, the coordination of public action is poor, the use of public funds is considered inefficient and public support is criticized for only reaching a small number of producers (Sonwa et al., 2001; Basse et al., 2019).

In addition, public regulations have not yet met the international demand for legal, sustainable and deforestation-free cocoa. It only sets minimalist conditions to define the legality of cocoa production (Sanial et al., 2019). The international standard ISO 34101 for sustainable and traceable cocoa was developed in 2019. It is not very restrictive in technical terms, but it has not yet been converted into a national standard in Cameroon.

The state is struggling to apply an effective national sectoral policy in Cameroon. As a result, private organizations, such as IDH (the Sustainable Trade Initiative), have been playing a key role since 2018 to design a national roadmap for deforestation-free cocoa and to experiment this approach in a few pilot jurisdictional landscapes with support from local authorities, certified firms and decentralized administrative services. However, it is still too early to tell whether this approach will achieve its objectives and be replicable on a larger scale in Cameroon.

Private certification is the third option for increasing cocoa production in compliance with international requirements. Apart from the few organic certification initiatives, two main private standards certify sustainable cocoa in Cameroon: the Rainforest Alliance standard, which merged with the Universal Trade Zone (UTZ) standard in 2018; and the Fair Trade standard, which remains a small minority and is not included in our analysis. The volume of certified cocoa increased significantly in Cameroon, from 3% in 2016 (Nlend Nkott et al., 2019) to 24% in 2019. More than 57,000 tons were produced in the 2018–2019 season according to NCCB figures. Cameroon is following the international trend of cocoa-producing countries (Lernoud et al., 2018).

Certification is a market-driven mechanism, whereby the state plays an indirect role in establishing the legal conditions for cocoa production. The governance of certified cocoa relies almost entirely on private actors, including the standards' developers, the international firms that use the standards, the auditors who verify their application and certified national producers. Given that it is a voluntary mechanism, it will only be adopted by private actors, including cocoa farmers if it can generate higher profits. The Rainforest Alliance certification for cocoa benefits producers in four ways. It provides: (1) supervision, information and training in "good agricultural practices"; (2) equipment and

agricultural inputs; (3) a premium per kilo of dry beans (50F.CFA in 2018–19); and (4) collective infrastructure, by investing some of the revenue from the sales of certified cocoa. However, certified cocoa production involves technical and social constraints that increase production costs. Overall, the effect of certification on the living standards of cocoa farmers in Cameroon is unclear (Mithöfer et al., 2017; Nlend Nkott et al., 2019). Without a more detailed analysis of the consequences of certification, it is difficult to establish whether certification can be extended to include more producers and, ultimately, become a relevant mode of governance for a cocoa sector committed to sustainability.

Over and above these three approaches to managing the cocoa sector in Cameroon, multiple forms of public and private governance mechanisms are emerging for agricultural and forestry commodities. The three main modes of interaction (RESOLVE, 2012; Gulbrandsen, 2014; D'Hollander and Tregurtha, 2016; Savilaakso et al., 2017) are described as follows: (1) substitution, when a public or private governance entity takes over all or part of a private or public governance system; (2) hybridization, when two public and private governance entities split or share functions, explicitly or implicitly; (3) symbiosis, when a certification system interacts with another entity to solve a policy problem, while retaining both its independence and autonomy, i.e., the actions of each entity reinforce the legitimacy and authority of the other.

This paper assesses the impact of certification on the profits of Cameroonian producers and how it could influence the future governance of cocoa production on the national scale. First, we establish a simple typology of cocoa producers in Cameroon in order to estimate profit levels and determine the extent to which profits depend on private and public support. Based on our findings, we discuss how private certification could influence the future hybrid governance of the cocoa value chain in Cameroon to meet the challenges of productivity and sustainability.

METHODS

Location of the Study Area

The survey took place in the four main cocoa production areas in Cameroon, according to official data from the National Cocoa and Coffee Board (NCBB) in 2018, namely the Center region (50.4% of national production), the South West region (31.6%), the Littoral region (7%) and the South region (5%). These four regions out of the ten regions that make up Cameroon are located in the forested part of the country (**Figure 1**), but the northern part of the Center region is mostly covered by savannah, gallery forest and residual forest (Santoir and Bopda, 2004).

Sampling Procedures

The information collected to establish a typology of cocoa producers in Cameroon was based primarily on a review of the scientific and technical literature. The literature review was then supplemented by 63 individual interviews with cocoa farmers in the four regions, i.e., Center (22 respondents), South (21 respondents), Littoral (12 respondents), and South West regions (8 respondents).

The selection of respondents followed 4 steps:

- (1) The Rainforest Alliance in Cameroon provided us with the contact details of leaders of cooperatives involved in certification in the four regions. These leaders were contacted by phone to explain our work and to plan a meeting with most of their members at the beginning of our visit.
- (2) The same process was undertaken with the NCCB to work with cocoa growers from cooperatives that were not engaged in certification in the four regions.
- (3) We went to the headquarters of these cooperatives to first hold a collective meeting to present our survey.
- (4) In a second phase, we randomly selected a certain number of producers present at these meetings to conduct individual interviews on their operating accounts. All of them agreed to participate to the survey. The planned duration of our survey of more or less 2 days for each of the cooperatives explains the number of interviews carried out at each site, around ten on average. This average number of interviews per cooperative allowed to catch the relative diversity of producers' practices within the same cooperative, as shown by the redundancy of the information collected beyond 5–6 individual interviews.

Within the sample, 37 producers had joined the Rainforest Alliance certification and 26 had no business links with any certification scheme. For the reference period, none of the cooperatives involved in certification in our sample received any support beyond the support received in the framework of certification.

Data Collection Procedure

Before visiting the sampled cooperatives, the individual questionnaire was tested on six farmers and amended. Data were collected using a paper questionnaire in French or English. The questionnaire was split into three parts:

1. a basic characterization of the cocoa plantation through 5 variables (active area in 2018 in hectares, production in 2018 in kilograms, age of the plantation, cocoa varieties, presence or absence of a certificate);
2. an estimate of revenues from the sale of cocoa beans in CFA francs in 2019, distinguishing between the different quality grades assigned to cocoa beans;
3. an assessment of the annual costs associated with operating this plantation in CFA francs in 2019, based on a pre-established list of all the usual cost items for a cocoa field. The amount of unpaid family labor and subsidies received were also recorded.

The average time for completing an individual questionnaire was around one and a half hours. This set of data was enough to calculate the value added and the net profit of each plantation.

The surveys were conducted between March and May 2019, using the 2018–19 production season as a reference. With the exception of the South West region, where access was dangerous at the time of the survey, all interviews took place at or around the cooperatives' headquarters, and within a few kilometers of the respondents' plantations. The meetings with cocoa producers took place in or around six cities: Yaounde, Ntui

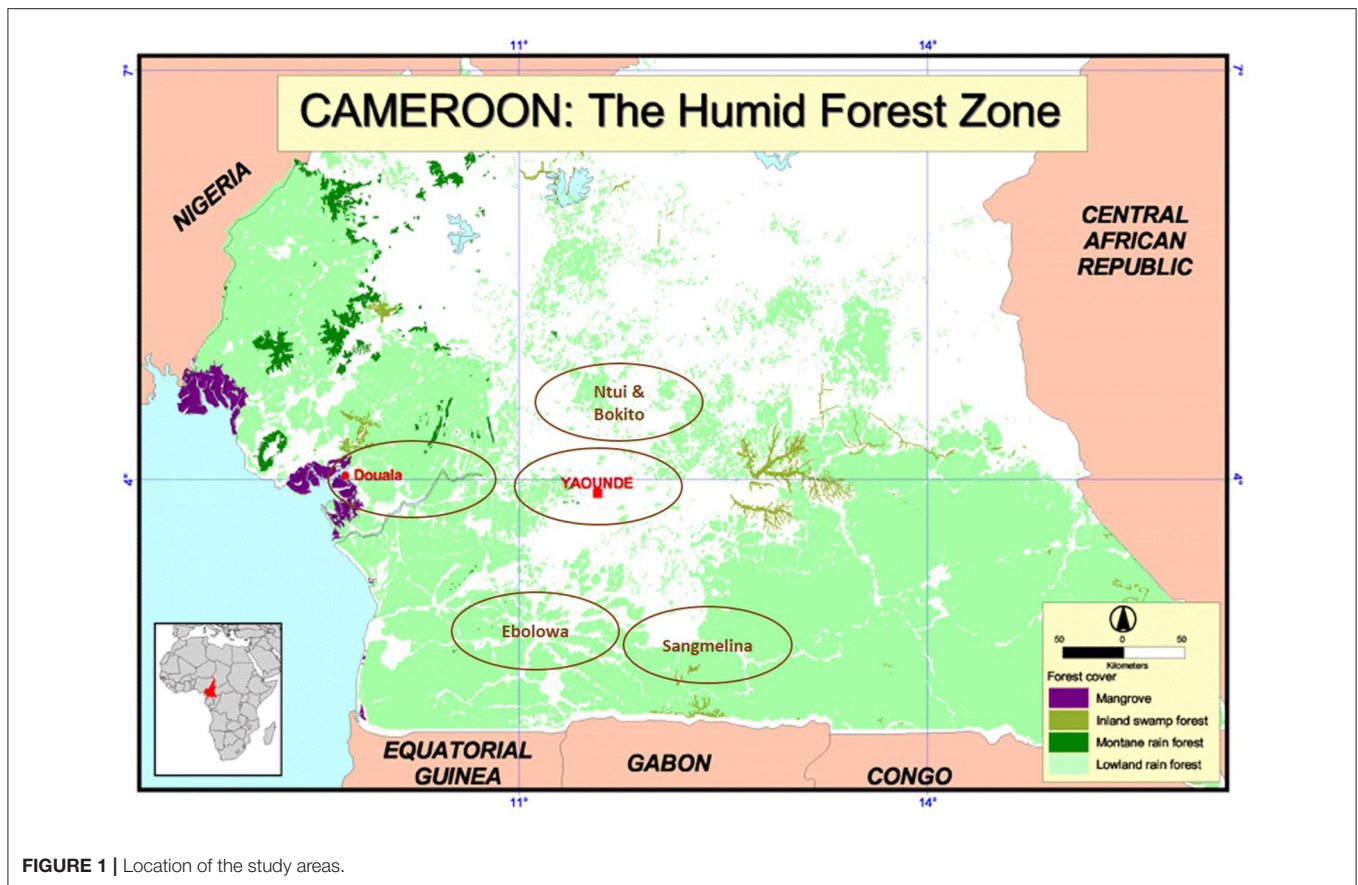


FIGURE 1 | Location of the study areas.

and Bokito for the Center region, Sangmelima and Ebolowa for the South region, Douala for the Littoral and South West regions (Figure 1).

Data Analysis Procedure

We have adopted the usual terminology and approach for compiling the operating accounts of cocoa producers. In this framework, the (gross) value added is the difference between the value of the output and the value of intermediate inputs, or the sum of wages, interest charges, taxes and gross profits. Similarly, the net profit is the balance when depreciation (equipment) is subtracted from the gross profit.

Three steps were followed to establish the average operating accounts for the four archetypes of cocoa producers in Cameroon. First, we collected data from each producer on plantation size, 2018–2019 yield and the values of the income and cost categories. Second, we estimated the average size and cocoa yield for each of the four archetypes. Third, we extrapolated the cost and revenue data for each individual plantation to calculate the average plantation by archetype in order to obtain the average operating accounts for each type of producer. The quantitative data were processed and analyzed using Windows Excel 2016.

RESULTS

Archetypes of Cocoa Producers

There are very diverse cocoa production methods in Cameroon. Many variables influence yield per hectare and farm size, which

means that there is no standard typology. However, three variables are commonly used to distinguish cocoa production modes (Ruf, 2000, 2011; Jagoret et al., 2008; Michel et al., 2019): (1) the number of trees on the cocoa farm and the degree of shading, (2) the size of the active plantation and (3) access to inputs. The last variable is now strongly correlated with the support received by farmers through Rainforest Alliance certification mechanisms or technical projects. By drawing on the information in the literature and from our surveys, these three discriminant criteria allowed us to identify four cocoa production archetypes in Cameroon (Table 1). They are completed with descriptive criteria that are drawn from literature and public data from NCCB. Although the four production archetypes are simplified representations of complex practices, they provide an overall coherent and realistic image of how cocoa production is organized in Cameroon, which is consistent with national statistics, as shown in the Table 2.

Cocoa Producers' Operating Accounts

Figures for the average operating accounts were calculated for each production archetype in order to determine their financial robustness and the contribution of private certification to their economic performance (Table 3).

Small forest plantations with no external support (Archetype 1) are characterized by low yields per hectare. Producers in this group do not receive public subsidies and rely mainly on domestic labor. They usually sell their cocoa at a low price

TABLE 1 | Main features of the archetypes of cocoa producers in Cameroon.

Discriminant criteria	Small plantations in forest without external support (A1)	Small plantations in forest with external support (A2)	Small plantations with little shade and with external support (A3)	Medium-sized plantations (5–20 ha) with little shade and no external support (A4)
Average area in production (ha)	1.5 ha with a range of 0.5–3 ha.	2.5 ha. Support through certification allows more old cocoa plantations to be rehabilitated and new cocoa plantations to be created.	3 ha, mostly in grasslands dominated by <i>Imperata cylindrica</i> , which have long been considered unsuitable for cocoa cultivation, Camara et al., 2012; Jagoret et al., 2012.	12 ha, with a range of 6–30 ha, Pédélahore, 2014a,b.
Average yield (kg/ha of dry beans)	280 kg/ha of dry beans, which is a high value according to the literature. Duguma et al. (2001), Jagoret et al. (2011), Iyabano and Kamdem (2012), Kanmogne et al. (2012), and Pédélahore (2014a) but a rather low value from the interviews.	600 kg/ha, which is a high average compared to the literature. Duguma et al. (2001), Pédélahore (2014a), Ngoucheme (2018) but rather low from the interviews.	500 kg/ha, which corresponds to a high average compared to Jagoret et al., 2012 but rather low based on interviews or Michel et al. This lower yield than that of cocoa farming under shade is explained by less favorable soil and climatic conditions and an imperfect control of the technical itinerary.	700 kg/ha, based on interviews and Pédélahore, 2014a.
Age of the cocoa farm (yr)	Cocoa plantations older than 40 years that are partially maintained or rehabilitated. Jagoret et al. (2011), Ngoucheme (2018).	Old cocoa plantations that have been rehabilitated over the last 10 years.	Cocoa plantations that rarely exceed 15 years of age, which were created with the late mastery of hybrid varieties, Beckett, 2009.	Cocoa plantations that are rarely more than 20 years old and established with funds from people in urban areas, Pédélahore, 2014a.
Descriptive criteria				
Number of producing households	Around 200,000 households.	Around 45,000 households.	Around 45,000 households, in strong growth for 15 years, and even more so in 2018 with the arrival of many producers from the South West.	3,000 people, continuously growing for 20 years, Jagoret et al., 2006; Pédélahore, 2014b.
Use of inputs and labor (qualitative)	Low level of labor and technical input. Iyabano and Kamdem (2012). The labor force remains essentially family-based Pédélahore (2014b). The difficult living conditions and access to goods and services, and the tensions related to the management of a cocoa farm often considered as a family heritage limit the investments in their plantations, Pédélahore (2014a).	External support received allows for better use of inputs, which translates into better environmental and social practices. Paid labor replaces some free family labor, but these arrangements remain informal.	External support allows for greater and better use of inputs, which translates into better environmental and social practices. Paid labor is dominant, especially in plantations established by non-native investors.	High level of technical knowledge and financial means to engage in effective cocoa farming. They generally implement good agronomic practices. They almost always rely on paid labor from outside the family, Pédélahore, 2014a.
External support (qualitative)	These producers do not have access to external public or private support.	These producers benefit from the support of firms involved in certification, previously from the GIZ support programme or, marginally, from a very few public projects.	The majority of these producers have received technical support to start this original and more complicated form of cocoa farming.	These producers have commercial relations with companies but receive very little external private and public support.
Land tenure (qualitative)	Access to cocoa areas or to land through inheritance. Weber (1975), and Pédélahore (2014b).	Access to cocoa plantations is by inheritance for old cocoa plantations, and on the basis of customary rights for new cocoa plantations.	Mainly through the purchase of land, especially for producers from the cities or other regions of Cameroon.	(1) In the Mbam zone, the purchase of land by non-natives is largely dominant; (2) in the forest zone, where population densities remain low, access to land is most often based on customary rights.
Presence of other woody species (level of density)	High density of non-cocoa trees. Jagoret et al. (2008, 2009), Gockowski et al. (2010). This agroforestry model of cocoa farming allows for great flexibility of use. Temple and Minkoua Nzié (2015), and Jagoret et al. (2014).	Moderate density of non-cocoa trees. Temple and Minkoua Nzié (2015).	Cocoa trees represent the majority of trees in these plantations, Jagoret et al., 2017; Nijmeijer et al., 2019.	Cocoa trees are largely the dominant trees.
Regions	Forest areas in the South, Center and South West regions, especially in remote areas.	Forest areas in the South, Center and South West regions, especially in little remote areas.	Northern part of the Central region ("le grand Mbam").	All producing regions, with a predilection for the Grand Mbam area.

TABLE 2 | Contributions of producer archetypes to national cocoa supply in Cameroon in 2018–19.

	Small-scale plantations			Medium-scale plantations	TOTAL	Official data (MINADER, ONCC)
	Forest zone		Savannah zone	No support		
	No support	With support	With support			
	Archetype 1	Archetype 2	Archetype 3		Archetype 4	
Average area in production (ha)	1.5	2.5	3.0	12.0		
Average yield (kg/ha of dry beans)	280	600	500	700		
Number of producing households	200,000	45,000	45,000	3,000	293,000	300–500,000
Total area in production (ha)	300,000	112,500	135,000	36,000	583,500	600,000
Total production (kg)	84,000,000	67,500,000	67,500,000	25,200,000	244,200,000	241,029,519

because of its poor quality and the unfavorable conditions for negotiating with informal buyers (Lenou Nkouedjo et al., 2020). These factors limit the profitability of this type of production, which yields a net profit of 4%. The financial performance of this model has deteriorated over the past decade, showing a decrease in the profit rate compared to earlier estimates by Duguma et al. (2001) or Temple and Minkoua Nzié (2015). The low profitability means that farmers do not have the resources to invest in more advanced and sustainable production practices.

The owners of small forest plantations with external support (Archetype 2) adopt a more intensive production model. As a result, they have a greater average turnover but with higher production costs. Private subsidies enhance the financial performance of this model, generating a net profit rate of 24%.

The owners of small plantations with little shade and with external support (Archetype 3) also use more intensive cocoa production methods. This comes at a higher cost, given the more technical nature of cocoa growing in the savannah zone and the monetisation of certain factors of production, such as labor or land. The net profit rate is 14%.

Lastly, the owners of medium-sized plantations with little shade and no external support (Archetype 4) are even more committed to a capitalist approach to cocoa farming. Their investments are based on solid business plans, which do not depend on private or public subsidies. Their net profit rate is 9%, but their value added is the highest of all cocoa farmer types.

DISCUSSION

Certification, an Effective but Partial Solution

Private certification is now a well-established mechanism in the cocoa sector in Cameroon. It represents almost a quarter of national production and involves some 90,000 small producers. The above results show that there is a positive correlation between the average profit level of a cocoa grower and his involvement in a certification process. However, the attribution of this profit surplus to certification alone remains to be demonstrated since many variables are likely to also influence the level of profit, such as the good governance of the cooperative or the training received previously by the producers, which do not necessarily relate to the certification process. Furthermore, the

development of our producer archetypes relies on a combination of primary information from a small sample of cooperatives and secondary data at the national level, which required several assumptions to make them compatible. These two limitations put the reliability of the analysis into perspective and mitigate against the lessons that can be learned from it. But in the absence of detailed national databases that allow for a more comprehensive and rigorous analysis, it is difficult to estimate the potential influence of certification on producers' net incomes without relying on such methodological proxies.

These methodological biases being noted, the success of private certification may be due to its positive correlation with the profitability of smallholders. A comparison of the financial performance of archetypes 2-3 and archetype 1 shows profit rates that are two to three times higher for the former. The additional profit associated to certification may not only be due to the higher price per kilo of beans, but also to lower production costs and better farming practices, which increase yield per hectare. The situation is similar in Ghana (Fenger et al., 2016). The support provided by certification may have a strong influence on smallholders' practices. It largely supplements public services, which are now almost non-existent, as shown by the absence of public subsidies in their operating accounts. Private certification has become the main support mechanism for smallholders, which means that it can no longer be considered as a complementary approach to public action (Nlend Nkott et al., 2019).

However, despite the potential financial benefits, private certification is not a panacea for all cocoa farmers in Cameroon. Two types of cocoa farmers do not benefit from this market-driven mechanism for different reasons: lack of capacity for some and overcapacity for others.

In the first case, the sustainability standards imposed cannot be met by small producers belonging to archetype 1 due to the age of their plantations, their small size, isolation and their limited material resources. Therefore, the cocoa sector in Cameroon is based on a two-tier production system, as in Côte d'Ivoire (Uribe-Leitz and Ruf, 2019). In addition, the price and premium for certified cocoa is too low to convince producers to invest in improving their production methods. The 200,000 producers in archetype 1 have an estimated break-even price of 680 XAF per kilogram (excluding the cost of domestic labor). This is close to the average sale price of 850 XAF for certified cocoa in rural

TABLE 3 | Operating accounts of the archetypes of cocoa producers (in XAF/year).

INCOME	Unit	A1–small plantations in forest with no external support			A2–small plantations in forest with external support			A3–small plantations with little shade and with external support			A4–medium-sized plantations with little shade and no external support		
		Unit price (in XAF, excluding VAT)	Number (of units)	Value (in XAF)	Unit price (in XAF, excluding VAT)	Number (of units)	Value (in XAF)	Unit price (in XAF, excluding VAT)	Number (of units)	Value (in XAF)	Unit price (in XAF, excluding VAT)	Number (of units)	Value (in XAF)
Dry beans quality 2 (FAQ)	ton	800,000	0.42	336,000	800,000	0.96	768,000	800,000	0.96	768,000	800,000	5.38	4 304,000
Dry beans UTZ-certified (or quality 1)	ton				900,000	0.54	486,000	900,000	0.54	486,000	900,000	3.02	2,718,000
Other services (technical advice)	day				5,000	8	40,000						
EXPENSES													
Intermediate consumption													
Training in “good practices”	package				6,000	1	6,000						
Purchase of crop protection products	package	70,000	1	70,000	34,000	1	34,000	150,000	1	150,000	860,000	1	860,000
Purchase of small equipment	package	13,500	1	13,500	33,000	1	33,000	35,000	1	35,000	45,000	1	45,000
Purchase of bags	bag	350	3	1,050	600	20	12,000				500	22	11,000
Purchase of seedlings	seedling										300	400	120,000
Transport in rural areas	bag				2,000	20	40,000	800	7	5,600	2,500	22	55,000
Transport to exporters	bag				1,400	20	28,000						
Miscellaneous trips	trip	4,600	5	23,000	20,000	1	20,000				3,000	4	12,000
Communication	package	11,000	1	11,000	11,000	1	11,000	35,000	1	35,000	25,000	1	25,000
Food for occasional staff	meal	1,200	16	19,200	1,200	50	60,000				20 000	4	80 000
Membership of the cooperative	package				8 000	1	8 000	37 500	1	37,500	350,000	1	350,000
Benefits of permanent staff	package										90,000	1	90,000
Total Intermediate Consumption				137,750			566,000			263,100			1,648,000
Subsidies													
Training in “good practices”	package				21,000			15,000					
Donation of crop protection products	package				19,000			18,000					
Donation of small equipment	package				4,500			10,600					
Transport to exporters	bag							4,200					
Total Subsidies		0			44,500			47,800			0		
Value added													
Salary for occasional staff	day	2,500	16	40,000	2,000	74	148,000	2,500	285	712,500	600	470	282,000
Salary for occasional staff	ha	19,000	2	38,000	25,000	2	50,000						0
Salary for permanent staff	month										80,000	48	3,840,000
Salary for bags handling	bag				400	30	12,000	500	7	3,500			0
Financial charges	package				12,000	1	12,000	300	1	300			0
Value added tax	package			25,367	75,350	1	75,350	45,000	1	45,000	167,500	1	167,500
Informal tax	package	20,000	1	20,000									
Gross profit				74,883			430,650			229,600			1,084,500
Total Value added				198,250			728,000			990,900			5,374,000
Depreciation (tools), (3–10 yrs)				62,200			117,000			42,000			479,000
Depreciation (land), (25 yrs)										12,000			24,000
Net profit				12,683			313,650			175,600			605,500

areas during the 2018–19 season. If there is no significant increase in the certification premium and no other external support, few farmers in this group are likely to be able to produce certified cocoa in the medium term.

Producers with medium-sized plantations, i.e., between 5 and 20 hectares, do not rely on certification to support their business models either. For about 20 years, i.e., well before the emergence of private certification, a class of cocoa entrepreneurs emerged. These producers are still marginal (in terms of numbers), but their performance (yield and value added) is remarkable. For this group, cocoa farming is a productive investment based on a cost-benefit analysis. They invest in the material, financial and human resources to meet the yield and profit objectives (Pédélahore, 2014b). This capital-intensive approach to cocoa production seems promising, at least from an economic point of view. However, it is only a realistic option for an urban elite with the necessary capital to invest. So far, certification has little influence on this production model. This may be because it was not integrated in their business plans. Certification schemes may be adopted, if they have the potential to increase financial profitability.

Toward a Hybrid Governance of the Cocoa Value Chain

The liberalization of cocoa production in Cameroon and the development of private certification have affected the governance of the cocoa sector. The public services have done little to support its development. The private sector has compensated to some extent, by setting up certification schemes. However, it would be misleading to suggest that the interactions between public and private instruments of governance in the cocoa sector are solely a matter of substitution. In the Cameroonian cocoa sector, the reality is more complex because substitution, hybridization and symbiosis simultaneously affect different governance variables.

Firstly, as the operating accounts show, the only direct or indirect subsidies that small producers receive come from firms involved in certification. However, this substitution of public subsidies by support from private firms faces two obstacles: most smallholders cannot afford to comply with the certification criteria; the development of certification may reach a plateau in the medium term because no national firm in Cameroon is interested in this mechanism at the moment. This could result in a two-tier cocoa sector, which would not only fail to achieve the objectives, but would also be unacceptable to the public authorities (Nlend Nkott et al., 2019). Rather than letting private certification schemes monopolize the technical support provided to producers, a hybrid between private and public governance is required. For example, private entities could provide effective technical support to producers, while public services could provide assistance to cooperatives and national enterprises (Fenger et al., 2016). Similarly, purchase price support could combine the premium offered by certification with the quality premium that the Ministry of Trade applies for grade 1 beans.

The traceability of cocoa beans is also an area with potential regarding the interaction between public and private governance.

In Cameroon, private cocoa certification is currently the only mechanism that can guarantee part of the traceability process, in the form of secure slips between the certified producers' cooperatives and the export markets. Due to a lack of resources, the administration now only collects data on approximate volumes in the regional capitals. This data is consolidated by the more complete export statistics from the port of Douala. As we have seen for timber in the context of the FLEGT Action Plan (Tsanga, 2021), the Cameroonian state has tremendous difficulty ensuring the credible traceability of products within its borders. Substituting a failing public traceability system by a proven private system is probably the solution to adopt, at least in the medium term. However, the traceability system used by the Rainforest Alliance standard is usually only partial since it only traces the cocoa bean from the first place of sale (often a cooperative) and not from the cocoa plantation. Although the geolocation of plantations is a criterion of this standard, it is rarely verified and seldom implemented (Ruf et al., 2019; Carimentrand, 2021). If the public authorities are to adopt a private traceability system, there are two prerequisites: first, ensuring that private certification effectively assesses legal compliance; second, improving the procedures developed by the Rainforest Alliance (or others') standard to trace cocoa beans from the plantations.

Lastly, current regulations provide very few benchmarks to define what legal cocoa is (Sanial et al., 2019). Public authorities are slow to define what would be considered sustainable and deforestation-free cocoa, apart from the non-binding roadmap signed in 2020 under the auspices of IDH. This is worrying, especially given that most of Cameroon's cocoa comes from agroforestry systems with high tree density and biodiversity (Jagoret et al., 2008). Private certification schemes are constantly reviewing certification standards under pressure from European markets. Indeed, the private sector is involved in discussions and is also making progress to define sustainable and deforestation-free cocoa. Therefore, a symbiosis between public and private modes of governance would help clarify the attributes of legal, sustainable and deforestation-free cocoa (Carodenuto, 2019; Nlend Nkott et al., 2019). Administrations still have a great deal of work to do in order to specify the conditions for legal cocoa, for example, in terms of ecosystem conversion or labor rights. Similarly, certification bodies need to improve the content of their standards to ensure that they recognize the sustainability of agroforestry cocoa plantations and integrate criteria that can demonstrate zero deforestation (Carimentrand, 2021).

CONCLUSION

Private certification to guarantee sustainability is sometimes seen as an approach that serves multinational companies keen to increase their market share or to green their reputation, with no real positive impact on the social and natural environments of their supply areas (Poynton, 2015). Our partial analysis of the Rainforest Alliance certification might show that it has a positive influence on the yields and profits of a significant proportion of cocoa farmers in Cameroon. This does not mean that

smallholders are the main beneficiaries of private certification at the national (Lenou Nkouedjo et al., 2020) or international level (Alliot et al., 2016). However, in areas where the state no longer provides the extension services that it used to provide, producers that join certification schemes could benefit from technical support and a higher level of income.

The positive influence that certification might have on the profits of many cocoa producers does not mean that it should become the exclusive mode of governance in this sector. Private certification also has major shortcomings, inasmuch as it excludes a majority of producers and is based on unsatisfactory sustainability and traceability criteria.

Several international and national conditions are now in place for a mixed governance approach to the cocoa sector in Cameroon. This mixed approach recognizes that the private sector plays a decisive role when it comes to improving the performance of cocoa producers and responding to market pressures, mainly through sustainability certification. Nonetheless, the role of private certification would be even more effective if it was clearly combined with the state's functions of regulating and promoting the sector. This type of mixed governance of the cocoa sector in Cameroon has yet to be developed. An objective analysis is required to examine the actors' capacities and interests to move forward in this direction, and on the basis of their respective efficiency.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation

REFERENCES

- Alliot, C., Cortin, M., Feige-Muller, M., and Ly, S. (2016). *La face cachée du chocolat. Une comparaison des coûts sociaux et environnementaux des filières conventionnelles, durables et équitables du cacao*. Paris: Etude du Bureau d'Analyse Sociétale pour une Information Citoyenne.
- Basse, I., Engille, A., and Hourticq, J. (2019). *Analyse institutionnelle, organisationnelle et financière des entreprises et établissements publics de secteur rural au Cameroun*. *Revue de la filière cacao*. Rapport AECOM.
- Beckett, S. T. (2009). *Industrial Chocolate Manufacture and Use*. Chichester: Blackwell Publishing. doi: 10.1002/9781444301588
- Brack, D. (2019). *Toward Sustainable Cocoa Supply Chains: Regulatory Options for the EU*. Report for Fern. Tropenbos.
- Burkhardt, D. (2020). *Motion for a European Parliament Resolution, with Recommendation to the Commission on a Legal EU Framework to Halt and Reverse EU-Driven Global Deforestation*. Public Health and Food Safety.
- Camara, A. A., Dugué, P., and de Foresta, H. (2012). Transformation des mosaïques de la forêt-savane par des pratiques agroforestières en Afrique subsaharienne (Guinée et Cameroun). *Cybergeogeo* 627, 1–25. doi: 10.4000/cybergeogeo.25588
- Carimentrand, A. (2021). *Certification du cacao et lutte contre la déforestation: Etat des lieux sur la déforestation et les schémas de certification de l'objectif zéro-déforestation dans la filière cacao*. Paris: AFD–CST Forêt.

and institutional requirements. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

GL and SB conducted the literature review. GL elaborated, tested and implemented the survey protocol, with the support of SB to connect with the cocoa growers, and other stakeholders. Data analysis was done by GL. GL and SB relied on the results to propose governance options for the cocoa sector in Central Africa. Both authors contributed to the writing of the manuscript, with GL contributing the most.

FUNDING

The work reported in this paper was conducted with funding support from the European Commission/DEVCO under its Value Chain Analysis for Development (VCA4D) project (Contract Number: 2016/375-804). This study was also funded by the CGIAR Research Programme on Forests, Trees and Agroforestry.

ACKNOWLEDGMENTS

The authors would like to thank all the cocoa producers who took the time to answer our questions, as well as the Cameroonian stakeholders who helped us to better understand the governance of this sector. We would also like to thank Bienvenue Belinga who conducted ten interviews with producers. This article is based on discussions held with Elsa Sanial, François Ruf, Raphaël Tsanga, Laurence Boutinot, Pietro Goglio, and Aurélie Carimentrand. Finally, Isis Olivier proofread and amended the English language of this article.

- Carodenuto, S. (2019). Governance of zero deforestation cocoa in West Africa: New forms of public-private interaction. *Environ. Policy Gov.* 29, 55–66. doi: 10.1002/eet.1841
- D'Hollander, D., and Tregurtha, N. (2016). Exploring the potential of government and voluntary standards collaborations to scale up sustainable production and supply. *Policy Matters* 21, 60–72.
- Duguma, B., Gockowski, J., and Bakala, J. (2001). Smallholder cacao cultivation in agroforestry systems of West and Central Africa: challenges and opportunities. *Agrofor. Syst.* 51, 177–188. doi: 10.1023/A:1010747224249
- Ernst, C., Verhegghen, A., Mayaux, P., Hansen, M., and Defourni, P. (2012). "Cartographie du couvert forestier et des changements du couvert forestier en Afrique centrale," in *Les forêts du bassin du Congo–Etat des Forêts 2010*, eds C. de Wasseige, P. de Marcken, N. Bayol, F. Hiol Hiol, PH. Mayaux, B. Desclée et al. (Luxembourg: Office des publications de l'Union Européenne), 23–42.
- Fenger, N. A., Skovmand Bosselmann, A., Asare, R., and de Neergaard, A. (2016). The impact of certification on the natural and financial capitals of Ghanaian cocoa farmers. *Agroecol. Sustain. Food Syst.* 41, 143–166. doi: 10.1080/21683565.2016.1258606
- Gockowski, J., Tchata, M., Dondjang, J. P., Hietet, G., and Fouda, T. (2010). An empirical analysis of the biodiversity and economic returns to cocoa agroforests in Southern Cameroon. *J. Sustain. For.* 29, 638–670. doi: 10.1080/10549811003739486

- Gulbrandsen, L. H. (2014). Dynamic governance interactions: evolutionary effects of state responses to non-state certification programs. *Regul. Gov.* 8, 74–92. doi: 10.1111/rego.12005
- Ingram, V., van Rijn, F., Waarts, Y., Dekkers, M., de Vos, B., Koster, T., et al. (2017). *Toward Sustainable Cocoa in Ivory Coast. The Impacts and Contribution of UTZ Certification Combined with Services Provided by Traders*. Wageningen: Wageningen Economic Research. doi: 10.18174/450223
- Iyabano, A. H., and Kamdem, C. B. (2012). “Fonctionnement de la filière cacao au Cameroun: Analyse des coûts et marges des acteurs,” in *17th International Cocoa Research Conference* (Yaoundé).
- Jagoret, P., Bouambi, E., Menimo, T., Domkam, I., and Batomen, F. (2008). Analyse de la diversité des systèmes de pratiques en cacao-culture. Cas du Centre Cameroun. *Biotechnol. Agron. Soc. Environ.* 12, 367–377.
- Jagoret, P., Couve, C., Bouambi, E., Menimo, T., Domkam, I., and Nyassé, S. (2006). *Caractérisation des systèmes de cacao-culture du Centre-Cameroun*. Yaoundé: Cirad-Irad-MAEE.
- Jagoret, P., Kwesseu, J., Messie, A. C., Michel-Dounias, I., and Malézieux, E. (2014). Farmers’ assessment of the use value of agrobiodiversity in complex cocoa agroforestry systems in central Cameroon. *Agrofor. Syst.* 88, 983–1000. doi: 10.1007/s10457-014-9698-1
- Jagoret, P., Michel-Dounias, I., and Malézieux, E. (2011). Long-term dynamics of cocoa agroforests: a case study in central Cameroon. *Agrofor. Syst.* 81, 267–278. doi: 10.1007/s10457-010-9368-x
- Jagoret, P., Michel-Dounias, I., Snoeck, D., Todem Ngnogue, H., and Malézieux, E. (2012). Afforestation of savannah with cocoa agroforestry systems: a small-farmer innovation in central Cameroon. *Agrofor. Syst.* 86, 493–504. doi: 10.1007/s10457-012-9513-9
- Jagoret, P., Snoeck, D., Bouambi, E., Todem Ngnogue, H., Nyassé, S., and Saj, S. (2017). Rehabilitation practices that shape cocoa agroforestry systems in Central Cameroon: key management strategies for long-term exploitation. *Agrofor. Syst.* 92, 1185–1199. doi: 10.1007/s10457-016-0055-4
- Jagoret, P., Todem Ngnogue, H., Bouambi, E., Battini, J. L., and Nyassé S. (2009). Diversification des exploitations agricoles à base de cacao au Centre Cameroun: mythe ou réalité? *Biotechnol. Agron. Soc. Environ.* 13, 271–280.
- Kanmogne, A., Jannot, Y., and Nganhou, J. (2012). Description concise et analyse des systèmes utilisés dans la région Sud du Cameroun pour le séchage du cacao. *Tropicicultura* 30, 94–102.
- Kroeger, A., Bakhtary, H., Haupt, F., and Streck, C. (2017). *Eliminating Deforestation from the Cocoa Supply Chain. Report of Climate Focus North America for the World Bank Group*. World Bank Group. doi: 10.1596/26549
- Lambin, E. F., Meyfroidt, P., Rueda, X., Blackman, A., Börner, J., Cerutti, P. O., et al. (2014). Effectiveness and synergies of policy instruments for land use governance in tropical regions. *Glob. Environ. Change* 28, 129–140. doi: 10.1016/j.gloenvcha.2014.06.007
- Lenou Nkouedjo, L., Mathe, S., Engwali Fon, D., Geitzenauer, M., and Awah Manga, A. (2020). Cocoa marketing chain in developing countries: how do formal-informal linkages ensure its sustainability in Cameroon? *Geoforum* 117, 61–70. doi: 10.1016/j.geoforum.2020.09.005
- Lernoud, J., Potts, J., Sampson, G., Schlatter, B., Huppe, G., Voora, V., et al. (2018). *The State of Sustainable Markets 2018. Statistics and Emerging Trends*. International Trade Centre.
- Louppe, D. (2013). *Etude sur l’exploitation forestière et les contraintes d’une gestion durable des forêts dans le domaine rural en Côte d’Ivoire*. Abidjan: GIZ.
- Michel, I., Carrière, S., Manga Essouma, F., Bihina, M. A., Blanchet, A., Moisy, C., et al. (2019). “Les cacaoyères agroforestières au Centre et au Sud du Cameroun : diversité et dynamique,” in *Agroforesterie et services écosystémiques en zone tropicale. Recherche de compromis entre services d’approvisionnement et autres services écosystémiques*, eds J. Seghier, and J. M. Harmand (Versailles: Quae), 85–98.
- MINEPAT (2020). *National Development Strategy–Cameroon 2030*. de la Planification et de l’Aménagement du Territoire.
- Mithöfer, D., Roshetko, J. M., Donovan, J. A., Ewane, N., Robiglio, V., Wau, D., et al. (2017). Unpacking “sustainable” cocoa: do sustainability standards, development projects and policies address producer concerns in Indonesia, Cameroon and Peru? *Int. J. Biodivers. Sci. Ecosyst. Serv. Manag.* 13, 444–469. doi: 10.1080/21517372.2018.1432691
- Ngoucheme, R. (2018). *Les effets de la certification sur la performance des systèmes agroforestiers à base de cacao au Cameroun* (Ph.D. thesis), University of Dschang, Dschang, Cameroon.
- Nijmeijer, A., Lauri, P. E., Harmand, J. M., Freschet, G. T., Essobo Nieboukaho, J. D., Kenfack Fogang, P., et al. (2019). Long-term dynamics of cocoa agroforestry systems established on lands previously occupied by savannah or forests. *Agric. Ecosyst. Environ.* 275, 100–111. doi: 10.1016/j.agee.2019.02.004
- Nlend Nkott, A. L., Mathé, S., and Temple, L. (2019). Analyse multi-niveaux des freins à l’adoption de la certification du cacao au Cameroun. *Econ. rural.* 370, 81–99. doi: 10.4000/economierurale.7282
- Pédélahore, P. (2014a). Farmers accumulation strategies and agroforestry systems intensification: the example of cocoa in the central region of Cameroon over the 1910–2010 period. *Agrofor. Syst.* 88, 1157–1166. doi: 10.1007/s10457-014-9675-8
- Pédélahore, P. (2014b). Systèmes agroforestiers à cacaoyers et transition capitaliste: l’exemple du Centre-Cameroun. *Bois For. Trop.* 321, 55–66. doi: 10.19182/bft2014.321.a31218
- Pokam, J., and Sunderlin, W. D. (1999). *L’impact de la crise économique sur les populations, les migrations et le couvert forestier du sud-Cameroun*. CIFOR.
- Poynton, S. (2015). *Beyond Certification*. Oxford: Do Sustainability.
- RESOLVE (2012). *Toward Sustainability: The Roles and Limitations of Certification*. Steering Committee of the State-of-Knowledge Assessment of Standards and Certification.
- Ruf, F. (2000). “Libéralisation et tenaille des prix cacao/intrants. Le cas du Sud-Ouest du Cameroun,” in *Filières agroalimentaires en Afrique: comment rendre le marché plus efficace?* ed M. Griffon (Paris: MAE), 275–302.
- Ruf, F. (2011). The myth of complex cocoa agroforests: the case of Ghana. *Hum. Ecol.* 39, 373–388. doi: 10.1007/s10745-011-9392-0
- Ruf, F., Uribe-Leitz, E., Gboko, K. C., and Carimentrand, A. (2019). Des certifications inutiles? Les relations asymétriques entre coopératives, labels et cacaoculteurs en Côte d’Ivoire. *Rev. Int. des études en Dév.* 240, 31–61. doi: 10.3917/ried.240.0031
- Ruf, F., and Varlet, F. (2017). The myth of zero deforestation cocoa in Côte d’Ivoire. *ETFRN News* 58, 86–92.
- Sanial, E., Lescuyer, G., Ruf, F., and Tsanga, R. (2019). *Relevance of a FLEGT-like Approach for West and Central African Cocoa Sustainability*. Bogor: FTA.
- Santoir, C., and Bopda, A. (2004). *Atlas régional Sud-Cameroun*. Institut de Recherche pour le Développement, Collection Atlas Cédérom.
- Savilaakso, S., Cerutti, P. O., Montoya Zumaeta, J. G., Ruslandi, Essiane Mendoula, E., and Tsanga, R. (2017). Timber certification as a catalyst for change in forest governance in Cameroon, Indonesia and Peru. *Int. J. Biodivers. Sci. Ecosyst. Serv. Manag.* 13, 116–133. doi: 10.1080/21517372.2016.1269134
- Sonwa, D., Weise, S. F., Tchatat, M., Nkongmeneck, B., Adesina, A. A., Ndoye, O., et al. (2001). *The Role of Cocoa Agroforests in Rural and Community Forestry in Southern Cameroon*. CIFOR.
- Temple, L., and Minkoua Nzié, J. R. (2015). “Socio-economic conditions of horticultural diversification in cocoa production systems in southern Cameroon,” in *Economics and Ecology of Diversification: The Case of Tropical Tree Crops*, eds F. Ruf, and G. Schroth (Dordrecht: Springer), 239–251. doi: 10.1007/978-94-017-7294-5_11
- Tsanga, R. (2021). *Les interactions entre normes juridiques et normes techniques de certification forestière dans le Bassin du Congo* (Ph.D. thesis). University of Aix-Marseille, Marseille, France.
- Tyukavina, A., Hansen, M. C., Potapov, P., Parker, D., Okpa, C., Stehman, S. V., et al. (2018). Congo Basin forest loss dominated by increasing smallholder clearing. *Sci. Adv.* 4:eaat2993. doi: 10.1126/sciadv.aat2993
- Uribe-Leitz, E., and Ruf, F. (2019). “Cocoa Certification in West Africa: The Need for Change,” in *Sustainable Global Value Chains*, eds M. Schmidt, D. Giovannucci, D. Palekhov, and B. Hansmann (Basingstoke: Springer Nature), 435–461. doi: 10.1007/978-3-319-14877-9_24
- Vancutsem, C., Achard, F., Pekel, J. F., Vieilledent, G., Carboni, S., Simonetti, D., et al. (2021). Long-term (1990–2019) monitoring of forest cover changes in the humid tropics. *Sci. Adv.* 7:eabe1603. doi: 10.1126/sciadv.abe1603

- Wardell, D. A., Piketty, M. G., Lescuyer, G., and Pacheco, P. (2021). *Reviewing Initiatives to Promote Sustainable Supply Chains: The Case of Forest-Risk Commodities. Forests, Trees and Agroforestry Working Paper* 8. CIFOR.
- Weber, J. (1975). "La région cacaoyère du centre sud Cameroun (Essai d'analyse d'une forme locale de production dominée)," in *L'agriculture africaine et le capitalisme*, ed S. Amin (Paris: Editions Anthropos-IDEF), 91–104.

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Copyright © 2021 Lescuyer and Bassanaga. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.