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Determinants of willingness and actual participation in cocoa certification programs in Sierra Leone: Farmers and officers' perspectives

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Abstract

This study addresses an important yet underexplored issue in agricultural development—distinguishing between willingness and actual participation in certification programs. This makes the research highly relevant for both policy and practice. The aim of the study is to investigate the factors influencing both farmers' and certification officers' willingness and actual involvement in cocoa certification initiatives in Sierra Leone. A multistage sampling technique was used to select the Kailahun District and the Kissi Tongi Chiefdom. Twenty cocoa farmers were randomly selected from each of the ten cocoa-producing communities in the chiefdom, resulting in a total sample size of 200 farmers. Thirty certification officers were also randomly chosen from the study area. Data were collected using a structured questionnaire, validated by experts, and analyzed using the Statistical Package for Social Sciences (SPSS) Version 29. Multiple linear regression, frequency counts, percentages, and Probit analysis were employed. The study's results show that ethnicity ($t = -3.01$, $p < 0.003$), marital status ($t = 1.81$, $p < 0.07$), religion ($t = 3.13$, $p < 0.002$), and income ($t = -6.26$, $p < 0.00$) are factors that influence willingness to participate, while limitations on extension services ($t = 1.86$, $p < 0.06$), educational attainment ($t = 3.69$, $p < 0.00$), and extension service participation ($t = 1.96$, $p < 0.05$) are factors affecting actual participation. Based on these findings, it can be concluded that while technological factors determine actual involvement, significant sociocultural factors influence willingness to participate.

Introduction

Cocoa is a widely used raw ingredient in chocolate, beverages, high-end medications, and cosmetic products worldwide. As a significant export product, cocoa is linked to better livelihoods, poverty reduction, and positive welfare impacts for smallholders. Major global chocolate industry players, such as Ferrero, Nestlé, Mondelez, and Mars & Hershey, committed to a sustainable cocoa sector by 2020. This commitment has led to the promotion of agricultural commodity certification as a strategy to improve producer welfare, reduce poverty, protect the environment, and enhance productivity (Iddrisu et al., 2020). For developing countries, cocoa is a major source of employment and foreign exchange (Löhr et al., 2021), significantly improving the quality of life for 40–50 million people globally. Nearly 95% of the world's cocoa is produced by smallholders, many of whom live below the poverty line and cultivate less than three hectares of cocoa. According to Abu et al. (2021), 70% of global cocoa production comes from the West African sub-region, with Ghana and Ivory Coast as the leading producers. Cocoa is a vital economic export crop for producing countries, primarily grown

in Africa, Asia, and Latin America, with consuming countries—typically lacking the climate for cultivation—importing substantial quantities (Staritz et al., 2023). Côte d'Ivoire, the largest producer by volume, accounts for 33% of global supply. Africa contributes 68% of global production, with Ghana, Nigeria, and Cameroon as major producers, while Brazil, Ecuador, and Colombia supply 15%, and Asia, including Indonesia, Malaysia, and Papua New Guinea, accounts for 17% (Staritz et al., 2023).

Moinina et al. (2023), noted that Sierra Leone is home to over 49,000 cocoa farm families, mostly concentrated in the eastern region. Cocoa was introduced to Sierra Leone by Portuguese sailors in the 16th century, and in the early 20th century, varieties from Ghana were brought in (MAF, 2019). The eastern region, particularly the districts of Kailahun, Kenema, Kono, and Bo, is the primary cocoa-producing area, covering approximately 114,125, 58,086, 43,232, and 11,715 hectares, respectively (Statistics Sierra Leone, 2021). However, over the past two decades, average cocoa yields in Sierra Leone have fluctuated between 300 and 400 kg/ha, despite an increase in cultivated area (FAOSTAT, 2020). One key strategy to improve the livelihoods of cocoa producers is the certification program. Agricultural certification programs establish production and marketing standards through stakeholder consultations, accreditation by organizations, and the standardization of critical aspects of production and trade, aiming to produce safe, high-quality food with minimal environmental impact (Rusli & Fatah, 2022); with the aim to improve smallholders' income and welfare.

Cocoa certification, as defined by Olendorf et al. (2023), involves a set of sustainable production practices outlined in codes of conduct by standards organizations or certification programs. This system ensures that participants in the cocoa supply chain adhere to required environmental, social, and economic criteria. It also enhances the quality of cocoa beans, promotes the adoption of best agricultural practices, and ensures the long-term sustainability of the cocoa value chain (Ankuyi et al., 2023). By offering premium payments and training opportunities, certification encourages farmers to enhance both their income and the quality of their products. However, concerns remain regarding the transparency and accountability of premium payments, as many certified producers do not disclose the amounts paid for their certified farms. To achieve accreditation, effective traceability measures must be implemented, and farmers should be encouraged to join or establish commodity groups and cooperatives to strengthen traceability and support sustainable cocoa production practices (MAF, 2019).

Certification programs are designed to protect the environment, enhance the welfare of producers and laborers, and safeguard consumers (Waldman and Kerr 2014). By charging a premium for certified products, sustainability certification programs aim to offset the higher production costs incurred by farmers. The rise of certification programs focused on sustainability has fostered optimism regarding improvements in the livelihoods of smallholder farmers. However, despite the increasing popularity of these certification systems, their effectiveness remains unproven. According to Fenger et al. (2017) and Fountain and Hütz-Adams (2015), the perspectives of smallholder farmers are prioritized in these certification systems. Understanding how certification programs function at the smallholder level, as opposed to their 'official' operations, is essential for assessing their impact on sustainable farming practices and improved livelihoods. In addition to facilitating market access and promoting sustainable practices, certification officers play a crucial role in ensuring that cocoa production meets established standards. Certification officers are typically experts with tertiary-level education backgrounds in environmental science, agriculture, or related fields, working for certification organizations or non-governmental organizations that support sustainable agriculture. Most certification officers have years of experience in auditing, agriculture, or related industries, enabling them to efficiently assess farming operations and guide farmers in meeting certification standards (Oke et al., 2020).

Moreover, certification schemes aim to improve farmers' livelihoods and encourage sustainable farming practices. A report by the Rainforest Alliance highlighted that farms producing various goods, including cocoa, are accredited as part of its sustainable agriculture program, which also includes farmer training initiatives. To preserve ecosystems, protect biodiversity, and enhance livelihoods, the program emphasizes the critical role of certifying officers in promoting sustainable practices (Dröge et al., 2025). Certification programs have also played a significant role in encouraging cocoa farmers to adopt sustainable methods. A study examining the impact of cocoa certification on farmers in Ghana found that certified farmers had better access to improved farming practices and support. However, the costs associated with meeting certification requirements, such as audit fees, certified input purchases, and farm infrastructure investments, may be unaffordable for smallholder farmers. Many of these farmers face challenges in financing these necessary expenditures due to limited access to affordable credit facilities (Eghe et al., 2014).

Certification officers are essential to ensuring that cocoa crops meet specific requirements. However, they face several challenges that limit their effectiveness. One major obstacle is the logistical difficulty of reaching

remote rural villages. Poor infrastructure, such as inadequate road networks, hampers regular agricultural inspections and monitoring, thereby delaying the certification process (Fairtrade, 2024). Certification authorities also encounter complex sociocultural challenges. Building successful partnerships with farmers requires establishing trust, but cultural differences, language barriers, and differing perceptions of certification can impede this connection. Training programs may not always adequately address cultural competence and effective communication strategies, which are crucial for overcoming these challenges. Furthermore, participation may be influenced by existing relationships with authorized purchasing firms. Farmers may have less incentive to seek certification if they have established ties with buyers who do not prioritize certified cocoa. This relationship fosters dependency, discouraging farmers from independently pursuing certification (Eghe et al., 2014).

Additionally, the constantly evolving nature of certification standards introduces further complexity. Certification officers are responsible for keeping farmers updated on regulatory changes and ensuring compliance. Continuous training and information sharing are essential for sustained improvements, but these processes can be resource-intensive and challenging to execute effectively. Certification now spans a broad range of agricultural products, including cocoa, coffee, and forest products. This expansion is driven by consumers becoming more aware of the economic, social, and environmental impacts of production methods. Certification is making stakeholder participation in supply chain decision-making more feasible, according to Moinina et al. (2023). Third-party certification provides consumers with information about key product attributes, such as quality and sustainability. Unlike traditional business transactions, where an agreement is formed between buyers and sellers based on standard regulatory frameworks, the certification process is different for products that comply with these standards. From upstream growers to downstream consumers, participants in the supply chain collaborate transparently to ensure traceability and quality (Vázquez et al., 2024).

Cocoa, Sierra Leone's primary agricultural export, has the potential to significantly strengthen the nation's economy and reduce poverty (MAF, 2019). When compared to conventional farmers, certified farmers typically experience higher levels of food security, as certification has been associated with enhanced food security. The implementation of cocoa certification can help alleviate the poor living conditions, low yields, and adverse social and environmental impacts associated with Sierra Leone’s current cocoa production practices (Brako et al., 2021); and ensures all stakeholders in the cocoa supply chain comply with relevant environmental, social, and economic standards (Sadeu et al., 2023).

Cocoa certification indicates whether various participants in the supply chain meet specific standards aimed at protecting human rights, enhancing farming practices, reducing deforestation, and improving opportunities for cocoa producers. To promote more ethical and sustainable cocoa production, several certification schemes employ different approaches. Some focus on fostering sustainable, fair-trade business partnerships, such as Fair Trade Certified, while others, like UTZ Certified, prioritize increasing farmer productivity. As noted by Pink et al. (2024), certifications are generally intended to improve farmers' quality of life, encourage the adoption of sustainable agricultural practices, and enhance their competency levels.

In Sierra Leone, Solidaridad has supported Randlyn Holdings in establishing six Farmer Support Centres in 2018 as part of the Cocoa Rehabilitation and Intensification Programme (CORIP), providing smallholder farmers with inputs to increase their cocoa yields. In 2019, employees of Randlyn Holdings received training from Solidaridad to assist cocoa producers. Since then, 4,500 farmers in the Buedu region, who supply cocoa to Randlyn, have gradually received capacity-building support from Solidaridad (Solidaridadnetwork, 2021). As part of the second phase of the Dutch government-funded CORIP, the established these centres help increase sustainable cocoa production in Sierra Leone. The program, which uses these centres as hubs to enhance farmers' output, income, and quality of life, is providing a variety of services to 12,000 cocoa farmers in the country. The Farmer Support Centres offer a range of services, including agrochemicals, fertilizers, crop protection, better planting materials, and financial services. These centres, established as private sector-led organizations, are designed to provide smallholder cocoa farmers with production and marketing support (Solidaridadnetwork, 2021).

Following the 11-year civil war, cocoa, once a major export crop for Sierra Leone, experienced a sharp decline in value. The country’s low productivity has long hindered efforts to revitalize its cocoa production sector and improve its value chain and competitiveness, disproportionately affecting smallholder farmers (Solidaridadnetwork, 2021). The cocoa trade in Sierra Leone is characterized by a poor value chain and a large number of unregistered middlemen in disorganized roles. The value chain is long and poorly integrated, making traceability difficult. Poor market access results from several factors, including the lack of standardized

prices, inadequate physical infrastructure for transporting goods, scarcity of trucks, and poor road conditions in cocoa-growing areas. Furthermore, the nature of business transactions, the absence of adequate market information, and the opaque communication of prices exacerbate the issue. In some regions, beans of the same grade are sold at different prices. There are no established supply routes, and most non-cooperative farmers sell their products to the nearest buyer (MAF, 2019). Cocoa cultivation remains essential for the economies and livelihoods of many communities, particularly in tropical areas. Certification programs, by promoting quality standards, sustainable farming practices, and the dissemination of best practices, have become vital tools for improving cocoa production (Farooq et al., 2020).

Several authors, including Akinwale et al. (2019); Ankuyi et al. (2023); Asare and Kofituo, (2023); and Brako et al. (2021), have independently examined farmers' willingness to participate in certification programs, as well as their actual participation. However, a significant gap in the literature is the failure to compare and integrate the factors influencing both aspects within the same context. Most studies focus on one dimension—either willingness or actual involvement—without exploring the relationship between these dimensions in a coherent framework. This gap creates an opportunity to better understand the interplay between the two factors.

Research that integrates both willingness and actual participation will provide deeper insights into the motivations and barriers faced by farmers in participating in certification programs. Understanding the factors influencing both dimensions is crucial for developing more effective certification policies and programs and enhancing farmer engagement in sustainable agricultural practices. This study aims to fill this gap by comparing and analyzing the factors influencing both willingness and actual participation of cocoa farmers in certification programs in Kailahun District, Eastern Region, Sierra Leone. The research question emerging from this study is: What factors influence cocoa farmers' willingness and actual participation in certification programs? The primary objective of this study is to investigate the factors influencing cocoa producers in Kailahun District to participate in certification programs. Specific objectives include determining the socioeconomic and personal characteristics of cocoa farmers and certification officers, assessing their levels of engagement and willingness to participate, and identifying the barriers to certification programs. The study will also explore the relationships between socioeconomic, personal, and agricultural traits, and the willingness and actual involvement in certification programs.

Method

The study area

The study was conducted in Kailahun District, located in the Eastern Province of Sierra Leone. This area lies in the far east of the country, northeast of Kenema, and near the Liberian border. The terrain and vegetation of Kissi Tongi Chiefdom vary from low inland valley wetlands to hills and plateaus. The district's landforms are ideal for organic farming, supporting the cultivation of a variety of crops. Situated in the West African highlands and bordered by the Moa River, the district experiences frequent rainfall, particularly during the rainy season.

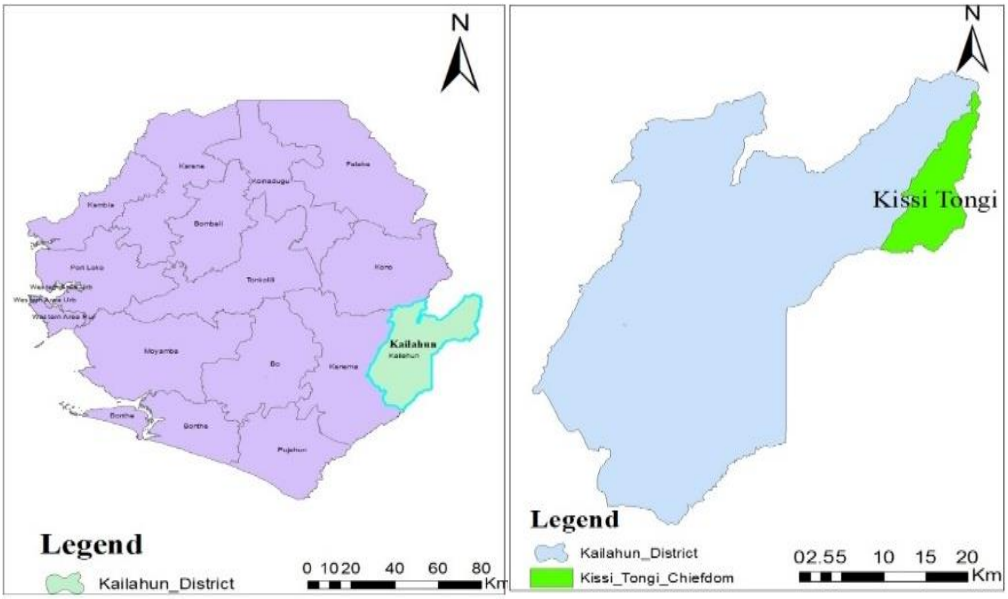

Figure 1. Map of Sierra Leone showing Kailahun district and study area

Research methods

This study utilized a cross-sectional survey with a descriptive design. The survey was conducted in the eastern region of Sierra Leone, specifically in the Kissi Tongi Chiefdom, which has a population of 33,457 residents in Buedu town, Kailahun District (Sierra Leone Statistics, 2021). In Sierra Leone's eastern cocoa bean value chain, the agricultural sector is the primary source of employment and livelihood. External certification organizations, such as Fairtrade, UTZ Certified (Rainforest Alliance), Ecocert, and USDA Organic, oversee the phytosanitary standards for dried cocoa beans. These certifications influence the prices of exported cocoa beans, although the impact on producers is not always clear to them.

The population for this study includes all cocoa producers and certification officials in the study area. The study was conducted in the eastern region of Sierra Leone, specifically in the Kissi Tongi Chiefdom of Kailahun District. Kissi Tongi accounts for about 5,000 of the approximately 20,000 cocoa farming families in Kailahun District, which is made up of 16 chiefdoms (MAF, 2019).

A multistage sampling technique was used in this study. First, Kailahun, the district with the highest cocoa production among the three cocoa-producing districts in the Eastern region (Kailahun, Kenema, and Kono), was selected. In the second stage, Kissi Tongi Chiefdom was specifically chosen from among the 14 chiefdoms in Kailahun due to its significant cocoa production and the presence of many agricultural certification officers. In the third stage, ten cocoa-producing communities were randomly selected from each of the four Kissi Tongi Chiefdom communities—Tongi Tongi, Konio, Pokolie, and Bendebengu. From the list of cocoa farmers compiled by local agricultural offices and certifying agencies, 20 farmers were randomly selected from each community, resulting in a total sample size of 200 farmers. Additionally, thirty certification officers were randomly selected from the research area.

Data for the study were collected through a structured questionnaire, which was face-validated by experts in certification, cocoa marketing, and agricultural extension in Sierra Leone. A split-half technique was employed to assess the reliability of the scales, with a minimum Cronbach's alpha value of 0.75 for Likert items. Data on socioeconomic characteristics, involvement, and barriers to participation were collected from both farmers and certification officers. Farmers' perceptions of their involvement in certification programs were assessed using a 5-point Likert scale, where 5 = strongly agree, 4 = agree, 3 = uncertain, 2 = disagree, and 1 = strongly disagree. Negative statements received the opposite scores. The scale consisted of 25 attitudinal statements, with a minimum score of 25 and a maximum score of 125. The mean score for each item was used as a cut-off point to distinguish positive and negative attitudes toward participation in certification programs.

Farmers' participation barriers were assessed using two metrics: severity and incidence. A constraint's severity was operationalised as high impact (2) and low impact (1), whereas its incidence was quantified as Yes (2) and No (1). 21 items with a maximum score of 84 and a minimum score of 42 made up the limitations scale. Licensed cocoa buyers, certification officers, and Njala University lecturers were asked to face-validate the questionnaire. Frequencies, percentages, and means were calculated and analysed using the Statistical Package for Social Sciences (SPSS) Version 29.

Although actual participation was subjected to multiple linear regression because the scale of participation has a maximum and minimum score (participation = 125 maximum and 25 minimum), willingness to participate in certification programs was analysed using Probit regression because the dependent variable of participation is binary (willingness = 1 and 0 otherwise). The research committee at Njala University gave the study ethical approval. The Probit regression equation was expressed as:

$$Pr(Yi = 1) = \Phi\,(Xi\,\beta i\,) + ui$$

Where, Pr denotes the probability of willingness to participate, $\Phi(.)$ is standard normal Cumulative Distribution Function, Xi is a vector of regressors with n x k matrices, βi is k x 1 vector of unknown parameters to be estimated to be estimated, ui is n x 1 residual error, and unknown βi parameters are estimated via Maximum Likelihood.

The Multiple linear regression was expressed as:

The OLS model was used to determine the effects of socio-economic characteristics of farmers on the use of agrochemicals.

$Y = F(X_1, X_2, X_3, X_4, \ldots X_{13})$ ……. 1
The explicit form is stated below;
$Y = b_0+b_1X_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5+b_6X_6+b_7X_7+b_8X_8+ b_9X_9+ b_{10}X_{10} + b_{11}X_{11}+ b_{12}X_{12}+ b_{13}X_{13} + et..$

Where;
Y = Participation in certification
X_1 = Constraints to extension activities
X_2 = Constraints to certification
X_3 = Impact of Constraints to certification
X_4 = Gender
X_5 = Age
X_6 = Ethnicity
X_7 = Educational level
X_8 = Years of experience
X_9 = Farm Size
X_{10} = Number of Dependents
X_{11} = Income
X_{12} = information sources
X_{13} = Participation in extension activities
et = stochastic error term
b_0 = Constant
$b_1 – b_{13}$ = parameters to be estimated

Results and discussions

The demographic characteristics of farmers and certification officers are presented in Table 1. These characteristics have important implications for decision-making among farmers and the adoption of agricultural innovations (Moinina et al. 2023). The majority of cocoa farmers (53.5%) are between 18 and 38 years old, indicating that younger farmers are more innovative than older ones. Tham-Agyekum et al. (2024), reported an average age of 48.34 years for cocoa producers in western Ghana, while Ankuyi et al. (2023), found that the average age of cocoa producers in eastern Ghana to be 49 years. In contrast, Iddrisu et al. (2020) reported an average age of 51 years for both certified and non-certified cocoa farmers, which influences their adoption of improved cocoa management practices.

The majority of cocoa farmers belong to the Kissi ethnic group (76%) and are married (78.5%). Among certification officers, most are Mende (46.7%) and married (63.3%). These findings align with Buabeng et al. (2024), and Tham-Agyekum et al. (2024), who also reported a high proportion of married couples involved in cocoa cultivation. This suggests that family labor is often available to support cocoa production, both among certified and non-certified farmers. Regarding religious affiliation, the majority of farmers are Christian (74.5%), while the majority of certification officers are Muslim (70%). This difference has implications for cultural sensitivity and tolerance during extension meetings on cocoa improvement activities.

A significant proportion of cocoa farmers (43%) have no formal education, a finding also reported by Buabeng et al. (2024) in Ghana, where most cocoa growers lack formal schooling. In Sierra Leone, religion and ethnicity, influenced by associations, play a role in the participation and adoption of improved practices (Moinina et al. 2023).

Regarding cocoa certification officers, 46.7% have a college or university degree, and 53% have 2 to 15 years of experience in cocoa certification. Most certification officers live in households with fewer than seven people and have low incomes, with radio being the primary source of information on cocoa. In contrast, the majority of cocoa farmers have at least 36 years of experience, with farm sizes ranging from 1.0 to 3.7 acres. Like certification officers, 63.5% of cocoa farmers live in households with fewer than seven people, and radio is also their most prominent source of information on cocoa production. Similar findings have been reported by Agyei-Manu et al. (2020); Diaz et al. (2022); and Wenda et al. (2024) regarding years of farming experience, farm size, and household size among cocoa farmers in Ghana and Cameroon. These results may reflect the fact that cocoa farms are increasingly passed down through inheritance, with family labor being heavily relied upon for production. Oginni et al. (2023) also noted that exporters and Licensed Buyer Agents (LBAs) are the most important sources of information on cocoa certification programs, while Adeogun et al. (2010) identified radio as a significant information source for cocoa growers.

Regarding farmers' readiness to participate in certification, 99.5% expressed a willingness to participate, while 0.5% were hesitant. This indicates a strong desire among farmers to engage in such programs. In contrast, 26.7% of certifying officers were unwilling to participate, while 73.3% were willing. This suggests a lower level of willingness among certifying officers compared to farmers. Abdul-Hanan et al. (2018) found that

factors such as a farmer's age, gender, level of education, and preferred information sources can influence their willingness to participate in certification programs.

Table 1. Distribution of cocoa farmers, and certification officers by personal characteristics

Variables	Options	Farmers	Certification Officers
Age	18-38	107(53.5)	16(53.3)
	39- 45	29(14.5%)	7(23.3)
	46-55	39(19.5)	7(23.3)
	56 and above	25(12.5)	0
Ethnicity	Mende	33(16.5)	14(46.7)
	Kissi	152(76.0)	8(26.7)
	Krio	15(7.5)	8(26.7)
Marital Status	Married	157(78.5)	19(63.3)
	Single	20(10.0)	11(36.7)
	Widowed	17(8.5)	0
	Separated	6(3.0)	0
Religious Affiliation	Christianity	149(74.5)	9(30.0)
	Islam	51(25.5)	21(70)
Education Level	College/University	8(4.0)	14(46.7)
	No Formal Education	86(43.0)	0
	Primary	43(21.5)	0
	Secondary	49(24.5)	8(26.7)
	Voc/Techinal	14(7.0)	8(26.7)
Experience in cocoa farming *	2-15	32(16.0)	16(53.3)
	16-25	107(53.5)	14(46.7)
	26-35	42(21.0)	0
	36 and above	19(9.5)	0
Cocoa farm Size	1.0-3.7	131(65.5)	0
	4.0-6.9	27(13.5)	0
	7.0 and above	42(21.0)	0
Number of Dependents	<7	127(63.5)	18(60.0)
	8-14	43(21.5)	7(23.3)
	14 and above	30(15.0)	5(16.7)
Income (Leones)	300-1000	64(32.0)	13(43.3)
	11000-20000	77(38.5)	14(46.7)
	21000-35000	39(19.5)	3(10.0)
	36000 and above	20(10.0)	0
Information sources	Extension Officers	48(24.0)	6(20.0)
	Radio	70(35.0)	12(40.0)
	Newspapers	52(26.0)	5(16.7)
	Internet	30(15.0)	7(23.3)

Source: (Field data, 2024)

The findings regarding farmers' and certification officers' attitudes towards certification are presented in Table 2. The vast majority of farmers (96%) hold a positive view that certification significantly enhances farming practices. Similarly, 95% of respondents acknowledge that certification ensures the quality of cocoa seeds, emphasizing its contribution to improving agricultural standards. Ninety percent of respondents believe that certification stabilizes cocoa pricing, underscoring its importance in regulating prices. With 89.5% of respondents expressing favorable opinions, certification programs are also seen as enhancing access to new markets, illustrating how certification facilitates farmers' access to high-end consumers. Additionally, 93% of respondents agree that certification increases market prices, emphasizing its economic importance.

Regarding self-reliance and credit availability, 76% of respondents view certification positively. A large majority (95.5%) agree that certification promotes climate-smart practices and resilience. However, there is

some disagreement regarding the direct influence of certification on sustainable land management, with 26.5% unsure, despite 57.5% believing that certification encourages agroforestry. The ecological value of certification is further underscored by the fact that 71.5% of respondents view it as supporting sustainable agricultural practices.

Moreover, 84% of farmers recognize the role of certification in ensuring responsibility and transparency. This is consistent with 84.5% of respondents, who emphasize the role of certification in improving traceability, in line with global trends in sustainable supply chain management. Certification's impact on labor standards is similarly significant, with 74.5% of respondents agreeing that it ensures adherence to ethical labor practices. Additionally, 89.5% of respondents agree that certification helps maintain equitable responsibilities in cocoa production, underscoring its role in advancing gender equity from both social and economic perspectives.

Furthermore, 73% of respondents agree that certification increases profitability, reflecting its economic value. While 60.5% of respondents view certification as a tool for enhancing credibility and reputation, 24% remain unsure, suggesting that its impact may vary depending on local implementation. These results support the view that certification plays a vital role in improving environmental sustainability and labor standards within the cocoa industry, as noted in the study by Kumi et al. (2022).

Table 2. Farmers' participation in certification programmes

Participation in certification	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Enhances good farm practices.	69(34.5)	123(61.5)	5(2.5)	3 (1.5)	0(0)
Serves as sources of employment to the youths	50(25.0)	114(57.0)	23(11.5)	12(6.0)	1(0.5)
Ensures cocoa seed quality efficiency	40(20.0)	150(75.0)	8(4.0)	2(1.0)	0(0)
Ensures price regulation for cocoa produce	30(15.0)	150(75.0)	16(7.5)	4(2.0)	0(0)
Supports innovation and crop diversification & organic production	19(9.5)	136(68.0)	31(15.5)	11(5.5)	3(1.5)
Enhances reputation and credibility	17(8.5)	121(60.5)	48(24.0)	12(6.0)	2(1.0)
Certification programme participation brings access to new markets	27(13.5)	152(76.0)	10(5.0)	11(5.5)	0(0)
Certification programmes bring the higher market price of produce	33(16.5)	153(76.5)	12(6.0)	2(1.0)	0(0)
Cocoa certification promote self-reliance increase access to credit	32(16.0)	120(60.0)	34(17.0)	12(6.0)	2(1.0)
Cocoa certification participation fosters agroforestry practices	9(4.5)	115(57.5)	53(26.5)	19(9.5)	4(2.0)
Participation improves brand recognition and marketing	12(6.0)	164(82.0)	18(9.0)	5(2.5)	1(0.5)
Certification programmes help reduce risks of contamination	70(35.0)	128(64.0)	1(0.5)	0(0)	0(0)
Certification encourage long-term environmental farming practices.	10(5.0)	143(71.5)	32(16.0)	15(7.5)	0(0)
Certification promotes climate-smart and resilience practices	45(22.5)	146(73.0)	4(2.0)	5(2.5)	0(0)
Participation in certification enhances traceability of produce	52(26.0)	117(58.5)	24(12.0)	7(3.5)	0(0)
Guarantees minimum and premium prices for individual famers	40(20.0)	105(52.5)	35(17.5)	12(6)	0(0)
Certification ensures labour standards interventions and monitoring	9(4.5)	149(74.5)	24(12.0)	14(7.0)	4(2.0)
Certification ensures gender equity and equality through roles	22(11.0)	157(78.5)	17(8.5)	4(2.0)	0(0)
Participation in certification leads to greater profitability	22(11.0)	146(73.0)	21(10.5)	11(5.5)	0(0)
Certification enables transparency and accountability	52(26.0)	116(58.0)	25(12.5)	7(3.5)	0(0)

Source: (Field data, 2024)

Table 3 presents the results of the constraints farmers face when attempting to participate in certification programs. In their efforts to meet certification requirements and gain access to premium markets, farmers encounter several challenges. One of the primary challenges identified is the difficulty in acquiring technical assistance for certification (77.0%). This suggests that farmers often struggle to obtain the necessary support to meet certification standards, resulting in reduced participation due to the barriers in accessing technical help.

The high cost of certification fees (44.5%) and the limited benefits for small-scale farmers (62.0%) are also significant issues. The high costs associated with audits, documentation, and compliance measures make certification financially challenging for many smallholder cocoa growers. While certification can increase market prices, small-scale farmers often find that the upfront costs outweigh the potential benefits, leading to lower involvement (Dröge et al., 2025). Additionally, the time-consuming nature of certification procedures (70.0%) and administrative and bureaucratic barriers (60.0%) further discourage farmers from participating in certification programs. According to Kuit et al. (2022), overly complicated certification processes create difficulties for farmers in navigating the system, leading to delays and dissatisfaction.

Farmers' interest and knowledge are also important limiting factors, with the two most common issues being a lack of interest (61.5%) and ignorance about certification programs (55.0%). Many farmers are either unaware of the potential advantages of certification or perceive the process as too difficult. As Quainoo-Mensah et al. (2023) pointed out, smallholder farmers often lack access to information on certification programs, which hinders their ability to make informed decisions about participation.

Finally, concerns regarding accountability and transparency (38.5%) and diversity and compatibility (65.0%) indicate that some farmers believe certification systems are administered unfairly or inconsistently. Jena and Grote (2021), noted that smallholder farmers are often at a disadvantage due to certification processes that disproportionately benefit large-scale producers. Additionally, many farmers find it difficult to contact the appropriate organizations that can assist with the certification process. The availability and accessibility of certification bodies (73.5%) remain significant obstacles.

Table 3. Constraints faced by farmers in participation in certification programs

Constraints to Participation in Certification Programme	High	Low	None
High cost of certification fees for farmers and their cooperatives	89 (44.5)	73 (36.5)	38(19.0)
Restriction on entry to the market	109(54.5)	91(45.5)	0(0)
Inadequate personnel in cocoa certification programmes	98(49.0)	87(43.5)	15(7.5)
Lack of necessary equipment and technology on certification	69(34.5)	116(58.0)	15(7.5)
Lack of training or support for farmers and cooperatives to be organic-certified	111(55.5)	85(42.5)	4(2.0)
Transportation or logistics issues limit certification process	74(37.0)	126(63.0)	0(0)
There is difficulty in record keeping for certification	88(44.0)	99(49.5)	13(6.5)
Difficulty accessing technical assistance for certification	154(77.0)	46 (23.0)	0(0)
Language limitations	59(29.5)	131(65.5)	10(5.0)
Bureaucracy and administrative hurdles limits certification	120(60.0)	60(30.0)	19(9.5)
Lengthy certification process	140(70.0)	35(17.5)	25(12.5)
Limited benefits for small-scale cocoa farmers in certification	124(62.0)	76(38.0)	0(0)
Lack of awareness or understanding for small-scale farmers	110(55.0)	68(34.0)	22(11.0)
Complicated requirements, EU regulations, policies, and standards	89(44.5)	61(30.5)	50(25.0)
Limited productivity limits certification	141(70.5)	59(29.5)	0(0)
Cocoa certification programmes require more labour intensity	139(69.5)	51(25.5)	10(5.0)
Lack of farmers' interest limits certification programmes.	123(61.5)	57(28.5)	20(10.0)
There are issues of diversity and compatibility in cocoa certification programs	130(65.0)	50(25.0)	20(10.0)
The availability and accessibility of cocoa certification bodies	147(73.5)	53(26.5)	0(0)
There is an accountability and transparency issue with the certification of cocoa farmers and their cooperatives	77(38.5)	100(50.0)	23(11.5)
Difficulty in maintaining organic farm due to emerging compliance criteria.	85(42.5)	90(45.0)	25(12.5)

Source: (Field data, 2024)

The results in Table 4, regarding certification officers' perceptions of cocoa farmers' involvement in certification programs are crucial for the effective execution of these initiatives. However, the findings show that certification officers have differing opinions regarding the value and benefits of these programs. Systemic issues are evident, with a significant number of officers reluctant or disagreeing with the advantages of certification, despite some recognition of its benefits.

One of the main advantages of certification is the promotion of appropriate farming practices. However, the usefulness of certification in improving farm practices remains unclear, as only 26.6% of certification officers agree with this statement, while 40.0% strongly disagree. While certification is intended to enhance sustainable agricultural practices, Fountain and Hütz-Adams (2022) argued that its application on farms is often limited due to inadequate enforcement methods.

Certification is also expected to create job opportunities for young people, yet only 43.3% of officers support this notion, with 30.0% strongly disapproving. This suggests that the job prospects resulting from certification programs may not have the desired impact, especially in areas where young people's involvement in agriculture remains low (Asare et al., 2023). Trust and confidence in certification systems are further undermined by the fact that only 20.0% of officers believe certification improves reputation and credibility, while 30.0% strongly disagree.

Certification officers also have differing views on price regulation and market access. While 40.0% believe certification guarantees efficient price regulation, 30.0% disagree. Similarly, only 30.0% agree that certification ensures minimum and premium prices, with 23.3% strongly disagreeing. These results align with Dröge et al. (2025), who argued that smallholder farmers typically receive lower payments from certification compared to large-scale producers, and that the financial benefits of certification are not equally distributed.

The promotion of innovation and agricultural diversification is another key function of certification. However, 23.3% of officers strongly disagree that certification effectively supports environmental sustainability, although 60.0% believe it encourages climate-smart and resilience activities. This finding is consistent with Kroeger et al. (2017), who found that while certification programs promote sustainable practices, low adoption rates persist due to insufficient training and incentives.

Another challenge is production traceability, which is necessary to maintain certification standards. While 26.7% of officers disagree, 40.0% believe certification enhances traceability. Denashurya et al. (2023), noted that many smallholder farmers lack the record-keeping skills required for full traceability, which poses a challenge for meeting international trade standards.

Although certification contributes to quality assurance, only 46.7% of officers believe it guarantees the production of high-quality cocoa, while 30.0% strongly disagree. This disparity raises concerns about the certification systems' ability to uphold consistent quality standards. Quainoo-Mensah et al. (2023) highlighted instances where inconsistent enforcement of certification leads to variations in product quality. These findings align with Adomako et al. (2024), who observed that while certification programs offer potential benefits, their effectiveness is often undermined by inconsistent implementation and a lack of local adaptability. Conversely, Adesiyan et al. (2023) found that well-managed certification programs, backed by strong institutional support, have significantly improved cocoa quality and market access, suggesting that the success of these programs is largely influenced by the structure and execution of the certification process.

Table 4. Certification officer's perception of farmers in cocoa certification programmes (n = 30)

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Cocoa certification participation enhances good farm practices	1 (3.3)	7 (23.3)	6 (20.0)	4 (13.3)	12 (40.0)
Serves as sources of employment to the youths	4 (13.3)	9 (30.0)	4 (13.3)	4 (13.3)	9 (30.0)
Certification ensures cocoa seed quality efficiency	2 (6.7)	4 (13.3)	11 (36.7)	4 (13.3)	9 (30.0)
Certification ensures effective price regulation	3(10.0)	9 (30.0)	7 (23.0)	9 (30.0)	2 (6.7)
Supports innovation, crop diversification &organic production	7(23.3)	11 (36.7)	4 (13.3)	5 (16.7)	3 (10.0)
Certification enhances reputation and credibility	4 (13.3)	7 (23.3)	4 (13.3)	6 (20.0)	9 (30.0)
Certification programme brings access to new markets	5 (16.7)	4 (13.3)	10 (33.3)	4 (13.3)	7 (23.3)

Certification programmes bring higher market price	1 (3.3)	11 (36.7)	9 (30.0)	5 (16.7)	4 (13.3)
Cocoa certification promote self-reliance access to credit	4 (13.3)	7 (23.3)	5 (16.7)	9 (30.0)	5 (16.7)
Cocoa certification fosters dynamic agroforestry practices	6 (20.0)	2 (6.7)	8 (26.7)	6 (20.0)	8 (26.7)
Participation improves brand recognition and marketing	2 (6.7)	9 (30.0)	6 (20.0)	5 (16.7)	8 (26.7)
Certification programmes help reduce risks of contamination	3 (10.0)	7 (23.3)	4 (13.3)	9 (30.0)	4 (13.3)
Certification encourage sustainable environmental farming	7 (23.3)	3 (10.0)	7 (23.3)	6 (20.0)	7 (23.3)
Certification promotes climate-smart and resilience practices	8(26.7)	11 (36.7)	2 (6.7)	4 (13.3)	5 (16.7)
Participation in certification enhances traceability of produce	5 (16.7)	7 (23.3)	5 (16.7)	8 (26.7)	5(16.7)
Guarantees minimum and premium prices	6(20.0)	9(30.0)	11 (36.7)	5 (16.7)	7 (23.3)
Certification ensures labour standards interventions monitoring	10(33.3)	7(23.3)	3 (10.0)	4 (13.3)	6 (20.0)
Participation in certification leads to greater profitability	10(33.3)	6(20.0)	4 (13.3)	5 (16.7)	5 (17.7)
Certification enables transparency and accountability	6(20.0)	2(6.7)	8 (26.7)	8 (26.7)	6 (20.0)
Certification brings access to new opportunities	7(23.3)	5(16.7)	9(30.0)	5 (16.7)	4 (13.3)
It guarantees quality assurance of produce.	6(20.0)	8 (26.7)	3 (10.0)	4 (13.3)	9(30..0)

Source: (Field data, 2024)

Table 5 reveals that certification fees are a significant barrier to farmers' involvement in cocoa certification programs, with 43.3% of certification officers citing high costs as a major deterrent. This finding aligns with Dröge et al. (2025), who argued that certification fees limit participation in sustainable cocoa production by imposing a substantial financial burden on farmers and officers. Additionally, 60.0% of officers reported that market access restrictions are a significant hurdle, which is consistent with Oxfam België/Belgique's (2024) findings, indicating that stringent certification requirements obstruct entry and make it more difficult for new market participants to join.

A major concern identified by 70.0% of officers was the shortage of qualified staff in certification programs. This staffing deficiency hinders the maintenance of certification standards, advisory support for farmers, and effective monitoring of compliance. According to Jena and Grote (2021), understaffing leads to low farmer engagement, audit delays, and challenges in implementing sustainability rules. Moreover, 53.3% of officers identified the absence of suitable technology and equipment as a significant obstacle. Quainoo-Mensah et al. (2023) highlighted the lack of infrastructure, record-keeping systems, and digital technologies needed for certification in many cocoa-growing regions. The difficulty in retaining records, mentioned by 53.3% of officers, underscores the need for enhanced training and digital tools to facilitate better documentation practices.

Administrative and bureaucratic hurdles also present challenges; 53.3% of respondents consider the system ineffective, a sentiment that aligns with the views of Kroeger et al. (2017), who argued that the complexity of certification procedures deters participation and leads to inefficiencies. Despite this, 23.3% of respondents still regard these issues as significant concerns. In line with Fountain and Huetz-Adams (2022), who found that long certification approval times result in stakeholder dissatisfaction, 53.3% of officers also cited the drawn-out certification process as a substantial constraint.

Smallholder farmers are often discouraged from participating due to the perceived low benefits of certification, with 56.7% of officers identifying this as a key limitation. Smallholder farmers, despite the financial incentives that certification is supposed to provide, often find the benefits negligible (Asare et al., 2023). According to 86.7% of officers, limited access to certification bodies is another significant constraint, contributing to delays and inefficiencies in the certification process. The difficulty in communicating with certification organizations further hampers the process.

Jena and Grote (2021) reported that 86.7% of officers view poor road and internet infrastructure in rural areas as a major challenge, restricting communication, data transfer, and monitoring activities in certification

programs. Furthermore, 60.0% of officers highlighted leadership issues as a significant obstacle, with community dynamics and leadership structures also serving as barriers. Successful implementation of certification programs requires collaboration among farmers, cooperatives, and municipal authorities; however, leadership disputes may hinder progress. Quainoo-Mensah et al. (2023) found that 56.7% of officers expressed concerns over accountability and transparency in certification programs, raising doubts about the legitimacy and impartiality of certifying bodies. Another critical issue is adherence to changing policies and regulations; 36.7% of officers pointed to complex EU legislation as a key barrier. Certification inspectors often struggle to keep up with frequent revisions to international standards, leaving farmers and stakeholders uninformed (Denashurya et al., 2023). Adetarami et al. (2022) found that certification restrictions often reduce participation and effectiveness in sustainability initiatives, which aligns with these findings. Conversely, Adesiyan et al. (2023), discovered that strongly institutionalized certification programs can significantly improve market access, sustainability outcomes, and compliance. These varying results highlight the importance of context-specific strategies to enhance certification effectiveness and inclusivity.

Table 5. Perceived constraints farmers faced according to certification officers

Certification officer perception	High	Low	None
High cost of certification fees for farmers and their cooperatives	13 (43.3)	8 (26.7)	9(30.0)
Restriction on entry to the market	18 (60.0)	5(16.7)	7(23.3)
Inadequate personnel in cocoa certification programmes	21 (70.0)	9(30.0)	0(0)
Lack of necessary equipment and technology on certification	16 (53.3)	8(26.7)	6(20.0)
Lack of training or support for farmers and cooperatives to be organic-certified	10 (33.3)	15(50.0)	5(16.7)
Transportation or logistics issues limit certification process	9 (30.0)	18(60.0)	3(10.0)
There is difficulty in record keeping for certification	16 (53.3)	8(26.7)	6(20.0)
Difficulty accessing technical assistance for certification	22 (73.3)	8(26.7)	0(0)
Language limitations	14 (46.7)	11(36.7)	5(16.7)
Bureaucracy and administrative hurdles limits certification	7 (23.3)	16(53.3)	7(23.3)
Lengthy certification process	16 (53.3)	10(33.3)	4(13.3)
Limited benefits for small-scale cocoa farmers in certification	17 (56.7)	5(16.7)	8(26.7)
Lack of awareness or understanding for small-scale farmers	23 (76.7)	7(23.3)	0(0)
Complicated requirements, EU regulations, policies, and standards for certification	11 (36.7)	9(30.0)	10(33.3)
Limited productivity limits certification	19 (63.3)	6(20.0)	5(16.7)
Cocoa certification programmes require more labour intensity	16 (53.3)	14(46.7)	0(0)
Lack of farmers' interest limits certification programmes.	9 (30.0)	15(50.0)	11(36.7)
There are issues of diversity and compatibility in cocoa certification programs	12 (40.0)	8(26.7)	10(33.3)
The availability and accessibility of cocoa certification bodies are most times difficult	26 (86.7)	4(13.3)	0(0)
There is an accountability and transparency issue with the certification of cocoa farmers and their cooperatives	17 (56.7)	9(30.0)	4(13.3)
Difficulty in maintaining the organic status of an organic farm due to emerging compliance criteria.	13 (43.3)	14(46.7)	3(10.0)
Leadership patterns and community structure	18 (60.0)	7(23.3)	5(16.7)
Poor road and internet networks in remote areas	24 (86.7)	6(20.0)	0 (0)

Source: (Field data, 2024)

Table 6 presents the findings on the factors influencing cocoa farmers' willingness to participate in certification programs. Both significant and non-significant factors are included in this data. Certification programs play a crucial role in promoting sustainable cocoa production, increasing farmers' incomes, and providing access to premium markets. While factors such as age, marital status, education, farm size, number of dependents, farming experience, and gender do not significantly influence participation, the data reveals that ethnicity, religion, and income have a notable impact on involvement. These results emphasize the complexity of farmers' decisions regarding certification, while also presenting some conflicting perspectives, yet aligning with previous studies.

Ethnicity, according to the study, has a negative impact on farmers' willingness to participate in certification programs, making it one of the most significant factors (Z = -3.007, p = 0.003). This suggests that farmers' attitudes toward certification programs may be shaped by their cultural or ethnic backgrounds. Farmers from specific ethnic groups may be less inclined to engage due to traditional agricultural practices, mistrust of external interventions, or lack of access to tailored information. However, Quainoo-Mensah et al. (2023) found that when cooperative-based certification methods were used, ethnicity had no significant impact, implying that group-based approaches could mitigate ethnic differences.

Religion (Z = -3.12, p = 0.002) is another significant factor with a negative influence on participation. Religious beliefs may affect farmers' willingness to embrace certification procedures, particularly if they feel these practices contradict their cultural norms or traditional farming methods. Coulibaly et al. (2021), observed that farmers' perceptions of certification programs were influenced by their religious affiliation, with some religious groups opposing certifications due to skepticism about agricultural standards originating from Western practices. However, Tambo et al. (2023) found that when certification was linked to financial benefits, religion had little to no impact, indicating that, in certain cases, financial incentives could outweigh religious concerns.

Income level, another significant predictor (Z = -6.26, p = 0.00), also affects farmers' participation in certification programs. Higher-income farmers are less likely to participate, likely because they already have established market access and may view certification as unnecessary. Asare et al. (2023), noted that lower-income farmers were more inclined to join certification programs to secure better market prices. In contrast, Aidoo et al. (2023) reported conflicting results, indicating that high-income farmers might participate when the certification offers additional benefits, such as farm management training or export potential. These inconsistent findings suggest that the impact of income on certification participation may vary depending on the specific benefits provided by different certification programs.

In line with the findings of Opoku (2024), age and education did not significantly influence the adoption of certification programs, suggesting that institutional and socioeconomic factors, rather than individual characteristics, play a more critical role in decision-making. However, Vinci et al. (2023) found that farmers with higher levels of education were more likely to recognize the advantages of certification and adhere to its requirements.

Table 6. Determinants of willingness to participate in certification programmes by cocoa farmers

	Estimate	Std. Error	Z	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Age	.002	.002	1.457	.145	-.001	.005
Ethnicity	-.159	.053	-3.007	.003	-.262	-.055
Marital Status	.041	.023	1.814	.070	-.003	.085
Religion	-.120	.038	-3.128	.002	-.195	-.045
educational level	.001	.009	.057	.954	-.018	.019
cocoa farm size (hectares)	.007	.009	.819	.413	-.010	.024
Number of Dependents	-.005	.004	-1.142	.253	-.013	.004
Farming Experience	.001	.002	.675	.499	-.003	.006
Income (Leones)	.000	.000	-6.259	.000	.000	.000
income sources	-.025	.024	-1.055	.291	-.072	.022
Information sources	.029	.018	1.566	.117	-.007	.065
Gender	-.019	.031	-.620	.535	-.081	.042
Constraint of extension services	.007	.005	1.388	.165	-.003	.018
Impact of extension constraint	-.008	.007	-1.222	.222	-.022	.005
Impact of technology Constraint	-.004	.006	-.718	.472	-.016	.007
Constraint of certification	.000	.005	-.079	.937	-.010	.009
Intercept	-1.013	.312	-3.248	.001	-1.325	-.701
Chi-Square	1131.837					
df	183					
Sig.	.000					

Source: (Field data. 2024)

The factors influencing cocoa growers' involvement in certification programs are revealed through regression analysis. With an R-squared value of 0.117, the model indicates limited explanatory power, as the included factors account for only 11.7% of the variance in participation. Higher educational attainment is strongly associated with increased participation in certification programs, as demonstrated by the notable positive and significant relationship between the variable "educational level" (t = 3.692, p = 0.000). This result aligns with previous studies highlighting the role of education in the adoption of agricultural technology.

In a study conducted by, Akinwale et al. (2019) in Ondo State, Nigeria, factors influencing cocoa farmers' adherence to certification criteria were explored. Age, availability of support services, and farmers' understanding of certification requirements were found to be significant predictors of compliance. Specifically, older farmers were more likely to adhere to certification standards due to their greater access to support services and higher levels of expertise. This underscores the importance of educational initiatives and support services in promoting certification compliance.

On the other hand, Krumbiegel and Tillie's (2024) examined the type and level of farmer involvement in cocoa certification schemes. Farm size, access to extension services, and affiliation with farmer associations were identified as significant factors affecting participation. Larger farms and active involvement in farmer groups were associated with higher participation rates, highlighting the importance of social capital and resource accessibility in the adoption of certification programs. Additionally, Kuit and Waarts (2014) found that farmers who participated in the Rainforest Alliance-UTZ cocoa certification program tended to have larger farms, more formal education, and better access to extension services. Similarly, Folefack et al. (2021) indicated that market access, price premiums, and the perceived benefits of certification all influence the uptake of certification programs.

Table 7. Determinants of participation in certification programmes by cocoa farmers

	Unstandardized Coefficients		**Standardized Coefficients**		
	B	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	85.496	9.075		9.422	.000
Constraints of extension services	.137	.074	.131	1.864	.064
Constraint of certification	-.073	.104	-.053	-.705	.482
Impact of certification Constraints	-.083	.134	-.044	-.616	.539
Gender	.058	.708	.006	.082	.935
Age	-.006	.034	-.018	-.173	.863
Ethnicity	.143	1.295	.008	.110	.912
educational level	.758	.205	.266	3.692	.000
Years of experience(cocoa farming)	.007	.056	.015	.133	.894
cocoa farm size(hectares)	-.202	.186	-.087	-1.086	.279
Number of Dependents	.135	.101	.115	1.341	.181
Income (Leones)	2.662	.000	.075	.748	.455
Information sources	.095	.367	.025	.258	.797
Participation in extension services	.134	.069	.142	1.959	.052
R	.342				
R Square	.117				
Adjusted R Square	.055				
F	1.896				
P	.033				

Source: (Field data. 2024)

This study examines the factors influencing both willingness and actual participation in cocoa certification programs in Sierra Leone, based on the perspectives of farmers and certification officers. Actual participation is defined as the active involvement and execution of a program's activities, while willingness to participate refers to the readiness and desire to engage in a specific activity, task, or event. These factors may be influenced by prior experience, available resources, perceived benefits, social influence, and perceived risks.

The study identifies ethnicity ($t = -3.01$, $p < 0.003$), marital status ($t = 1.81$, $p < 0.07$), religion ($t = 3.13$, $p < 0.002$), and income ($t = -6.26$, $p < 0.00$) as significant determinants of willingness to participate. Conversely, limitations in extension services ($t = 1.86$, $p < 0.06$), educational attainment ($t = 3.69$, $p < 0.00$), and participation in extension services ($t = 1.96$, $p < 0.05$) are key factors affecting actual participation. These findings suggest that sociocultural factors, such as religion, marital status, and ethnicity, play a significant role in shaping farmers' willingness to participate in certification programs. Additionally, income, which impacts the affordability of technology and related services, is also a significant determinant of willingness to participate. Technical aspects, including education, service limitations, and ancillary participation, influence actual involvement. Therefore, the elements underlying real participation are crucial in determining the benefits received by participants. These technical factors define the necessary competence, support, and supplementary activities that enhance effective participation.

Table 8 presents the comparison between farmers and certification officers regarding their involvement in and barriers to cocoa certification programs. The findings reveal a significant difference in the level of involvement between farmers and certification officers ($t = 35.37$, $p < 0.00$), with farmers reporting higher levels of involvement. The disparity may arise from differing perspectives on the factors that drive engagement, with certification officers, such as inspectors, offering a different viewpoint on the factors associated with experiential engagement.

However, no significant difference was found between the constraints to participation as identified by farmers and those perceived by certification officers. This suggests that certification officers recognize the obstacles that hinder cocoa farmers' participation in certification programs.

Table 8. Congruence between farmers and certification officers

Variables	Groups	N	Mean	Std. Deviation	Std. Error Mean	Mean Difference	T	df	p
Participation in certification	Farmers	200	103.10	4.83	0.34	34.16	35.37	228	0.00
	Certification officers	30	68.93	5.56	1.01				
Constraints in certification	Farmers	200	43.72	4.13	0.29	-0.75	-0.92	228	0.36
	Certification officers	30	44.47	4.33	0.79				

Conclusion

The results indicate that most cocoa growers are married, young, active workers (ages 18–38), have limited formal education, and have fewer than seven dependents. Income distribution reveals that cocoa growers' primary source of income is trading, with earnings ranging from $100 to $600. Radio is the most common source of information for both certifying officers and farmers. Most respondents perceive certification programs as beneficial, highlighting their role in promoting ethical farming practices, improving cocoa seed quality, and regulating prices.

However, challenges such as difficulties in obtaining technical assistance, high certification fees, and administrative barriers hinder participation in these programs. Additionally, a lack of knowledge and interest deters farmers. Farmers also express concerns about compatibility issues, fairness in certification, and access to certifying authorities. The findings suggest that certification initiatives face significant obstacles that limit the involvement of cocoa farmers. Structural challenges, including high costs, limited experience, land tenure issues, and complex regulations, contribute to low participation. Other barriers include low awareness, gender biases, and sociocultural challenges.

Divergent perspectives among certifying officers indicate a gap between the expected benefits of certification and its actual implementation. This study recommends that development interventions in cocoa production, undertaken by agencies such as the government, NGOs, and certification bodies, focus on addressing the real challenges of certification implementation. Key strategies should include reducing certification fees, integrating cultural mediators into extension programs, and promoting demand-driven activities and greater farmer participation.

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Statement of originality and plagiarism-free

The author declares that this article is an original work that has not been published elsewhere and is free from plagiarism. All references and citations have been properly acknowledged according to the applicable standards.

Declaration of conflicts of interest

The author declares no conflicts of interest related to this research, authorship, or publication.

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