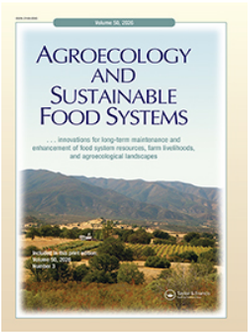

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How sustainability certification works for smallholder farmers across different crops

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ABSTRACT

Sustainability certification (SC) aims to address negative impacts associated with production, processing, and trade of commodity crops. The efficacy of SC for smallholder producers depends on households adopting and aligning their own production practices with stipulated standards and practices. Using data from 357 households in Ghana, we examine smallholders' experiences with Fairtrade certification across four different crops: cocoa, pineapples, oranges, and cashews. We find significant gaps in certification implementation including inadequate training, infrequent inspections, and lack of knowledge about price premiums. The results suggest the need for implementation strategies that reflects smallholders' context-specific issues and foster greater training and inspection.

KEYWORDS

Cocoa; pineapples; oranges; cashews; fairtrade; sustainable development goal 12

Introduction

Sustainability certification (SC) is widely heralded as an important tool for addressing environmental and socioeconomic challenges associated with commodity crop production, processing, and trade. Successful implementation of voluntary sustainability standards and principles can effectively reduce negative impacts of agriculture on environmental resources including biodiversity at local, regional, and global scales (Dragusanu, Giovannucci, and Nunn 2014; Milder et al. 2015; Smith 2010). Sustainability standards can also help improve the sustainability of production processes in certain situations, although such standards alone are not enough to usher in sustainability at scale (Meemken et al. 2021). Proponents of SC often point to the role of price premium payments to participating producers as incentives for adopting sustainable production practices, improving livelihood/welfare of smallholders, and promoting further environmental sustainability efforts. However, reports are mixed on SC's impact on participating farmers' well-being and its ability to ensure food systems sustainability at scale and/or address equity issues in the

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production process. For example, Iddrisu, Aidoo, and Abawiera Wongnaa (2020) and Dompreh, Asare, and Gasparatos (2021) reported little or negative impacts of SC on smallholder producers' food security despite increases in yield and income. Voluntary certification of small-scale producers of tropical agricultural commodities (e.g., bananas, cocoa, coffee, oil palm, and tea) reportedly can play a role in meeting sustainable development goals (e.g. SDG 12: Responsible consumption and production) but, to date, studies do not clearly show improved social outcomes for smallholder farmers (DeFries et al. 2017; Meemken 2020).

The efficacy of SC depends on the extent to which it can attract high participation of producers willing to use production practices closely aligned with stipulated standards (Meemken, Veettil, and Qaim 2017; Waldman and Kerr 2014). For example, only a quarter (26%) of the world's cocoa is currently produced/traded under an SC framework, leading to calls for increased commitment to SC, alignment of sustainability standards with governmental efforts, and increased effort to extend SC to small producers and traders (Parra-Paitan et al. 2023). At the same time, questions remain about implementation strategies that enhance recruitment, retention, and effective adoption of sustainability practices by smallholders that, in turn, may deliver desired environmental, equity, and socioeconomic outcomes. Furthermore, most SC studies focus on one crop, so the relative performance of SC across different commodity crops produced by smallholders appears understudied. We know that crops vary in their production systems, value chain structures, and physical product attributes, which may affect the successful implementation of certification schemes (Ruben and van Schendel 2008; Waldman and Kerr 2014). For example, agrifood safety and quality standards were found to vary in their impacts on smallholder farmers operating under different value chain structures (Lee, Gereffi, and Beauvais 2012).

Therefore, this study compares the perceptions, understanding, and experiences of smallholder farmers in Ghana engaged in Fairtrade SC production of four crops: cocoa, pineapples, oranges, and cashew. Fairtrade International (Fairtrade) is among the most widely recognized sustainability certification programs and it uses standards based on a blend of social, economic, and environmental criteria.[1] In Ghana, Fairtrade developed SC standards for small-scale producers of cocoa, and later expanded product-specific standards for small-scale producers of banana, fruits, and nuts/oils. More than 110,000 Ghanaian farmers are organized into 19 Fairtrade certified farmer organizations, apart from more than 4000 workers on SC plantations/companies in Ghana (https://riskmap.fairtrade.net/countries/ghana). Like cocoa, pineapple, orange, and cashew are commodity crops grown "for market" by Ghanaian smallholders. Unlike cocoa, the production of pineapple, orange, and cashew in Ghana do not have government-controlled boards that set buying prices and other terms of trade. All four crops are being produced by Ghanaian

smallholder farmers under Fairtrade's ongoing standards programs. Because sustainable smallholder-production of these four crops in Ghana is being promoted, we undertook our examination of smallholder Fairtrade certification of these four crops in Ghana.

Drawing on data from 357 participating smallholder farmers in four Fairtrade programs in Ghana, we study how smallholder farmers perceive, understand, and benefit from Fairtrade SC. We also explore how cocoa, pineapple, orange, and cashew smallholder farmers' experiences align with the stated principles and goals of SC programs. The results reveal gaps in certification implementation processes across the four crops including inadequate training, an absence of (compliance) inspections, and a prevailing lack of knowledge by smallholders of price premium received. Our findings suggest SC programs revise implementation toward strategies that reflect context-specific issues facing smallholders and encourage greater training and inspection.

Sustainability certification background

Third-party certification is generally recognized as a multi-stakeholder initiative promoted by partnerships involving relevant national governments, international development organizations, NGOs, the private sector, and representatives of producers and consumers (Barham et al. 2011; Kleemann and Abdulai 2013; Rueda and Lambin 2013). Sustainability certification (SC) began as a way for outside interest groups to demonstrate consumer support (and willingness to pay) for sustainable production practices, and to "reward" producers for sustainable management practices rather than prohibit or penalize unsustainable practices. SC was designed to eventually bring corporations on board so that sustainable practices would be a prerequisite for participating in global supply chains (Waldman and Kerr 2014).

Several studies provide evidence that certification programs have, in certain contexts, successfully achieved their intended objectives, particularly in improving livelihoods, promoting sustainable practices, and enhancing market access. For example, Iddrisu, Aidoo, and Abawiera Wongnaa (2020) found that participation in certification schemes among smallholder cocoa farmers in Ghana led to improved household income and increased adoption of environmentally sustainable farming practices. Similarly, Dompreh, Asare, and Gasparatos (2021) reported that certified cocoa and oil palm farmers enjoyed higher food security in terms of their dietary diversity than uncertified farmers. They also experienced better farm gate prices and improved access to extension services compared to their non-certified counterparts. In a systematic review and meta-analysis, Meemken et al. (2021) provide cross-country evidence demonstrating that certification programs, especially those linked to Fairtrade and organic labels, contributed to modest yet statistically

significant improvements in farmer welfare outcomes. The paper noted that farmers certified under a sustainability standard receive 20–30% higher prices than their non-certified counterparts leading to an overall improvement in household incomes by about 16–22%. These findings suggest that while the effectiveness of certification can vary by context and implementation, well-designed and supported certification programs have the potential to deliver tangible benefits to producers and contribute to broader development goals

Typically, certification has been studied based on observed changes in outcome measures attributed to the certification activities (Auld, Gulbrandsen, and McDermott 2008). For certification to lead to intended changes, smallholder farmers need to implement the practices stipulated in the standards (Dragusanu, Giovannucci, and Nunn 2014; Milder et al. 2015). However, in practice, certification of smallholder farmers may not actually align with program principles and practices (Hatanaka and Busch 2008; Winters et al. 2015). While one study reported the successful translation of sustainable (cocoa) principles into technical specifications to be followed by farmers (Lemeilleur et al. 2015), another study demonstrated that certified (shrimp) farmers do not understand their SC program's standards and project objectives, and that (some) noncompliance goes undetected (Hatanaka 2010). Similarly, the Roundtable on Sustainable Palm Oil reported that their standards were improperly understood and implemented resulting in poor outcomes (Ruysschaert and Salles 2014). Certified smallholder farmers may receive higher prices than non-certified smallholder farmers, but a meta-analysis showed mixed results on production costs and yields, and no significant differences by crop type (Meemken 2020). Therefore, it seems important to better understand if and how SC works for smallholder farmers engaged in growing different crops, all else equal.

Fairtrade typically certifies smallholder farmers in groups (smallholder producer organizations or SPOs) to maximize economies of scale for certified products and reduce transaction costs. SPOs must adhere to Fairtrade core requirements and development requirements. Core requirements cover the production, purchase, and sale of crops and they are supposed to be met before producers are certified by Fairtrade. Development requirements encourage producers to continuously improve and invest in the development of their organizations and people.[2]As part of Fairtrade certification, SPOs and their members are supposed to be audited regarding their core requirements at years 0, 3, and 6, and audited regarding their development requirements at years 3 and 6. Accordingly, SPO members are expected to be trained on all requirements on a regular basis so that previously trained members can carry on and new members can catch up. Across Fairtrade core and development requirements, there are three categories: general requirements, trade requirements, and production requirements (ethical and sustainable practices). Some of these requirements are the responsibilities of the SPO as a group and others

are the responsibility of individual member farmers (Fairtrade International 2019). According to Fairtrade, SPOs are expected to develop and implement a development plan to successfully adhere to the Fairtrade standard. Among other things, such a plan is expected to document the activities and decisions of the group as well as their use of the price premium and other funds. In addition, SPOs are expected to conduct annual internal inspections to prepare the group and its members for the regular external inspections. After internal inspections, SPOs are expected to take measures including sanctions to ensure that they and their members are compliant with all the core requirements and maintain acceptable levels of the development requirements at the time of external inspections (Fairtrade International 2019).

Sources of variation in sustainability certification across crops

The cultivation, harvest, and sale of crops by smallholders may differ in their scale and means of production (Ruben and van Schendel 2008); value chain structures (Lee, Gereffi, and Beauvais 2012); and physical product attributes (Waldman and Kerr 2014). The four crops in this study fall in two groups based on the proportion of smallholder farms relative to medium and large plantations (plantations henceforth). Smallholder farming systems are typically small, household-based/owned farming enterprises in contrast to the medium and large farms organized under a plantation system where the enterprise is relatively large and company-based/owned (Van Eijck et al. 2013). Some crops including cocoa are grown/produced in production systems that rely on smallholder farms only, with no plantations. A second group of crops rely on a production system where there are some smallholder farms as well as some plantations. This group includes pineapple and cashew producers who are mostly smallholder farms with a few plantations. A third group of crops, such as oranges, are predominantly grown on plantations with relatively few smallholder farms (Dendena and Corsi 2014; Kleemann and Abdulai 2013; Ruben and van Schendel 2008). This study focuses on smallholder producers and does not focus on plantation production systems. These smallholder producers may face different levels of SC support depending on their production context.

Second, crops also differ in their value chain structures, which could impact certification implementation strategies and outcomes. Therefore, this study considers the market available to smallholder farmers and the roles of intermediary companies therein. Smallholder cocoa farmers in Ghana face a partially liberalized market where they can only sell their cocoa beans to the Ghana Cocoa Board (COCOBOD), through Licensed Buying Companies (LBCs). The LBCs engage in non-price competition, while the COCOBOD annually determines and announces the producer price (Anang 2011). Beyond the Ghanaian market, smallholder cocoa

farmers face a buyer-driven chain, where there are a few large processors/manufacturers and numerous smallholders. In that value chain, intermediary companies play key roles in collecting and aggregating cocoa beans for the large processors and manufacturers (Lee, Gereffi, and Beauvais 2012). Smallholder farmers of pineapple, orange, and cashew, in contrast, face liberalized traditional markets where they independently sell their produce to various buyers both in the domestic and export markets. That is, pineapple, orange, and cashew transactions are more spontaneous with buyers engaged in price competition (Dendena and Corsi 2014; Kleemann and Abdulai 2013; Lee, Gereffi, and Beauvais 2012; Smith 2010).

A third source of differences that could impact sustainability certification across crops relates to the physical product attributes of the crop. Although smallholder farmers of cocoa, pineapple, orange, and cashew all sell their produce in their raw states, the four crops vary in their perishability, storage, shipping, and handling characteristics (Lee, Gereffi, and Beauvais 2012; Ruben and van Schendel 2008). For example, cocoa beans and cashew nuts typically go through significant processing so physical and food safety quality attributes are less important as compared to pineapple and orange. Inferring from Waldman and Kerr (2014), adopting practices required for sustainability certification will have varied cost implications for smallholder farmers of the different crops. Smallholder farmers' participation decisions and behavior will, therefore, be different under the various cost structures; hence, we expect variations in their experiences with certification. For example, unlike cocoa farmers, pineapple, and orange farmers may already be using practices required for certification because those practices promote physical and food safety quality attributes, which are important for pineapple and orange but not applicable for cocoa. As such, it may be relatively less expensive for pineapple and orange farmers to meet the requirements to participate in sustainability certification than for cocoa farmers.

Considering the differences in production systems, value chain structures, and physical product attributes and their potential impact on certification programs for smallholder farmers, we examine how cocoa, pineapple, orange, and cashew certification by Fairtrade appears to work for Ghanaian smallholder farmers. Our four research objectives are to:

(1) Examine smallholder farmers' perceptions and knowledge about sustainability certification programs including standards and price premiums;
(2) Investigate whether smallholder farmers' experiences with sustainable certification programs aligns with the key principles of the certification programs;

(3) Explore the extent to which smallholder experiences with sustainability certification may differ across crops; and
(4) Discuss the implications for sustainable certification program design and implementation for smallholders.

Methods

Research site

This paper focuses on experiences of smallholder farmers with sustainability certification in Ghana, a country located in West Africa. Ghana is a major commodity producer that specializes in the production and export of multiple crops. It is the second largest producer of cocoa and ranked 11th globally in pineapple exports. With an average annual production of 85,000 metric tonnes, Ghana is also one of Africa's leading producers of raw cashew. Cashew production dates back to the 1960s but has significantly expanded over the past three decades following its inclusion as one of the non-traditional crops under the 1983 Economic Recovery Program that sought to diversify the country's export base (Boafo 2019).[3] According to the Food and Agricultural Organization, Ghana's agriculture employs about 40% of its workforce, and accounts for over 40% of export earnings, while providing over 90% of the country's food needs. Ghana's agriculture is predominantly smallholder, traditional, and rain-fed (FAO 2023a, 2023b)

We focus on agrarian communities in six of the sixteen regions in Ghana, namely Eastern, Central, Ashanti, Bono, Ahafo, and Western North that are known to be major producing centers of the crops studied (see Figure 1). Cashew farmers were drawn from the Bono regions while pineapple and orange farmers were sampled from Central and Eastern regions. Similarly, cocoa farmers came from cocoa growing communities in Western North, Eastern, Ashanti, and Ahafo regions. All the regions are in Southern Ghana and their fertile soils makes them attractive hubs for cultivating various agricultural commodities including the four crops that are the focus of this study.

Research design

Data were collected from farmers using a questionnaire developed with an iterative design and pretesting process involving key informant interviews and field experiences. The study's research methods, including informed consent procedure and data collection, were reviewed and approved by the [university] IRB prior to any data collection. This study, including its informed consent and data collection processes, was reviewed and approved by the [university] Institutional Review Board prior to any data

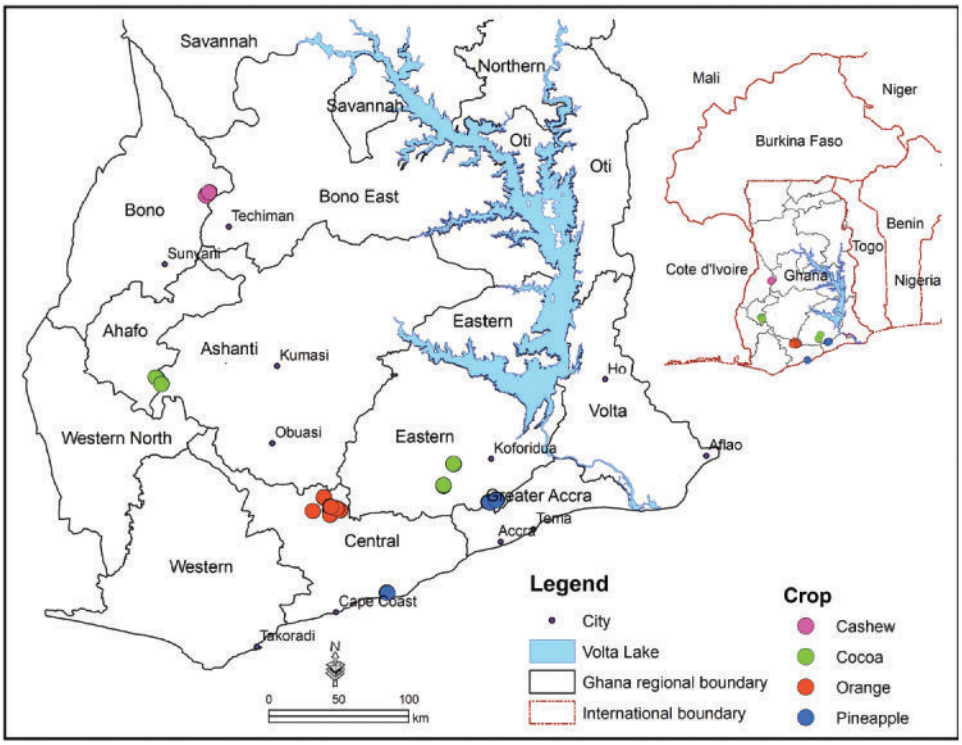

Figure 1. Location of study communities: fairtrade certified crops.

collection (STUDY00000048). The questionnaire included items designed to understand respondents' knowledge, perceptions, practices, and participation in relevant aspects of Fairtrade certification. First, respondents were asked about their training, understanding of requirements, practices, and decisions regarding their (1) farm establishment and rehabilitation, (2) farm management and maintenance, (3) soil management and fertilization, (4) integrated pest management and crop protection, (5) harvest and post-harvest practices, (6) safe and healthy farm practices, (7) workers' rights including child labor and informal workers, (8) waste management, and (9) environment and natural resource protection. Following that, respondents were asked about inspections, sales, price premiums, intermediary companies, as well as expected and realized benefits associated with Fairtrade sustainability certification. In addition, we asked whether the Fairtrade SPO groups hold on to part of the price premiums they receive for group projects and community benefit (which they are entitled to do). Lastly, the survey collected some demographic information about respondents and their households. Table 1 presents our program measures and variables, their descriptions, and values.

The multi-sectional questionnaire together with its skip-patterns was programmed onto tablet computers using the Census and Survey Processing

Table 1. Program measure/variables, descriptions, and values.

Measure/Variable	Description	Values
Level of training	Number of times trained for 9 topics, rescaled to 0 to1. Last time trained for 9 topics, rescaled 1 if <3 yrs, 0 if >3 yrs/never.	Sum of 18 items; range 0 to 18.
Understanding requirements and recommendations	*I understand sustainability certification requirements regarding* 9 topics, 1=agree strongly to 5=disagree strongly	Average of 9 items; range 1 to 5.
Changes in farming practices	*Because of sustainability certification, I have made changes in my farming practices regarding* 9 topics.	Average of 9 items; range 1 to 5.
Agreement with group decisions	*To what extent do/did you agree or disagree with decisions of the organization regarding* 9 topics? *To what extent do you agree or disagree that members are/ were engaged in decision-making regarding* 9 topics?	Average of 18 items; range 1 to 5
Inspections	Times inspected by internal/external auditors, rescaled to 0 to 1. Last time inspected by internal/external auditors, rescaled 1 if <3 yrs, 0 if >3 yrs/never.	Sum of 4 items; range 0 to 4
Sales and price premium	Produce sold as certified in last 12 months, rescaled to 0 to 1. Received price premiums in last 12 months, 1=Yes, 0=No. Amount received as price premium per unit, rescaled to 0 to 1.	Sum of 3 items; range 0 to 3
Knowledge of price premium	Farmer knows extra income is price premium, 1=Yes, 0=No. Knows group use of price premium for 6 items, 1=Yes, 0=No. Knows other group members received price premium (<12 mo), 1=Yes, 0=No. Knows amount other group members received as price premium, 1=Yes, 0=No.	Sum of 9 items; range 0 to 9
Perception of intermediary companies' interests	Extent farmers (dis)agree that intermediary companies in certification are concerned with 8 items, 1–5 scale, (6 items reverse coded)	Average of 8 items; range 1 to 5
Perception of requirements and recommendations	Extent to which farmers (dis)agree with requirements and recommendations of certification for 10 items, 1–5 scale	Average of 10 items; range 1 to 5
Expected benefits	Extent to which farmers (dis)agree with initially expected certification benefits for 11 items, 1–5 scale	Average of 11 items; range 1 to 5
Realized benefits	Extent to which farmers (dis)agree that certification has been beneficial for 11 items, 1–5 scale	Average of 11 items; range 1 to 5
Gender	Male = 1/Female = 0	1/0
Migrant	Born in community = 1 Born outside of community = 0	1/0
Leader, Self	Respondent in leadership position	1/0
Leader, HH member	Household member in a leadership position	1/0
Leader, Acquaintance	Close acquaintance in a leadership position	1/0
Age	Age in completed years	18+
Education	Years of formal education completed	0+
Membership Years †	Years since joining certified farmer group	0+
HH Income †	Household income in the last 12 months	0+
Income share †	Share of household income from certified crop	1+
Expenditure †	Household food, water, energy for cooking and lighting, and rent in the last 30 days	1+
Farms †	Number of separate pieces of land household currently cultivates	1+
Farm size †	Total size of all pieces of land household cultivates	1+
Size Crop †	Size of total land cultivated with certified crop	1+

† Potentially endogenous variables (†) not included in principle regression analysis.

Table 2. Survey samples and response rates.

		Smallholder Farmer Households			
Crop	Communities	Enumerated	Sampled	Completed	Response Rate
Cocoa	4	210	120	104	86.67%
Pineapple	3	128	110	97	88.18%
Orange	3	95	95	82	86.32%
Cashew	3	125	100	74	74.00%
Total	13	521	426	357	84.00%

System (CSPro) and was administered in-person by a team of survey enumerators using Computer Assisted Personal Interviewing (CAPI).

The survey enumerators participated in a five-day training to equip them with knowledge and skills for ethical and high-quality data collection. We developed a fieldwork manual with definitions of key terms and concepts; descriptions of question-and-answer formats; and protocols for community entry, household enumeration, sampling, and tracking. To practice and improve all aspects of the survey, a field pretest was undertaken by the enumerators in a community like those selected for our study but not within the sample frame.

Our study sample was stratified by crop, community, and certification status. For each of the four crops, smallholder farming communities were randomly drawn based on a list of smallholder producer organizations maintained and provided by Fairtrade. Survey enumerators entered the selected communities using a multi-stage procedure proven successful in previous field studies of Ghanaian cocoa farming households (Ansah et al. 2020). The procedure included meeting with the community leader (typically a chief), enumerating all households in the community, determining each household's sustainability certification status (i.e., participation in a Fairtrade certified smallholder producer organization), and then drawing random samples of certified households in each community.

A total of 357 smallholder farmers implementing Fairtrade sustainability certification for cocoa, pineapple, orange, and cashew in 13 communities were surveyed. This was an overall response rate of 84%. These smallholder farmers cultivate their own crops as a major source of their livelihoods. Although there are some Fairtrade certification programs for plantations that use hired labor in Ghana, these plantations and households of such hired laborers are not part of our study.[4] Table 2 describes the crops, number of communities, households enumerated, sampled, and the number of completed questionnaires for farmers engaged in certification.

Data analysis

Data analysis was conducted using descriptive statistics, univariate test of differences, and a multivariate regression analysis to assess relative differences

and impacts of Fairtrade certification across smallholder farmers engaged in growing different crops. The regression model compares the reported certification program measures for three commodities (pineapple, orange, and cashew) against the results of a baseline commodity (cocoa) to identify the relative effects across crops for each of the index scores. Unlike the descriptive statistics, the regression controls for farm and farmer observable characteristics allowing us to measure differences in SC outcomes across crops that are not attributable to farm-level and farmer characteristics. The $j = 1 \ldots n = 11$ regressions are specified as follows:

$$Y_j = \beta_{j,Pineapple} T_{Pineapple} + \beta_{j,Orange} T_{Orange} + \beta_{j,Cashew} T_{Cashew} + \gamma_j \boldsymbol{X_i} + \varepsilon_{ij}$$

where Y_j is the dependent variable representing each index j, $\varepsilon_{ij}$are error terms which are clustered at the community level to control for unobservable correlations within communities; each of the T_c are treatment dummy variables to measure the difference of each crop c from the score for cocoa; and each of the $\beta_{j,c}$ identify the mean difference in the score for each crop c. In each regression, $\boldsymbol{X_i}$ is the vector of control variables that includes a constant and characteristics of farmer i and their farm. The controls used are a set of variables we expect to be exogenous to the decision-making of a farmer, such as age.[5]

Results and discussion

Participant characteristics

Table 3 presents four sets of mean descriptive statistics, one for each crop group of smallholder farmers engaged in Fairtrade certified production. To better understand similarities and differences across the four groups of smallholders, we test for significant differences using one-way ANOVA for continuous variables and Kruskal-Wallis for categorical variables. We find that the four smallholder groups differ in respondents' gender composition, whether members were born in the community, leadership experience, age, education, and membership years. Furthermore, the respondents' average household income, share of income from farming, farm size, and size of crops differed across crops.

Smallholder farmers participating in this study were largely males, on average 49 years old. This makes sense due to sociocultural factors that disproportionately limit women and youth access to agricultural land, credit, and other resources needed to successfully participate in cash crop production. Across the four groups, smallholder pineapple farming appears particularly male-dominated with male farmers constituting about 90% of respondents. This compares to 69% male for cocoa smallholders, 67% male for orange smallholders, and 64% male for cashew smallholders. These results may reflect

Table 3. Mean demographic characteristics of smallholder farming communities.

Characteristics	Cocoa	Pineapple	Orange	Cashew	F or χ2 §
Gender (male)	0.69	0.90	0.67	0.64	11.38***
	(0.46)	(0.31)	(0.47)	(0.48)	
Migrant	0.50	0.27	0.28	0.20	14.27***
	(0.50)	(0.45)	(0.45)	(0.40)	
Leader, Self	0.29	0.37	0.52	0.34	8.12**
	(0.46)	(0.49)	(0.50)	(0.48)	
Leader, HH member	0.13	0.09	0.30	0.07	8.51**
	(0.33)	(0.29)	(0.46)	(0.25)	
Leader, Acquaintance	0.63	0.67	0.70	0.62	0.98
	(0.49)	(0.47)	(0.46)	(0.49)	
Age (yrs)	51.44	49.14	56.87	55.52	7.29***
	(14.48)	(10.63)	(10.49)	(13.54)	
Education (yrs)	7.67	8.16	7.56	4.49	14.03***
	(4.10)	(3.66)	(4.05)	(4.13)	
Membership Years †	5.24	9.85	6.28	5.08	21.06†**
	(2.89)	(6.89)	(4.26)	(3.46)	
HH Income †	12, 262	18,580	9,472	7,052	9.20***
	(12874)	(21876)	(9634)	(13270)	
Income share †	68.46	65.28	17.10	41.78	71.69***
	(23.41)	(30.08)	(19.33)	(32.41)	
Expenditure †	477	714	545	708	11.22***
	(280)	(427)	(302)	(344)	
Farms †	2.32	1.91	2.98	2.77	10.92***
	(1.32)	(0.94)	(1.68)	(1.41)	
Farm size (acres) †	11.15	5.69	12.68	12.35	9.56***
	(8.10)	(6.24)	(14.03)	(11.34)	
Size crop (acres) †	9.54	4.32	4.49	10.22	18.00***
	(7.75)	(5.47)	(4.47)	(9.54)	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

§We used one-way ANOVA for continuous variables and Kruskal–Wallis for categorical variables. ANOVA produces an F statistic while KW produces a chi-squared statistic.

†denotes potentially endogenous variable not included in principal regression model.

the heavy lifting and arduous manual labor associated with pineapple production. The results also show orange farmers (57 years) to be the oldest group, followed by the cashew farmers (55 years), cocoa farmers (51 years) and pineapple farmers (49 years).

Formal education influences farmers' literacy and ability to acquire new knowledge relevant to their farming operations. Given the information-intensive nature of certification programs, which require farmers to understand and follow prescribed standards, formal education is expected to play a mediating role in farmers' knowledge and practice of certification standards. The results show that all four groups of respondents have received less than 9 years of formal education. Interestingly, respondent groups did not differ much in their level of education across crops except for orange farmers (5 years) who had less formal education, on average, than cocoa, pineapple, and cashew farmers (~8 years).

Given our focus on farmer experiences, we asked respondents about the length of time they have been part of their Fairtrade-certified farmer group. As mentioned above, Fairtrade programs typically work with smallholder groups to conduct training and compliance verification at the group level.

Membership in farmer groups provides smallholder farmers access to information and resources needed to participate in the certification program. Respondents reported having been members of their respective Fairtrade-certified farmers group between 5 and 10 years. Pineapple smallholders, on average, reported the longest time in their Fairtrade certified group (10 years) followed by orange (6 years), cocoa (5 years), and cashew (5 years).

A significant proportion of respondent farmers are not born and raised in their present farming community. About half of the certified cocoa smallholders were born elsewhere and moved to the cocoa farming community. About a quarter of pineapple and orange farmers as well as one-fifth of cashew farmers migrated from other parts of the country to their present community for agricultural purposes. Interestingly, all groups of respondents report having developed connections with the leadership of their farmers group with a sizable proportion that have held leadership roles themselves. That is, 29% of cocoa smallholders and 50% of orange smallholders report having been a leader in their community.

The results show differences across crop groups in the extent to which participating farmers depended on their certified crop for their livelihood. As Table 3 shows, cocoa and pineapple farmers earned, on average, more than 68% and 65% of their annual household income from their respective crops. In contrast, cashew growers earned 42% of their household income from their certified crop while orange growers earned 17% of their household income from their certified crop. Respondents were asked about their smallholder farm sizes with cashew farmers having, on average, the largest farms (10.22 acres) followed by cocoa farmers' farms (9.54 acres) with pineapple farms (4.32 acres) and orange farms (4.49 acres) being, on average, about half the size of cocoa and cashew farms.

Farmers' perception and knowledge of certification programs

For certification programs to succeed, smallholder farmers at the minimum need to understand the practices they are required or recommended to adopt. Knowledge of the broader benefits of certification and the benefits to the participating farmers are critical motivation for adopting recommended practices. To this end, we asked farmers about their understanding and perception of certification requirements, expected and realized benefits from certification, and their knowledge of how their SPO used price premiums received. Respondents answered survey questions about their understanding of certification requirements and recommendations. An average score from the responses was computed to represent participants' aggregate understanding score of the certification program requirements. We also asked about participants' perceptions of intermediary companies' interest in certification, and agreement with required practices and recommendations.

Table 4. Mean response for composite variables on program characteristics by smallholder farming community.

Program Characteristics	Cocoa $n = 104$	Pineapple $n = 97$	Orange $n = 82$	Cashew $n = 74$	F or χ2
Level of training (0–18)	9.18	10.70	3.77	8.15	77.32***
	(2.73)	(2.37)	(4.22)	(3.26)	
Understanding of requirements and recommendations (1–5)	4.71	4.80	3.75	4.72	89.83***
	(0.46)	(0.38)	(0.96)	(0.45)	
Changes in farming practices (1–5)	4.73	4.65	3.75	4.32	71.92***
	(0.46)	(0.52)	(0.94)	(1.03)	
Agreement with group decisions (1–5)	4.23	4.26	3.48	3.18	90.23***
	(0.73)	(0.70)	(0.70)	(1.13)	
Inspections (0–4)	1.09	2.03	0.55	0.86	52.37***
	(0.94)	(0.62)	(0.89)	(0.89)	
Sales and price premium (0–3)	1.58	0.57	0.41	0.16	89.86***
	(0.89)	(0.59)	(0.52)	(0.31)	
Knowledge of price premium (0–9)	3.63	1.37	0.28	0.22	119.43***
	(2.07)	(1.45)	(0.65)	(0.60)	
Perception of intermediary companies' interests (1–5)	2.45	2.47	2.63	2.35	5.79
	(0.40)	(0.51)	(0.59)	(0.60)	
Perception of requirements and recommendations (1–5)	4.79	4.79	3.57	4.73	108.41***
	(0.34)	(0.39)	(0.96)	(0.43)	
Expected benefits (1–5)	4.29	4.30	4.06	4.30	5.36
	(0.74)	(0.70)	(0.82)	(0.78)	
Realized benefits (1–5)	4.20	4.17	2.56	3.49	161.28***
	(0.65)	(0.67)	(0.78)	(0.70)	

The results show that the Fairtrade certified farmers generally have a good understanding of the certification requirements and recommendations (see Table 4). Across crops, pineapple farmers had the highest level of understanding of certification requirements and recommendations (4.8) followed by cashew (4.72), cocoa (4.71), and orange (3.75) farmers, in descending order of understanding. Results from the regression analysis further revealed that cocoa farmers do not significantly differ from pineapple and cashew farmers in their understanding when controlling for farm-level and farmer characteristics. On the contrary, orange farmers' understanding of the requirements are significantly lower than all other farmer groups (Table 5).

The satisfactory levels of understanding seem to have translated into changes in farm operations. Indeed, farmers across the four crops have made significant changes to their farm operations because of certification. Despite having the same level of understanding of certification requirements, the regression results indicate that cashew farmers significantly have implemented fewer changes to their farms than cocoa farmers. Unsurprisingly, orange farmers reported making even fewer such changes (Table 5). This may reflect a lower level of understanding of Fairtrade requirements given the relatively lower educational levels, the lower relative importance of oranges to those farmers' household income, or simply orange farmers already complying with health and food safety requirements. Moreover, although farmers of all four crops found the prescribed requirements and recommendations for

Table 5. Regressions of outcome measures by group compared to baseline results of cocoa farmers.

	Cocoa ($n = 104$) Baseline		
Outcome Measures	Pineapple ($n = 97$)	Orange ($n = 82$)	Cashew ($n = 74$)
Level of training received *(0–18)*	1.22*	−5.65***	−1.20*
	(0.59)	(1.06)	(0.57)
Understanding of requirements and recommendations *(1–5)*	0.02	−1.00***	0.03
	(0.19)	(0.24)	(0.11)
Changes made in farming practices *(1–5)*	−0.14	−1.05***	−0.36***
	(0.10)	(0.23)	(0.08)
Agreement with group decisions *(1–5)*	0.04	−0.76***	−1.06***
	(0.10)	(0.17)	(0.15)
Inspections *(0–4)*	0.89***	−0.48	−0.17
	(0.21)	(0.28)	(0.23)
Sales and price premium *(0–3)*	−1.01***	−1.13***	−1.42***
	(0.19)	(0.20)	(0.18)
Knowledge of price premium usage *(0–9)*	−2.26***	−3.32***	−3.22***
	(0.48)	(0.49)	(0.43)
Perception of intermediary companies' interests *(1–5)*	0.07	0.18***	−0.10*
	(0.07)	(0.06)	(0.05)
Perception of requirements and recommendations *(1–5)*	−0.04	−1.27***	−0.03
	(0.14)	(0.14)	(0.10)
Expected benefits of sustainability certification *(1–5)*	−0.0	−0.27*	0.03
	(0.13)	(0.14)	(0.13)
Realized benefits of sustainability certification *(1–5)*	−0.04	−1.61***	−0.58***
	(0.36)	(0.11)	(0.11)

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

certification favorable, results from the regression analysis suggests orange farmers' perceived favorability of the requirements was significantly lower than the others. This could also explain why orange farmers have made fewer changes to farming practices.

All farmer groups had positive perceptions of the expected and realized benefits from certification although at varying levels. Cocoa and pineapple farmers rated their realized benefits very close to their expected benefits to farmers and society, while cashew farmers had somewhat lower realized benefits (3.49 on a 1–5 scale, with 3 being neutral) compared to 4.30 expected benefits, and orange farmers had much lower realized benefits (2.56) compared to their expected benefits to farmers and society (4.06). Results from the regression results also indicate cashew and orange farmers experienced significantly lower realized benefits than cocoa and pineapple farmers after controlling for farmer and farm-level factors (Table 5). The particularly low realized benefits perceived by orange and cashew farmers may reflect the common finding in the literature of smallholder farmers not fully reaping the benefits that certification promises to offer to them. Moreover, across all four crops, farmers recorded very low scores on their knowledge of how price premiums are used; this is particularly so for orange and cashew farmers. This knowledge gap together with the disappointing realized benefits from certification if inadequately addressed could adversely lead farmers to drop out of the certification program and jeopardize its future.

Intermediary companies play a significant role in the training, resource allocation, purchasing, and compliance verification of certification programs. These companies often support and bring experts to train farmers on an array of SC issues. They are also expected to work with farmer groups to implement internal inspections as well as liaise with Fairtrade to secure third party certifiers to conduct external inspection. To gain some insights into their relations with smallholder farmers, the study assessed respondents' perceptions of the interest of intermediary companies in fully executing their role in certification. Across all four crops, the results show smallholder farmers held negative perceptions regarding the interests that intermediary companies have in ensuring successful implementation of certification. It seems that smallholder farmers consider certification to be a good thing although they feel that intermediary companies are in it only for their own benefit. Efforts to strengthen certification programs need to rethink the role of intermediary companies and develop strategies to garner their commitment toward certification.

Training and compliance verification

Sustainability certification emphasizes training as a critical component of the certification process for smallholder farmer groups. Training provides avenues to address knowledge gaps in certification requirements and benefits, as well as introduce farmers to emergent technologies and practices. We measured participants' levels of training using survey items that asked them about the number of times they have been trained and the last time they were trained. The results show that the frequency of training received by farmers is relatively low. Farmers on average receive less than 50% of their total expected training requirements. Across the four crops, smallholder farmers growing pineapple received the highest levels of training (10.70 out of 18) followed by cocoa (9.18), and cashew (8.15). Orange farmers had the lowest levels of training received (3.77). These differences across the crops in amount of training is robust after controlling for farm-level and farmer characteristics (Table 5).[6] Although unexpected, the findings that smallholder pineapple farmers significantly receive more training than cocoa farmers could be explained by the relative stringent standards that pineapple farmers are required to comply with as well as the preexistence of well-established systems for implementation. These systems include structures for conducting trainings, which could be leveraged for working toward compliance with certification. On the other hand, the very low level of training for orange farmers is consistent with their poor perception of intermediary companies, which are responsible for training, and farmers' disappointment with realized benefits.

Compliance verification is a key component of certification and integral to its success. Certified farmer groups are expected to use their internal

management/control system to conduct internal inspections to prepare members for regular auditing by third-party certifiers, who are appointed by Fairtrade. We assessed compliance verification using survey items that measured the frequency of inspections by internal and external auditors and the length of time since the last inspection was conducted. The results suggest that Fairtrade certified farmers in the study areas are inadequately inspected both internally and by third-party certifiers. This finding applied to all four crops but especially orange, which drew a response for compliance verification (inspections) of 0.55 out of 4. The highest rating among the four crops was for pineapple, with a score of 2.03 out of 4. The failure to appropriately verify certified farmers for compliance with certification requirements and recommendations undermines the credibility of the programs.

Receipt of price premiums and group decisions

At the core of certification schemes is the expectation that certified smallholder farmers will receive a price premium for their produce to compensate for the extra cost of adopting required and recommended practices. Responses to survey items exploring farmers experiences with receipt of price premiums indicates that Fairtrade certified farmers are often unable to sell all their certified produce, and therefore miss out on some of the premium they expect to receive. In addition, some Fairtrade farmers reported that even when they can sell crops as certified, they do not receive the expected amounts of price premium.

Generally, cocoa farmers have the highest proportion of certified produce sales and highest price premium receipts while the other three groups of farmers have very low or close to zero certified produce sales and receipt of price premium. This could be explained by the value chain structure and partially liberalized domestic market cocoa farmers in Ghana face. The beans cocoa farmers produce go through high levels of processing for the final products. Pineapple, orange, and cashew are different than cocoa in one or more of these characteristics. Furthermore, cocoa sales in Ghana are still centrally controlled. As such, certification is expected to work differently in practice for smallholder cocoa farmers as compared to the other farmer groups. Efforts outside of certification are made to organize cocoa farmers to facilitate bulk purchase of cocoa beans. For example, LBCs typically work with groups of smallholder cocoa farmers to enable them to easily aggregate cocoa beans. Such existing structures also facilitate training of smallholder cocoa farmers on certification requirements and recommendations, which likely enhances their knowledge and experiences with certification programs relative to farmers of other crops.

Moreover, in line with Fairtrade's emphasis on using democratic principles for group practices and decision making, certified farmers across the four

crops reported appreciable engagement and agreement with group decisions in their farmer group. Further analysis, however, shows that smallholder cocoa farmers have better experiences with certified-group decisions than orange and cashew farmers, which may be indicative of the usefulness of preexisting smallholder cocoa farmer groups. At the same time, the partially liberalized domestic cocoa market in Ghana does not allow intermediary companies, LBCs, to engage in price competition. Certification, therefore, has become a significant market tool for intermediary companies in Ghana's cocoa sector. For most intermediary companies, facilitation of certification of smallholder cocoa farmers provides an avenue to manage the sales of certified cocoa beans and the attendant price premiums as well as expand their client base. Hence, due to the nature of the competition in the sector, intermediary companies for cocoa have an added incentive to implement certification programs in ways that enhance farmers' experiences. This may explain why smallholder cocoa farmers have better experiences with the sale of certified produce and price premiums, more positive perceptions of intermediary companies' interests in certification than cashew farmers, and why they know more about the use of the price premium that their certified groups receive as compared to the other groups of farmers.

Conclusion

To broaden understanding of what enhances or impedes the successful implementation and impacts of SC, we examined how smallholder farmers participating in four Fairtrade programs in Ghana perceive, understand, and experience the benefits of sustainable certification program. We also explored how smallholder farmers' experiences align with the stated principles and goals of SC programs. The study uncovered some critically important gaps in certification implementation processes that need to be addressed to enhance the credibility, performance, and sustainability of the SC programs.

The findings related to reported inadequate frequency of compliance inspections and trainings may be seen as supporting assertions that some certification programs are only greenwashing and that they do not provide adequate attention to monitoring and enforcement of certification standards (Auld, Gulbrandsen, and McDermott 2008; Jaffee 2012; Ruben and Fort 2012; Smyth 2014; Waldman and Kerr 2014). At the same time, we learned of the challenges of some participating smallholders to sell their certified produce at a premium price as well as other problems associated with receipt of price premiums associated with certification programs (Ruben and Fort 2012).

The study results show that smallholders generally have a good understanding of the requirements and recommendations of SC and have accordingly made changes in their farm operations. However, knowledge gaps persist on how price premiums are used, as well as the benefits that SC bring to

farmers and society in general. Such knowledge gaps were particularly common among cashew and orange farmers, who also reported lower returns in benefits from SC than what they expected. Additionally, it was noted that participating smallholder farmers are neither frequently trained on sustainability requirements, nor are they adequately inspected to ensure compliance with the requirements. Indeed, farmers reported on average receiving less than 50% of the total expected training requirements. Relatedly, internal inspections from smallholder management group and external inspections from third party certifiers to ensure compliance with SC requirements are occurring much less frequently than what SC prescribes. The results also suggest that participating farmers face challenges selling and/or receiving optimal price premiums for their certified products.

The observed knowledge gaps, lax training and compliance verification, and poor delivery of price premiums to farmers undermine the efficacy and credibility of SC programs and could jeopardize the SC program's ability to recruit and/or retain smallholders. Investments in education on SC practices and benefits as well as revisions of operational strategies toward more frequent inspections are warranted. The finding that intermediary companies, who are pivotal facilitators of training and inspection, are perceived to be indifferent in fulfilling their role(s) and seemingly only care about money from certification suggests an entry point for action to address the observed gaps. Further inquiry into the role of intermediary companies and restructuring of the certification process to align incentives with desired actions will be critical components of needed reforms.

Furthermore, the study also found noteworthy differences across crops on farmers experiences with SC as well as the level of adherence to the key tenets of certification programs even though they are operating under the same certifying organization (Fairtrade) in the same country. Notably, orange producers appear to be performing worse than other producers of other crops on most indicators, while cocoa and pineapple smallholders show relatively greater success with SC. The reasons for this discrepancy remain unclear. One possibility is that orange farming contributes only a small portion to the sampled farmer's household income, leading farmers to place less emphasis on meeting certification standards. Another explanation could be that certification efforts for orange have not received the same level of institutional attention and investment as those of cocoa and pineapple. Differences in farmer training as well as access to relevant information and support services may account for some of the variation across crops. In the case of cocoa, the presence of established structures for engaging with smallholder farmer groups before the introduction of SC, along with the partially liberalized market structure for cocoa in Ghana could be contributing to the relatively successful certification outcomes for cocoa.

Nevertheless, the observed differences in implementation outcomes highlights the limitations of a uniform approach to certification that assumes

homogeneity across crops and farming context. It suggests a need to rethink the current certification modalities in favor of more tailored implementation strategies that diversify sustainability certification requirements and processes to reflect context-specific circumstances and challenges smallholder farmers face and peculiarities associated with crop types. Therefore, prior to determining sustainable certification requirements and processes for each crop, there is the need for a deeper understanding of the contextual realities in which smallholder farmers operate to ensure effective implementation and positive outcomes.

Notes

1. See link to learn more about the Fairtrade SC program: https://www.fairtrade.net/standard.
2. See https://www.fairtrade.net/standard./aims.
3. https://www.alphonsacashew.com/business/origins/ghana.
4. Figure 1 in the Appendix shows the survey locations.
5. We also ran the regression model with all potential control variables, including some likely to be endogenous to farmer decision making, such as income or farm size. The all-variable regression generated only slightly different results for two items as compared to our model using exogenous variables (available from authors upon request).
6. Note that the difference in training is driven by the alternative crops rather than differences in control variables. For example, our variable male did not have a significant effect on training when crop type is controlled for (p-value = 0.558).

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Appendix

Table A1. Community details on population and sample.

Community	Households enumerated – population	Households targeted	Households surveyed – sample (response rate)
Cocoa	*210*	*120*	*104 (87%)*
0201	62	30	30
0202	44	30	20
0203	37	30	27
0204	67	30	27
Pineapple	*128*	*110*	*97 (88%)*
0205	58	50	47
0206	27	20	16
0207	43	40	34
Orange	*95*	*95*	*82 (86%)*
0208	20	20	19
0209	15	15	10
0210	30	30	24
0211	30	30	29
Cashew	*125*	*100*	*74 (74%)*
0212	67	50	39
0213	58	50	35
Total	521	425	357 (84%)