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Abstract

Voluntary sustainability standards on the one side, and, sustainable sourcing practices on the other side, are two favored ways of the cocoa industry for a more effective, social and environmental friendly value chains. But how well do these two kinds of sustainability schemes improve the cocoa farmers' income? This thesis investigates the major factors affecting the income among cocoa farmers certified under Fairtrade and Fair for life, and non-certified cocoa farmers participating in Olam's own sustainability program in the provinces of Guayas and Manabi, in the coastal region of Ecuador. The analysis uses survey data gathered through field interviews with a sample of each participating group during the end of the main crop period March-April 2019. The first part of the anlysis consist of multinomial probit regressions to understand what motivates a farmer to choose a program or not. The results identify that a male household is more likely to choose fair trade programs while for Olam younger farmers increases the probability to join their program. Larger farms are more likely to join Olam, while for Fairtrade this decreases the probability to join the program. Farmers with only cocoa monocultures are less likely to choose Olam. The regression model shows that income increases with accumulated program experience, larger cocoa farms, livelihood diversification, participation in training, yield, and farming experience. Minimum floor prices increase the income to FT and FL, meanwhile monetary premiums increase income for farmers belonging to Olam. Different results among the groups suggest that there is a need for better harmonization of sustainability practices, if sustainable practices will be implemented, between schemes to benefit farmers incomes.

Abbreviations

ANECACAO: The National Association of Ecuador’s Cocoa Exporters and Industrials (by its Spanish initials)

BCE: Central Bank of Ecuador (by its Spanish initials)

CECAO: Cocoa Exporting Company (by its Spanish initials)

CSO: Civil Societies

CSR: Corporate Social Responsibility

ESPAC: Surface and Continuous Agricultural Production Survey (by its Spanish initials)

FLA: Fair Labor Association

FMP: Fairtrade Minimum Price

ICCO: International Cocoa Organization

IMO: Institute for Marketecology

INEC: National Institute of Statistics and Census (by its Spanish initials)

MAGAP: Ministry of Agriculture and Livestock (by its Spanish initials)

MNP: Multinomial Probit

NEK: Swedish abbreviation for economics

NGOs: Non-Governmental

OLC: Olam Livelihood Charter

OSS: Olam Sustainability Standard

SDG: United Nation's Sustainable Development Goals

SDGs: United Nation's Sustainable Development Goals

SLU: The Swedish University of Agricultural Sciences

SRL: Sustainable Rural Livelihood

SSP: Sustainable Sourcing Practices

UN: United Nations

UNOCACE: Union of Peasant Cocoa Organizations of Ecuador (by its Spanish initials)

UPAs: Agricultural Production Unit (by its Spanish initials)

VSS: Voluntary Sustainable Standards

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1 Introduction

Paul Schoenmakers, a chocolate-maker company's executive, once said that ‘nobody needs chocolate. It is a gift to yourself or someone else … it is absolute madness that for a gift that no one needs, so many people suffer’ (Whoriskey & Siegel, 2019). Globalization has made chocolate an everyday product in every kind of form: from food to cosmetics. Besides the high consumption in western countries, new players like China and India increase the demand even more. Simultaneously, there is a demand for more sustainable products due to rising consumers' awareness.

1.1 Problem background and statement

Cocoa beans are the base ingredient of chocolate products. The Theobroma Cacao is a tropical tree that grows around the equator line, mostly in developing countries located in West Africa, South America, and Asia. Smallholder farmers typically produce cocoa; they represented 80% of the world cocoa production (Gayi & Tsowou, 2016).

The major producing countries are Côte d'Ivoire, Ghana, Ecuador, Indonesia, Cameroon, Nigeria, Brazil, and Peru. According to the International Cocoa Organization (ICCO) estimation, cocoa beans' total world production in 2018 was 4.546 thousand metric tons (2018). The most significant importing countries are the United States, followed by the European Union. Still, there is also growing demand in emerging markets such as China and India, and by 2020 is expected to exceed 4.5 million tons (Fairtrade International, 2018). To satisfy the increasing demand, small-scale cocoa farmers face several challenges, such as increasing productivity on limited land. Smallholders do not have enough financial resources to upgrade their cocoa trees with younger and improved plants. Furthermore, low cocoa prices limit the options to invest in modern agricultural practices hence limits enhancing the quality of life of their family members (World Bank Group, 2018).

The cocoa supply chain is known for having several social and environmental problems, particularly in African countries. In the first place, the multi-billion-industry faced and still faces accusations like modern practices of labor exploitation and child labor (Ingram, 2015; Berlan, 2016; LalwanI, et al., 2018). Secondly, according to Fairtrade, farmers face economic exploitation as the retail price of a chocolate bar and only 6% of a chocolate bar’s value is going to the farmers (Fairtrade, 2016). Another major challenge is poverty, as cocoa workers earning less than two dollars per day, and farm households make less than four dollars per day (True Price & Sustainable Trade Initiative, 2016). Furthermore, deforestation and land-degradation due to cocoa farms' expansion is problematic for local environments (Thorlakson, 2018). In addition to the challenges previously mentioned, farmers regularly suffer from highly volatile prices inflthe uenced by the long value-chain, concentrated processors, traders, and manufacturers, the distance from the end consumer, and the presence of market power at higher levels.

Companies’ rising interest in developing strategies to reduce their commercial practices' negative impact combined with the increased consumers' awareness in social and environmental issues, many different approaches emerged to tackle these challenges. Fairtrade was one of the first certifications to shed on prices and wages for low-income countries producing agricultural products for the global market through setting a minimum floor price to help farmers in developing countries to get out of the circle of poverty (Fairtrade International, 2018). One system used is Corporate Social Responsibility (CSR) initiatives.

Another method used is third-party non-governmental organizations, such as Fairtrade, Rainforest, or UTZ, to provide verification and certification. Alternatively, there are modern own-value-chains with sustainable sourcing practices (SSPs) that promises traceability and transparency (Thorlakson, 2018). Even though there is a rapid growth of fair trade products and an increase of people purchasing fair-trade products, there is a lack of scientific evidence that confirms fair-trade certification effects on farmers' level (Dragusanu, et al., 2014; Barrientos, 2016; Glasbergen, 2018). Likewise Fairtrade, companies' sustainability programs in the cocoa industry started to materialize two decades ago (Thorlakson, 2018). Nowadays, international third-party certifications, also known as Voluntary Sustainability Standards (VSS), play an essential role in the industry, and so corporate social responsibility initiatives such as Sustainable Sourcing Practices (SSP). This aspect has not yet given much attention to the farmers' livelihood outcomes of certifications compared to alternatives initiatives like sustainable sourcing practices.

1.2 Aim and delimitations

This project aims to understand how different cocoa sustainability program can improve cocoa smallholders' income. The following research questions will guide this work:

1. To what extent are sustainable schemes driven by commercial concerns over the future social and economic sustainability of cocoa sourcing in the dynamic cocoa–chocolate value chain?
2. What is the effect of sustainable schemes on small-scale cocoa producers' income in Ecuador?

This work will only focus on two types of sustainable programs: Voluntary Sustainable Standards (VSS) such as Fairtrade and Fair for life and the second as Sustainable Sourcing Practices (SSP) implemented by private companies, such as Olam Ecuador S.A. in the cocoa industry in Ecuador. This work's geographical scope is limited to Guayas and Manabí, two of the major cocoa producing provinces in Ecuador.

1.3 Structure of the report

The structure of the thesis is as follows: section 2 will introduce the conceptual framework motivating this study, section 3 is a literature review that includes an overview of the Ecuadorean cocoa sector, as well as a review of current research regarding third-party certification schemes. The fourth section describes the data collection process and the preliminary survey results. Section 5 describes the method and model specification. After that, the results are presented, analyzed, and discussed (section 6). The last part (7) concludes the study and draws an outlook on further research and possible developments. Figure 1 graphs the sequence of the sections.

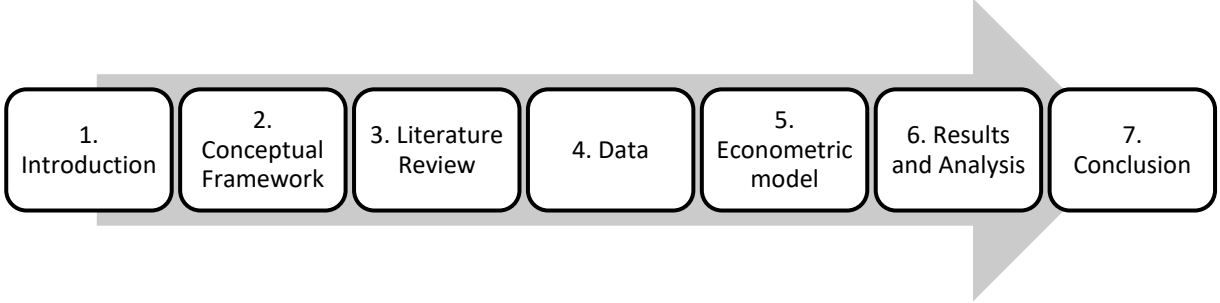

Figure 1. Thesis Structure.

2 Conceptual Framework

This section defines the concepts and describes the sustainable livelihood framework and its application to certification systems. This section aims to provide a conceptual background for our study and introduce the different certification systems types.

2.1 Rural Sustainable Livelihood Framework

The conceptual framework applied to assess the effect of Fairtrade certification and other sustainability programs on the livelihood of cocoa farmers is the concept of sustainable livelihood as presented by Chambers and Conway (1992):

‘livelihood comprises the capabilities, assets (stores, resources, claims, and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; which contributes net benefits to other livelihoods at the local and global levels, and in the short and long term’ (p. 13),

and later as: sustainable rural livelihood by Scoones (1998). The framework's basics explain how households, individuals use, enhance, or maintain their assets, tangible or intangible resources. In the rural framework, organizations and institutions can influence farmers' livelihood outcomes by developing a livelihood strategy, e.g., agricultural intensification or income diversification (Scoones, 1998). (Davies and Hossain, 1997) defined institutions as:

‘the social cement which links stakeholders to access to capital of different kinds to the means of exercising power and so define the gateways through which they pass on the route to positive or negative [livelihood] adaptation’ (p. 24).

Understanding organizations and institutions allow them to identify limitations and opportunities to achieve a sustainable livelihood framework (Morse and McNamara, 2013). Organizations and institutions are public and private structures that enable a different set of factors that affect livelihoods, such as policies and regulations, social norms and practices, and agreements that incentivize smallholders' choice for better trade-offs (Serrat, 2017).

Figure 2 in Annex 1 presents the sustainable livelihood framework showing how interventions can transform smallholders' livelihood. Organizations and institutions are entities capable of transforming smallholders’ livelihood strategies and outcomes. Four types of interventions to address challenges in the cocoa industry, such as civil societies (CSO) and non-governmental (NGOs), voluntary sustainable standards (VSS) and individual cooperate initiatives

2.2 Voluntary Sustainability Standards (VSS) and Sustainable Sourcing Practices (SSP)

Voluntary Sustainability Standards (VSS) are a set of different mechanisms such as standards, codes of conduct, and requirements for more sustainable development of global consumption and production. Various stakeholders implement VSS in the value chain. Third-party organizations such as certifying bodies enforce VSS. Lamolle *et al*. (2019) defined VSS as:

‘non-governmental, voluntary, usually third party-assessed (i.e., certification) norms and standards relating to environmental, social, ethical and food safety issues, adopted by

companies to demonstrate the performance of their organizations or products in specific areas' (Lamolle et al., 2019, p. 265).

The number of VSS in the agricultural value chain has increased over the last 30 years, and most vital agricultural commodities follow at least one VSS (Salmon, 2002). These sustainability initiatives implemented by external actors embrace the Sustainable Development Goals by the United Nations in poverty, decent work, economic development, food security, education, gender equality, climate change and environmental restoration, and responsible consumption and production.

Growing consumer awareness in matters of ethics, environment, quality, and safety also encouraged the proliferation of VSS around the world. Developed countries set VSS (Mitiku *et al*., 2017). Another motivation for institutions and organizations to develop and implement VSS is that consumers are willing to pay a higher price for a social, environmental, and ethical traded product. Market power also plays a role in the increasing number of VSS. Food processors and retailers' concentration imposed more requirements on quality and sustainability to their suppliers via codes and standards (Ingram et al., 2018b; Lamolle et al., 2019). VSS can be adopted by any stakeholder in the supply chain, from product manufacturers, traders, and processors, and retailers, to gain a competitive advantage in the marketplace with their sustainable-trade product. By shortening the supply chain through VSS, producers, and buyers can reduce costs and risks (Ruben, 2017; Ssebunya et al., 2019).

Cocoa VSS emerged over 20 years ago (Ingram et al., 2018b) with initiatives implemented by the industry in public-private partnerships type. However, those initiatives were not monitored or audited regularly, leading to the rise of independent certification bodies. Certification bodies are multi-stakeholder groups and NGOs. A company can supply from VSS entities but does not necessarily have to comply with the standard. VSS is the initiative with more acceptance by the consumer and the industry because of their transparency approach (Ingram et al., 2018b). Companies are implementing sustainable sourcing practices SSP to secure sustainable supply (Thorlakson, 2018).

Sustainable sourcing practices (SSP) refer to individual corporate initiatives. A business commits monitoring and compliance with ethical practices and standards playfully and following national regulation and international norms. SSPs are directly related to corporate social responsibility and self-compliance and go beyond their business objectives or the law (Ingram et al., 2018b). SSPs are voluntary and, just as VSS, also tackle sustainability challenges on global consumption and production. SSP is defined as 'voluntary practices companies pursue to improve the social and environmental management of their suppliers' activities' (Thorlakson et al., 2018, p. 1).

The proliferation of VSS is one motivation for companies to commit to sustainability (Ruben and Zuniga, 2011) under sustainable sourcing practices (SSP). To obtain higher sustainable outcomes, firms tend to create partnerships with relevant and well-known voluntary standards for their industries (e.g., Fairtrade, UTZ) and their suppliers (Lalwani et al., 2018). Firms will invest in the standard that best fits their objectives and interests and invest in improving their sustainable strategy within their supply chain (Lamolle et al., 2019). Another motivation is the growing market share for products marked as responsible, ethical and sustainable traded, which influenced individual firms to implement SSP, in addition to their commitments to VSS (Ruben and Zuniga, 2011).

One difference between the two type of programs is that SSP follows internal norms within the company or industry and does not comply with an international standard. Conversely to traditional CSR schemes, companies with SSP will report their sustainable practices by third-party auditors or external verification (Thorlakson et al., 2018). Both VSS and SSP are sustainability schemes that pursue socio-economic and environmental development in different value chains.

3 Review of the literature and empirical context

Several studies have analyzed the impact of voluntary sustainability standards and sustainable sourcing practices on smallholders' livelihoods in developing countries. What can be concluded is that the majority of studies that evaluated the impact of certifications in commodities focus on a single certification and a single commodity (DeFries et al., 2017).

Given the increasing number of sustainability-focused programs, certification schemes, the vast number of certified products, and indicators assessed, the study expects that studies on impact evaluation lead to different results. Many studies report mixed findings with some negative results from their estimations and positive benefits from the qualitative evidence (Vellema et al., 2015). Overall the impact of certifications on the household income of coffee farmers compared to their corresponding counterpart is statistically not significant; however, certifications have demonstrated positives benefits in terms of yield, market access, input use, organization, safety, and health for cocoa and coffee farmers (Jena et al., 2017; Ruben and Fort, 2012).

Some studies in FT-certified coffee find significant positive effects on the income and poverty reduction for private and double certification schemes: FT-organic (Chiputwa et al., 2015; Ruben and Zuniga, 2011). Ingram et al. (2018b) found modest results in UTZ cocoa certification; higher yield resulting from intensive training services in agricultural practices instead of price premiums or higher market prices ensure better income. Meanwhile, Akinwale et al. (2019) found that farmers with more knowledge on certifications lead to obtaining higher benefits from the certificate itself. They have a high level of compliance with agricultural practices. Studies concerning farmers' willingness to adopt a certification in the cocoa sector, Aidoo and Fromm (2015) showed that membership in farmers' cooperatives and knowledge about aspects related to certification has a significant positive effect, while farm size produces a negative effect.

Concerning methods applied to projects on the impact of certification, a wide range of information is in the literature, from qualitative research to more complex quantitative methods using econometric models. Selected qualitative studies used systematic review methods to collect data from currently available studies that assessed the impact of certification programs found on those studies (Bray and Neilson, 2017; Dammert and Mohan, 2015; Oya et al., 2018). Quantitative methods used to evaluate the impact of certifications and results obtained are mixed and differ from each other depending on the context of the study (Jena et al., 2017). In this context, Ruben and Zuniga (2011), Jena et al. (2017), and Mitiku et al. (2017) combined different econometric models. To reduce the participants' selection bias in the sample and to evaluate the effect of programs, researchers use propensity score matching (PSM) techniques. In the first place, a logit regression (Aidoo and Fromm, 2015) or probit to estimate the likelihood of a farmer joining a particular certification (Chiputwa et al., 2015; Jena et al., 2017; Ruben and Fort, 2012; Ruben and Zuniga, 2011). Based on the scores obtained, certified and non-certified farmers are matched to construct a balanced comparison group.

The second part of the methodology consists of executing estimations that help identify the real welfare effect of the VSS or SSP. Ruben and Zuniga (2011) and Mitiku et al. (2017) used a difference-analysis approach by calculating the difference in outcome between certified farmers and non-certified nearest neighbors from the comparison group. Chiputwa et al. (2015) estimated the average treatment effect to evaluate the impacts of different sustainability programs on the treated. Likewise, Jena et al. (2017) used an endogenous

switching regression (ESR) model to compare the impact of certifications among certified and noncertified farmers. Beuchelt and Zeller (2011) used a different quantitative approach to compare certified and non-certified coffee farmers' profitability, based on the net income resulting from gross margins, production costs, profits, breakeven yield, and price analysis.

3.1 Determinants on better income

The commonly used determinants of better income in previous literature are farm productivity and profitability. Ingram et al. (2018a) identified that better agricultural practices enhance crops, which leads to increased production and thus increased income. Interventions lead to a sustainable livelihood outcome (Ingram et al., 2018a). Table 1 provides an overview of the determinants of better income, as presented in this section.

Table 1. Overview of determinants on better income.

Impact	Determinants	Examples	Source
Better Income	Farm Efficiency	- Labor costs - Production costs - Household characteristics	(Beuchelt and Zeller, 2011; Djokoto, 2016; Ingram et al., 2018a; Jena et al., 2017; Mitiku et al., 2017; Utami et al., 2018)
	Cocoa farm yield	- Higher productivity - Variety of cocoa trees - Weather conditions - Access to inputs and technology - Better agricultural Practices	(Akinwale et al., 2019; Balineau et al., 2016; Bray and Neilson, 2017; Díaz-Montenegro et al., 2018; Djokoto, 2016; Fenger et al., 2017; Ingram et al., 2018a; Mithöfer et al., 2017; Valkila and Nygren, 2010; Vellema et al., 2015)
	Profitability	- Cocoa income - Accurate weight - Additional income sources - Quality of the commodity	(Chiputwa et al., 2015; Fenger et al., 2017; Ingram et al., 2018a; Jena et al., 2017; Mitiku et al., 2017; Oya et al., 2018)
	Sustainability practices rewarded by the market	- The premium received (paid to cooperatives) - Minimum floor prices - Long-term buying commitment	(Beuchelt and Zeller, 2011; Chiputwa et al., 2015; Dammert and Mohan, 2015; DeFries et al., 2017; Glasbergen, 2018; Ingram et al., 2018a; Mitiku et al., 2017; Ruben and Fort, 2012; Ruben and Zuniga, 2011)

Source: Own depiction based on the literature review.

Utting (2009) and Fenger et al. (2017) found that Fairtrade and Rainforest Alliance certifications positively impact better livelihood outcomes for smallholders through capacity building. Capacity building refers to providing skills and knowledge that allow farmers to perform successfully and sustain a livelihood. Ingram et al. (2018a) also found that information, inputs, and other cocoa farmers' services lead to better crops, better income, and increased livelihood outcomes. Akinwale et al. (2019) and Ruben (2017) pointed out that better agricultural practices and quality improvements are rewarded by the market and derive higher income benefits. Chiputwa et al. (2015) found that minimum floor prices increase farmers' income in contrast to studies of Valkila and Nygren (2010) and Bray and Neilson (2017) that concluded that revenues are likely to be a result of improved yields rather than price premiums.

Some constraints found to improve income is low cocoa yield due to low usage of inputs, age of plantation, small planting densities, and financial means to invest in it (Balineau et al., 2016; Beuchelt and Zeller, 2011). Dammert and Mohan (2015) wrote that minimum prices improve farmers' income only when the international price is lower than the minimum price; otherwise, farmers receive the market price, which does not necessarily mean a higher profit. The premium fee is uncertain for farmers' income (Glasbergen, 2018). Other factors that negatively influence smallholders' income is farmers' illiteracy and lack of technical

knowledge. According to Iritié and Djaléga (2016), this blocks farmers from diversifying their income sources through other innovative and profitable farm activities. Worldwide, farmers need to diversify their income to sustain their livelihood (Iritié and Djaléga, 2016; Vellema et al., 2015). Environmental concerns such as climate change or soil erosion can impact cocoa productivity, resulting in low yield and limited income (Mithöfer et al., 2017).

Farm households' characteristics also have an impact on the income of the family. For instance, the farming experience can increase the yield given the necessary resources; meanwhile, family size can reduce labor costs because adult family members can join the labor force (Djokoto, 2016). Farm size (Vellema et al., 2015) and studies in gender (Jena et al., 2017) have found that larger farms and women participation can lead to higher income. Training provided by VSS and SSP leads to better income as farmers gain more entrepreneurial and specialized; meanwhile, better working and safety conditions, environmental and chemical management contributes to better living standards (Ingram et al., 2018a). Chiputwa et al. (2015) found that certified farmers have higher income, which leads to rising household expenditure and, therefore, a reduction in the poverty rate and gains in living standards.

3.2 Overview of the cocoa sector in Ecuador

Ecuador is one of the five largest countries producing cocoa beans, accounting for approximately 280 thousand metric tons of cocoa's global during 2017-2018 (ICCO, 2018). According to The National Association of Cocoa Exporters (ANECACAO), the total exports of cocoa and cocoa products in 2018, from January to December was approximately 295,000 metric tons for beans and 20,000 of sub-products (2018), which represents more than 4% of national exports of traditional non-oil products after bananas and shrimp in volumetric terms (BCE, 2018). Cocoa farms represent 20% of the Ecuadorian agricultural land; in 2017, the total agricultural land planted with cocoa trees was 573.516 hectares; meanwhile, the land harvested was 264.546 hectares (MAG, 2018). In Ecuador, around 28.717 units of Agricultural Production (UPAs1) with less than 10 hectares produce cocoa as a monoculture, from which 60% are smallholders and have less than 5 hectares (ESPAC-INEC, 2017).

In Ecuador, the cocoa sector has around 39 international standards like voluntary sustainable standards, quality standards, norms, and registered sustainable sourcing practices (Sustainability Trade Map, 2020). For instance, several companies in the industry: Olam Ecuador S.A., Nestle Ecuador S.A., Cargill Ecuador S.A., Barry Callebaut, have developed their sustainable cocoa supply chain and operations. Moreover, public organizations Ministry of Agriculture (MAGAP), and national private organizations National Association of Cocoa Exporters (ANECACAO), play an essential role in the cocoa sector of the country. Cocoa production is a labor-intensive activity; most cocoa jobs have low-wages and temporary contracts due to the crop seasonality: the main harvest goes from August to January, and mid-crop goes from March to June. Another characteristic of the Ecuadorean cocoa sector is the variety of trees; in Ecuador, CCN51 (ordinary hybrid cocoa tree) and Fine Aroma Cocoa (National Cacao tree) are the main production varieties.

Fine Aroma Cocoa is part of the plan for reactivating the cocoa sector in the country implemented by the Ecuadorian Ministry of Agriculture. Governments are implementing national guidelines for ethical and environmentally friendly practices across industries and demand sustainability commitment (Lamolle et al., 2019). Local initiatives in the cocoa sector

[1] UPA in Ecuador is a Unit of Agricultural Production. It is an extension of land of 500 m² or more, dedicated totally or partially to agricultural production, considered as an economic unit.

in Ecuador can be positive for marginalized farmers. Still, a study realized in three provinces found that public interventions have to be in conjunction with policies and other measures to improve farmers' quality of life (Clark and Martínez, 2016). For instance, a high-quality cocoa type for chocolate makers, Fine Cocoa, was expected to increase prices. Still, in rural markets, dried Fine Aroma cocoa beans do not have a significant price difference between varieties, yet the yield is half from CCN51, see figure 4 (MAG-SIPA, 2020). Díaz-Montenegro et al. (2018) found that policies implemented to produce Fine Cocoa do not guarantee higher income to sustain a cocoa farmers' livelihood strategy. Many certifications aim to enhance the cocoa quality with better agricultural and environmentally friendly practices so prices can rise. Sepúlveda et al. (2018) studied how farmers perceive quality labels in coffee and cocoa farmers in Manabí, Ecuador. The study found that farmers are motivated to produce under quality standards because they can access broader markets. That premium received for complying with the label specifications is moderate.

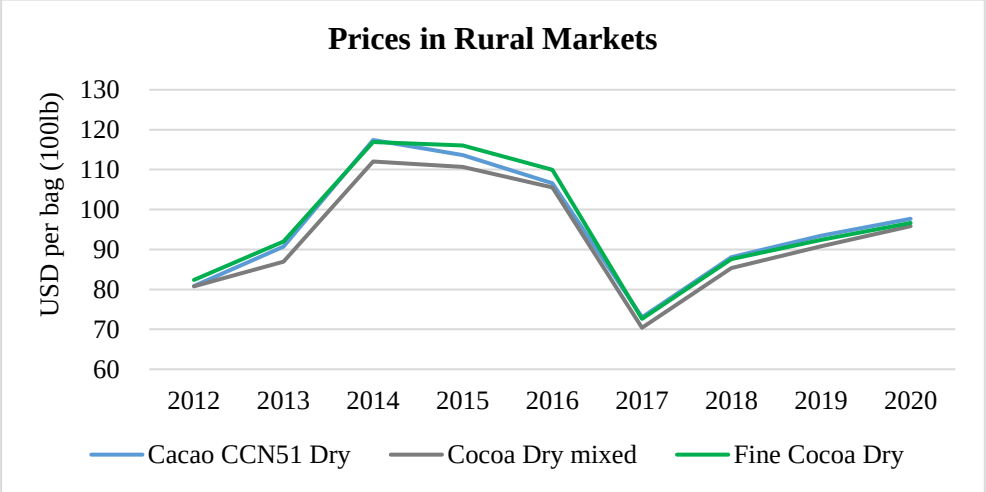

Figure 2. Average prices per year for the purchase of dried cocoa beans in rural markets. Source: Own Author graph based on monthly prices of cocoa collection centers reported by the MAGAP

3.2.1 Fair-trade organizations

Fairtrade (FT) is an international organization well-known as a voluntary standard since 1997. To ensure compliance with the standard, FT is compound by two independent organizations: one develops and reviews FT standards (FLO International). The second one certifies that producers and traders are following FT standards (FLOcert). Meanwhile, Fair for life (FL) is an international organization developed by the Swiss Bio Foundation in 2006, certified by Institute for Marketecology (IMO), and belongs to the Ecocert group. IMO ensures compliance with the standard (Fair for Life, 2018). Both fair trade organizations have the main objective of ensuring that farmers receive prices that cover their production costs and sustain their livelihood. Another objective of FT and FL has been to promote labor rights and protect children.

Fairtrade (FT) focuses on developing countries; contrariwise, Fair for Life (FL) has an approach that is not exclusive to producers in developing countries but also producers from North or South the globe with a socio-economic disadvantage (Jaffee and Howard, 2016). FT and FL provide farmers access to international markets by facilitating trading contracts and long-term and strong relationships with buyers. Smallholders and workers benefit from the global food trade system and give them financial security (Fairtrade International, 2018).

Fair-trade organizations guarantee that farmers get a minimum floor price, and farmers also receive a monetary premium, which is later invested at the cooperative and community level. Farmers benefit from the minimum floor price guarantee, which compensates when the market price falls under the optimum of sustainable livelihood. A fairtrade minimum price (FMP) is the lowest price a trader or any other stakeholder can pay for FT or FL certified product. FMP for cocoa is 2000 USD per metric ton of cocoa, and if the cocoa is organic, the FMP is 300 USD additional. Producers and traders can negotiate higher prices based on quality and other characteristics (Fairtrade, 2016). The cooperative premium can be invested in development projects such as infrastructure, training, tools, machinery, and social projects (Fairtrade International, 2018).

The main requirement to join the FT certification scheme is that farmers must be organized groups either in a cooperative or association. The cooperative has to incur certification fees and audit fees. Meanwhile, FL certifies producers groups and smallholders even if they are not part of a cooperative or have a production contract with a buyer or NGO (Fair for Life, 2019). However, they also receive premiums for investments in their farms. Another differentiating characteristic is that Fair for Life is a certification throughout the whole supply chain: producers, handlers (traders and manufacturers), and brand holders (Fair for Life, 2018). In FL, responsible sourcing principles are applied equally in every stage of the custody chain, and performance information about each stakeholder is available to the public. This whole supply chain approach enables long-term partnerships and responsible distribution of value-added to all the value chain (Jaffee and Howard, 2016).

3.2.2 Olam Ecuador S.A.

Olam International is a leading global food and agricultural business company, with operations in more than 60 countries. Olam's portfolio supplies food ingredients, feed, and fiber to more than 19 thousand customers worldwide (Olam, 2020). Olam has designed its strategy Olam Sustainability Standard (OSS) based on its policies, codes, and other international standards (Olam, 2019). Olam Supplier Code defines that Olam's suppliers of raw materials and products have to produce in a way that is socially and environmentally responsible and economically profitable (Olam, 2019).

Olam Livelihood Charter (OLC) was the first program for cocoa that focused on eight principles to tackle economic, environmental, and social challenges. In 2019, the new initiative: Cocoa Compass started. The key targets of Olam's Cocoa Compass are set by 2030 and aligned with the United Nation's Sustainable Development Goals (SDGs). Cocoa Compass focuses on farmers and aims to provide a living income that is not only for survival by improving cocoa practices, product quality, and diversifying farm incomes (Olam, 2019). Focus on farmers' pursue to promotes cocoa production as a prosperous business for younger generations. The second pillar, which focuses on the environment, aims to protect forests and regenerate natural assets. Natural assets cost to produce cocoa is quantified by assessing land-use change, greenhouse gas emission, chemical application levels, water usage, among other factors. It is used to re-evaluate sustainability initiatives (Olam, 2019). Olam Cocoa Compass is country-specific; for instance, in Ecuador, the Bee Sustainable Project is an additional income source for cocoa farmers. Each beehive can increase the farm income by USD 400 per year (Olam, 2019); this represents 10% of the national yearly minimum salary. Until 2019, in Ecuador, approximately 5,500 cocoa farmers belong to Olam Sustainability Strategy (Olam, 2017).

3.2.3 Comparison of sustainability programs

Under the framework of Sustainable Livelihood, voluntary sustainability standards (VSS) and sustainable sourcing practices (SSP) act as an external stakeholder capable of influencing access to livelihood resources and promoting livelihood strategies to impact smallholders to achieve sustainable livelihood outcomes. Table 2 provides different characteristics of the sustainability programs in this study.

Table 2. Comparison of Cocoa Sustainability Schemes

	UNOCACE (FT)	CECAO (FL)	OLAM ECUADOR S.A.
Sustainability Program	Fairtrade International	Fair for Life	Olam Cocoa Compass
Type of Sustainability initiative	VSS	VSS	SSP
Traded MT (dry beans)	1.316,79	3.272,36	42148,62 [2]
Traded MT (sub-products)	14	-	-
Farmers in program [3]	1.400	1.868	5.500
Pricing	Minimum Floor Price	Minimum Price	Market Price
Premium	Flo Premium	Development Premium	Agricultural inputs
Premium amount	USD 200 per MT	5% of the Producer Operation	-
Credit	NA	Pre-finance and social credit	NA
Standards	FLO standards	ILO conventions, FLO standards, SA 8000, and the ETI Base Code	-
Verification	FLO-Cert	Eco-Cert	External Auditors
Key aspects	Labor rights and livelihood income	Labor rights, fair trade, and responsible supply chains	Farmers' income, environmental impact, and child and labor rights
Technical Assistance	Local farmers' Co-operatives and Associations	Local farmers' Co-operatives and Associations	Good Agricultural Practices (GAP)
Supply chain coverage	Supply records	Chain of Custody	AtSource traceability
Community outreach	The premium can be used in farmers' community	The linkage between producers and manufacturers, premiums can be used in development projects for their communities	Projects in cocoa communities
Main Focus	Fairness	Fairness and shared responsibility	Responsible Sourcing

Source: Own depiction based on a literature review.

[2] Base on ANECACAO, 2019 Report of Ecuadorean Exports. Report does not differentiate between conventional and sustainable certified cocoa.

[3] Data is approximately and is up to 2019.

4 Data Collection Process and Data

This section discusses the research approach used for the data collection and data analysis process. It complies with the different methods used to gather and analyze the empirical data. At first, is presented the data collection process followed by the descriptive data.

4.1 Data collection

A survey can provide broad quantitative data coverage and allows them to do various statistical tests (Mazzocchini, 2008). Secondly, collected data quality significantly impacts econometric processing; therefore, the primary data collection process implies greater responsibility for achieving the research objectives (Mazzocchini, 2008). In this particular research, the surveys were confidential and not anonymous; the respondent's identity was coded; however, it is possible to trace the response source. Before the field research, the project supervisor revised the survey questionnaire. Later on, the survey was sent and agreed with the organizations participating in this study and their representatives.

4.1.1 Survey Area

The survey was carried out in Ecuador's coastal region, in two out of 17 cocoa producing provinces. The province of Guayas and Manabí is part of the top cocoa-producing provinces in the country. In Guayas, the land is flat, and in Manabí, the landscape has hills. Both areas are suitable for agricultural production and commerce due to their fertile soil, access to water, and infrastructure that facilitates transportation to Guayaquil's main port. Cocoa production in the province of Manabí and Guayas plays an essential role as an income-generating activity. In Guayas, 51,000 ha are for cocoa plantations; meanwhile, in Manabí, 52,000 ha (ESPAC-INEC, 2017). Figure 6 represents a cocoa-production map of Ecuador. The map includes cocoa collection centers, cocoa productive areas, cocoa farms, and finally, the survey locations.

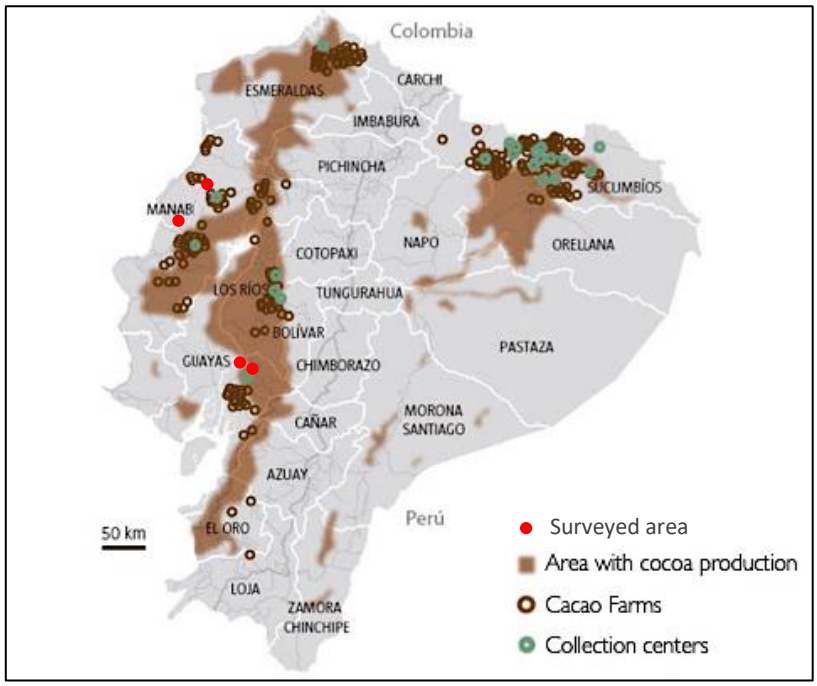

Figure 3. Locations where the survey was carried out.
Source: MAGAP

4.1.2 Questionnaire

To structure the questionnaire follows the previous literature about smallholders and the impact of certification schemes on livelihood outcomes. It was not limited to cocoa surveys but also considered surveys on coffee. The survey used structured and standardized questions (Mazzocchini, 2008). The questionnaire had in total 28 questions divided into five sections: A. general information about the farmers and their household, B. general information about their farm and income sources, C. productivity in relation the cocoa activity, D. related to the voluntary sustainability standard, and sustainable sourcing practices they belong, and E. gather farmers' perception of the sustainable programs. Table 3 summarizes the structure of the questionnaire.

Table 3. Survey questionnaire structure.

Section	Topics	Variables
A	Farmer household characteristics	Gender, age, size of household, level of education, household head, sources of income
B	Farm characteristics	Farm ownership, farm area, experience in farming, co-operative membership
C	Cocoa Production	Labor, production costs, changes in production, intercropping, variety of cocoa, type of production system, commercial practices (dry/wet beans), quantity sold
D	Sustainability Standards and Practices	Sustainability program participation, contract/agreement of participation, area of production that is for certification, years in the program, training received, the premium received, minimum floor price received, changes in production due to certification
E	Perception of Sustainability Practices	Economic, social, and environmental perception of the sustainability program, benefits, and constraints of certification, future of certification

Source: Own depiction based on questionnaire design.

The structure and measurement scale selected for the question type was dichotomous (just allows two outcomes), multiple-choice, and finally, Likert scale-like. For sensitive questions like income sources, direct quantification was avoided (Mazzocchini, 2008). The questionnaire was prepared in English and translated to Spanish as the official language of Ecuador is Spanish. The full questionnaire version in English and Spanish versions are in Appendix 2 and 3.

4.1.3 Data Collection Process

During December and January, the researcher contacted prominent business executives representing cocoa exporting companies in Ecuador. The main intention was to obtain details of their sustainability practices and invite their companies to develop this research. To get approval to survey their farmers, the researcher had several remote meetings with the group representing Olam. It took several months until the headquarters approved the participation. Discussions with other cocoa exporting companies with sustainability programs did not support the research due to upper management's lack of permission and unknown reasons. The involvement of Fair-trade groups in this study did not represent any significant concern.

The questionnaire was revised during February and March with the thesis supervisor before traveling to Ecuador. Fairtrade UNOCACE, Fair for Life CECAO, and Olam's Sustainable

and Operations Managers received a copy of the questionnaire with a letter of intention and research goals. To ensure that the questions were understandable and easy to answer, a pilot test was done with one farmer from FT-UNOCACE. The pilot test took 20 minutes and served as a reference to point out that academic questions were not easy to understand. Due to the farmers' limited literacy level, the survey was carried out face-to-face and in Spanish using everyday language.

The field data collection started with the province of Guayas with the Fairtrade group. Interviews were carried out in several farmers' co-operatives in the main building with farmers who delivered their cocoa. For the second group: Fair for life, it was necessary to visit some households on their farms. In mid-April, the field trip began to interview the farmers belonging to Olam's Sustainability Program in the province of Manabí. The village is 9 hours away from the port-city Guayaquil. Olam's managers arranged a training session where farmers joined randomly. To minimize selection bias, the farmers did not know that they would also participate voluntarily in an interview until they arrived at the training center. Surveyed farmers were isolated from the rest of the group to reduce the risk of learned answers from other respondents. The process of data collection started between the end of March and April 2019 in Guayas and Manabí. In March, the mid-crop season starts and have bad weather conditions, heavy rains, and low yield. Hence some farmers did not visit their co-operatives, and as a result of it, the number of respondents was lower than the expected. The final sample includes 132 smallholders, certified cocoa farmers as FT or FL, and the non-certified farmers belong to a sustainability program with Olam.

4.1.4 Ethical Aspects and consent

When conducting survey research in every stage of the process, from sample selection to questionnaire design, reporting, and analysis, the study considered ethical aspects. Ethical elements such as protecting human subjects, the privacy of the information, accuracy when presenting results, and the findings reflect the respondents' answers must be taken into account in survey research (Oldendick, 2012). Before every interview, the farmer received an introduction to the study's topic and the research intentions and objectives, and that they could terminate the survey at any moment without any negative consequence. Additionally, the interviewers informed the farmers that the data collected will be treated confidentially and only for academic purposes. Finally, a cover letter was at the beginning of the questionnaire; this form included information about the thesis topic and the research purpose, the organization behind the study, data treatment, confidentiality, and contact information.

4.2 Data preparation and sample descriptive statistics

In this section, descriptive statistics of the sample are shown after the culmination of the fieldwork. Before the statistical processing, the questionnaire information needed to be transferred into an electronic format. The dataset was carefully assessed, organized, and coded with variables. This process greatly impacts the data's quality, improving subsequent econometric analysis (Mazzocchi, 2008).

4.2.1 Household characteristics and farm characteristic

Table 4 presents the cocoa farm household and farm characteristics of the sample. Out of 132 interviewed farmers, only 20 respondents were female farmers responsible for the cocoa farm. The results show that 73% of the surveyed farmers are more than 45 years old, of which 20% are over 65 years old, which is the retirement age in Ecuador. The majority of the farmers

have a primary school education, equivalent to 6 years of studies. However, it is not confirmed if the surveyed farmer has completed primary school. The education level is deficient among farmers with an overall average of 7 years of schooling and a standard deviation of 3.01. The results also show that 75% of the sample has less than 5 hectares, with a farm size concentration between 0.5 hectares to 3 hectares. In contrast, only 9% of the surveyed household has a farm size larger than 10 hectares. Farm ownership stands for the farm's legal status from which most of the farmers have inherited their land.

Regarding the farming experience, around 64% of the sample has more than 40 years of working as farmers. The sample distribution among the sustainability scheme type is 53% for voluntary sustainability standards (VSS) and 47% for sustainable sourcing practices (SSP). In VSS groups, it is expected that all the farmers of the sample have a cooperative membership since it is part of the requirements in other to belong to FT. For farmers that belong to SSP, such as Olam, 63% of the farmers had training in the last year; meanwhile, only 19% of the farmers in Fairtrade received training in the previous year. Only 42 farmers received non-monetary benefits, such as tools, machinery, inputs. Finally, only 25% of the farmers perceived that they could access market information due to the sustainability program.

Table 4. Farm Household and Farm Characteristics (Categorical Variables)

Sustainability Program	**Fairtrade**		**Fair for Life**		**Olam**		**Full Sample**		
Categorical Variables	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**% (graph)**
Sample Distribution	37	28%	33	25%	62	47%	132	100%	
Gender (Male)	35	95%	27	82%	51	82%	113	86%	
Age group (> 45 years old)	32	86%	25	76%	39	63%	96	73%	
Household Head (Male)	34	92%	27	82%	53	85%	114	86%	
Family size (< 4 family members)	20	54%	16	48%	29	47%	65	49%	
Education Level (at least primary school)	34	92%	31	94%	57	92%	122	92%	
Farming experience (> 40 years)	34	92%	18	55%	32	52%	84	64%	
Farm Size (< 5 ha)	33	89%	26	79%	40	65%	99	75%	
Farm onwership (heir)	31	84%	29	88%	54	87%	114	86%	
Membership of cooperatives	36	97%	33	100%	0	0%	69	52%	
Training participation (last year)	7	19%	17	52%	39	63%	63	48%	
Non monetary benefits (accessed)	10	27%	11	33%	21	34%	42	32%	
Market information (agree)	12	32%	11	33%	10	16%	33	25%	

Source: Own depiction based on survey data.

4.2.2 Farm profits and cocoa revenue

Since most of the sample respondents use mixed intercropping systems, the survey questionnaire failed to collect direct information on farm income, cocoa income, and expenses due to several reasons. First, most farmers have limited farm business management and accounting skills. Hence, they were unable to give precise values to the total sales of the previous harvest. Secondly, multiple crops impeded to collect of information on cocoa revenue. As income is a sensitive question, the questions related to income were asked in intervals to avoid direct quantification and make it easier for the farmer to allocated their income interval per income source (Mazzocchini, 2008). Table 5 presents a summary of income by type of activity and group.

Table 5. Income by a source per month (average).

By Type	Farm activities		Off-farm activities							Other			Total (average)
By Income source per month (median in usd)	Temporary crops	Permanent crops	Poultry	Livestock	Subtotal	Trading	Salary	Others	Subtotal	Monetary Premiums	Minimun price	Subtotal	
Fairtrade	11	242	5	1	259	24	72	24	120	2	36	38	418
Fair for life	21	386	27	3	438	50	20	18	88	0	51	51	576
Olam	17	278	32	35	362	0	15	15	29	,35	0	,35	391
Full Sample	16	295	23	17	352	19	32	18	69	2	87	89	511

Note: Income is in USD. Sample size: n=132. Source: Author's own based on survey data.

The monthly average income was calculated by taking the median of each income interval and identifying the income source type. Farmers belonging to Fair for life (FL) have higher incomes compared to the other groups. During 2019, the minimum salary per month was 394 USD, and the basic food basket in Ecuador is 715.85 USD, whereas the survival food basket was 501.52 USD (INEC, 2019; Ministerio del Trabajo, 2018). Other monetary income refers to premium and minimum prices per bag of cacao sold; this was calculated based on the number of bags sold and the compensation received per bag.

This study used the total number of cocoa bags sold during the previous year multiply by the average price in their respective township published by the Minister of Agriculture to estimate only cocoa's income. This table is not including the minimum price per bag or any other monetary incentive received. Fair for life (FL) presents the highest mean with 3,274 USD and a standard deviation of 2,716 USD. It is essential to mention that FL has the highest cocoa crop area and a mean for yield than the other two groups. The variable bags sold and the variable intercrop number of hectares for cacao allowed us to calculate an approximate cocoa yielding. The average farm size used for cocoa is 3.62 hectares, with a 2.75-standard deviation. In Ecuador, around 49% of cocoa farms have less than 10 hectares (ESPAC-INEC, 2017). Appendix 4 and appendix 5 presents a summary of cocoa prices.

Table 6. Income and Cocoa Farm Characteristics (discrete and continuous variables)

Sustainability Program	Fairtrade		Fair for Life		Olam		Full Sample			
Continuous Variables	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Min	Max
Education (in years)	7,57	3,14	7,70	3,06	6,82	2,88	7,25	3,01	0	12
Cacao Plantation (Ha)	3,18	2,00	3,91	2,87	3,73	3,06	3,62	2,75	,50	14
Incomer per year (all sources)	4.557	2.834	6.309	6.218	4.694	2.752	5.059	3.963	600	36.000
Income per year (only cacao)	2.145	1.826	3.274	2.716	1.609	1.326	2.153	1.980	254,1	13.445
Bags sold last year (100 lb)	24	20	36	30	19	25	20	22	3	150
Yield (bags x Ha)	8	4	10	4	6	3	7	4	,75	20

Note: n=132. Source: Own depiction based on survey data.

Perceived benefits and perceived disadvantages from involvement in Sustainability Programs
It is essential to know if farmers perceive benefits or difficulties by participating in cocoa certification to understand how sustainability programs affect small-scale cocoa farmers. In the survey, questions were structured, and the answers had a Likert scale from 1 to 5. The surveyed farmers had to respond on how strongly they agreed or disagreed with different statements about benefits and constraints. Figures 6 and 7 summarize the overall advantages and disadvantages perceived by farmers, respectively, from the different sustainability programs.

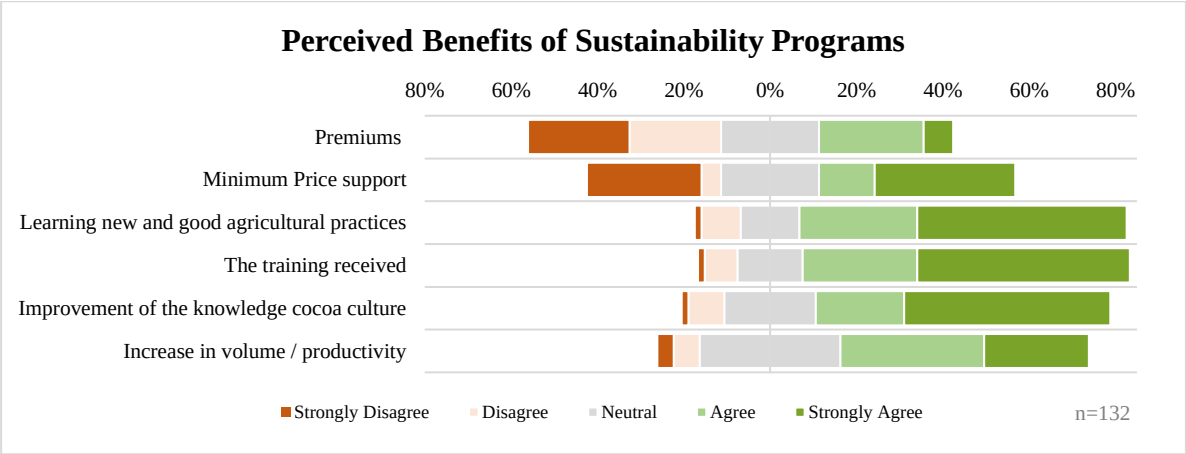

Figure 4. Perceived benefits of Sustainability Programs
Note: n=132. Source: Own Depiction based on survey data.

Most farmers have responded positively to the section related to knowledge and training. More than 76% of the sample agreed that the main perceived benefits of their involvement in a sustainability scheme are the training received, followed by learning new and better agricultural practices and improvement of knowledge in cocoa culture. Secondly, farmers recognized that their cocoa plantations had increased productivity and yield; however, 1/3 of the sample responded that they do not agree or disagree. Conversely, the question related to perceived economic benefits has the highest disagreement in our sample. One reason for this is that farmers involved in the Olam sustainability program do not receive premiums in monetary terms, and Olam is the largest group.

Based on the literature review, the main perceived disadvantages for farmers adopting a sustainability scheme are the cost and time. Nevertheless, according to our sample's survey results, the main disadvantage is that the price received is too low; 30% of the sample strongly agreed with this statement. All three groups responded that they disagreed with disadvantages implying that participating in a sustainable scheme is costly, labor-intensive, and time-consuming. However, a large part of the interviewed farmers viewed the presented possible constraints of the scheme neutral.

The second perceived disadvantage is related to the transparency of the administration. In this case, farmers belonging to a voluntary sustainable standard were more likely to respond that they agreed and strongly agreed that the administration is not transparent with the information shared and with the decisions made by their cooperatives. Meanwhile, farmers belonging to Olam replied that they strongly disagreed with this statement, which is acceptable as Olam’s farmers are not members of an association or cooperative. They do not have a voting decision on the treatment of premiums.

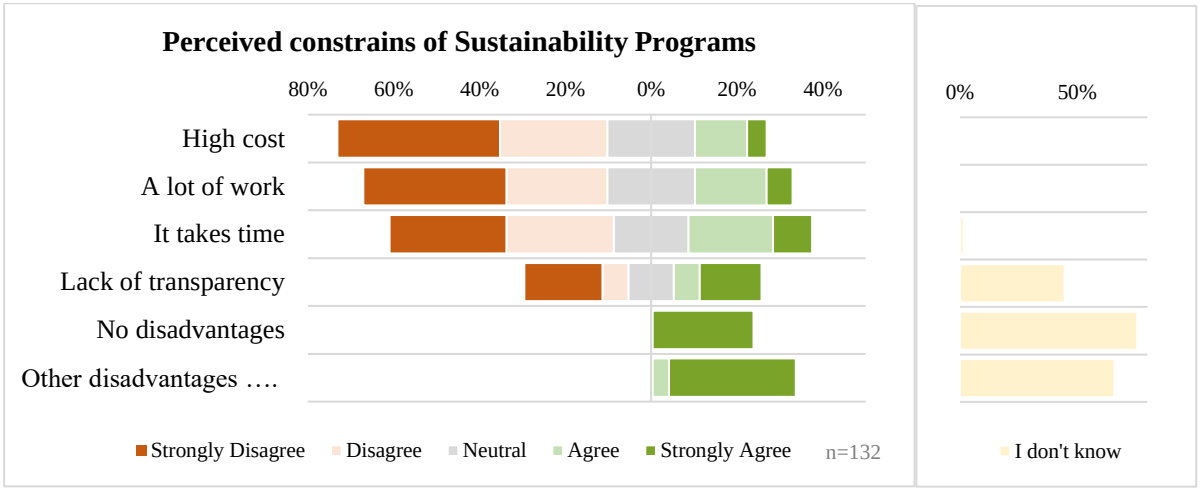

Figure 5. Perceived constraints of Sustainability Programs.
Note: Sample size n=132. Source: Own Depiction based on survey data.

5 Econometric model and specification

This section discusses the method used to assess the impact of different sustainability schemes on cocoa farmers' livelihood in Ecuador quantitatively. The model specification consists of an econometric approach based on previous literature to estimate the sustainability program's impact on the farmers' livelihood.

5.1 Modeling farmers' choice

To model the farmers' choice of participation in a particular sustainable scheme, either VSS (e.g., FT or FL) or SSP (e.g., Olam), the study uses the utility framework. A farmer will choose a program that will maximize their utility. Utility, U, is determined by a set of variables x_i, such as farm and household characteristics, also influence the farmers' willingness to join a certification scheme.

$$MAX\ U = f(x) \tag{1}$$

A farmer, *i*, will participate in a particular certification scheme voluntary sustainable standard (VSS), j, if the utility U_{ij} obtained in this scheme is more significant than participating in sustainable sourcing practices (SSP) scheme, utility U_{im} derived from an alternative sustainability scheme m. This relationship can be represented by the dependent variable y* as:

$$y^* = U_{ij} > U_{im} \qquad \forall j \neq m \tag{2}$$

Where y^* represents the benefits obtained from participating in a particular sustainable scheme VSS or SSP in the cocoa market j instead of the alternative scheme m. The probability that a farmer joins a specific scheme of sustainability j can be denoted by $\Pr(p = 1)$ given a set of explanatory variables (x). Therefore, if the farmer does not participate in the sustainable scheme j, the benefit is valued as 0. In other words, p^* takes a value of zero. The decision-making of farmers maximizing utility can be denoted as:

$$U_i = \begin{cases} y^* & if\ y_{ij} \geq 0 \\ 0 & if\ y_{im} < 0 \end{cases} \quad \forall j \neq m \tag{3}$$

Assuming a linear relationship, *P** can be specified as the following:

$$P^*_{ij} = \gamma_j x_i + \varepsilon \tag{4}$$

Where γ is the estimated coefficients for a set of explanatory variables x, and ε represents the errors to be estimated, which are the unconsidered factors influencing the participation decision.

In this study, y^* is qualitative and explains the probability of the farmers' choice of a sustainability program base on the utility. There are three different sustainable schemes: *j*

(FT, FL, and Olam) that a smallholder can choose to participate in; the outcome variable can take more than two values but only one at a time.

To predict the farmers' choice to participate in a sustainability scheme *j*, the following sustainable schemes can be defined as:

$$j = \begin{cases} 0 = for\ households\ that\ are\ FT \\ 1 = for\ households\ that\ are\ FL \\ 2 = for\ households\ that\ are\ Olam \end{cases} \quad (5)$$

To fix the latent variable to zero, FT is the base outcome, so the remaining outcome variables measure the preference of the other programs Olam and Fair for Life, relative to Fairtrade. Following Gujarati's (2008) empirical applications, a multinomial probit model predicts the probability of participation in one of each cocoa sustainability scheme. In a multinomial probit model, the dependent variable can take more than two categorical outcomes. Still, only one at a time values are finite, discrete, and cannot be ordered in any way.

5.1.1 Factors influencing the sustainability program decision

To find the effect of VSS (e.g., FT or FL) or SSP (e.g., Olam) in cocoa farmers' income and improved wellbeing is necessary in the first place to find the farmers' choice for a particular sustainable program. In an imperfect market, utility maximization differs from profit maximization (Chiputwa et al., 2015). Hence, factors that influence a sustainability program's participation may vary as each sustainability scheme (FT, FL, Olam) requirements and benefits are different. Table 7 summarizes a set of covariates that cocoa farmers hypothetically consider in the decision-making process.

Table 7. Overview of potential factors influencing the decision-making process of participating in a program

Category	Variable Name	Variable definition
Household characteristics	x_1: Male household head	Qualitative variable, categorical, dichotomous 1 Male, 0 No
	x_2: Age of household head	Qualitative variable, categorical, ordinal 1 (18-25), 2 (26-35), 3 (36-45), 4 (46-55), 5 (56-65), 6 (66 - 75), 7 (>75)
	x_3: Education of household head (years)	Quantitative Variable, numerical, discrete 1 Primary school = 6 years; 2 Secondary school =9 years; 3 High school =12 years; 4 Institute/College =11 years; 5 University =17 years; 6 Other =13 years; 7 Nothing = 0 years
	x_4: Household size	Qualitative variable, categorical, ordinal 1 (1 – 3 people), 2 (4 – 7 People), 3 (> 7 people)
	x_5: Years working in farming cocoa	Qualitative variable, categorical, ordinal 1 (<5 years), 2 (5-10 years), 3 (11-20 years), 4 (21-40 years), 5 (41-50 years), 6(>51 years)
	x_6: Livelihood diversification	Qualitative variable, categorical, ordinal 1 "1 income source", 2 "2 income sources", 3 "3 income sources", 4 "4 income sources"

Farm Characteristics	x_7: Farm size	Qualitative variable, categorical, ordinal 10-1 ha; 2 1-2 ha; 3 2-3 ha; 4 3-4 ha; 5 4-5 ha; 6 5-10 ha; 7 >10 ha
	x_8: Labour	Qualitative variable, categorical, dichotomous 1 (1 – 3 people) 2 (4 – 7 People) 3 (> 7 people)
	x_9: Production system (No intercrop, only cocoa)	Qualitative variable, categorical, dichotomous 1 Yes, 0 No

Source: Own depiction based on previous literature review.

5.2 Modeling the effects on income

The type of sustainability scheme VSS (e.g., FT or FL) or SSP (e.g., Olam) and a set of selected explanatory variables will describe how it affects the cocoa farmers' income (dependent variable). Based on the literature review presented in section 3, several predictor variables x_i have been identified as potential determinants of a better income. For estimating the effect of Fairtrade, Fair for life, and Olam program on income, besides the variables on household and farm characteristics, the model will use a dummy variable for each sustainability scheme. However, income differences among the smallholder farmers of the different programs are not necessarily due to their choice. Other factors might influence the income differences, such as productivity, management skills, and location.

The study will use a multiple regression model to estimate how each covariate (x) affect the outcome variable income Y, holding all else constant. A multiple regression model allows determining the model's overall fit and the relative effect of each of the predictors to the total variance explained income. The model takes the general regression form specified by the following formula:

$$Y_{ik} = \beta_0 + \beta_n X + \varepsilon_{2i} \tag{6}$$

where the betas are parameters to be estimated in the income regression model, *k* is the farmers' choice of sustainability scheme (VSS = 1, SSP = 0):

$$k = \begin{cases} 1 = for\ households\ that\ are\ VVS \\ 0 = for\ households\ that\ are\ SSP \end{cases} \tag{7}$$

β_n are the parameters estimated that show the effect of the covariate on the income of cocoa farmers and ε_{2i} is the error term for the income regression model. The dependent variable income uses the log-transformation to reduce the skewness of the data and normalize the distribution:

$$\log(Y_{ik}) = \beta_0 + \beta_n X + \varepsilon_{2i} \tag{8}$$

For the analysis of the results, the interpretation for the estimated coefficients $\hat{\beta}$ will be in terms of for every 1-unit increase in x_1 will result in an expected increase in $log - Y$ of $\widehat{\beta_1}$ units. Regarding the income itself, without the log-transformation, for every 1-unit increase in x_1 the expected outcome of Y is multiplied by $e^{\widehat{\beta}}$.

5.2.1 Determinants affecting the farmer's income

In the first stage, the study will analyze the determinants that affect smallholders' income using some of the probit model's significant parameters. As the probit model is based on the utility theory, it is expected that the independent variables used in the model will also affect farmers' income. Based on the literature review presented in section number 3, the explanatory variables used in the regression model assumed to affect outcome variable income are detailed in table 8.

Table 8. Overview of potential determinants affecting income

Category	Variable Name	Variable definition	Expected sign
Household characteristics	x_1: Education of household head	1. Primary school =6 years; 2. Secondary school =9 years; 3. High school =12 years; 4. Institute/College =11 years; 5. University =17 years; 6. Other =13 years; 7 = 0 years	Positive
	x_2: Years working in farming	1. (<5 years), 2. (5-10 years), 3. (11-20 years), 4. (21-40 years), 5. (41-50 years), 6. (>51 years): median	Positive
	x_3: Livelihood diversification	1. "1 income source", 2. "2 income sources", 3. "3 income sources", 4 "4 income sources."	Positive
Farm Characteristics and Competitiveness	x_4: Labor force	1. (1 – 3 people) 2. (4 – 7 People) 3. (> 7 people)	Positive
	x_5: Farm size	1. 0-1 ha; 2. 1-2 ha; 3. 2-3 ha; 4. 3-4 ha; 5. 4-5 ha; 6. 5-10 ha; 7. >10 ha	Positive
	x_6: Average production cost (only cocoa)	Median of ranked costs	Negative
	x_7: Cocoa Yield	Bags of dry beans sold per ha	Positive
	x_8: Experience in Sustainability Scheme	Number of years in the program	Positive

Source: Own depiction based on previous literature review.

Following the conceptual framework of sustainable rural livelihood, institutional resources are essential for improving smallholders' income (Jena et al., 2017; Marsh, 2003). In the current model potential determinants affecting the income associated to the sustainability scheme are added. Voluntary sustainability standards (VSS), FT, or FL are only possible; in most cases, through cooperative membership, this type of sustainability program allows farmers to have floor prices, enhancing their income. Meanwhile, with sustainable sourcing practices (SSP), farmers are not required to be cooperative members, but a long-term buying commitment also exists. For the human capital component variables from household characteristics, such as years of education, family size, farming experience, and services received from sustainability programs (e.g., training) to improve farming practices and years of experience in the sustainability program. Table 9 describes the additional variables included in the model.

These variables provide capabilities that improve the farmer's skills and knowledge to develop a livelihood strategy to achieve a livelihood outcome such as better income (Jena et al., 2017; Meemken et al., 2019; Scoones, 1998; Vellema et al., 2015). Larger farm sizes allow farmers to have more considerable means of livelihood (Jena et al., 2017). Income from non-farming activities is considered a livelihood strategy to improve livelihood outcomes as the income and risk is diversified (Jena et al., 2017; Ruben and Zuniga, 2011).

Table 9. Overview of potential determinants rewarded by the market affecting income

Category	Variable Name	Variable definition	Expected sign
Sustainability practices rewarded by the market	x_9: Premium received	Total premium = qty sold * premium in USD per bag	Positive
	x_{10}: Other non-monetary premiums (intensity)	Count of other non-monetary categories received such as tools, machinery, inputs, social help, other	Positive
	x_{11}: Minimum floor prices	Total minimum price = qty sold * min price in USD per bag	Positive
	x_{12}: Training Intensity	Total number of training received in overall	Positive
	x_{13}: Perceived access to market information	1. Strongly Disagree; 2. Somewhat disagree; 3. Neutral; 4. Somewhat Agree; 5. Strongly Agree; 6. I do not know; 7. Not applicable	Positive
	x_{14}: Perceived access to inputs and technology	1. Strongly Disagree; 2. Somewhat disagree; 3. Neutral; 4. Somewhat Agree; 5. Strongly Agree; 6. I do not know; 7. Not applicable	Positive

Source: Own depiction based on previous literature review.

5.3 Threats to internal validity

Guarantee that every surveyed farmer in the sample has a nonzero probability of being selected is difficult to achieve. Farmers where randomly surveyed in different provinces and in specific locations. Since, selection bias at the sample level can significantly affect the estimation results is important to correct. One alternative solution to reduce the selection bias of the sample can be by estimating the effect of the independent variables over the outcome (income) in the overall representation of the sample, and later estimating the income by each subgroup (VSS vs SSP). Another option is to by using a two-step procedure, where in the first part the multinomial probit is calculated and then for each farmer the inverse mills ratio is calculated. The estimated rate is used as a regressor in a second model or this research in the income model (Wooldridge, 2010). Finally, there is no evidence of endogeneity and the OLS is consistent, results can be presented. However, this correction is not possible to perform within the time frame for this thesis and the data is too limited to find a control group, a group of farmers that are conventional.

Another problem is with omitted variable bias (OBV) when explanatory variables are not included in the regression model. According to Wooldridge (2010), bias also occurs when regressors are under or overestimated due to the missing variables. In the present thesis, the risk of omitted variable bias exists because of data unavailability as it was not possible to

collect all explanatory variables for income. For example, it was not possible to collect information for the analysis with the farmer's existing assets due to time and budget. Another reason is that the sample was very small, and it was not possible to add more variables to our model as we could risk having instable coefficients.

Measurement error occurs when the data present errors either on the dependent or independent variables. This could happen because, first, interviews were held in most collection centers of each sustainability scheme. Farmers probably answered the interview accordingly to what their organization expected. Even though the survey was face-to-face, farmers might feel compromised to their organization and did not give their genuine opinions. Secondly, questions about the farmer's perception of the sustainability program benefits and constraints depend mainly on farmers' interpretation. There is a risk of bias due to slightly different understandings among the surveyed farmers, which is inevitable. On the other hand, data related to quantities sold, minimum prices received, or income sources show that farmers could not estimate these amounts correctly. Finally, to avoid collinearity problems between the covariates, as the sample size is small, and to prevent numerical instability and avoid underestimated standard errors and inaccurate regressors, limited variables are being used (Wooldridge, 2010).

6 Results and Discussion

This chapter presents the results of the econometric model and the respective analysis. The econometric model examines the determinants of choosing specific sustainability programs and the effects on cocoa farmers' income following a two-step analytical procedure.

6.1 Results of the multinomial probit model

The analysis examines the factors influencing cocoa farmers' sustainability program decisions through a multinomial probit (MNP). Table 10 describes the results of the MNP model. The Wald chi-square test 53.98 is significant, with a p-value of less than 1% implies that the regressors as a whole are statistically significant in the multinomial probit model. In other words, the model explains better than a model with no predictors the probability of farmers choosing a sustainability program over Fairtrade (FT). FT group is set as the base outcome. The statically significant regressors are household head age, household gender male, years of education, farming experience, cocoa income, farm size, labor, production system (means only cocoa no intercrop), and income diversification.

Table 10. MNP estimations for determinants influencing the sustainability program decision.

	Dependent variable = Sustainability Program					
Variables	**Coefficient**	**Std. Err.**	**z**	**P>z**	**[95% Conf. Interval]**	
Fairtrade	*(base outcome)*					
Olam						
Male household head	-0.2591	0.5549	-0.47	0.641	-1.3468	0.8285
Age of household head	-0.7626	0.2244	-3.40	0.001 ***	-1.2025	-0.3227
Education of household head (years)	-0.2578	0.0764	-3.38	0.001 ***	-0.4076	-0.1081
Household size	-0.4945	0.3617	-1.37	0.172	-1.2034	0.2143
Years working in farming cocoa	-0.5870	0.2170	-2.71	0.007 ***	-1.0123	-0.1618
Livelihood diversification	0.3591	0.2660	1.35	0.177	-0.1622	0.8805
Farm size	0.3931	0.1280	3.07	0.002 ***	0.1424	0.6439
Labour	1.5596	0.8164	1.91	0.056 *	-0.0405	3.1598
Production system (No intercrop, only cocoa)	-0.1976	0.6116	-0.32	0.747	-1.3963	1.0011
Intercept	5.6906	1.9902	2.86	0.004	1.7898	9.5913
Fair_for_Life						
Male household head	-1.5318	0.5436	-2.82	0.005 **	-2.5973	-0.4664
Age of household head	-0.3822	0.2274	-1.68	0.093 *	-0.8280	0.0635
Education of household head (years)	-0.0483	0.0773	-0.62	0.532	-0.1998	0.1032
Household size	-0.2719	0.3725	-0.73	0.466	-1.0021	0.4583
Years working in farming cocoa	-0.4608	0.2210	-2.09	0.037 **	-0.8939	-0.0277
Livelihood diversification	-0.1739	0.2886	-0.60	0.547	-0.7396	0.3918
Farm size	0.3295	0.1325	2.49	0.013 **	0.0699	0.5891
Labour	0.4616	0.9776	0.47	0.637	-1.4544	2.3776
Production system (No intercrop, only cocoa)	1.4138	0.5723	2.47	0.013 **	0.2922	2.5354
Intercept	4.1130	2.1002	1.96	0.050	-0.0033	8.2292
Number of obs =	132					
Prob > chi2 =	0.000					
Wald chi2(18) =	53.98					
Log likelihood =	-97.1019					

*Note: ***p<0,01; **p<0,05; *p<0,1 Source: Survey data computation based on the MPM results in Stata/IC 16.1.*

To better interpret the results, the study will use the average marginal effects of a certain covariate on each outcome variable. Because a multinomial probit model is a non-linear model, interpreting its coefficients will only explain an event's odds-ratio. However, it would not explain the effect on the outcome. In the multinomial probit, the p-value will explain the relevance of a coefficient in the model specification, test for statistical significance, whether or not to include a certain regressor. Not including one covariate can affect the results and significance of the remaining coefficients. A regressor can influence the probability of choosing a sustainability program over the probability of choosing the baseline program positively on the ratio, but the same covariate in average marginal effect estimation, can negatively affects the probability of choosing or not a specific sustainability program. The marginal effect explains the changes in the probability of the observed outcome. The summary of every sustainability program's average marginal effects after the multinomial probit is in table 11.

Table 11. Average Marginal effects after Multinomial Probit Model estimations for determinants influencing the sustainability program decision.

	Average Marginal Effects (dy/dx)		
Variables	**FT**	**Olam**	**FL**
Male household head	0.138756 *	0.113756	-0.252512 ***
	0.0813	0.0831	0.0661
Age of household head	0.103240 ***	-0.116586 ***	0.013346
	0.0304	0.0353	0.0334
Education of household head (years)	0.028921 ***	-0.048273 ***	0.019352 *
	0.0103	0.0120	0.0116
Household size	0.068725	-0.072978	0.004253
	0.0548	0.0626	0.0572
Years working in farming cocoa	0.091794 ***	-0.071525 **	-0.020269
	0.0318	0.0319	0.0288
Livelihood diversification	-0.022449	0.093623 **	-0.071174 *
	0.0409	0.0442	0.0431
Farm size	-0.063017 ***	0.045618 **	0.017399
	0.0179	0.0200	0.0184
Labour	-0.187472	0.273457 ***	-0.085985
	0.1364	0.1112	0.1269
Production system (No intercrop, only cocoa)	-0.085128	-0.195714 **	0.280842 ***
	0.0873291	0.091821	0.0711455
Number of obs =	132		

*Note: Standard errors are reported in parenthesis, ***p<0,01; **p<0,05; *p<0,1.*
Source: Survey data computation based on average marginal effect results in Stata/IC 16.1

The marginal effect is positive for a male household head choosing Fairtrade (FT) at a 10% level of significance; meanwhile, the marginal effect is negative for a male farmer to choose Fair for life (FL) at 1% of significance. The marginal effect of a household head being male, holding all other factors constant, increases the probability for a farmer choosing Fairtrade (FT) at a 0.14-point percentage and decreases 0.25-point percentage the likelihood of a farmer choosing Fair for life (FL); meanwhile, the covariate is not significant for farmers choosing Olam.

The coefficient for household age is favorable for farmers choosing FT at a 1% level of significance; meanwhile is negative for farmers choosing Olam at the same level of

significance. The marginal effect of a farmer being older, holding all the rest constant, increases the probability by 10-point percent to choose FT. For Olam, the relation is the opposite; by 12-point percent. This is plausible because the Olam sustainability program has less than three years in the market and farmers are younger within this group.

The estimated coefficient for years of education significantly determines farmers' choice decisions towards Fairtrade and Olam at a 1% level of significance. The marginal effect of education of a 3-point percentage, while holding all other factors constant, increases the probability that a farmer participates in FT by 3%. The marginal effect for farmers choosing Olam decreases by 4% the likelihood if the farmers have more years of education. Higher education level is translated to a higher understanding of information and business. As cocoa farmers choosing FT must be associated at a cooperative level, they need to have some education to improve supply, contract, and price negotiation.

The marginal effect of years of experience in farming increases the probability of joining FT by 6% while holding the rest of the variables constant at a 1% level of significance. It can be explained as the farmers in FT has a higher number of older farmers, and farmers have ample working experience associated with cooperatives. For Olam, at a significance level of 5%, the marginal effect of working experience decreases the probability of choosing Olam as a sustainability program by 7% because farmers with more experience in cacao farming will select a program with more experience in the market. For FL, the experience does not influence the decision-making process of choosing FL or not.

The estimated coefficient for farm size is negative and significant and determines farmers' choosing Fairtrade at a 1% level of significance. The marginal effect of the farm size variable of 0.063017 point-percent denotes that an increase in farm size leads to a 6.30% decrease in the possibility of the cocoa farmers to join the Fairtrade sustainability program while holding other factors constant. This is realistic; one of the conditions to join a FT program is that farm size must be a smallholder according to the national parameters. Secondly, cocoa farmers with larger farm sizes may have more bargaining power to sell to other private buyers than FT. Farm size is also significant at 5% for farmers' choosing Olam as a sustainability program; controversy larger farm sizes positively affects the decision-making process. The marginal impact of farm size is a 0.046-point percentage; as farm size increases, the probability of joining the Olam increases by 4,5%. The Olam program does not have any limitations on the farm's size.

Regarding the estimated coefficient of labor, it is positive and statistically significant for farmers choosing Olam. The marginal effect of labor is a 27-point percentage, while everything else is constant. The probability of a farmer choosing Olam as a sustainability program increases by 27% when a larger labor force is working at the farm. Larger farm sizes require a larger workforce.

The estimated coefficient that is also statistically significant in the decision-making process is the intercropping system for farmers with cacao crops only, monocultures. At a 1% level of confidence, the marginal effect of having only cocoa crop increases the probability of a farmer to join to FL by 28%, holding the rest of the explanatory variables constant. Meanwhile, the variable is negative and significant at a 5% level of significance for farmers choosing Olam. The marginal effect of farms with only cocoa crops decreases a farmer's probability of joining Olam by 19%. One of the reasons is that farmers in Manabí have mixed farms, which means they use various crops in the same plot due to the farms' sizes.

Income diversification is explained as the number of income sources a farmer has. Income sources can be from farm activities and off-farm activities. The marginal effect of having additional income sources decreases the probability of joining FL by 7% at a 5% confidence interval. Inversely, the likelihood increases by 9% when a farmer selects Olam. Intercropping system; mix farms increased the probability of joining Olam, which means then that income sources will also positively affect the decision-making process because the number of multiple crops explains the number of income sources. Appendix 7 shows a table of the predicted probabilities of an individual choosing one of the alternatives in the estimation sample and the summary of predicted outcomes.

6.2 Sustainability schemes and their effect on a higher income

The results of table 12, determinants on income (income per year in USD), shows that when regressing for the whole sample (n=132) without making any segregation by type of sustainability program, household and farm characteristics such as education, income diversification, farm size, yield and program experience have a positive effect on income. Production costs have a negative effect on the model. Explanatory variables such as livelihood diversification, farm size, production costs, yield, experience in the program (years), are statistically significant at 1% level of confidence, and education of the household head is significant at a 5% level of confidence, holding all other variables constant.

Table 12. Results of regression on determinants affecting the farmer's income

	Dependent variable = Log Income					
Variables	**Coefficient**	**Std. Err.**	**t**	**P>|t|**	**[95% Conf. Interval]**	
Education of household head (years)	0.03492	0.01471	2.37	0.02 **	0.00580	0.06404
Years working in farming cocoa	0.00180	0.00277	0.65	0.52	-0.00369	0.00729
Livelihood diversification	0.22784	0.05584	4.08	0.00 *	0.11729	0.33838
Labour	0.04176	0.12007	0.35	0.73	-0.19592	0.27944
Farm size	0.07657	0.01352	5.66	0.00 *	0.04981	0.10334
Average production cost (only cocoa)	-0.24178	0.09710	-2.49	0.01 *	-0.43399	-0.04958
Cocoa Yield	0.04473	0.01227	3.64	0.00 *	0.02043	0.06903
Experience in Sustainability Scheme	0.20805	0.05403	3.85	0.00 *	0.10109	0.31500
Type of sustainability scheme (VVS=1)	-0.01884	0.10974	-0.17	0.86	-0.23608	0.19839
Constant	6.89313	0.35034	19.68	0.00	6.19959	7.58667

Number of obs =	132
F(9, 122) =	8.48
Prob > F =	0.0000
R-squared =	0.3847
Adj R-squared =	0.3393
Root MSE =	0.47672

*Note: Standard errors are reported in parenthesis, ***p<0.01; **p<0.05; *p<0.1.* Source: Survey data computation based on multiple regression model on income in Stata/IC 16.1.

Experience is measured as the number of years in farming. Working experience in agriculture was asked in class intervals during the survey. For the regression, the intervals were transformed into continuous numbers by calculating the median of the intervals. The same

technique, the median of each interval, was used for education and years of experience in the sustainability program. Yield is calculated based on the number of bags sold the previous year and the number of hectares of cocoa planted calculated from the question of intercrop "cacao". The amount only indicates an approximate productivity per hectare of cacao. However, it does not consider cocoa trees ratio per hectare or distribution of crops when it is a mixed farm type.

For the analysis, the multiple regression model is perform by each sustainability scheme (variable type of program: VSS = FT & FL; SSP = Olam). In this way, it is possible to see each effect of the farmer's income determinants according to the sustainability group. Due to the small sample size, the significance levels found in the regression of the full sample changed when running the regressions for each sustainability scheme. For every regression, the sample was adjusted to the size of each group. Table 13 contains the three regression results for the full sample including all groups, then a regression per sustainability scheme VSS, and SSP. The table summarizes the first model (1) for FT and FL together under the VSS group and SSP is for Olam. The log-transformed outcome variable must be considered to evaluate the effects on income itself for interpreting the results. To interpret the amount of change in the income, is necessary to first exponentiate the coefficients of each variable to obtain the exponential of each, and to calculate the percent change we subtract this result and then multiply it by 100.

Table 13. Estimated effects of suggested determinants on income model 1.

	Dependent variable = Log Income		
Variables	**All Groups**	**VVS (FT & FL)**	**SSP (Olam)**
Education of household head (years)	0,035*	0.028	0.031
	-0.015	-0.018	-0.021
Years working in farming cocoa	0.002	-0.002	0,011*
	-0.003	-0.003	-0.004
Livelihood diversification	0,228***	0,379***	0.1
	-0.056	-0.077	-0.069
Labour	0.042	0.416	-0.105
	-0.12	-0.248	-0.127
Farm size	0,077***	0,126***	0.032
	-0.014	-0.021	-0.016
Average production cost (only cocoa)	-0,242*	-0.058	-0,328*
	-0.097	-0.127	-0.131
Cocoa Yield	0,045***	0,037**	0,041*
	-0.012	-0.014	-0.02
Experience in Sustainability Scheme	0,208***	0,201**	0,185*
	-0.054	-0.063	-0.08
Type of program	-0.019		
	-0.11		
Intercept	6,893***	5,990***	7,550***
	-0.35	-0.455	-0.477
Number of obs =	132	70	62
F(9, 122) =	8.48		
F(8, 61) =		12.07	
F(8, 53) =			4.57
Prob > F =	0.000	0.000	0.000
R-squared =	0.385	0.613	0.408
Adj R-squared =	0.339	0.562	0.319

*Note: Standard errors are reported in parenthesis, ***p<0.01; **p<0.05; *p<0.1.* Source: Survey data computation based on multiple regression model on income in Stata/IC 16.1

Income diversification is positive and statically significant only for VSS group at a 1% level of significance. The scale for income diversification is ordered from 1 to 4. Hence, an increase in the number of income sources results in an increase in income by 46%. Surveyed farmers had seven income sources categories: temporary crops, permanent crops, poultry, livestock, trading, salary, or other. Out of the whole sample, the maximum number of income sources found was four income sources. It is reasonable that higher number of income sources increase income. This is congruent with the finding in the literature review income diversification from farming, and non-farming activities are a livelihood strategy and help improve livelihood outcomes, in this case, better income, as the risk is diversified and farmers don't rely in only one source (Jena et al., 2017; Ruben and Zuniga, 2011).

Farm size is divided into seven categorical groups, with 1-hectare interval up to 5 hectares and then one interval of 5-hectares and finally one last interval equivalent to >10 hectares. The median of the farm size interval is used as the explanatory variable to facilitate the results' interpretation. The positive relationship between farm size and income for farmers belonging to VSS can be illustrated as per every 1-ha increase in the farm size, income increases by 13.43% per year, at a 1% level of significance and holding the rest of the regressors constant. Larger farms also imply higher yield and higher income; this is consistent with Vellema et al. (2015) findings.

Yield, in terms of bags per hectares, is significant at 5% for FT-FL and significant 10% for Olam farmers showing a positive relationship with income. For every increase in yield, 1-bag per hectare, income increases by 3.78% and 4.19% for VSS and SSP respectively, while holding the rest of the covariates constant. In monetary terms this means an increase of USD 223 and USD 196.83 for VSS and SSP group respectively. Productivity increases income as higher number of bags per hectare can be sold in cocoa markets. Increased productivity can result from skills and experience (Djokoto, 2016; Ingram et al., 2018a). It can also be anticipated that as annual income increases, it can influence the farm's size as it enables farmers to expand their cocoa farms.

Farming experience, years working in farming, is significant when estimating for SSP group at 10%. The coefficient has a positive effect on income, for every year of gained farming experience income increase by 1.11%. The percentage change is very low and represents an increase per year of USD 51. For the VSS, farming experience is not statistically significant but is possible to see that the effect of farming experience has a negative effect on income. Farmers belonging to Fairtrade and Fair for life have many years as members of their sustainability program, what is more 81% of the sample were older that 45 years old. Experience has a learning curve that starts decreasing after certain point and explains why the sign is negative for VSS (FT, FL).

As expected, the correlation of production cost is negative to income, which means as cost increases, income decreases. For interpreting the results, the answers should be allocated within the scale 0-4, being the lowest 0-as "no-cost," 1- as "not important cost," up to 4- as "very important cost." For SSP-Olam, at a 10% significance level, if production cost increases in the rank by 1-unit, the income will decrease by 38.82%. This coefficient is relatively high in comparison to the effect that other explanatory variables have on the income. For SSP farmers, the mean production cost is 2.32, which is falls between the *"somewhat important"* and *"important"* production cost rank; meanwhile, the mean for VSS farmers is 1.97, which is one level less than the group in question. It could be explained since farmers in Olam have higher fuel costs for transportation and water supply. The first one is the distance the farmers have to the collection center in San Isidro. The second one is due topography of the province

and the location of the county. Manabí is characterized as a hilly landscape; hence irrigation is done using water bombs that collect the water from rivers at the bottom of the hills. Water bomb requires fuel to impulse the water up to the plantation (MAG, 2018).

Years in the program are positive and statically significant at a 5% level of significance for farmers that are Fairtrade and Fair for life (VSS) and at a 1% level of significance for Olam farmers, holding the rest of the variables constant. When experience in sustainability program increases by one year, income increases by 22.26% for FT&FL. In VSS (FT & FL) the mean of the income per year is equal to USD 5912.12; hence 22.26 percent change is equivalent to USD 1316.03 additional per year. For Olam, a 1-year increase in program experience results in an 20.32% increase in income. The mean of income per year for Olam is equal to USD 4697.71; the percentage change in the income represents USD 954.57 per year for every year of experience in the program acquired by the farmer. This result is extremely rare because of the size of the coefficient. Is important to mention that in sample there are neither farmers that have left the program nor farmers that are conventional and doesn't belong to any program or farmers that choose not to enter to the program. This can be an explanation of the huge effect of this covariate on income due to small sample size and the absence of a control group.

6.2.1 The effect of adding sustainability practices rewarded by the market to income

In equation 2 additional covariates that potentially have an effect on the farmers' income were included. More specifically, explanatory variables suggested in the literature as sustainability practices rewarded by the market such as premiums, non-monetary premiums, minimum floor prices, training intensity. Also, variables such as access to market information, inputs and technology were included in the regression, but these variables are measured as the farmer's perception of suggested benefits of a sustainability program. After including all the suggested additional variables to the income equation and regressing for the whole sample (n=132), only the effect on livelihood diversification did not change in significance. The first set of variables related to household characteristic either changed in significance level or lost the significance statically, results can be found in table 14. This statistical technique allows testing of the relationship between the two variables and assessment of how the relationship is affected by the grouping.

Out of the 6 new variables included in the model (equation 2), the results indicate that when estimating for the whole sample without group segregation, only the variable minimum floor price (MNP) is positive and significant at 1% level of confidence. When estimating per group, minimum floor price is significant at 10% for the VSS, but the magnitude of the coefficient is so small that when converting into percentage change the effect of minimum floor prices on income is 0.14%. This means that for every USD 1 increase in the MFP, the farmers' income increases by 0.14%, which is USD 8.27 per year. Minimum floor price refers to the price established by the programs: Fairtrade and Fair for life, and prices are established by metric ton of dried cocoa beans. Olam group (SSP) doesn't have a minimum floor prices hence the variable was omitted when regressing for the group. The results are consistent with Chiputwa et al. (2015) findings in which that minimum floor prices increase farmers' income. Is also important to consider that an increase of USD 8.27 per year is relative low even in a developing country as is Ecuador, Dammert and Mohan (2015) wrote that minimum prices improve farmers' income only when the international price is lower than the minimum price; otherwise, farmers receive the market price, which does not necessarily mean a higher profit.

Another important characteristic of sustainability program are the premiums they provide to their farmers groups. In the regression, when including the covariate monetary premiums, the

effect on income is only significant for farmers belonging to SSP. The effect is positive and increases income by 0.69%. Monetary premiums in Olam are based on the workshops the farmers' affiliate, for example if there's an improvement in their agricultural practices, following technical trainings, farmers receive a compensation for their efforts in reducing fertilizers usage or in implementing agroforestry systems in their farms. These monetary premium increases income by USD 32.41 per year. For the fair-trade groups (FT, FT) the monetary premium is not significant for the regression, this is reasonable as these premiums are given to their cooperative for improvement in infrastructure or developing projects in their communities, therefore farmers don't receive that money in their hand, but they receive it in-kind.

Table 14. Estimated effects of suggested determinants on better income when adding sustainability rewards

	Dependent variable = Log Income					
	(1)	**(2)**	**(1)**	**(2)**	**(1)**	**(2)**
Variables	**All Groups**		**VVS : (FT & FL)**		**SSP : (Olam)**	
Education of household head (years)	0,035*	0.028	0.028	0.019	0.031	0.023
	-0.015	-0.014	-0.018	-0.02	-0.021	-0.021
Years working in farming cocoa	0.002	0.003	-0.002	-0.003	0,011*	0,009*
	-0.003	-0.003	-0.003	-0.003	-0.004	-0.004
Livelihood diversification	0,228***	0,188***	0,379***	0,335***	0.1	0.08
	-0.056	-0.053	-0.077	-0.077	-0.069	-0.07
Labour	0.042	-0.08	0.416	-0.046	-0.105	-0.101
	-0.12	-0.115	-0.248	-0.301	-0.127	-0.123
Farm size	0,077***	0,045**	0,126***	0,086**	0.032	0.025
	-0.014	-0.015	-0.021	-0.03	-0.016	-0.017
Average production cost (only cocoa)	-0,242*	-0.148	-0.058	-0.075	-0,328*	-0.181
	-0.097	-0.095	-0.127	-0.133	-0.131	-0.142
Cocoa Yield	0,045***	0,029*	0,037**	0.025	0,041*	0,042*
	-0.012	-0.012	-0.014	-0.015	-0.02	-0.019
Experience in Sustainability Scheme	0,208***	0.078	0,201**	0.09	0,185*	0.124
	-0.054	-0.057	-0.063	-0.078	-0.08	-0.086
Type of program	-0.019	-0.045				
	-0.11	-0.152				
Premium received		0.001		0		0,007*
		-0.001		-0.001		-0.003
Other non-monetary premiums (intensity)		0.012		-0.028		0.044
		-0.047		-0.072		-0.063
Minimum floor prices		0,000***		0,000*		*omitted*
		0		0		
Training Intensity		0.062		0,129*		0.029
		-0.033		-0.06		-0.039
Perceived access to market information		0.033		0.024		0.011
		-0.033		-0.051		-0.045
Perceived access to inputs and technology		0.021		0.004		0.022
		-0.03		-0.039		-0.048
Intercept	6,893***	7,110***	5,990***	6,892***	7,550***	7,278***
	-0.35	-0.375	-0.455	-0.586	-0.477	-0.529
Number of obs =	132	132	70	70	62	62
Prob > F =	0.000	0.000	0.000	0.000	0.000	0.000
R-squared =	0.385	0.510	0.613	0.670	0.408	0.512
Adj R-squared =	0.339	0.446	0.562	0.586	0.319	0.379

*Note: Standard errors are reported in parenthesis, ***p<0.01, **p<0.05, *p<0.1. Source: Survey data computation based on multiple regression model on income in Stata/IC 16.1*

Sustainability programs invest a lot of time and money in providing trainings to their target farmer groups. According to Utting (2009) and Fenger et al. (2017), certifications can positively impact the income through capacity building and capacity building refers to providing to farmers access to skills and knowledge so they can improve their livelihood outcome, in this case income. In the regression model, the variable training intensity is measured as the counts of trainings received per topic. As per the results of the model, higher training intensity doesn't translate into higher income, SSP (Olam group) has higher number of trainings received, the mean is 3.40 meanwhile for VSS the mean is only half of it: 1.19. Though, training intensity is only significant for VSS, at 10% level of confidence, holding the rest of variables constant, the effect is positive and as training intensity increases by 1 unit the income increase 13.73% per year, in dollars is equivalent to USD 811.73 per year.

Is important to mention that trainings has a focus on improvement of agricultural practices, and according to Akinwale et al. (2019) and Ruben (2017): better agricultural practices and quality improvements derive higher income benefits. For farmers belonging to Olam group, the sustainability program is very young, only has 3 years in the market, extension services such as training intensity and non-monetary premiums should have resulted in higher income. Even though both covariates aren't statistically significant, we can see that the coefficient goes in the right direction, both variables have a positive effect on income. And finally, variables related to the perception of the farmers in regard to access to information and inputs at lower prices, both variables are also not statically significant for either of the sampled groups, but both coefficients are positive, implying that the effect on income is positive. The results goes in line with Ingram et al. (2018a) who found that information, inputs, and other cocoa farmers' services lead to better crops, better income, and increased livelihood outcomes.

7 Conclusions

The purpose of this thesis was to analyze the effects of various sustainability programs in the cocoa sector in Ecuador. The research objective was to understand how different sustainability programs operate in the country and learn more about their motivations in the economic sustainability of the cocoa sector. Secondly, the study aim to find the effect of different determinants on better income of on smallscale cocoa producers in Ecuador. Results point to very different effects across programs, but are consistent with the findings in the literature. To understand how sustainability programs work, it is important to know what are the efforts that they are doing related to social, economic and environmental aspects of the value chain. Two main groups participate in this research, the first group was identified as Voluntary Sustainability Standards, Fairtrade and Fair for life, which are international organizations that certify different actor across the value chain. Those stakeholders must comply with the international standard. The second group is know as Sustainable Sourcing Practices (SSP), in this group Olam Ecuador participated. Companies engage with their suppliers and customers through SSP, this scheme is not complying with any international standard, but companies report the results of their sustainability practices.

Organizations and companies have adjusted to current trends in the food industry, customers increasing preferences for sustainable trade, and also have recognized the significance of addressing key issues in the cocoa industry. This can be seen as per the prominent number of cocoa-initiatives in the market to tackle down ethical and environmental concerns. For companies to be competitive in the market, they must be reliable, and is only possible trough verification, monitoring and control. Fairtrade, Fair for life, Olam are positive examples on how sustainability programs can contribute to changes in the farmers' livelihood and producer associations.

The findings of this study about the factors that motivates a farmers choice for a sustainability sheme are for VSS are that age, literacy, and farming experience enhances the probability of farmer's participation in fair trade cocoa market. On the other hand, larger farm sizes reduces the likelihood of farmer's participation in fair trade cocoa market. Male household is less likely to choose Fair for life. For Olam, education and age decreases the probability to choosing their program, and labor, income diversification, and larger farm sizes increases the probability. Is also important to stress that even that the farmers were randomly interviewed and that farmers are free to choose a sustainability scheme, the location of the program plays an important role in their decision process.

Results from the multiple regression model confirms that income earning increment from cocoa sector seeks for long period accumulated program experience, larger cocoa farm, livelihood diversification, participation in training, yield, farming experience. Minimum floor prices only have a positive effect on Farmers belonging to FT and FL, meanwhile monetary premiums increase income only for farmers belonging to Olam. On the other hand, average production costs tend to reduce income derived from cocoa. The experience in the program should be interpreted with precaution because the variable might be influence by other variables that were not included in the model such as level of satisfaction with the program, hence omitted variables bias in the model can lead into a overestimatted other coefficients. Limitations such as that the sample size is not large enough, and also limitations of selection bias of the sample can lead to understimated and overstimated results. Simultanous bias exists in the present thesis and it causes results to be inneficient. While economic growth may be essential for poverty reduction, it also depends on the capabilities of the farmers to take advantage of expanding economic opportunities. Secondly, smallholders know their own

situation but are often excluded in the design of policies and interventions that are intended to better their life. Finally, majority of smallholders have a low income, low income is also transferred to other dimensions such as: illiteracy, lack of social services, health issues, vulnerability and feelings of powerlessness in general.

Future research, given the limitations of the thesis, many of the estimates risk suffering from simultaneous bias hence it would be of interest to identify an instrumental variable that could correct for these biases. It would of interest to use a control group without any certification or affiliation to see the factors influencing cocoa farmers' sustainability program choice. Results from adding additional covariates to estimate the effect of sustainability practices rewarded by the market didn't reveal any significance, and to better analyze the effect of the sustainability programs in the farmers' income, in the future, similar studies should also include a control group, so estimations can be compared among the groups. Finally, a focus only on the income alone underestimate the impact of interventions in smallholders' welfare, it is a suggestion for future research to analyze this.

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Appendix 1: Sustainability Livelihood Framework

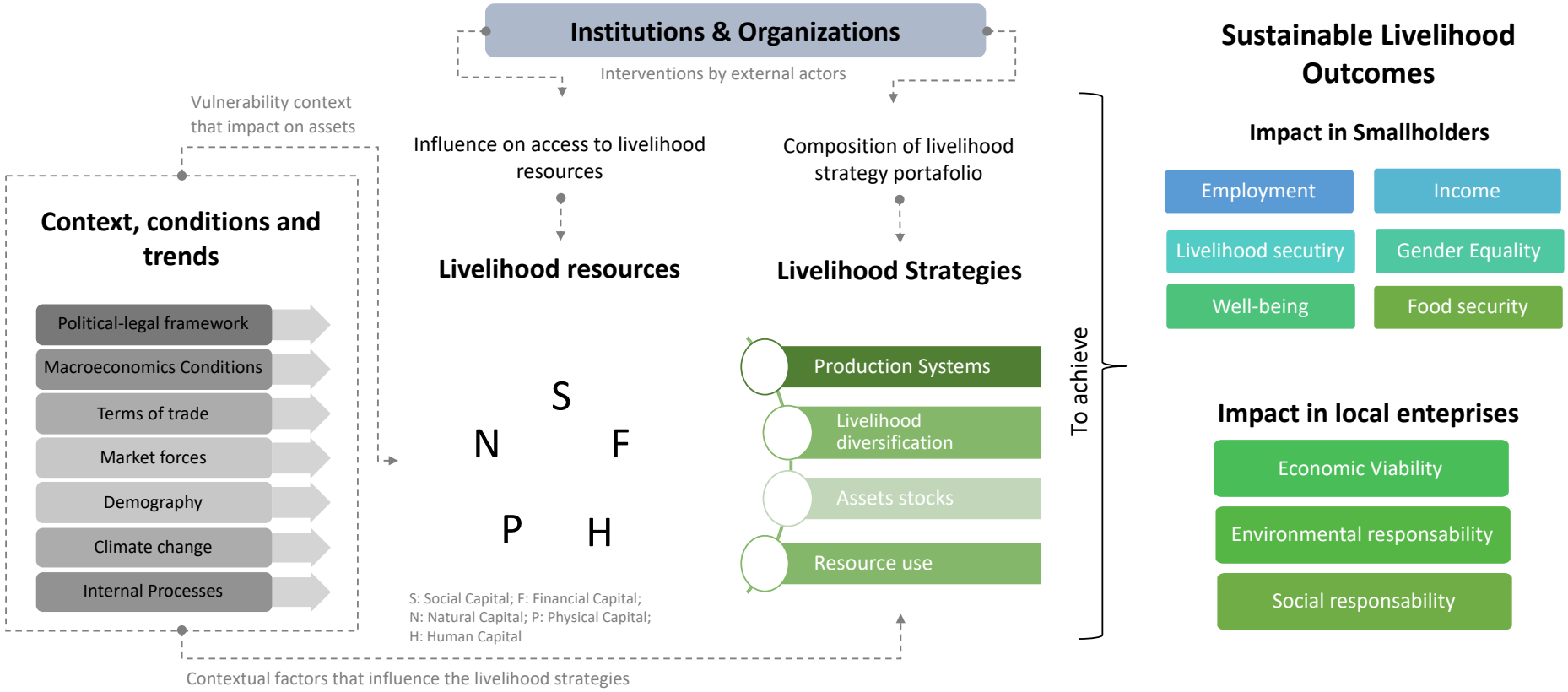

Figure 6: Sustainability Livelihood Framework.
Source: Scoones (1998); own depiction.

Appendix 2. List of towns and villages where interviews were conducted

Province/State	County/Parishes	Municipality	Villages	# of farmers
Guayas	**Milagro**	Milagro	Buenos Parte	2
			Creo en Dios	1
			El Paraiso	1
			La Puntilla	11
			La Sepa	1
			Piñoelal	1
			San Gerardo	1
			Santa Rosa 2	4
			Tengel	3
			Voluntad de Dios	2
	Yaguachi	Yaguachi	Yaguachi	1
			El Deseo	40
			La Chiquita	2
Manabi	**Sucre**	San Isidro	Dominguillo	5
			El Balsamo	1
			Eloy Alfaro	1
			La Industria	1
			Las Mercedes	4
			Many	1
			Muchique 2	5
			Mumi	1
			Palmar	7
			San Isidro	35
			Santa Teresa	1
Grand Total				**132**

Appendix 3: Questionnaire (English Version)

Consent

Dear Participant, thank you for agreeing to participate in this survey about sustainability programs and their impact perceived by small farmers. The survey is being carried out with the purpose of a culminating master's thesis in Agricultural and Food Economics conducted at the Swedish University of Agricultural Sciences (SLU). Your information is important for the development of local and international organizations and companies that work to empower cocoa communities in Ecuador. The information in the questionnaire will be treated confidentially and will be used only for scientific research purposes. The answers provided will not be linked to individual names or addresses. The anonymous data file will be available for other scientific research purposes. All information that can indirectly identify respondents or organizations will be removed from the data file before it is available. Data-based publications will never contain information that can identify individual respondents or individual educational institutions. If you have any questions, do not hesitate to contact Ms. Stefania Celi Garofalo by email: sceligarofalo@hotmail.es.

Working Tittle

IMPACT PERCEIVED BY COCOA FARMERS PARTICIPATING IN FAIRTRADE CERTIFICATION AND PRIVATE SUSTAINABILITY PROGRAMS IN ECUADOR

General Information

- Date of the survey…….
- Start time……..
- End Time……..
- Name of interviewer…….
- Cooperative name (or Place of interview) ……

Personal Information

1. What is your name? * …….....
2. What is your phone number *…….....
3. Province, city/town, community/village ……..

** This information is for the researcher; it won't be shared and could be used to contact the respondent in a special situation.*

First filter

Are you still actively involved in cocoa production?

Yes No

** If the answer is **No**, the interview has to end politely.*

Have you sold cocoa last year (2017 & 2018)?

Yes No

If not: what is the reason why did you stop with cocoa production?

……..……..……
……..……..……

GENERAL

1. Gender

Male Female

2. Which age group are you in?

18-25 26-35 36-45 46-55 56-65 >65

3. Is head of household male or female?

Male Female

4. How many people do you have in charge? (Family members) *In your charge refers to people who regularly live in your house and who share the meal together

1 – 3 people 4 – 7 People > 7 people

5. How many years have you been working as a farmer?

<5 years 5-10 years 10-15 years 15-20 years >20 years

6. Which level of education have you achieved?

Primary Secondary High School College University Other

7. What are the major cash income sources? *Monthly estimate

Activities	In USD					
	0 - 100	**100 - 200**	**200 - 400**	**400 - 600**	**600 -1000**	**> 1000**
a. Agricultural temporary crops (e.g. rice)						
b. Agricultural permanent crops (e.g. cacao)						
c. Livestock (smalls animals)						
d. Livestock (large animals)						
e. Trading (buying to others and selling to the coop./company)						
f. Salaries (working for others in other activities)						
g. Others, specify: …….....						

FARM CHARACTERISTICS

8. What is your status in relation to the plantation? (owner, etc.)

a) Tenant
b) Administrator
c) Owner
d) Other …

** If owner, please describe:*

a) Purchased
b) Heir
c) Other

9. How many people work in your farm?

1 – 3 people 4 – 7 People > 7 people

10. Can you please indicate the total size of your farm?

0-1 ha 1-2 ha 2-3 ha 3-4 ha 4-5 ha 5 – 10 ha > 10 ha

11. Are you a member of a cocoa cooperative/association?

Yes No I don't know

12. Do you use the intercrop agriculture method?

Yes No I don't know

If yes, which crop:

Crops:	**Cocoa Beans**	**Bananas**	**Plantain**	**Coffee**	**Oranges**	**Other crops**
Mark						
Area in ha						

13. Rank the costs according to the importance. Only for cocoa production.

Cocoa Production	Not important	Somewhat important	Important	Very important
a) Land Preparation *(Only for planting new cocoa plants)*				
b) Weeding / cleaning				
c) Labour Pruning				
d) Chemical application				
e) Labour Harvest and splitting				
f) Labour Fermentation, drying, sorting				
g) Empty bags				
h) Transportation				
i) Water (fuel)				
j) Other costs: describe ….				

COCOA PRODUCTION

14. Which quality of cocoa do you have in your plantation?

a) Conventional
b) Organic
c) Mixed

.... *Which variety of cocoa trees do you have in your plantation?*

a) Nacional
b) CCN51
c) Others
d) Mixed varieties

15. How do you sell your beans?

Wet beans Dry beans Both

16. How many kilos did you sell last year of cocoa? (1 quintal of 100 lb. = 46 kg.)

a) Amount .....
b) Metric Unit ..... (quintal / kilos / other)
c) Status …… (wet / dry)
d) I do not know

17. Has there been a change in the production of the recent year (Mar 2018 to Jan 2019) compared to the production of the previous year (Mar 2017 to Jan 2018)?

Less than last year | The same as last year | Much more than last year | I Don't know

CERTIFICATION / COMPANY SUSTAINABILITY PROGRAMS

18. Do you belong to any of the following programs? *Multiple answers are allowed.

a) Fairtrade: Unocace
b) Olam Cocoa Sustainability
c) Fairtrade: Kaoka
d) Nestle Cocoa Plan
e) Barry Cocoa Forever

f) Other

19. Do you have contract with sustainability program?

Yes No I don't know

20. How many years have you been certified as fair-trade or have you been participating in the companies' sustainability program?

Program	<1 year	1-2 years	2-5 years	5-10 years	>10 years
Fairtrade Unocace					
Olam Cocoa					
Fairtrade Kaoka					
Nestle Cocoa Plan					
Barry Cocoa					
Other…….					

21. Can you please indicate the total size of your farm dedicated for any of the programs selected above?

Program	0-1 ha	1-2 ha	2-3 ha	3-4 ha	4-5 ha	5 -10 ha	>10 ha
Fairtrade Unocace							
Olam Cocoa							
Fairtrade Kaoka							
Nestle Cocoa Plan							
Barry Cocoa							
Other:							

22. Have you or anyone in your household participated in any of the following trainings in the past years?

Topic	No training	< 1 year	1-2 years ago	2-5 years ago	5-10 years ago	>10 years ago
a) School field (all topics below together)						
b) Good agricultural practice (Cocoa production)						
c) Health and security (e.g. secure chemicals)						
d) Environmental Protection						
e) Application of chemicals						
f) Good social practice (e.g.: Children's work)						
g) Economic (diversification of income….)						
h) Other, please specify ……						

23. Have you received premiums for your cocoa that you have produced in the last year? *(Can be other non-monetary premiums)

No
Yes *(see next question)
Not currently

Not yet *(see next question)
I do not know / Don't want to answer

If yes, or not yet, how much per quintal of dry beans?

a) Amount .....
b) Metric Unit ..... (quintal / kilos / other) of dry beans
c) Nothing
d) Other …….... (*see next question)

*If **other** non-monetary premiums received please described:*

e) Tools
f) Machinery
g) Inputs
h) Social help
i) Monetary (i.e.: Christmas bonus)

24. Have you received *minimum support price* for your cocoa during last year in the last year?

No
Yes *(see next question)
Not currently
Not yet *(see next question)
I do not know / Don't want to answer

If yes, how much per kilos / quintal of dry beans?:

a) Amount .....
b) Metric Unit ..... (quintal / kilos / other) *of dry beans*
c) Nothing / I do not know

25. Do you think your income has changed after joining fair-trade or any of the sustainability programs you chose above?

Program	Very Significant	Significant	Neither significant nor insignificant	Insignificant	Very Insignificant
Fairtrade Unocace					
Olam Cocoa					
Fairtrade Kaoka					
Nestle Cocoa Plan					
Barry Cocoa					
Other:					

LIVELIHOOD IMPROVEMENT PERCEIVED

26. Answer following questions:

Being involved in the certification scheme …	Strongly Disagree	Somewhat disagree	Neutral	Disagree	Strongly Agree	I don't know	No applicable
a) … has improved my income from cocoa farm							

b) … has given better prices for your cocoa beans							
c) … has given you access to information on cocoa market prices in proper time							
d) … has helped me market my cocoa							
e) … has improved your knowledge of good agricultural practices							
f) … has improved the quality of your cocoa beans							
g) … has increased your yield compared to previous years							
h) … You have received support to renew your cocoa plantation with young trees							
i) … You received agricultural-inputs at lower price							
j) … You use food crop production (intercrop) to improve food security of your household							
k) … You are motivated to expand your cocoa production activities to increase the income							
l) … Your farm managements skills have improved							
m) … The security and working conditions in your land have improve							
n) … You understand that protecting the environment is important for you and your family							
o) … have now more women with participation in important decisions for the farm?							
p) … has improved the conditions of your home, access to water, electricity, etc…							
q) … have improved your children's education							
r) …. has been fun and enjoyable (ie. social benefits)							
s) … has improved my quality of life							

27. What do you think are the benefits of fair-trade certification or sustainability programs? (Choose your answer)

Benefits	**Strongly Disagree**	**Somewhat Agree**	**Neutral**	**Disagree**	**Strongly Agree**	**I don't know**	**No applicable**
Premiums							
Minimum Price support							

Learning new and good agricultural practices							
The training received							
Improvement of the knowledge cocoa culture							
Increase in volume / productivity							
I do not know							
Other: …….							

28. What do you think are the disadvantages of Fairtrade certification or sustainability programs? (Choose your answer)

Disadvantages	**Strongly Disagree**	**Somewhat Agree**	**Neutral**	**Disagree**	**Strongly Agree**	**I don't know**	**No applicable**
High cost							
A lot of work							
It takes time							
I do not know							
No disadvantages							
Other, specify:							

29. Do you want to continue being certified over the next years?

Yes No I don't know

Appendix 4: Questionnaire (Spanish)

Consentimiento: Querido Participante, Gracias por aceptar participar en esta encuesta acerca de los programas de sostenibilidad y su impacto percibido por los pequeños agricultores. La encuesta se está llevando a cabo con el propósito de realizar una tesis de maestría en Economia Agricola y Alimentaria realizada en la Universidad Sueca de Ciencias Agrícolas (SLU). Su información es importante para el desarrollo de organizaciones y companias locales e internacionales que trabajan para empoderar las comunidades cacaoteras en Ecuador. La información en el cuestionario se tratará de manera confidencial y se usará unicamente con fines de investigación científica. Las respuestas proporcionadas no estarán vinculadas a nombres o direcciones individuales. El archivo de datos anónimos estará disponible para otros fines de investigación científica. Toda la información que pueda identificar indirectamente a los encuestados u organizaciones se eliminará del archivo de datos antes de que esté disponible. Las publicaciones basadas en los datos nunca contendrán información que pueda identificar a los encuestados individuales o instituciones educativas individuales. Si tiene alguna pregunta, no dude en ponerse en contacto con la Srta. Stefania Celi Garofalo por correo electrónico: sceligarofalo@hotmail.es

Titulo del trabajo:

IMPACTO PERCIBIDO POR LOS PRODUCTORES DE CACAO QUE PERTENECEN EN CERTIFICACIÓN FAIRTRADE O EN PROGRAMAS PRIVADOS DE SOSTENIBILIDAD

Información general

- Fecha de la encuesta ……
- Hora de inicio ……..
- Hora de finalización ……
- Nombre del entrevistador ……
- Nombre cooperativo (o lugar de la entrevista) …….…….…….…….

Informacion personal

- Cual es tu nombre * …….
- ¿Cuál es su número de teléfono * ……
- Provincia, ciudad / pueblo, comunidad / pueblo …….

* Esta información es para el investigador, no se compartirá y podría usarse para comunicarse con el encuestado en una situación especial.

Primer filtro

- ¿Sigues participando activamente en la producción de cacao?

  Si No

** Si la respuesta es No, la entrevista debe terminar cortésmente.*

- ¿Has vendido cacao el año pasado (2017 y 2018)?

  Si No

Si no es así, ¿por qué se detuvo con la producción de cacao?

……..……..……

……..……..……

A. GENERAL

1. Genero

Hombre Mujer Otros

2. En que grupo de edad se encuentra?

18-25 26-35 36-45 46-55 56-65 66-75 >85

3. Quien es la cabeza del hogar?

Hombre Mujer

4. Cuantas personas tiene a su cargo? (Carga familiar) *Personas que viven regularmente en sus casa y que comparte su comida.

1 – 3 personas 4 – 7 personas > 7 personas

5. ¿Cuántos años llevas trabajando como agricultor?

<5 años 5-10 años 10-15 años 15-20 años 21-40años >40 años

6. ¿Qué nivel de educación has alcanzado?

Nada Primaria Secondaria Bachillerato Instituto Universidad Otros

7. ¿Cuáles son las principales fuentes de ingresos en efectivo? *Estimación por año, el investigador calcula esto de ser necesario.

Actividades	En dolares					
	0 - 100	100 - 200	200 - 400	400 - 600	600 -1000	> 1000
Cultivos agrícolas temporales (por ejemplo, arroz)						
Cultivos agrícolas permanentes (por ejemplo, cacao)						
Granja (animales pequeños)						
Granja (animales grandes)						
Comercio (comprar a otros y vender a la cooperativa / compañía)						
Salarios (trabajando para otros en otras actividades)						
Otros, especificar: ……...						

B. CARACTERISTICAS DE LA FINCA

8. ¿Cuál es su estado en relación con la plantación? (propietario, etc.)

a) Inquilino (propiedad es alquilada a otro)
b) Heredero
c) Administrador
d) Propietario (nativo de la comunidad)
e) Propietario (no nativo de la comunidad)
f) Otros ...

9. ¿Cuántas personas trabajan en su finca?

1 – 3 personas 4 – 7 personas > 7 personas

10. ¿Puede indicar el tamaño total de su finca? *En Hectareas (1 ha tiene 10000 mt, 1 cuadra tiene 7056 metros). *Si responde en cuadras, anotar que son cuadras para luego convertir.

0-1 ha 1-2 ha 2-3 ha 3-4 ha 4-5 ha 5 – 10 ha > 10 ha

11. ¿Eres miembro de una cooperativa de cacao?

Si No No lo se

12. ¿Utilizas el método de la cultivo intercalado? (Producción de cultivos adicionales al cultivo principal) O tambien conocida como Finca mixta

Si No No lo se

En caso afirmativo, qué cultivo:

Cultivo:	Cacao	Cacao Organico	Banano	Platano	Café	Narajas	Otros: ……..
Senalar con X							
Area en Ha							

13. Clasifique los costos de acuerdo a la importancia. Solo para la producción de cacao.

Producion de Cacao	No importante	Algo importante	Importante	Muy importante
Preparación de la tierra (para plantar nuevas plantas de cacao)				
Desherbar / limpiar hierba				
Poda (mano de obra)				
Aplicacion de quimicos (fertilizantes o pesticidas)				
Cosecha (mano de obra)				
Fermentación, secado, clasificación (mano de obra)				
Bolsas vacías				
Transporte				

C. PRODUCCION DE CACAO

14. ¿Qué tipo de produccion de cacao tienes en tu plantación?

Convencional Organico

Que calidad:

d) CCN51
e) Nacional Arriba
f) Otros: …..

15. ¿Cómo vendes tus granos de cacao?

En baba Seco Semi-seco Las dos formas

16. ¿Cuántos kilos vendiste el año pasado de cacao? (1 quintal de 100 lb. = 46 kg, caneca = 8kg)

e) ..... Kg
f) Otra cantidad ..... en ..... (unidad métrica) en ……. (estado)
g) No lo sé

17. ¿Ha habido un cambio en la producción del año reciente (de marzo de 2018 a enero de 2019) en comparación con la producción del año anterior (de marzo de 2017 a enero de 2018)?

Menos que el año pasado | Lo mismo que el año pasado. | Mucho más que el año pasado. | No lo sé

D. CERTIFICACIÓN / PROGRAMAS DE SOSTENIBILIDAD DE LA EMPRESA

18. ¿Usted y su familia pertenecen a de alguno de los siguientes programas? *Se permiten múltiples respuestas.

g) Fairtrade
h) Olam Cocoa Sustainability
i) Guangala Cocoa
j) Barry Cocoa Forever
k) Other

¿Tienes contrato con ellos?

Si No No lo sé

19. ¿Puede señalar el tamaño total de su finca que esta dedicada a alguno de los programas seleccionados anteriormente?

Programa	0-1 ha	1-2 ha	2-3 ha	3-4 ha	4-5 ha	5 -10 ha	>10 ha
Fairtrade							
Olam Cocoa							
Guangala Cocoa							
Barry Cocoa							
Otro:							

20. ¿Cuántos años ha sido certificado como fairtrade o ha estado participando en el programa de sostenibilidad?

Program	<1 Año	1-2 Años	2-5 Años	5-10 Años	>10 Años
Fairtrade					
Olam Cocoa					
Guangala Cocoa					
Barry Cocoa					
Other…….					

21. ¿Usted o alguien en su hogar ha participado en alguna de las siguientes capacitaciones?

Tema	Año	Si	No	No lo sé
Campo escolar (todos los temas a continuación juntos)				
Buenas prácticas agrícolas (producción de cacao).				
Salud y seguridad (por ejemplo, productos químicos seguros)				
Protección del medio ambiente				
Aplicación de productos químicos.				
Buenas prácticas sociales (p. Ej .: trabajo infantil)				
Económico (diversificación de ingresos….)				
Otros, especificar ……				

22. ¿Ha recibido primas/premios por su cacao que ha producido en el último año? *Primas o premios se refiere a dinero adicional al precio del cacao.

a) No
b) Si *(ver sig. pregunta)
c) No actualmente
d) No todavia *(ver sig. pregunta)
e) No lo se / Prefiero no responder

En caso afirmativo, o aún no, ¿cuánto por kg?

h) ..... USD por …….. Kg
i) Otra cantidad (total) ..... USD por ..... (unidad métrica aquí)

j) No lo se

23. Recibe precio minimo?

Si No No lo sé

En caso afirmativo, o aún no, ¿cuánto por kg?

a) ..... USD por …….. Kg
b) Otra cantidad (total) ..... USD por ..... (unidad métrica aquí)
c) No lo se

24. ¿Cree que sus ingresos han cambiado después de unirse al comercio justo o alguno de los programas de sostenibilidad que eligió anteriormente?

Programa	Muy Significante	Significante	Ni significativo ni insignificante	Insignificante	Muy Insignificante
Fairtrade					
Olam Cocoa					
Guangala Cocoa					
Barry Cocoa					
Other:					

E. MEJORAMIENTO en la CALIDAD DE VIDA PERCIBIDO

25. Responde las siguientes preguntas:

Estar involucrado en el esquema de certificación ...	Muy en desacuerdo	En desacuerdo	Ni en desacuerdo ni de acuerdo	Parcialmente de acuerdo	Totalmente de acuerdo	No lo se
	1	2	3	4	5	0
... ha mejorado mis ingresos de la finca						
… Ha dado mejores precios para sus granos de cacao						
… Le ha dado acceso a información sobre los precios del mercado del cacao en el momento adecuado						
... me ha ayudado a comercializar mi cacao						
… Ha mejorado su conocimiento de buenas prácticas agrícolas						
… Ha mejorado la calidad de sus granos de cacao						
... ha aumentado su rendimiento en comparación con años anteriores						
... Usted ha recibido apoyo para renovar su plantación de cacao con árboles jóvenes						
... Recibiste insumos agrícolas o maquinaria a menor precio						
… Utiliza la producción de cultivos adicionales para su propio consumo (seguridad alimentaria familiar)						
... Usted está motivado a ampliar sus actividades de producción de cacao para aumentar los ingresos						
… Tus habilidades de control/financiero ha mejorado.						

… Las condiciones de seguridad y de trabajo en su tierra han mejorado.						
… Usted entiende que proteger el medio ambiente es importante para usted y su familia.						
... tienen ahora más mujeres con participación en decisiones importantes para la granja?						
... ha mejorado las condiciones de su hogar, el acceso a agua, electricidad, etc						
... ha consumido mucho tiempo y es costoso sin beneficios reales para mí						
… Han mejorado la educación de tus hijos						
... Ha sido divertido y agradable (es decir, beneficios sociales) / Le gusta participar en este programa / cooperativa?						
… Ha mejorado mi calidad de vida						

26. ¿Cuáles cree que son los beneficios de la certificación de comercio justo o los programas de sostenibilidad? (Múltiples respuestas son posibles)

Ventajas	**Muy en desacuerdo**	**En desacuerdo**	**Ni en desacuerdo ni de acuerdo**	**Parcialmente de acuerdo**	**Totalmente de acuerdo**	**No lo se**
Las primas/premios monetarios						
Precio mínimo de soporte						
Aprendizaje de nuevas y buenas prácticas agrícolas.						
La formacion recibida						
Mejora del conocimiento cacaotero / conocimiento del mercado						
Aumento de volumen / productividad						
No lo sé						
Otros: …….						

27. ¿Cuáles cree que son las desventajas de los programas de certificación o sostenibilidad de Comercio Justo? (Múltiples respuestas son posibles)

Desventajas	**Muy en desacuerdo**	**En desacuerdo**	**Ni en desacuerdo ni de acuerdo**	**Parcialmente de acuerdo**	**Totalmente de acuerdo**	**No lo se / No aplica**
Alto costo						
Un montón de trabajo						
Toma tiempo						
Transparencia en la administracion						
Sin desventajas						
Otra, especificar ……..						

28. ¿Desea continuar siendo certificado en los próximos 5 años?

Si No No lo se

Appendix 5: Monthly prices of cocoa collection centers in Guayas

Average Price per 100lb bag (in USD)			Producto			
Province	**County**	**Year**	**Cacao CCN 51 Seco**	**Cacao seco fino de aroma**	**Cacao seco mezclado**	**Grand Total**
Guayas	**Alfredo Baquerizo**		**94.73**	**94.73**	**94.73**	**94.73**
		2018	86.50	86.50	86.50	86.50
		2019	95.81	95.81	95.81	95.81
		2020	102.50	102.50	102.50	102.50
	Balao		**108.82**	**104.33**	**111.82**	**110.04**
		2013	93.00	89.50	93.00	92.13
		2014	123.71		123.71	123.71
		2015	118.92	134.00	118.92	119.53
		2016	108.01		111.34	109.59
		2017	72.00		78.00	73.50
		2018	87.00		86.17	86.58
		2020	115.00		115.00	115.00
	Coronel Marcelino Maridueña		**93.95**	**93.95**	**93.95**	**93.95**
		2018	90.84	90.84	90.84	90.84
		2019	94.45	94.45	94.45	94.45
		2020	98.94	98.94	98.94	98.94
	Durán		**99.87**	**88.33**	**99.84**	**99.62**
		2012	95.00		95.00	95.00
		2013	95.00	88.33	95.00	94.05
		2014	123.64		122.59	123.15
		2015	115.94		115.94	115.94
		2016	110.19		110.83	110.54
		2017	76.01		76.74	76.38
		2018	92.50		92.50	92.50
		2019	96.90		96.90	96.90
		2020	98.88		98.90	98.89
	El Empalme		**93.03**	**94.00**	**93.20**	**93.37**
		2013	89.10	89.20	85.79	87.76
		2014	118.00	118.00	118.00	118.00
		2015	105.00	105.00	105.00	105.00
		2016	107.63	107.63	107.63	107.63
		2017	74.33	74.06	74.33	74.25
		2018	86.50	87.42	87.17	87.03
		2019	86.38	90.00	93.60	92.40
		2020			96.88	96.88
	El Triunfo		**98.94**	**98.99**	**98.62**	**98.84**
		2012	88.00	88.00	87.43	87.76
		2013	92.97	93.74	92.97	93.21
		2014	126.88	126.88	126.88	126.88
		2015	122.53	123.64	122.53	122.87

	2016	112.76	112.76	112.76	112.76
	2017	74.55	74.55	74.55	74.55
	2018	92.00	92.00	92.00	92.00
	2019	96.98		96.98	96.98
	2020	97.28	89.42	97.28	95.31
General Elizalde (Bucay)		**90.69**	**90.69**	**94.69**	**92.20**
	2015	110.75	110.75	116.80	114.11
	2016	101.17	101.17	107.04	104.43
	2017	75.09	75.09	75.09	75.09
	2018	92.58	92.58	92.58	92.58
	2019	94.91	94.91	94.91	94.91
	2020	99.63	99.63	99.63	99.63
Guayaquil		**102.48**	**131.21**	**103.79**	**109.03**
	2014	124.39	135.71	124.56	127.75
	2015	118.91	130.12	118.94	122.21
	2016	108.46	132.19	114.20	118.79
	2017	73.51	115.00	74.13	78.61
	2018	87.46		88.44	88.00
	2019	95.05		95.05	95.05
	2020	93.83		93.83	93.83
Milagro		**99.57**	**92.80**	**102.22**	**99.05**
	2012	87.00	87.00	85.33	86.29
	2013	93.69	93.92	97.63	94.57
	2014	120.32	114.33	119.92	119.40
	2015	118.06		118.06	118.06
	2016	109.58		113.64	111.38
	2017	74.19	74.38	73.32	74.02
	2018	89.58	89.64	89.58	89.60
	2019	95.61	95.61	95.61	95.61
	2020	97.75	108.75	97.75	99.32
Naranjal		**98.05**	**90.00**	**98.16**	**97.93**
	2012	93.00		95.00	94.00
	2013	95.25	90.00	96.00	94.67
	2014	126.78		125.91	126.37
	2015	113.81		113.81	113.81
	2016	106.57		111.10	108.46
	2017	76.04		76.42	76.22
	2018	92.46		92.41	92.43
	2019	96.24		96.24	96.24
	2020	95.32		95.32	95.32
Naranjito		**98.07**	**98.46**	**98.05**	**98.19**
	2012	82.38	82.50	82.38	82.41
	2013	91.47	92.22	91.47	91.70
	2014	122.90	122.90	122.90	122.90
	2015	119.79	119.96	119.79	119.85
	2016	110.63	110.63	110.63	110.63
	2017	74.12	74.12	74.01	74.08
	2018	90.50	90.50	90.42	90.47
	2019	95.09	95.09	95.09	95.09
	2020	100.08	100.08	100.08	100.08

San Jacinto De Yaguachi		**97,24**	**89.71**	**100.11**	**96.81**
	2012			95.00	95.00
	2013	93.83	89.50	93.83	93.21
	2014	125.00		124.00	124.53
	2015	116.75		116.75	116.75
	2016	106.00		115.25	109.70
	2017	73.64	75.63	73.95	74.09
	2018	89.87	89.73	89.87	89.82
	2019	93.94	93.94	93.94	93.94
	2020	108.00	108.00	108.00	108.00
Simón Bolívar		**97.26**	**89.09**	**97.29**	**95.22**
	2012	82.72	82.72	83.39	82.94
	2013	89.87	90.63	89.87	90.11
	2014	120.22	120.00	120.39	120.28
	2015	115.54		115.54	115.54
	2016	106.59	100.40	106.59	105.71
	2017	72.86	72.86	72.86	72.86
	2018	89.98	89.98	89.94	89.96
	2019	94.85	94.85	94.85	94.85
	2020	100.13	100.13	100.13	100.13
Grand Total		**98.41**	**96.96**	**99.09**	**98.35**

Source: Monthly prices of cocoa collection centers. Minister of Agriculture and Agricultural Public Information System of Ecuador (MAG-SIPA, 2020)

Appendix 6: Monthly prices of cocoa collection centers in Manabi

Average Price per 100lb bag (in USD)			Producto			
Province	**County**	**Year**	**Cacao CCN 51 Seco**	**Cacao seco fino de aroma**	**Cacao seco mezclado**	**Grand Total**
Manabi	**Bolívar**			**99.30**	**86.57**	**98.08**
		2012		93.07	78.00	85.53
		2013		102.50		102.50
		2014		124.29	108.00	121.58
		2015		119.38		119.38
		2016		100.00		100.00
		2017		75.41		75.41
		2018		89.42		89.42
		2019		93.94		93.94
		2020		100.44		100.44
	Chone		82.17	93.66	78.92	92.08
		2012	82.17	87.75	83.00	84.50
		2013		94.00	70.75	84.70
		2014		119.12		119.12
		2015		113.40		113.40
		2016		102.36		102.36
		2017		70.94		70.94
		2018		86.28	75.17	80.72
		2019		90.08	77.09	83.59
		2020		96.80		96.80
	Flavio Alfaro*			93.20	88.63	93.07
		2012		79.44	88.63	84.03
		2013		94.40		94.40
		2014		122.25	93.33	107.79
		2015		110.00	103.33	106.67
		2016		105.00	89.06	97.03
		2017		70.80		70.80
		2018		84.70	75.17	79.93
		2019		88.64		88.64
		2020		95.38		95.38
	No Delimitada		104.00	104.00	104.00	104.00
		2015	104.00	104.00	104.00	104.00
	Pichincha		113.50	88.93	88.33	89.42
		2014		130.38		130.38
		2016	113.50		95.00	101.17
		2017		75.36	75.00	75.18

	2018		87.73		87.73
	2019		86.00		86.00
	2020		93.80		93.80
Portoviejo			83.35	78.55	80.84
	2012		75.27		75.27
	2013			79.50	79.50
	2014		105.57	93.33	101.90
	2015		93.33	103.33	100.00
	2016			89.06	89.06
	2017		64.38	60.17	62.07
	2018		82.82	75.17	78.99
	2019		84.00	77.09	80.55
	2020		89.41	83.60	86.50
Santa Ana		111.67	108.00	103.83	106.69
	2015	105.00	106.00	115.50	111.29
	2016	115.00	109.33	92.17	102.96
	2020		108.00		108.00
Grand Total		**99.88**	**92.69**	**82.54**	**90.70**

* Flavio Alfaro is the area that collects San Isidro information on prices.
Source: Monthly prices of cocoa collection centers. Minister of Agriculture and Agricultural Public Information System of Ecuador (MAG-SIPA, 2020).

Appendix 7: Predicted Probabilities after multinomial probit estimation

		Predicted Probabilities		
		Pr1	*Pr2*	*Pr3*
Obs	**Sust. program**	**FT**	**Olam**	**FL**
1.	Fairtrade	0.230	0.687	0.083
2.	Fairtrade	0.061	0.613	0.326
3.	Fairtrade	0.158	0.509	0.333
4.	Fairtrade	0.561	0.150	0.289
5.	Fairtrade	0.322	0.509	0.170
6.	Fairtrade	0.581	0.260	0.160
7.	Fairtrade	0.572	0.260	0.168
8.	Fairtrade	0.276	0.655	0.069
9.	Fairtrade	0.509	0.421	0.070
10.	Fairtrade	0.626	0.286	0.088
11.	Fairtrade	0.743	0.017	0.240
12.	Fairtrade	0.265	0.595	0.140
13.	Fairtrade	0.640	0.050	0.309
14.	Fairtrade	0.902	0.039	0.058
15.	Fairtrade	0.418	0.368	0.215
16.	Fairtrade	0.841	0.094	0.066
17.	Fairtrade	0.783	0.098	0.119
18.	Fairtrade	0.218	0.713	0.069
19.	Fairtrade	0.950	0.029	0.021
20.	Fairtrade	0.846	0.113	0.040
21.	Fairtrade	0.766	0.006	0.229
22.	Fairtrade	0.838	0.115	0.047
23.	Fairtrade	0.802	0.035	0.163
24.	Fairtrade	0.455	0.055	0.490
25.	Fairtrade	0.587	0.352	0.061
26.	Fairtrade	0.924	0.034	0.043
27.	Olam	0.080	0.611	0.309
28.	Olam	0.010	0.402	0.588
29.	Olam	0.041	0.553	0.406
30.	Olam	0.359	0.552	0.088
31.	Olam	0.035	0.953	0.012
32.	Olam	0.126	0.256	0.618
33.	Olam	0.007	0.623	0.370
34.	Olam	0.107	0.540	0.353
35.	Olam	0.054	0.410	0.535
36.	Olam	0.059	0.662	0.279
37.	Olam	0.546	0.262	0.192
38.	Olam	0.420	0.566	0.013
39.	Olam	0.129	0.541	0.330
40.	Olam	0.141	0.833	0.026
41.	Olam	0.345	0.507	0.148
42.	Olam	0.371	0.464	0.165
43.	Olam	0.297	0.311	0.392
44.	Olam	0.455	0.418	0.127
45.	Olam	0.033	0.892	0.075
46.	Olam	0.075	0.737	0.188
47.	Olam	0.001	0.933	0.067
48.	Olam	0.035	0.780	0.185
49.	Olam	0.187	0.746	0.067
50.	Olam	0.122	0.750	0.129

		Predicted Probabilities		
		Pr1	*Pr2*	*Pr3*
Obs	**Sust. program**	**FT**	**Olam**	**FL**
67.	Olam	0.618	0.249	0.133
68.	Olam	0.000	0.365	0.635
69.	Olam	0.620	0.228	0.153
70.	Olam	0.194	0.149	0.657
71.	Olam	0.029	0.925	0.046
72.	Olam	0.000	0.991	0.009
73.	Olam	0.502	0.354	0.144
74.	Olam	0.142	0.763	0.095
75.	Olam	0.324	0.485	0.191
76.	Olam	0.179	0.709	0.112
77.	Olam	0.147	0.810	0.043
78.	Olam	0.000	0.597	0.403
79.	Olam	0.219	0.557	0.224
80.	Olam	0.292	0.352	0.356
81.	Olam	0.290	0.489	0.221
82.	Olam	0.000	0.997	0.003
83.	Olam	0.170	0.763	0.066
84.	Olam	0.089	0.879	0.032
85.	Olam	0.075	0.851	0.074
86.	Olam	0.004	0.947	0.049
87.	Olam	0.005	0.956	0.039
88.	Olam	0.083	0.815	0.102
89.	Fair for Life	0.000	0.249	0.751
90.	Fairtrade	0.683	0.154	0.163
91.	Fair for Life	0.220	0.284	0.496
92.	Fair for Life	0.675	0.050	0.275
93.	Fair for Life	0.176	0.716	0.108
94.	Fair for Life	0.845	0.027	0.128
95.	Fair for Life	0.480	0.304	0.217
96.	Fair for Life	0.084	0.764	0.152
97.	Fair for Life	0.090	0.053	0.857
98.	Fair for Life	0.024	0.049	0.927
99.	Fair for Life	0.013	0.595	0.392
100.	Fair for Life	0.000	0.942	0.058
101.	Fair for Life	0.046	0.448	0.506
102.	Fair for Life	0.000	0.040	0.960
103.	Fair for Life	0.236	0.291	0.472
104.	Fair for Life	0.308	0.225	0.467
105.	Fair for Life	0.340	0.423	0.237
106.	Fair for Life	0.005	0.681	0.314
107.	Fair for Life	0.242	0.241	0.517
108.	Fair for Life	0.252	0.595	0.153
109.	Fair for Life	0.505	0.222	0.273
110.	Fair for Life	0.272	0.560	0.168
111.	Fair for Life	0.145	0.363	0.492
112.	Fair for Life	0.390	0.537	0.072
113.	Fair for Life	0.609	0.023	0.368
114.	Fairtrade	0.110	0.728	0.161
115.	Fairtrade	0.030	0.864	0.106
116.	Fairtrade	0.398	0.203	0.399

51.	Olam	0.012	0.595	0.394	117.	Fairtrade	0.480	0.125	0.394
52.	Olam	0.181	0.775	0.044	118.	Fairtrade	0.489	0.174	0.337
53.	Olam	0.224	0.594	0.182	119.	Fairtrade	0.863	0.069	0.067
54.	Olam	0.059	0.897	0.044	120.	Fairtrade	0.924	0.034	0.043
55.	Olam	0.077	0.877	0.047	121.	Fair for Life	0.000	0.172	0.828
56.	Olam	0.332	0.414	0.254	122.	Fair for Life	0.088	0.437	0.475
57.	Olam	0.089	0.818	0.092	123.	Fair for Life	0.436	0.282	0.282
58.	Olam	0.024	0.840	0.136	124.	Fair for Life	0.020	0.504	0.476
59.	Olam	0.001	0.969	0.029	125.	Fair for Life	0.192	0.386	0.422
60.	Olam	0.047	0.364	0.589	126.	Fair for Life	0.121	0.084	0.795
61.	Olam	0.061	0.722	0.217	127.	Fair for Life	0.505	0.222	0.273
62.	Olam	0.272	0.560	0.168	128.	Fair for Life	0.025	0.080	0.895
63.	Olam	0.023	0.952	0.025	129.	Fair for Life	0.168	0.350	0.482
64.	Olam	0.140	0.735	0.125	130.	Fairtrade	0.148	0.277	0.575
65.	Olam	0.241	0.589	0.171	131.	Fairtrade	0.455	0.055	0.490
66.	Olam	0.017	0.967	0.016	132.	Fairtrade	0.683	0.154	0.163

Appendix 8: Pictures of field research

From left to right. Top to bottom.
a) Unocace All labels, certification and standards the cocoa association belongs.
b) Unocace warehouse. Beans ready for exports.

c) Cocoa boxes for fermentation process (7 days) at Unocace.
d) Coop. workers changing the beans to the box level below.

From left to right. Top to bottom. At Unocace:
a) After fermentation beans are transferred to a drying house with elevated tables.
b) Beans are later dried under the sun.

c) Coop workers packing the dry beans.
d) Beans must be packed in traceable bags with the name of the program.

From left to right. Top to bottom. Unocace – Fairtrade group.

a) and **b)** Interviews with farmers at their respectives cooperatives

c) The oldest farmers in the field research, he has more than 90 years old.
d) Unocace has a chocolate making facility for internal market.

From left to right. Top to bottom.
a) and **b)** Interviews with farmers at their association: CECAO – Fair for life group.

c) Manabi agricultural landscape.
d) Farmer and Agronomist explaining GAP in their farms, such as Agroforestry. Olam Group.

From left to right. Top to bottom.
a) Interview with farmers at their farms. Olam's group.
b) Cocoa pod, yellow pod can be harvest.

c) Training session in San Isidro, Manabi held by Olam.
d) Olam's agricultural and technical body