



SUSTAINABLE PRODUCTION OF AGRI-FOOD COMMODITIES: EXPLORING
THE RELATIONSHIP BETWEEN SERVICE DELIVERY AND FARMERS
PERFORMANCE IN THE COLOMBIAN COCOA SECTOR



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Abstract

With over 4 million tonnes produced globally and a net worth topping US\$21 billion annually, cocoa is one of the most traded agri-food commodities worldwide. While few large competitors dominate the processing and manufacturing phase, millions of small farmers directly depend on the commodity for their livelihood at the production level. However, several sustainability challenges such as deforestation, soil degradation and poor working conditions are hindering the future availability of the crop and the well being of the communities involved in its production. Stakeholders active in the sector have reacted to these challenges by embracing new forms of cooperation and self-regulation, resulting in the emergence of various Sustainable Supply Chain Governance (SSCG) arrangements. So far, numerous investigations have been conducted examining the role of these new actors in ensuring the environmental, social and economic well-being of the communities where cocoa is sourced. However, the majority of these evaluations tend to focus on the same type of arrangement such as voluntary third-party standards, while providing contradictory views regarding their actual benefits to producers. As a common feature to many of these arrangements is the delivery of services to farmers, this research explores a new approach linking service delivery to improvements in farmers' performance. A causal model is proposed combining a theory of change approach to Service Delivery Models (SDM) used to identify services exchange between actors active in global value chains. Combining the causal pathway thinking introduced by a theory of change approach to SDM enables further evaluation of these services, whilst disentangling the underlying mechanisms and decision making processes leading to desired improvements in the sustainability performance of farmers. To test the validity of the model a mixed case-study approach is used including interviews, open-ended questionnaires and secondary data review with stakeholders active in the Colombian cacao sector. The selected case studies represent two main public and private players active in the country's cacao sector, providing evidence from a country-undergoing major political and industry transformations. The findings show that the application of the model can deliver important insights on the relationship between service provision and outcomes at the farm level, while taking into account external factors which might influence the observed changes in outcomes. In particular, the results show that both the investigated parties have set up a good delivery of different services complementing each other. However, external factors such as availability of physical resources and the institutional characteristics of the entity providing services can hinder adequate delivery in practice. This is reflected in the adoption of agricultural practices between the two cases, and in turn on the outcomes at farm level in terms of productivity and quality of the final product. The application of the model to the chosen case studies also identified the persistence of issues with data availability between actors at different levels of the value chain. This hinders cooperation efforts at higher levels to achieve the desired improvements in farmers' learning on the ground, affecting their sustainability performance and also livelihoods. Recommendation for practitioners and academia are reported based on the study findings.

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Table of Contents

ABSTRACT	I
AWKNOWLEGMENTS	II
LIST OF ABBREVIATIONS	VII
CHAPTER 1	1
INTRODUCTION	1
1.1 SUSTAINABILITY IN THE COCOA SECTOR	1
1.2 PROBLEM CONTEXT AND APPROACH TO RESEARCH	1
CHAPTER 2	3
OVERVIEW OF THE COCOA INDUSTRY	3
2.1 ACTORS IN THE COCOA VALUE CHAIN AND THEIR ROLES	3
2.2 ECONOMIC CHALLENGES	4
2.3 ENVIRONMENTAL CHALLENGES	5
2.4 SOCIAL CHALLENGES	6
2.5 BUSINESSES AND THEIR ROLES	6
2.6 COLOMBIA AS A COCOA PRODUCING COUNTRY	7
2.6.1 NATIONAL PRODUCTION AND CONSUMPTION	7
2.6.2 COLOMBIA VALUE CHAIN AND SUSTAINABILITY CHALLENGES	9
2.6.3 FUTURE TRENDS	9
2.7 HIGHLIGHTS FROM THE CHAPTER	10
CHAPTER 3	11
CAUSAL FRAMEWORK	11
PART 1: SUPPLY CHAIN GOVERNANCE THEORY	11
3.1 THE EMERGENCE OF SSCG SYSTEMS IN THE AGRI-FOOD SECTOR	11
3.2 THE IMPACT OF VSS ON PRODUCERS IN THE AGRI-FOOD SECTOR	12
PART 2: KEY ACTORS: FROM VALUE CHAIN ACTOR TO SERVICE DELIVERY NETWORK	14
3.3 SERVICE DELIVERY MODELS AND THE IMPORTANCE OF TRAINING SERVICES	14
PART 3: INTEGRATING BOTH PERSPECTIVES IN SOCIAL TRANSFORMATION THEORY: TOC APPROACH	18
3.4 EVALUATION THEORY AND THE THEORY OF CHANGE	18
3.5 COMBINING THE EVIDENCE: THE THEORY OF CHANGE OF SDM	20

CHAPTER 4	22
<hr/>	
METHODOLOGY	22
4.1 RESEARCH DESIGN	22
4.2 CASE STUDIES SELECTION	22
4.3 DATA COLLECTION	23
4.4 RESEARCH LOCATIONS	28
4.5 DATA ANALYSIS	29
4.6 QUALITY OF THE RESEARCH	29
CHAPTER 5	30
<hr/>	
DESCRIPTION OF THE CASES	30
5.1 CASE 1: FEDECACAO	30
5.1.1 FEDECACAO SERVICE DELIVERY MODEL	30
5.2 CASE 2: CASA LUKER	31
5.2.1 CASA LUKER SERVICE DELIVERY MODEL	31
5.2.2 FARMERS' ASSOCIATION CORTIPAZ	32
CHAPTER 6	33
<hr/>	
DELIVERY OF SERVICES	33
6.1 TRAINING DELIVERY FEDECACAO	33
6.1.1 TRAINING PLANNING AND DESIGN	33
6.1.2 TRAINING PERFORMANCE AND MANAGEMENT	33
6.1.3 MONITORING AND EVALUATION	35
6.1.4 FEATURES OF THE TRAINER	35
6.2 INPUTS PROVISION FEDECACAO	36
6.2.1 DELIVERY OF AGRICULTURAL INPUTS	36
6.2.2 ASSISTANCE TO COMMERCIALISATION	37
6.3 REJUVENATION FEDECACAO	38
6.4 FINANCING AND SCALABILITY FEDECACAO	39
6.5 TRAINING DELIVERY CASA LUKER	40
6.5.1 TRAINING PLANNING AND DESIGN	40
6.5.2 TRAINING PERFORMANCE AND MANAGEMENT	41
6.5.3 MONITORING AND EVALUATION	41
6.5.4 FEATURES OF THE TRAINEE	42
6.6 INPUTS PROVISION CASA LUKER	42
6.6.1 DELIVERY OF AGRICULTURAL INPUTS	42
6.6.2 ASSISTANCE TO COMMERCIALISATION	43
6.7 REJUVENATION CASA LUKER	44
6.8 FINANCING AND SCALABILITY CASA LUKER	45

6.9 SERVICE DELIVERY AS PART OF CERTIFICATION	45
6.10 ISSUES WITH DATA AVAILABILITY	46
6.10.1 FEDECACAO	46
6.12.2 CASA LUKER	46
CHAPTER 7	47
<hr/>	
AGRICULTURAL PRACTICES UTILISATION	47
7.1 FARM CHARACTERISTICS AND MANAGEMENT	47
7.2 HARVESTING PRACTICES	50
7.3 POST-HARVESTING PRACTICES	55
7.4 SOCIAL PRACTICES	57
7.5 SOURCES OF KNOWLEDGE	58
7.6 FARMERS' SATISFACTION WITH SERVICES PROVISION	60
7.8 SUMMARY OF FINDINGS ON AGRICULTURAL PRACTICES UTILISATION	62
CHAPTER 8	63
<hr/>	
OUTCOMES ON FARMERS' PERFORMANCE	63
8.1 QUALITY FEDECACAO	63
8.1.1 QUALITY DETERMINATION PROCESS	63
8.1.2 FARMERS PERCEPTION OF QUALITY	65
8.2 PRODUCTIVITY FEDECACAO	65
8.2.1 AVERAGE PRECIPITATION SAN VICENTE	66
8.3 PRICE FEDECACAO	68
8.3.1 IDENTIFICATION PROCESS AND PRICE PAID TO FARMERS	68
8.3.2 FARMERS' PERCEPTION OF PRICES	70
8.4 QUALITY CASA LUKER	71
8.4.1 QUALITY DETERMINATION PROCESS	71
8.4.2 QUALITY IMPROVEMENTS WITH CERTIFICATION	72
8.4.3 FARMERS PERCEPTION OF QUALITY	72
8.5 PRODUCTIVITY CASA LUKER	73
8.5.1 PRODUCTIVITY IMPROVEMENTS AS A RESULT OF CERTIFICATION	73
8.5.2 AVERAGE PRECIPITATION EL CARMEN	74
8.6 PRICE CASA LUKER	74
8.6.1 PRICE DETERMINATION	74
8.6.2 FARMERS' PERCEPTIONS OF PRICE	75
8.7 DATA AVAILABILITY	76
8.7.1 ISSUES WITH DATA AVAILABILITY FEDECACAO	76
8.7.2 ISSUES WITH DATA AVAILABILITY CASA LUKER	76

CHAPTER 9	77
LINKING SERVICE DELIVERY AND OUTCOME	77
9.1 FEDECACAO	77
9.2 CASA LUKER	78
CHAPTER 10	80
DISCUSSION	80
CHAPTER 11	83
CONCLUSIONS	83
CHAPTER 12	87
RECOMMENDATIONS	87
12.1 RECOMMENDATIONS FOR PRATICITIONERS	87
12.1.1 CASA LUKER	87
12.1.2 UTZ CERTIFICATION	87
12.1.3 FEDECACAO	87
12.1.4 COLOMBIAN GOVERNMENT	88
12.1.5 OTHER ENTITIES OPERATING IN AGRICULTURAL SECTOR	88
12.2 RECOMMENDATIONS FOR ACADEMIA	89
LIST OF REFERENCES	90
ANNEX 1: LIST OF INTERVIEWS AND ANNOTATIONS	96
ANNEX II: CONSENT FORM AND FARMERS' QUESTIONNAIRE	97
ANNEX III: QUESTIONS SEMI-STRUCTURED INTERVIEWS	106
ANNEX IV: THE DEVELOPMENT OF DIFFERENT CACAO GENETICS AND THEI CHARACTERISTICS	109

List of Abbreviations

CORTIPAZ	Corporación Tierra por la Paz
FEDECACAO	Federación nacional de cacaoteros
GAP	Good Agricultural Practices
ICCO	International Cocoa Organisation
NGO	Non Governmental Organisation
SDM	Service Delivery Model
SSCG	Supply Chain Governance Arrangments
TOC	Theory of Change
VSS	Voluntary Sustainability Standards

Chapter 1

Introduction

1.1 Sustainability in the cocoa sector

Cocoa is harvested primarily for its beans, which are used to produce cocoa liquor, butter and powder, the main ingredients in chocolate (Afoakwa, 2014). More than half of global production occurs in Africa, in particular Cote D'Ivoire and Ghana, while the main import markets are the USA and Europe (FAO, 2014; FAO, 2015; FairTrade, 2016). Today's cocoa production reaches 4 million tonnes globally with a net worth of \$21 billions, with demand expected to exceed 4.5 millions by 2020 (FairTrade, 2016). While the processing and manufacturing of cocoa is dominated by 9 main companies (FairTrade, 2016), close to 50 million people directly depend on cocoa for their livelihood (FAO, 2015; FairTrade, 2016), with 90% of today's production coming from 4-5 million small farms (Wessel and Wessel, 2015). Cocoa farming is known for its poor working conditions, characterised by hard labour work, unprotected use of chemical, widespread child labour and gender inequalities (FairTrade, 2016). Cocoa production has also a severe impact on the environment, contributing to deforestation, biodiversity loss and water pollution in many of the countries in which it is produced (COSA, 2013). Induced soil degradation due to the utilisation of unsustainable practices, ageing of cocoa trees and climate change pose therefore a great threats to future availability of the plant, with younger generations becoming increasingly disinterested in continuing working in the sector (ibid.). Because of these challenges, there is a growing urgency within the cocoa sector to guarantee the environmental, social and economic well-being under which cocoa is produced.

1.2 Problem context and approach to research

Cocoa traders, manufacturers, retailers and public institutions are responding to these challenges by embracing new forms of cooperation and self-regulation, to ensure that their products are sourced whilst respecting the environmental, social and economic position of cocoa farmers. Today, the increase in commitments from these public and private actors have resulted in the emergence of various sustainable supply chain governance arrangements (SSCG). A common feature to all these systems is the delivery of services to farmers, mainly in the form of training and provision of different agricultural inputs. These should help them produce more sustainably and maintain constant levels of quality and productivity in the long-term. However, although some evidence is emerging describing the impact of different interventions at the farm level, little is known about the underlying mechanisms and processes defining the provision of these services. Data characterising these services, as well as linking provision of services, farmer performance and intermediary actors operating in between is scarce. Indeed, reviewing of the literature reveals that the majority assessments so far have focussed on evaluating Voluntary Sustainability Standards such as UTZ, Rainforest Alliance or Fairtrade, of the same commodities or producing countries. However, the results of these evaluations have produced mixed and rather context specific outcomes: while some indicate a number of advantages provided to farmers, concerns have been raised as to whether whether these forms of self-regulation will be able to provide the same advantages in the future, as more farmers decide to participate and less benefits will be available.

Taking an explorative approach, this thesis will contribute to this knowledge by proposing the following research question:

How can we best capture and understand the relationship between the provision of agricultural services, day-to-day practice utilisation and improvements in the sustainability performance of farmers in the cocoa sector?

In order to answer this main research question, six sub-questions are proposed:

1. *What type of actors and Service Delivery Models are observable in practice?*
2. *How are training processes, inputs and rejuvenation approaches identified and delivered in each Service Delivery Model?*
3. *How is the delivery of services reflected in farmers' adoption of good agricultural practices?*
4. *What are the influences on product quality, productivity and price paid to the farmers as a result of a Service Delivery Model?*
5. *Are there other contextual factors present in practice which might influence the relationship between the services delivered and observed changes in quality, productivity and price paid?*
6. *What type of data are available in practice to be able to apply this approach to other contexts?*

These sub-questions have been identified following a review of the literature. A causal model is proposed to explore each sub-question. The proposed model combines a theory of change approach utilised in the evaluation of development interventions with the Service Delivery Model (SDM) recently proposed by the IDH Sustainable Trade Initiative. SDM allow to better identify the types of services delivered to farmers, the stakeholders involved and the possible business models originating from these relationships. Combined with a causal pathway thinking proposed by a theory of change approach, it is possible to further evaluate these services and disentangle the underlying mechanisms and decision making processes leading to desired improvements in the sustainability performance of farmers. In particular, the model brings together both qualitative and quantitative data available amongst the different actors playing a role in agricultural service provision.

This will highlight whether combining a qualitative understanding of change processes with more quantitative data on outcomes can lead to an explanation of changes in farmers performance. The model is applied to two case studies in the Colombian cocoa sector. While Colombia's cocoa production remains to date relatively low compared to other cocoa producing countries, recent increases in production and political developments make the country an interesting case for the purpose of this research. The selected case studies represent two of the main public and private players active in the Colombian sector, providing strong evidence of the present and future direction of the country.

The remainder of the report is as follow. Chapter 2 provides an overview of the actors which characterize the cocoa value chain, with a focus on the main sustainability challenges afflicting the sector. The case of Colombia as a cocoa producing country is also described, highlighting the relevance for this research. Chapter 3 explores the emergence of Sustainable Supply Chain Governance (SSCG) arrangements and discusses existing evidence of the impact of these market-led systems on producers, demonstrating the persistence of contending views in the current debate. Building on this evidence, alternative approaches are explored, leading to the causal model. Chapter 4 describes the methods. Chapters 5 to 8 report the findings, separating delivery of services, adoption of practices and results on outcomes. Chapter 9 highlights the linkages of the various steps. The findings are then discussed in chapter 10. Conclusions and recommendations are provided in chapter 11 and 12.

Chapter 2

Overview of the cocoa industry

This chapter provides an overview of the actors operating within the cocoa value chain and the main challenges faced in the environmental, social and economic domains. The chapter ends with a description of Colombia as a cocoa producing country, including the challenges it faces in the international supply of cocoa .

2.1 Actors in the cocoa value chain and their roles

When exploring the features of the cocoa value chain it is important to make a distinction between the markets for fine or flavoured and conventional or bulk chocolates.

The fine chocolate market gives central focus to the taste and quality of the beans (CBI, 2015). It is usually considered a niche market compared to its bulk counterpart, corresponding to only 5-10% of world chocolate production, with 80% originating from Latin America (ibid.). In the last few years, increasing demand from consumers for superior quality and traceability of the beans has contributed to boost demand, with promising growing trends for the future (CBI, 2015). At the top of the chain we find the producers, which are involved in the harvesting of the plant. Usually farmers are also responsible for the implementation post-harvesting treatments of the beans, such as fermentation and drying. However, it is also possible that in order to ensure higher quality of the beans, the pods are collected from farmers and fermented and dried by either a local cooperative or the trader in cooperation with the manufacturer of the chocolate. In either case, it is common for the farmer to be involved in the quality determination process and to maintain strong relationships with the trader. The next phase in the chain consists in the processing of cocoa beans. Depending on the relationships between the producers and the trader, this phase can be carried out either by the trader itself or a manufacturer, in the country of origin or another country. The manufacturer is usually also in charge of transporting the chocolate to the main markets of Europe and North America, where it will sell directly to the consumer or in specialized chocolate stores. In order to maintain higher quality and longer-term trading relationships, it is common for trader to provide training and/ or other inputs to the farmers such as planting material, technologies, or infrastructures. This occurs with more frequency in countries or regions recognised for their ability to provide good quality beans. When this is not the case, local governments, NGOs or industry associations can play a role in providing these inputs necessary to reach higher quality and access the flavour market.

On the other hand, the bulk or conventional market represents circa 90% of the world production, with the majority originating in West-Africa (The International Cocoa Organisation, 2015; FAO, 2015). At the top of the chain we find millions of smallholders. In contrast to producers in the fine chain, these are almost always in charge of both harvesting and post-harvesting practices. Dried beans from various farmers are sold to a local collector, which in turn sells to a local wholesaler. In the case of farmers are organised in a cooperative, the latter will be in charge of collecting beans from the farmers. Both the collectors and cooperative carry out a first quality check. Cooperatives are usually also in charge of payments to farmers, provision of agricultural inputs and/or facilitation of training. However, where cooperatives are not present, training and inputs provision is generally carried out by local extension services or NGOs. Wholesalers will then sell the beans to exporters, which can be either locally or internationally located. The beans will then be shipped and sold to a processor, which can either manufacture them itself or sell to a manufacturer. Finished chocolate products are subsequently distributed to retailers and to millions of consumers.

Besides an overall focus on quality characteristics of the product, an important difference between the value chains of the two markets is the number of actors involved. The fine chain market is generally much smaller and involves a smaller number of actors. This allows for better tracing of the origins of the product throughout the chain, and to ensure that the practices utilised at the various stages of the chain create and guarantee higher quality. A lower number of middlemen at the source also allows higher value to be transferred to the farmers. On the other hand, tracing products and maintaining quality results in many more difficulties in the conventional market, due to the higher number of actors involved. A higher number of intermediaries contributes to less value delivered to the farmers, and to the establishment of weaker relationships between the manufacturer and the producers. These disparities translate in some differences in the sustainability challenges experienced by the two markets, particularly in the economic dimension.

2.2 Economic challenges

For the conventional market, economic challenges differ from country to country. In general, partly privatized sectors relieve the issues originating from the large fluctuations of cocoa prices experienced within the international market. However, this is usually not enough to alleviate farmers from poverty (Fountain and Hütz-Adams, 2015). Small plot size, low volumes produced and the presence of middlemen results in low prices paid to the farmers (Fountain and Hütz-Adams, 2015) corresponding to as little as 6.6% of every \$1 paid for the finished product (ibid.). This generates little income to farmers, who in turn cannot make investments allowing them to boost production. Access to loans from rural banks is not an option for everyone, with interest rates topping 40% in some cocoa producing countries (Laven and Boosma, 2012). Governments usually have programs in place offering loans and other inputs, but poor coverage and infrastructures in rural areas does not enable them to reach every farmer in a consistent manner (Fountain and Hütz-Adams, 2015). Low productivity, low income, impossibility of investments to boost production and lack of related knowledge creates the danger of a poverty trap. When provided by either governments or other private actors, loans and premium for production represent an important and often main source of income to the farmers (KPMG, 2012). However, high reliance on premiums to ensure decent living conditions is not a sustainable option in the long-run (COSA, 2013). Crop diversification is also a widely used safety net in cases of crop failure. However, the practice is not particularly widespread amongst farmers as it requires higher investments and agro-economic knowledge which many farmers do not have (COSA, 2013).

The fine flavoured market is also characterised by small plot sizes and low volumes of production. However, the focus on high quality, on the production of specific cocoa varieties, and shorter value chains guarantees a higher price paid to the farmers (CBI, 2015). This protects them from price fluctuations and provides a higher return on the investments made. Stronger relationships between buyers and producers also ensures the provision of inputs and other technologies to the farmers, complementing their investments and enabling them to focus on higher quality. However, farmers who manage to enter the market become exposed to a 'performance risk': the ability to deliver high quality cocoa in a sizeable and consistent manner over a longer period of time to their buyer, while relying on a small plot size. Reduction in quality can be caused by the spreading of disease, changing climate, erroneous post-harvesting practices or mixing (Chocolate, Biscuits and Confectionery of Europe, 2015). The latter refers to the situation where one cooperative or agent, in order to meet buyers demand, collects smaller quantities from several producers with diverging quality levels, therefore lowering the overall quality delivered. When quality is reduced, the buyer might reject the beans or fail to pay the premium to farmers. They are then obliged to sell on the conventional market, failing to make a return on the high investment made.

2.3 Environmental challenges

Cocoa production as a whole is known for its negative impact on the environment: deforestation of tropical forests and the utilisation of agro-chemicals with negative effects on human health are common issues afflicting the sector. Price fluctuations and disease are inducing farmers to convert from shade-tree diversified production to full-sun growing monocultures, with several diverse effects on biodiversity and soils.

Cocoa is best grown in variable systems of production named 'agro-forestry' whereby forests are carefully thinned to allow cocoa and other trees to grow under the selected canopy (Franzen and Mulder, 2007). However in recent years, growing demand for cocoa, economic pressures on producers and persistence of old agricultural techniques and beliefs have resulted in the expansion of land devoted to cocoa and increased thinning and clearing of tropical forests (ibid.). This issue is particularly prominent in West-Africa such as Ghana and Cote D'Avoire, where there have been forest reduction rates of almost 2% a year as a result of cocoa production (Hütz-Adams and Fountain, 2012). In Latin America, cocoa trees have historically been grown in shade areas of native forest species with high biodiversity levels (Schroth and Harvey, 2007). However, lowering of prices and spreading of diseases have induced many farmers to convert their shaded systems to full-sun high yielding varieties by clearing the surrounding vegetation (Franzen and Mulder, 2007). In Ecuador and Brazil for instance, more than half of the new cocoa being planted is now full-sun produced (ibid.). In some cases, these converted lands are abandoned, allocated to pasture or allocated to full-sun coffee growing (Franzen and Mulder, 2007). Only when prices are again favourable cocoa trees are replanted, but usually by clearing new forests rather than utilising already cleared areas (ibid.).

Reduction of shading areas, lack of crop diversification and erroneous agricultural practices are resulting in high soil degradation. Soil erosion and loss of fertility in cocoa producing systems is a severe problem afflicting all countries in which cocoa is produced (Franzen and Mulder, 2007). The lack of shade reduces the longevity of cocoa trees, increases vulnerability to diseases and weeds and accelerates the loss of soil nutrients (Bowers *et al.*, 2001). On the other hand, maintaining or planting shade trees can quickly offset the above mentioned effects, increase biodiversity and improve air and water quality (Bowers *et al.*, 2001).

In order to meet growing demand and counteract decreasing soil fertility, farmers usually rely on the utilisation of agro-chemicals such as fertilizers, pesticides, herbicides and insecticides. However, the sporadic availability of these inputs in many rural areas of West-Africa and Latin America results in a sub-optimal utilisation; heavy spraying a few times a year during diseases and pests infestations, which diminishes the efficacy of the chemicals while affecting farmer's health and surrounding ecosystems (Bowers *et al.*, 2001).

Another environmental risk adding to the already existing detrimental effects of cocoa production is climate change. Most of the evidence originating from West-African producing countries suggest that the 2° C degrees temperature increase foreseen by 2050 will significantly affect the suitability of the countries to produce cocoa (Läderach *et al.*, 2013). This is also true for Latin America, where changes in temperature will require farmers to switch to other commodities in order to stay in businesses (Franzen and Mulder, 2007). However at present, most private and public policies are insufficiently addressing adaptation and mitigation to climate change in the cocoa sector (Hütz-Adams and Fountain, 2015).

2.4 Social challenges

The cocoa sector worldwide faces a number of social challenges: unfavourable working conditions, gender discrimination and child labour.

In comparison to other food commodities, cocoa harvesting and post-harvesting is a highly labour intensive process (Afoakwa, 2014). Long hours of hard manual labour, associated with a lack of infrastructures and of mechanised production systems potentially facilitating the process characterise the working days of cocoa farmers (Hütz-Adams & Fountain, 2013). Many also manage agro-chemicals and other toxic substances without adequate protective gears, with severe long-term health effects (ibid.). The campaign published by Oxfam in 2013 highlighted the deep gender inequalities between male and female which characterise the sector in West-Africa. Women find much harder to participate in the cocoa sector which is thought to be a male dominated industry. When they do, women are usually not granted the same land ownership rights as men nor participation in cooperatives. At the same time, they have to work much longer hours in the field while carrying out households responsibilities (Oxfam, 2013). Other investigations found similar results in Latin America (COSA, 2013).

The economic hardships highlighted above force many farmers to rely on unpaid workers in their fields. These are usually members of their family or households, increasing the probabilities of forced child labour. Following public scandals in the early 2000, consumers attention has enabled stricter low enforcements and controls in producing countries (Hütz-Adams and Fountain, 2013), as well as by cocoa businesses. This has significantly reduced the incidence of child labour, but still remains a problem in the cocoa sector (FairTrade, 2016).

2.5 Businesses and their roles

In the challenges highlighted above, businesses play a preeminent role. In the agri-food sector, increased public attention has forced businesses to take concerted efforts to address sustainability issues. As explored in later sections, this has resulted in the proliferation of different forms of private-public sustainability initiatives and partnerships, at both national and international levels (Potts *et al.*, 2014). Through these engagements, businesses are publicly committing to ensure that the products in their portfolios are as clear as possible of any environmental, social and economic issues. Similarly to other industries, this has put enormous pressures on businesses in the cocoa sector, with licenses to operate being granted at times only upon demonstration of solid sustainability plans (Matissek *et al.*, 2012). Therefore, besides having to compete on the consumer's side to guarantee a stable and satisfactory product quality, competition in the cocoa sector has now more than ever also shifted to the sourcing sides: a company competitive advantage is also determined by the efforts put in place to guarantee a livelihood to the producers from which they source. This is particularly true considering the foreseen severe reductions of cocoa availability in the near future.

As a results of these trends, the cocoa industry has witnessed an exponential increase in business commitments and public-private partnerships (Bitzer *et al.* 2012; COSA, 2013). However, whether these efforts are equally balanced at both ends of the supply chain can still be questioned. As previously mentioned, the cocoa global value chain is characterised by a high concentration of a few players, which control both vertical and horizontal levels of the chain (Hütz-Adams and Fountain, 2015). This concentration is reflected also in the distribution of value across the chains: manufacturers and retailers still retain respectively 35.2% and 44.2% of the value for every \$1 of finished product, as opposed to a mere 6.6 % granted to farmers (Hütz-Adams & Fountain, 2015). Price distribution in complex supply chains such as the one of cocoa are dependent upon on a number of global factors including economic recessions, price wars and international markets (Afoakwa, 2014), and cannot therefore be orchestrated by one actor only. However, expenditure choices are subject to single actors' wills: already in the 2009, the Cocoa Barometer calculated that only 1% of the marketing budget of the biggest chocolate manufacturer (circa. \$86

millions) would be sufficient to provide training to half of farmer population in Côte D'Ivoire (Weiligmann *et al.*, 2009). These types of claims raise obligatory questions on the reality of some of these businesses approaches, which should be kept into account when evaluating their actions. Nonetheless, the recent increases in sectoral initiatives experienced by the industry leave margin for future hopes, reiterating the need for additional evidence investigating the real contribution of such initiatives.

2.6 Colombia as a cocoa producing country

2.6.1 National production and consumption

The production of cocoa in Colombia grew at a very high rate in the past 10 years, increasing 63% between 2010 and 2016 (figure 2.1). This trend is set to continue, with the first part of 2017 showing the highest production ever recorded in the country (Fedecacao , 2017).

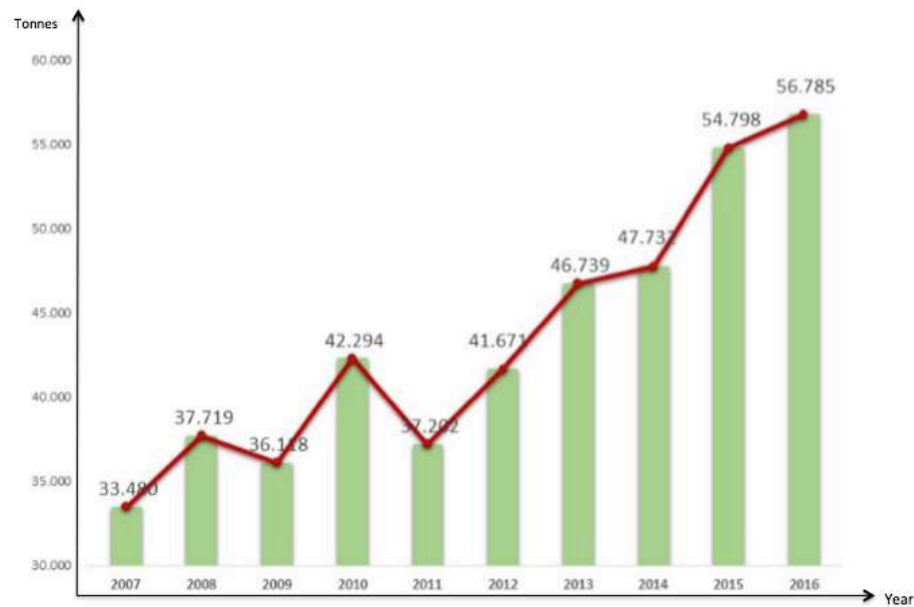


Figure 2.1 Colombia cocoa national production between 2007-2016 (Fedecacao, 2017).

As of 2016, the highest producing region is Santander (22.000 t/annum), followed by Arauca (6000 t/annum), Antioquia (5.300 t/annum), Huila (4.200 t/annum), Tolima (3.500 t/annum), Cundinamarca (2.100 t/annum) (Fedecacao , 2017). In the country, cocoa is grown between 0 and 1200 m over sea level, mostly by smallholders managing between 2 and 5 hectares of land on average (ibid.)

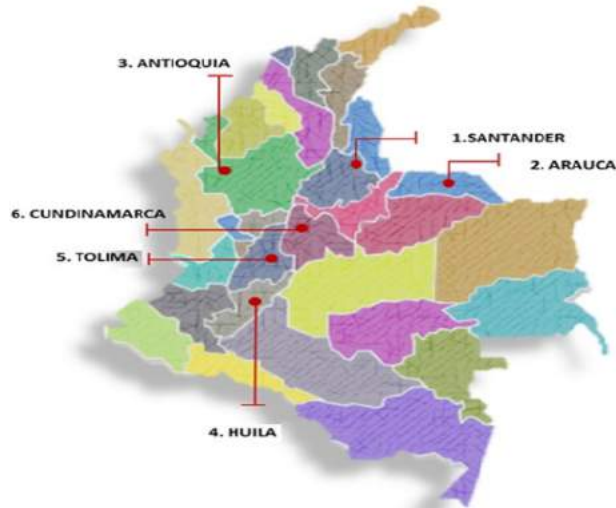


Figure 2.2. Highest producing departments in Colombia.

In terms of size, in 2016 there were 173.000 producing hectares of cocoa in the country, corresponding to a 25% increase from 2010 (figure 2.3). Of these, around 120.000 h are planted with old cocoa trees and hybrids, while the remaining is planted with cloned trees (see Annex IV). With regards to productivity per hectare, three types of plantations are identifiable, based on the ratio between clones/hybrid tree presence: high technical plantations producing between 1000 kg up to 3000 kg per hectares a year; medium producing plantations between 400 and 1000 kg/ha; and low producing plantations, yielding less than 400 kg/ha. All together, average production in Colombia is of 400-450 kg/ha a year (Fedecacao , 2017).

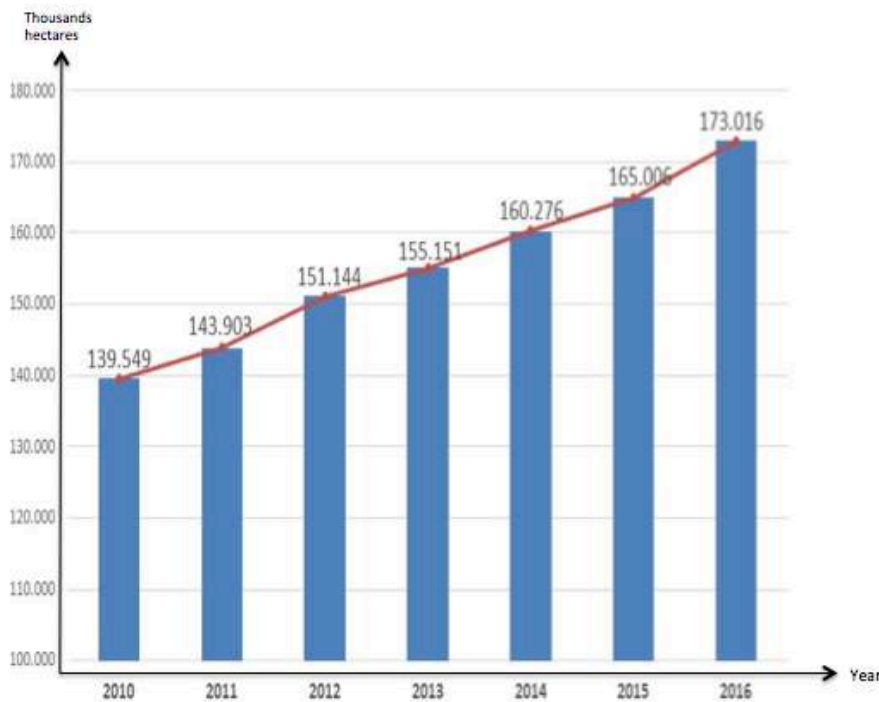


Figure 2.3. Total area under cocoa cultivation in Colombia (Fedecacao , 2017)

Internal consumption of cocoa is stable at around 50.000 t/annum, which requires to imports cocoa in order to meet internal demand. As of 2016, Colombia exported around 10.600 tonnes of cocoa (Fedecacao , 2017). The Colombian national market is dominated by two main processors, Compañía Nacional de Chocolate and Casa Luker. Together, these manufacturers contribute to over 90% of the national demand (Villamil *et al.* 2013).

2.6.2 Colombia value chain and sustainability challenges

In 2010 the ICCO classified Colombian cocoa as fine and flavoured, thanks to the majority of its plantations originating from Criollo and Trinitario materials (please see Annex IV for an explanation regarding cocoa origins and their characteristics) (Villamil *et al.* 2013). However, recent evaluations of the Colombian cocoa value chain demonstrate that the latter resembles predominantly the features of the bulk market than the fine and flavoured one (García-Caceres *et al.* 2014). In fact, the majority of the cocoa is sold from farmers to middleman and wholesalers, who in turn re-sell almost entirely to national companies (*ibid.*). More direct trading relationship between farmers and international manufacturer do exist, but are mostly limited to a small number of fine flavoured cocoa varieties (Cocoa nect, 2017).

In terms of sustainability, the Colombian cocoa sector shares many challenges faced by other cocoa producing countries worldwide. Low tree density, technological level and knowledge of the farmers, together with ageing cocoa trees contribute to the production per hectare to remain particularly low (Villamil *et al.* 2013). Low prices paid to farmers and presence of middleman results in small margins to the farmers who often live at subsistence level (García-Caceres *et al.* 2014).

Ageing of farmers and low education levels are responsible for the utilisation of older, unsuitable agricultural practices. While deforestation of native plants is not as widespread as in other South American countries, low inputs utilisation and plantation rejuvenation is contributing to the rapid deterioration of soil nutrients amongst cocoa plantations (Hernandez and Guerrero, 2009). This is exacerbated by the persistence of plant diseases such as Monilla, which can reduce up to 60% of a plantation's output in certain cases (Villamil *et al.* 2013).

2.6.3 Future trends

The country's national production is still extensively low compared to other cocoa producing countries (table 2.1). Nonetheless, the significant increase in productivity recorded in the past 10 years together with other national trends, leave hope for a major role being played by Colombia in the sector in the near future.

The recent good results of the Colombian cocoa at the Salón del Chocolate en Paris has provided a lot of visibility to the country's product and attracted a number of international buyers worldwide (Portafolio, 2010). Furthermore, newly established peace agreements from decades' long armed conflicts have helped with the advancement of nationwide reforestation projects, substituting coca for cocoa plantations (UNODC, 2016). Reconversion of former coca land to cocoa is foreseen to grow more in the future, given that over 2m ha of available land in the country is currently particularly suitable to cocoa plantations (Castellanos *et al.*, 2007). These favourable trends, but also the existence of threats to the future availability of cocoa in the country make Colombia an interesting case to be investigated.

Countries	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	% Part. 2015/16
Cote d'Ivoire	1.223	1.242	1.511	1.486	1.449	1.746	1.796	1.570	38%
Ghana	662	632	1.025	879	835	897	740	820	20%
Indonesia	490	550	440	440	410	375	325	330	8%
Camerún	224	209	229	207	225	211	232	250	6%
Brazil	157	161	200	220	185	230	230	250	6%
Ecuador	135	150	161	198	192	234	250	230	6%
Nigeria	250	235	240	245	238	248	195	190	5%
Perú	36	43	54	61	70	80	83	85	2%
Dominican Rep.	55	58	54	73	68	70	82	72	2%
Colombia	36	40	35	43	48	47	51	53	1%
New Guinea	59	39	48	39	41	36	36	36	1%
India	12	13	15	13	15	14	16	17	0%
Malasia	22	15	8	4	3	6	7	7	0%
Other Countries	230	247	293	189	164	179	187	244	6%
World Total	3.592	3.635	4.311	4.095	3.943	4.374	4.230	4.154	100%

Table 2.1. World production of cocoa vs Colombian production in thousands tonnes (Fedecacao, 2017).

2.7 Highlights from the chapter

The chapter highlighted a number of environmental, social and economic challenges afflicting the cocoa sector. While these differ according to country and type of market (bulk or fine flavoured), it is clear that they cannot be treated in isolation but need holistic approaches, due to their interconnectedness. However, from the discussion it emerges that a common factor hindering farmers from improving environmental, economic and social performance is the lack of knowledge on best practices in each domain. Knowledge transfer and learning is crucial in agricultural development in order to improve performance, in particular product quality and productivity, which can directly alleviate farmers from poverty (Halim and Hali, 2005), and induce them towards positive changes. The next chapter will explore ways to best identify this relationship in agricultural contexts.

Chapter 3

Causal framework

Chapter two highlighted the main features and challenges within the cocoa value chain. This chapter builds upon various strands of literature and identifies a causal model enabling a better understanding of the relationship between services provision and farmers improvements in performance. The chapter is divided in three main parts. The first one discusses the emergence of SSCG arrangements and the role of VSS in improving farmers' performance. The second part identifies a model describing the relationships between farmers and service providers in agricultural settings. The third part builds on the previous two sections and proposes a way to further explore the causal relationships between delivery of services and improvements in farmers' performance.

Part 1

Supply chain governance theory

3.1 The emergence of SSCG systems in the agri-food sector

By the late 1960 and early 1970s, the various ideas about progress, sustainability, growth and development which had been maturing over many years started taking on a new direction, that of sustainable development (Du Pisani, 2006). With a growing recognition of the widening gap between developed and developing economies, the externalities originating from producers of commodities were for the first time targeted by national and local bodies (Vermeulen and Seuring, 2009), giving rise to a government-centered approach to environmental regulation. However, this polarisation of powers was subsequently replaced by more collaborative market-based approaches (Vermeulen and Seuring, 2009) in the late 1980s and early 1990s.

In these years, international trade grew exponentially in the global economy. For developing countries, it corresponded to an increase in export of primary agricultural commodities as well as of environmental impacts associated with their production (Giovannucci and Ponte, 2005). The rapid increase in trade made Western governments unable to influence production conditions in developing countries, which had to rely on international bodies (UN) to impose regulations on the governments of developing countries (Vermeulen and Seuring, 2009); this created a 'regulatory vacuum' in international environmental regulation, a process which has been examined extensively by governance literature (Vogel, 2008). As governments ability to control companies for their operations diminished, consumers and civil society (NGO) began to call for more sustainable production. On the one hand, this imposed businesses to begin collaborating with these actors to internalise sustainable development in their supply chain (Vermeulen and Seuring, 2009; Garriga and Melé, 2004). On the other hand, 'eco-entrepreneurs or bioneers' took the lead creating new, more sustainable forms of sustainable supply chain governance (Schaltegger, 2002).

Nowadays, various systems of these market-led sustainable supply chain governance (SSCG) approaches have come forth, overcoming a niche position and becoming increasingly mainstream. The most widespread are voluntary sustainability standards (VSS), such as third-party certifications (UTZ, Rainforest Alliance, Fair Trade) which have emerged predominantly in the agri-food industry (Pott *et al.*,2013). However, the persistence in the sector of numerous environmental issues have contributed to the rise of also other SSCG arrangement (Rueda *et al.*, 2017; Pott *et al.*,2013). Scholars have grouped these according to their form of collaboration (Delmas and Young, 2009, in Rueda *et al.*, 2017), the type of actor (Griffin and Prakash, 2014, in Rueda *et al.*, 2017) or the form of stringency (Rueda *et al.*2017). Nonetheless, they can be generally identified as single firm approaches, which rely on internal codes of conduct and sustainability regulations (e.g. Nespresso AAA Program); multi-

stakeholders roundtables (e.g. Roundtable on Sustainable Palm Oil), which bring together industry and civil society actors; retail imposed standards (e.g. GlobalGap), which from the back end of the supply chain impose regulations to producers. Whether an organisation will prefer to rely on one form rather than the other depends on a number of contextual factors, which have only just recently been explored in more detail (Rueda *et al.*, 2017).

Given that these new forms of SSCG have emerged with a push from the private sector, questions have been raised concerning their legitimacy and ability to include all actors in their participatory processes (Kalfagianni, 2015; Ponte, 2014; Plaza Esteban, 2014; Fuchs *et al.* 2011), as well as on their effectiveness in implementing policies on the ground (Barrientos, 2006; Damette and Delacote, 2011). Furthermore, their rapid expansion in recent years encouraged the publication of a number of meta-evaluations trying to identify the environmental, economic and social benefits to certified farmers in producing countries (Potts *et al.*, 2014; COSA, 2013; Kessler *et al.*, 2012; Blackman and Rivera, 2011; Loconto and Dankers, 2014; Alvarez and Von Hagen, 2011). These investigations are predominantly focussed on the impact of VSS, being the most widespread form of SSCG. The next section will therefore explore evidence originating from this body of literature.

3.2 The impact of Voluntary Sustainability Standards on producers in the agri-food sector

Although there has been a rapid increase in academic literature examining the role of VSS, there is not enough evidence to be able to confirm a positive effect on farms sustainability performance (Blackman and Rivera, 2011; Loconto and Dankers, 2014; Alvarez *et al.*, 2011; Potts *et al.*, 2014). Few studies are explicitly addressing the impact of VSS, with many selecting methods which undermine the reliability of results (Blackman and Rivera, 2011; Alvarez *et al.*, 2011). Furthermore, a closer analysis of available meta-studies reveals that most of the attention is centered around global product markets such as coffee, banana or timber. However, with the exception of two recent large impact evaluations (COSA 2013; Kessler, 2012), a small number of credible studies has been produced specifically addressing other important commodities such as cocoa (Loconto and Dankers, 2014; Alvarez and Von Hagen 2011; Blackman and Rivera, 2011).

While conclusions from these studies need to be treated carefully, there is growing evidence that producers economic performance under VSS tends to be higher than other farmers (Milder and Newsom, 2015; Gibbon *et al.*, 2009; KPMG, 2011, 2012; COSA, 2013). This is attributable to the increased prices and productivity received by farmers for participating in such initiatives. Producers under VSS have also lower inputs costs compared to non-participating farmers, mostly because they can benefit from other non-income related support such as access to credit, training, and technical inputs, covering up for the initial investments needed to conform with the standards (*ibid.*). VSS also promote increased market access and more direct-trading relationship, guaranteeing a larger value share being delivered to the farmers (*ibid.*). Utilisation of GAP by certified farmers also seems to be higher than other farmers, mostly due to the need to comply with strict codes of conduct. Yet, very scant evidence is available regarding the long term impact on biodiversity and the environment (WWF, 2010). The social benefits related to VSS participation are much more contested. Certified farmers generally have a larger positive perception of their social performance (COSA, 2013), with VSS favouring community empowerments and labour conditions, in particular with regards to child labour issues. However, poverty-related challenges such as food security and livelihood improvements still remains an issue, and with gender equality not being consistent across all communities in which VSS operate (COSA, 2013; Potts *et al.*, 2009).

Concurrently to the direct benefits of VSS on producers, a number of *indirect* benefits have been identified. In some occasions these might be even greater than the direct evidence highlighted above (Resolve, 2012). Knowledge spillovers is thought to be very common between certified and non-certified farmers, with the latter being able to access and implement knowledge on GAP and other farm management practices while not being

directly participating in the scheme (Resolve, 2012). This holds true also for the transference of technologies and agricultural inputs which certified producers have access to (Resolve, 2012). Some governments have also institutionalised the practices and codes of conduct of certain VSS, including them in public regulations or contributing to the formation of country-wide public standards (Resolve, 2012). Other large indirect benefits of VSS have been described at the macro- and landscape levels (Resolve, 2012; Reinecke *et al.* 2012).

On the other hand, a number of critiques have been put forwards questioning the actual effectiveness of VSS in creating sustainable development. Diversity in standards systems, geography, institutions and value-chains of each product result in the impact of VSS to be very context-specific (Loconto and Dankers, 2012). Yet, to accelerate uptake across different sectors, stringency of the standards has been reducing and homogenising over time (Potts *et al.*, 2014), suggesting an opposite response to the issue.

Although most of VSS are controlled by third-party private organisations, there is evidence that the choices made by retailers, manufacturers and importers directly influence the ability of VSS to impact market access of smallholders in developing countries (Loconto and Dankers, 2012). This type of buyer preferences reflects the differences in value distribution across the supply chain which have been discussed in chapter 2.

Selection bias amongst producers is also an issue which has been highlighted by the literature. The high requirements of many of these standards often limit the capacity of the poorest farmers to join a certification. In fact, there is a tendency between exporters and farmers' associations to select the best-performing and successful producers in a community. While these selected farmers are more likely to comply to the requirements, it leaves out the poorest producers who would benefit the most from a certification (Resolve, 2012). However, insights on what drives farmers in their business decisions and in defining personal successes are still lacking (Ingram *et al.* 2014). This might aid VSS to better target these excluded groups and overcome selection bias issues.

High costs of compliance with a standard are also a barrier to implementation. This is an issue not only amongst smallholders, but also with small and medium sized enterprises, often preventing them to become engaged with sustainability (CBI, 2015). As a response to these high costs, many of these enterprises decide to enter niche markets focussed on higher product quality, and to display sustainability commitments by leveraging on more transparent and direct trading relationships across the chain, embracing the value chain features discussed in chapter 2. The latter include higher control and knowledge of the supplied material due to better relationships with producers and lower number of actors involved, as well as higher value delivery at the start of the chain. This allows to prevent the utilisation of environmentally harmful agricultural practices and to guarantee better economic and social performance through the payment of higher prices and delivery of additional services. These arrangements are increasingly being seen in commodities where differentiation through quality is possible, with cocoa being one of these commodities (CBI, 2015).

This high economic burden placed on farmers has historically been counterbalanced by the payments of premiums and increase in market access (Potts *et al.*, 2010). However, this might be no longer the case in the near future with the rapid expansion of VSS and entrance of additional producers (Potts *et al.*, 2014). Evidence shows that access to market is dependent on a number of factors which need to be present on the ground (Aidenvironment, 2016). Thus, being certified does not always result in more buyers showing up (Aidenvironment, 2016; Ingram *et al.* 2014). An increase in certified producers and products might therefore only reduce the possibilities of farmers to access markets, unless demands for sustainable products increases at the same pace. On the other hand, payments of a premium, either in the form of higher prices paid at farm gate, or as physical inputs, still remains an important reason for farmers to join VSS (COSA, 2013; Potts *et al.* 2014). Premiums have also other important

benefits to farmers: some recent analyses have demonstrated that, although reducing significantly, premiums can act as a shield during high volatility of international prices (Rueda and Lambin, 2013). With the growing number of certified producers, it is not clear whether these incentives and associated benefits will still be available to all farmers in the near future (COISA, 2013).

Altogether, the body of literature discussed shows a rather contested picture emerging from the debate examining the impact of VSS, and more broadly of SSCG systems. In particular, it can be seen that the majority of meta-evaluations published examines the role of third-party standards, which are however not the only form of market led initiative which have emerged in the agri-food sector. Under these private arrangements, producers seem to be experiencing some advantages in the economic, environmental and social domains of their farm systems. However, there is a risk that this might only be true for a selected number of best performing producers. Furthermore, important incentives such as premiums and market access have been declining in the past few years. Building on this evidence, the next section will explore how to better understand the linkage between key stakeholders active in agricultural value chains and production of commodities. The aim is to highlight the underlying mechanism and relationships occurring between these actors, in the hope to better understand the observed differences in impact on farmers' performance which emerged from this analysis.

Part 2

Key actors: from value chain actor to service delivery network

3.3 Service Delivery Models and the importance of training services

Modern agri-business is characterised by the delivery of a number of services to producers, such as training, access to inputs, and financing, to ensure that productivity, crop quality and income of farmers remains constant (Maienfisch and Stevenson, 2015).

While in developed countries service delivery is organised and operated by professional actors, this is not the case in countries in the South. As highlighted in chapter 2, in these countries markets are not robust, and public structures for delivery of services are often non-existing or not well functioning. For this reason, processors, traders and other actors have started to develop and provide services to their supplying farmers. This type of arrangements characterise the majority SSCG systems emerged in recent years.

In order to better assess performance, the Sustainable Trade Initiative (IDH) has recently proposed a model capturing the main features and diversities of such arrangements (figure 3.1).



Figure 3.1. Service delivery model (IDH, 2016).

Their Service Delivery Model recognises three main actors operating in the majority of today's supply chain structures: the value chain investor, the service provider and the farmer. The first, also described as the off-taker, is in charge of providing capital and financial resources to initiate the model, and in return buys the crops from the farmer. The service provider organises and oversees the delivery of services to the farmer. The farmer receives these services and in return sells his/her products into the value chain. The simplicity of this models is allowing a number of companies and institutions operating in various commodities to oversee their complex suppliers' activities in the form of a coherent business model, and to assess their performance using a number of standardized parameters (Blackmore *et al.*,2015).

IDH has recently published a report summarising the findings from the application of SDMs to the value chains of various commodities (IDH, 2015). The empirical application of the initial model has enabled the organisation to identify 5 broad categories according to the relationship between the off-take and the farmer, and the negotiating power of the latter.

Figure 3.2 provides a graphical representation of each identified category. Table 3.1 and 3.2 describe the main features, risks and benefits of each arrangement.

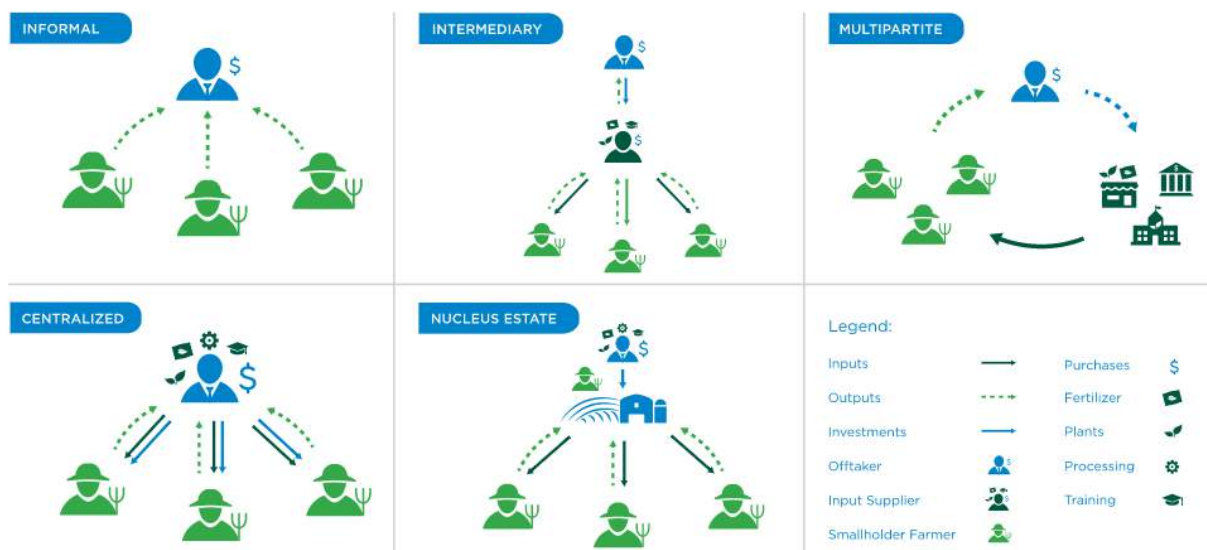


Figure 3.2. Identified categories of Service Delivery Model (IDH, 2015)

Informal	Intermediary	Multipartite	Centralised	Nucleus-estate
No relationship between farmer and off-taker	Off-taker has contract with intermediaries, who signs contract with large number of farmers	Farmer signs contract with joint venture between the off-taker and a local entity	High off-taker-farmer coordination with direct purchase of supply by off-taker from farmer	Combination of direct contracting of outgrowers with centralised production and processing (estate)
No services provided	Off-taker subcontracts intermediaries to provide services	Service delivery via third parties	Off-taker provides services directly	Off-taker provides services directly

Table 3.1 Description of the main features of each identified category. Adapted from IDH (2015)

Common to all cases investigated is the provision of three main services: training, provision of inputs and rejuvenation. The latter refers to the planting material delivered in combination with training on rejuvenation practices, as well as the identification of strategies and decisions taken aimed at long-term innovation of the farm. Although differences can be found in the quality and characteristics of these services, the main findings suggests that it is essential that all three services are delivered simultaneously, and that their provision becomes financially sustainable in the longer term (IDH, 2016). When this happens, farmers have experienced significant improvements in productivity and quality of their products, which are key indicators used to understand farmers' performance and track changes (ibid.).

	Informal	Intermediary	Multipartite	Centralised/ Nucleus-estate
Off-taker	<p>Risks: No control over supply</p> <p>Benefits: No costs involved, fully flexible to make changes around who to source from</p>	<p>Risks: Dependent on quality of intermediary, risk of misunderstandings with smallholders due to indirect relationships</p> <p>Benefits: Service supply is outsourced, not core activity of the off-taker</p>	<p>Risks: Can be difficult to coordinate, different agendas for different stakeholders</p> <p>Benefits: Specialised service supply</p>	<p>Risks: High costs involved, low return on investment due to side-selling</p> <p>Benefits: Direct control over supply chain</p>
Farmer	<p>Risks: No agreement or guarantee for off-take of their produce, no access to service</p> <p>Benefits: Free to sell to anyone</p>	<p>Risks: Dependent on quality of services of the intermediary - quality of services can be low, no direct contact with off-taker, which can result in lack of requirements of off-taker</p> <p>Benefits: access to services</p>	<p>Risks: No clear division of roles on service provision between multiple parties, risk of difference in agendas between parties</p> <p>Benefits: Specialized service supply (each party can act on its strengths)</p>	<p>Risks: Locked into supply chain of off-taker</p> <p>Benefits: Centrally focused service supply, direct off-take of the produce. Off-taker has on-the-ground experience, vested interest in the business since off-taker also runs nucleus farm</p>

Table 3.2. Description of the risks and benefits of each category. Adapted from IDH (2015)

The concept of SDM has been only recently brought forth by the organisation. Consequently, a lot of research is still required in a number of key aspects and applications of the models. In particular, additional evidence is needed in relation to training provision, effectiveness and on factors influencing farmers adoption of best practices (IDH, 2016).

Indeed, within literature on agricultural development, training represents a crucial service to be provided to farmers (Halim and Hali, 2005). The notion of training has evolved extensively over time parallel to changes in agendas and challenges faced (Hagmann *et al.*, 2000). From a mere transfer of knowledge in early development initiatives in the mid90s, modern trainings incorporate learning and participatory theories in their processes (Scarborough *et al.*, 1997). In particular, recent publications highlight the importance of tailoring training and

capacity building activities to the needs of farmers (Bustamante *et al.*,2009), in order to boost adoption levels and suitability of the practices to the targeted community (*ibid.*). Therefore, thorough diagnosis and preparation anticipating training events is necessary to establish content and modes of delivery (Ousman, 2007). Since a few years now, it is widely accepted that the education, skills and learning methods of agricultural people are crucial in determining inter-farm and inter-countries differences in agricultural performance, together with more conventional factors such as availability of local resources and inputs (Alexandratos, 1995).

Despite the importance recognised to training in agricultural development theory, little attention has been given on the subject by existing investigations examining the impact of SSCG systems (Potts *et al.*, 2014; Kessler *et al.*, 2012; Blackman and Rivera, 2011; Loconto and Dankers, 2014; Alvarez and Von Hagen, 2011). This is particularly true for the cocoa sector. With the exception of more recent evaluations (COSA, 2013; Aidenvironment, 2016, K118uit *et al.*,2013), training processes and its outcomes have been addressed insufficiently, or simply considered as an 'input' of an intervention with no further insights on which features guarantee the achievement of better outcomes. Where evidence is available, it documents whether government based interventions such as farmers field schools or rural extensions programs have contributed or not to the implementation of good agricultural practices, increases in yields or reduction of inputs costs (David *et al.*, 2008; Adisa *et al.*, 2012; Ayenor *et al.*, 2007; Kuklinski *et al.*, 2013; Gockowski *et al.* 2010; Soniia *et al.*, 2011; Muilerman *et al.*, 2016; Okorley *et al.*, 2014; Dzomeku *et al.*, 2014), producing mixed results.

In sum, SDMs can be a resourceful tool when attempting to understand the mechanisms and relationships between the main stakeholders active in agricultural value chains. More specifically, the model provides a clear explanation of main actors active in a chain, and the type of services and outputs exchanged amongst them. The section highlights that following the model's principles, particular attention should be paid to the delivery process of training in combination with two crucial services such as inputs provision and rejuvenation, as well as the financial sustainability of the services. Outcomes in quality, productivity and price received under each SDM should also be explored to understand farmers' performance and track changes. However, the review suggests that SDMs provide little information on how to best understand the quality of these relationships and underlying mechanisms which could explain changes in farmers' performance. The next section will discuss approaches allowing to do so.

Part 3

Integrating both perspectives in social transformation theory: ToC approach

Within this thesis, services provided under SDM can be considered as a development intervention with the aim of improving the livelihood of farmers. For this reasons, insights on evaluation theories and how they can be applied to a development program are examined.

3.4 Evaluation theory and the theory of change

Development programs and policies are typically designed to change outcomes, for example, to raise incomes, improve learning, or to reduce illness (Gertler *et al.*2016). Whether or not these changes are actually achieved is a crucial question of program managers and policy makers. Evaluations, which are periodic, objective assessments of a planned, ongoing or completed project (Gertler *et al.*2016, pg. 7), are used by program developers to verify whether this is the case, by answering questions related to design, implementation and results (Gertler *et al.*2016).

The modern discipline of evaluation emerged from social science research, which is based on a scientific method (Morra-lmas *et al.*, 2009). With first introductions dating back to the 17th century, evaluation approaches and

applications have evolved accordingly to societal needs and historical occurrences (ibid). In particular, the need for evaluation and associated research increased during and after World War II, as more large scale reconstruction programs were implemented requiring assessment (ibid.). In this period, governments and organisations moved from an emphasis on verification and compliance to an emphasis on impact, and social science techniques started to be incorporated into evaluation. This allowed to shift the attention of evaluation to the effects of intervention on development, giving rise to the notion of development evaluation (ibid.).

Today, literature on evaluation offers different approaches, or models, to programs evaluators. Hansen (2005) explains that this is attributable to the persistence of two theoretical traditions, program evaluation and organisational evaluation, which have historically been treated separately by academic literature. The first is concerned with the assessment of specific programmes. The second, focusses on evaluation of organisations, and is more generic in the sense that it is directed towards the assessment of public, private, small or larger organisations (Hansen, 2005). Drawing from both academic instances, the author groups the various approaches in result base models, economic models, actor models, and theory based models. The latter, are focused on assessing the validity of a program theory on which an intervention or organisation builds, based on empirical observations. The empirical focus allows to open up the underlying 'black box' of the program theory, providing an understanding of how to improve the theory beyond a program, as well as evaluating the results of intended goals (Hansen, 2005). In their paper, Blamey and Mackenzie (2007) expand further on the meaning of 'theory', distinguishing between 'implementation theory' and 'program theory'. Implementation theory is defined as 'what is required to translate objectives into ongoing service delivery and program operations' (Blamey and Mackenzie, 2007, pp.444). Program theory, on the other hand, refers 'to the hypothesized causal links between mechanisms released by an intervention and their anticipated outcomes'. In both stances, theory remains important to inform the evaluation's purpose and maintain the focus on the key questions to be addressed, including the selection of methods.

One of the most common approaches utilised to evaluate development interventions, which combines both implementation and program theory (Weiss, 1995), is the Theory of Change (ToC) (Gertler et al.2016; Morra-Imas et al., 2009; Development Assistance Committee, 2006; Rogers, 2009; White, 2009). A good definition of a ToC is provided by Connell and Kubisch (1998, pp 2):

A theory of change approach would seek the agreement from all stakeholders that, for example, activities A1, A2, and A3, if properly implemented (and with the ongoing presence of contextual factors X1, X2 and X3) should lead to outcomes O1, O2 and O3; and if these activities, contextual supports, and outcomes all occur more or less as expected, the outcomes will be attributable to the interventions (Connell and Kubisch, 1998, pp 2).

In other words, a ToC describes how an intervention is supposed to deliver the desired results. It achieves so by depicting the sequence of events leading to an outcome, while exploring the conditions and assumptions needed for the change to take place. It also allows to explicitly describe the logic beyond the program, and map the intervention logic along the causal pathways (Gertler et al.2016; Morra-Imas et al., 2009). Furthermore, ToC can be particularly useful in programs which seek to influence behaviours, by helping disentangling the inputs that go into providing the program intervention, the output that are delivered, and the outcomes that stem from expected behavioural changes among beneficiaries (Gertler et al.2016).

A theory of change can be modelled in various ways (Gertler et al.2016; Morra-Imas et al., 2009; Development Assistance Committee, 2006; Rogers, 2009; White, 2009). In the operational context of development interventions, Result Chains are usually the most utilised model to outline a ToC, due to its simplicity and clarity. Figure 8 shows the basic outline of a result chain with a description of the main sequence of inputs.

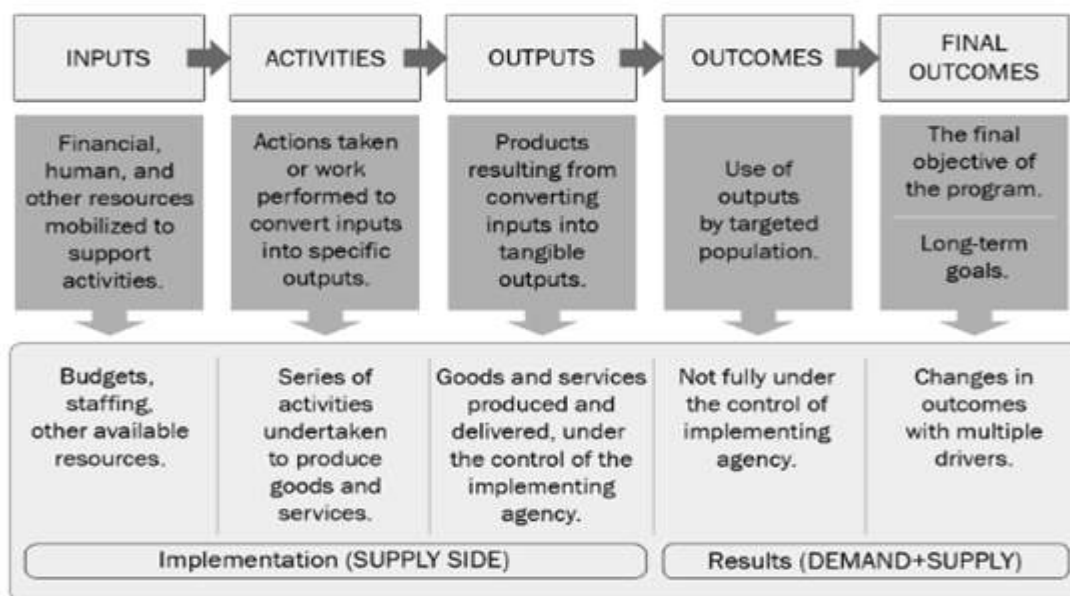


Figure 3.3. Results chain (Gertler et al., 2016)

3.5 Combining the evidence: The theory of change of SDM

The identified causal model (figure 3.4) displays how the delivery of services can bring about social transformation in agricultural settings, improving farmers' performance and their well-being, while preserving the environment. Theory on service delivery models described in Part 2 enables to identify the main actors and the type of services and output exchanged between these. However, the underlying characteristics and quality of these services potentially explaining changes in farmers' performance are not sufficiently described in these models. Originating from development literature, ToC approaches allow to identify causal patterns between interventions and outcomes, highlighting change processes and contextual factors explaining these changes. For the purpose of this research, merging the two approaches would enable to zoom into the characteristics of each service and gain a clearer picture of the interactions between the main actors and outcomes.

The main inputs of the model consist in the financing of services by the investor. In order to provide benefits to the farmers, financing needs to be long-term targeted and scalable, with returns on investments being made through the provision of services and of the product. For this reason, there is a direct linkage to the quality and price at which the final product is sold. The type of value chain and consequent relationship are important factors influencing the financing of activities. As we have seen in chapter 2, the cocoa value chain can be distinguished in fine/flavoured and bulk. Products characteristics such as quality and genetics will determine at which of the two markets farmers can sell, but also which of the two market is present in a determined region or country. This could affect the type of relationships between the service provider and farmer, and consequent delivery of services, as explored in section 3.3. Farmers capability and starting level will also be an important factor to consider which might influence the provision of activities, in particular training. The first set of activities in the causal model are the delivery of training, together with inputs and rejuvenation material and knowledge. A good training process, in particular, should be delivered following a number of well defined steps, which in the model have been grouped in four main categories. These have been identified by reviewing extant research on modern training techniques, delivery and impact (Ousuman, 2007; Bustamante et al. 2009; Bustamante et al. 2009a; UTZ, 2016; Kuit et al., 2013). When this happens, it is assumed to lead to increased adoption of sustainable practices by the farmers

and of training content more in general (activities 2). If well delivered, understood and perceived by the farmer, but also if in line with the characteristics of the farm, this adoption of practices will then be fully assimilated by the farmer and become his/her day-to-day practice utilisation (output). A first outcome of this new practice utilisation would then be seen in the increased levels of productivity and quality of the product. Depending on the type of value chain arrangements, this should also lead to increased price paid to the farmers. GAP utilisation and increased prices paid to the producers would contribute to increase ecological and social outcomes at the farm level. When all the identified steps are in place, the final outcome of services provision would be the longer-term planetary and human well-being of the farm (Vermeulen, 2018, forthcoming). The model also highlights other contextual factors which might help explaining the relationship between various steps. Adverse or favourable weather conditions might directly influence differences in productivity between one year and the other. National and international industry mechanisms might also directly be responsible for the determination of prices to be paid to farmers (Aidenvironment, 2016; Steijn, 2016).

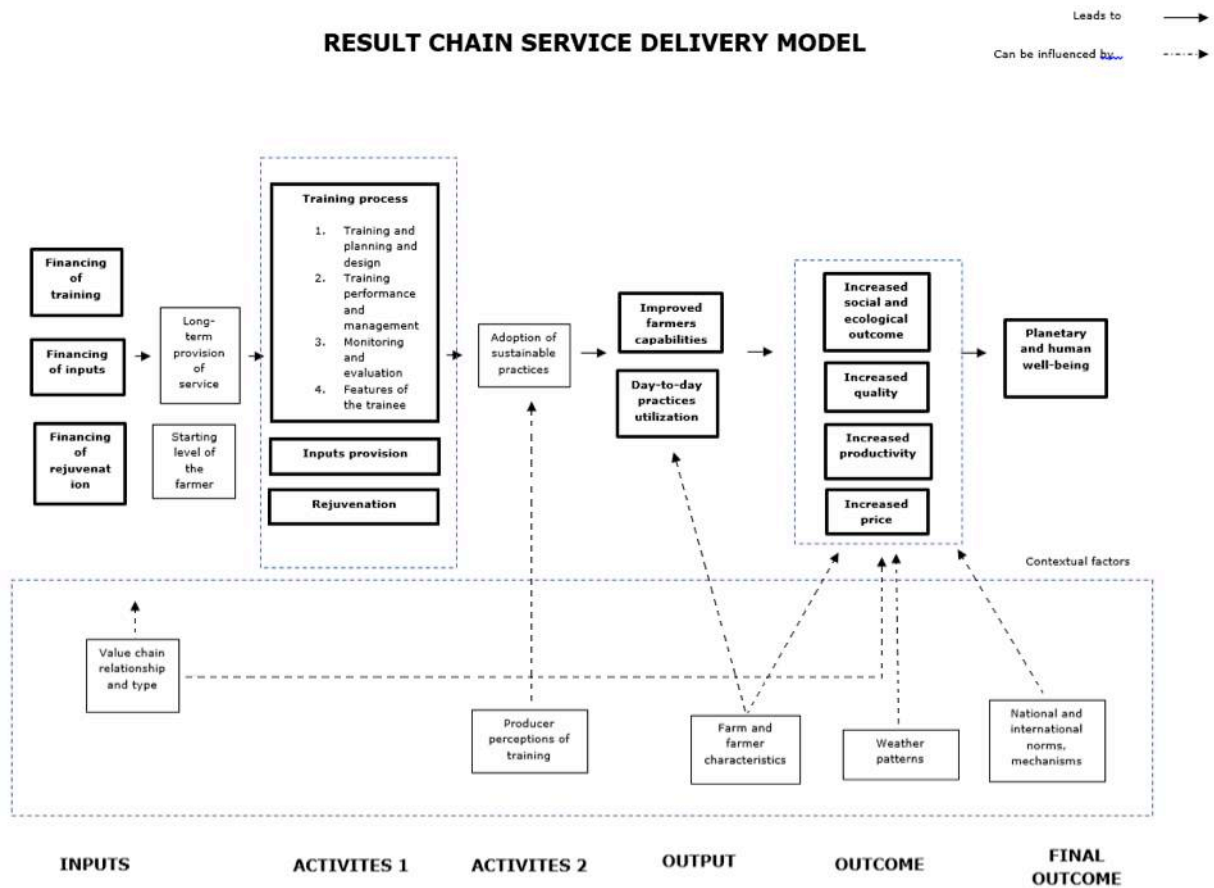


Figure 3.4. Causal model

From the causal model, the 6 sub-questions reported in the introduction were identified and used to guide the research process. The next chapter will explore the methods utilised in this research.

Chapter 4

Methodology

This chapter presents the main approach to research, including data collection and analysis. Case study selection and research locations are also reported here.

4.1 Research Design

The aim of the research is to better understand the relationships between the main stakeholders within SSCG arrangements, while also highlighting the benefits to farmers, particularly in terms of productivity, quality and price received. To answer this question and the proposed main objectives, an explorative approach based on qualitative and quantitative field-based data collection was chosen. Explorative research is particularly useful to answer a determined research question while identifying a range of causes and alternative options for a solution (Sigh, 2007), especially in settings where little is known regarding the type and quality of data available on the ground (Robson, 2011). In this sense, explorative research is not intended to provide conclusive evidence, but rather a better understanding of a problem or issue, laying the ground for future research. In this investigation, the proposed approach was useful to explore further the links between the main stakeholders highlighted in the causal model and the type of data available enabling to identify relationships between them.

When dealing with exploratory investigations focussing on real world open systems, the use of a case study method can be useful (Robson, 2011; Yin 2009). This is particularly true when focussing on a contemporary event, and the investigator has little control over behavioural events (*ibid*). While some issues with this approach might be that it focusses on specific contexts or life situations, Yin (2009) argues that generalisation through case study is possible, when discussing the results in relation to previous theory, or when more than one case is investigated. Given the aim of the present research, an explorative case study approach seemed the most suitable.

In order to provide a more holistic picture allowing for future comparisons and research, two case studies were selected and analysed: Casa Luker and Fedecacao. These represent two of the most important actors within respectively the private and public spheres of the Colombian cocoa sector. In this research, the two case studies were used to explore the type of services provided to farmers, the benefits each stakeholder draw from this collaboration, and the results on product quality, productivity and price. The focus on both actors allowed to obtain a clearer picture of the situation within the Colombian cocoa sector.

4.2 Case studies selection

The two case studies were selected due to their important roles covered within Colombias' cocoa value chain. Fedecacao is the national Federation of Cacao Producers in Colombia. With a presence in 23 municipalities it is the entity with the largest capacity, network and infrastructure in the field providing services to farmers. Furthermore, with around 6 thousand tonnes of cocoa being exported in 2016, corresponding to over 60% of the total, the organisation is the largest exporter of cocoa in the country (Chief Export Fedecacao, interview, 09/05/2017). Due to their presence at the beginning of the value chain, including Fedecacao as a case study enabled to gain concrete evidence of the type of services provided within the Colombian cocoa sector and their effects on farmers' performance from the perspective of a public institution. Moreover, being the largest exporter in the country enabled to understand external influences potentially affecting the delivery of service and payment to farmers in the country.

On the other hand, Casa Luker is the second largest manufacturer in Colombia, processing around 40 % of the cocoa produced and sold nationally, with the second largest market share within Colombia's chocolate consumer products market. Due to their position, including Casa Luker enabled to understand service provisions and effect on farmers' performance from the perspective of the Colombian private sector. Furthermore, their large national market share provided an indication of any internal mechanism potentially affecting service provision and payments to farmers.

Fedecacao was initially approached by the author during a conference in the Netherlands, with follow-ups once in Colombia. Casa Luker on the other hand, was first contacted after arrival in Colombia through local connections.

4.3 Data collection

A challenge common to case study approaches is to cope with the richness of the phenomenon, plenty of variables and diverse nature of data (Yin, 2009). One way to overcome this issue is to triangulate data. Triangulation refers to the selection of data from multiple sources (Yin, 2009). In this research, data were collected via face-to-face interviews, open-ended questionnaire with farmers, desk-based review of documents, and field observations.

A total of **10 semi-structured and unstructured interviews** were conducted. Semi-structured interviews were compiled according to a number of operationalisation variables described in table 4.1 These variables were identified based on the causal model emerged from the literature (figure 9), and corroborated by the review of other available studies (Ousuman, 2007; Bustamante et al. 2009; Bustamante et al. 2009a; UTZ, 2016; Kuit et al.,2013), as well as the provision of internal documents by Stitching UTZ certified, which due to confidentiality cannot be cited in this research. Following these operationalisation variables allowed the data collection process to remain on focus throughout the research, overcoming a common issue in exploratory research of deviating from the intended aim and objectives during course of action (Yin, 2009). Besides identifying the key variables guiding the research process, the table also describes the data nature of each variable, namely whether it is qualitative or quantitative. This will allow to reflect on what type of data are available and necessary to answer the proposed research question.

Semi-structured interviews were selected as they provide flexibility during the interview process, allowing the interviewee to stay focussed on the intended research aims, while being able to ask additional questions which might arise during the conversation (Robson, 2011). All the semi-structured interviews were recorded and transcribed, with consent of being recorded formally requested to the interviewee (see Annex I, II, III). A number of unstructured interviews were also conducted. The topics of these interviews were decided according to the results from the semi-structured interviews, and used to further explore findings remained unclear during the latter. Interviewees were selected according to their position within the organisation and knowledge regarding the topic to be explored. Not all the unstructured interviews were recorded. This is because not all the interviews were previously planned, but were arranged in the field and in unfavourable settings unsuitable for recordings. However, notes were taken and dutifully analysed, as described in the next section (see also Annex I).

Interview duration ranged between 20 and 90 minutes, and was carried out between April and May 2017. All interviews were conducted anonymously, meaning that no names were asked or reported in this research. Conversation occurred in Spanish, and transcribed to English when necessary. When requested, transcripts of the interviews were sent to the interviewees and adjusted for minor details.

A mixed open-close ended questionnaire was conducted with **30 farmers**. The majority of the interviewees were approached directly at their farms, but 6 interviews were conducted at cocoa selling points during sells-day. Farm

visits were previously planned with technicians to ensure that the farmers had received training and other services from the entities under scrutiny. **15 interviews** were conducted in San Vicente de Chucurí, and **15** in El Carmen de Chucurí. 13 farmers from El Carmen were also UTZ certified. Finally, 5 over 15 farmers interviewed in El Carmen were women, and 6 out of 15 in San Vicente.

The questionnaire utilised was taken from another research (Rueda *et al.*, 2018, forthcoming), following recommendation of utilising ‘already tested’ questionnaire during field-research in order to ensure its functionality (Robson, 2011). However, the entire questionnaire was adapted to the scope of this research, and additional open-ended questions added and certain questions removed. It was chosen to rely on a mixed close-open ended questionnaire to be able to gain quantitative data while also collecting more in-depth information and explanations regarding some of the farmers’ choices. This allowed to ask additional questions on a number of diverse topics, while also collecting deeper insights from a relatively small sample of farmers. The questionnaire (see Annex II) was divided in different sections, and asked general information regarding the farmers and their farm, harvesting and post-harvesting practices, participation in networks or certification schemes, and land tenure. All questions were asked by the researcher, and responses collected using KoboCollect application for smartphones. This ensured no data loss during field visits or after. Each farmer was asked to fill a consent form.

Table 4.1 Operationalization variables

Variable	Indicator	Data Nature
Training planning and design		
Training needs analysis	<i>An analysis of farmers knowledge and needs of training is carried out before the event to establish effective planning and design of training</i>	Qualitative
Learning objectives	<i>Objectives of the training and intended learning outcomes are clearly stated and laid out at the beginning of the training</i>	Qualitative/ Quantitative
	<i>Schedule is made by trainer provider defining planning, delivery, evaluation and monitoring plan, and record of trainee characteristics</i>	
	<i>Farmers satisfaction with provision of learning outcomes</i>	
Organisation of contents	<i>Completeness of the training content delivered in environmental, social and economic domains</i>	Qualitative/ quantitative
	<i>Level of incorporation of training analysis into content</i>	
	<i>Farmers satisfaction with content delivered</i>	
Training methods and materials	<i>Delivery of training includes mixed methods and material including theoretical, on-farm demonstration and DIY for farmers</i>	Qualitative/ quantitative
	<i>Farmers satisfaction with methods of delivery and material used</i>	
Selection of participants and invitation to training	<i>Features on which farmers are selected for training</i>	Qualitative
	<i>Invitation process to training</i>	
Venue, duration and length of training	<i>Characteristics of the venue selected for training</i>	Qualitative
	<i>Location of venue selected for training</i>	
	<i>Duration of each training event</i>	
	<i>Frequency of training in a year</i>	
	<i>Farmers satisfaction with venue location, length and frequency of training</i>	
Group size and farmers participation	<i>Participation and discussion between farmers and trainer during training event</i>	Qualitative /quantitative
	<i>Farmers satisfaction with participation during training</i>	
	<i>Group size of each training</i>	

Monitoring and evaluation		
Evaluation of training activities	<i>Farmers can evaluate training and trainer during or at the end of training event</i>	Qualitative
	<i>Results of evaluation are incorporated in subsequent training process</i>	
Follow-up and monitoring of post training	<i>Farmers knowledge and adoption levels are verified following a training activity</i>	Qualitative/ quantitative
	<i>Type of support provided to farmers following a training activity</i>	
	<i>Farmers satisfaction with evaluation and monitoring of practices</i>	
Features of the trainee		
Educational background	<i>Type and length of education of the trainee in the sector</i>	Qualitative
Experience as a trainer and in the cocoa sector	<i>Experience in the cocoa sector</i>	
	<i>Family background and experience with the region of training location</i>	Qualitative
Farmers satisfaction with trainee	<i>Farmers satisfaction with trainee provision of training</i>	Qualitative/ quantitative
Adoption rates		
Adoption rates of training curricula	<i>Level of adoption of farmers of training content delivered</i>	Quantitative /qualitative
	<i>Easiness of farmers in adopting training content</i>	
	<i>Motivations of farmers for adoption/non-adoption of content</i>	
Inputs provision		
Types of inputs provision	<i>Types of inputs provided (credit, agro-inputs, facilities, market access)</i>	Qualitative
	<i>Process utilised for identification of inputs to be delivered</i>	
	<i>Entity providing all the inputs</i>	
Assistance provided	<i>Type of assistance provided with each input</i>	Qualitative
Farmers satisfaction	<i>Farmers satisfaction with inputs provided</i>	Quantitative
Rejuvenation		
Rejuvenation approach	<i>Type of rejuvenation approach utilised (stamping/side grafting, replanting and other)</i>	Qualitative
	<i>Quantity of rejuvenation material provided</i>	
	<i>Entity providing the material</i>	
Rejuvenation strategy	<i>Emphasis of rejuvenation strategy versus other inputs provided</i>	Qualitative
	<i>Future plans on rejuvenation approach and financing</i>	
Farmer satisfaction	<i>Farmers satisfaction with material provided</i>	Qualitative
	<i>Farmers easiness in utilising material</i>	
Financing and scalability		
Training financing	<i>Costs of training per farmer</i>	Quantitative / qualitative
	<i>Description of the main costs in training provision</i>	
	<i>Description of how are the training costs financed</i>	
	<i>Is there a return on the investment being made</i>	
Training scalability	<i>How scalable is the provision of training</i>	Qualitative
	<i>What are the main barriers to scaling up training</i>	
Inputs financing	<i>Costs of inputs per farmer</i>	
	<i>What are the main costs in inputs provision</i>	
	<i>How are the inputs costs financed</i>	

	<i>Is there a return on the investment being made</i>	
Inputs scalability	<i>How scalable is the provision of inputs</i>	Qualitative
	<i>What are the main barriers to scaling up inputs provision</i>	
Rejuvenation financing	<i>Costs of rejuvenation per farmer</i>	Qualitative
	<i>What are the main costs in rejuvenation provision</i>	
	<i>How are the rejuvenation costs financed</i>	
<i>Is there a return on the investment being made</i>		
Rejuvenation scalability	<i>How scalable is the provision of rejuvenation material</i>	
	<i>What are the main barriers to scaling up rejuvenation material</i>	
Outcomes of services		
Quality	<i>Quality determination process</i>	Qualitative/ quantitative
	<i>Adoption rates of post-harvesting practices</i>	
Productivity	<i>Productivity levels before and after SDM</i>	Quantitative
	<i>Adoption rates of harvesting practices</i>	
	<i>Weather patterns</i>	
Price	<i>Price determination process</i>	Quantitative

The secondary data utilised in this research consisted of internal companies documents provided by some of the interviewees, public information available on the organisations website, legislations concerning product features both in Colombia and other countries, findings from previous researches conducted in the country by other entities which could be useful for this investigation.

Finally, notes and photographic evidence were collected during the field research. Tours were given on 17 farms where it was possible to see in practice what had been discussed in the interview. Notes were also taken when relevant information were given during conversation with farmers, technicians and other (see Annex I).

Data Collection method	Source	Aim
Desk Research	Organisations' internal documentation	To get background data regarding some of the organisations approaches and complement what gathered via interviews
	National policies regarding product features	To better understand what were the technical requirements determining cocoa quality
	Past researches and online documents regarding cocoa cultivation in Colombia	To enrich and compare the study findings with previous researches' findings, but also to try and explain some of the identified patterns
Interviews and discussions	Field technicians	To understand the type of technical knowledge transferred to producers, and other technical aspects regarding cocoa production
	Managers	To understand the strategies undertaken by the organisation and future intended directions
Open-ended questionnaire	Farmers	To understand the type of practices utilised by the producers, but also the challenges and advantages obtained within the SDM.
Farm-field	Farms and Casa Luker training center	To see in practices what were the farmers implementing, but also to understand more regarding cocoa cultivation, and the differences between various performing farms.

Table 4.2 Summary of the data collection methods employed in this research

4.4 Research locations

Data collection was conducted in three locations across the country. Firstly, a visit was made to the Casa Luker Farm located near the municipality of Palestina, in the coffee region area (figure 4.1). Here, data were collected regarding training approach promoted by Casa Luker.



Figure 4.1. Location of the Farm Casa Luker

The second data collection activity occurred in the region of Santander, in the departments of San Vicente and El Carmen the Chucurí (figure 4.2). These are respectively the first and second most producing municipalities in the country. These locations were selected due to the long history and involvement in the cocoa sector, providing a good snapshot of the evolution and efforts which have been undertaken in the country to improve cocoa 's production and farmers' conditions. Fedecacao 's office which has been visited in San Vicente de Chucurí is the largest technical unit in the country. The association Cortipaz is instead located in El Carmen de Chucurí.



Figure 4.2. Location of San Vicente and El Carmen de Chucurí

	Total Population Municipality	Total area municipality	Average cocoa plantation size	Average production per hectare per year	Annual production	Elevation
San Vicente	34650	1200 km ²	~4 h	~550 kg	~7000 t	690 m
El Carmen	20100	914 km ²	~4 h	~500 kg	~6000 t	1160 m

Table 4.3. Main features of El Carmen and San Vicente de Chucurí (Alcaldía San Vicente, n.d.; Alcaldía El Carmen, n.d.; Fedecacao, 2008)

4.5 Data analysis

To analyse qualitative data, open coding was used. Coding occurs when 'data are broken down into component parts which are then given names' (Bryman, 2008, p. 542). In open coding, these concepts are grouped into categories, and each category is given a name, providing patterns within the findings. Codes were derived from the transcripts of interviews, but also from secondary documents and notes from field observations and discussions. NVivo software was utilised for the process, which facilitates grouping of the various codes ensuring no information loss. Patterns from the quantitative data of the survey were instead identified using Excel. The relatively smaller sample size did not allow for statistical analysis, which however made an analysis using Excel sufficient. Information from the open-ended questions were coded and grouped into categories, which were then added to the qualitative information.

The analysis proceeded according to the identified operationalisation variables, which were derived from the causal model drawn from the literature. The model therefore guided the entire data collection and analysis process. For each category, conclusions were drawn by putting together the findings from the qualitative and quantitative data analysis. However, given the explorative approach of the research, findings which did not fit the identified model were also reported where necessary.

4.6 Quality of the research

To ensure the validity of the research, a number of measures were taken. Firstly, to avoid biases in farmers responses and results of the survey, the farmers to be visited and interviewed at the buying points were randomly selected from lists of farmers in each area to be visited. Interviews with technicians also run the risk of being biased. In order to avoid this, triangulation was used. Interviews with technicians and managers were confronted with responses from farmers surveys, as well as with responses of other interviewees. Finally, more than half the interviews with farmers were followed or anticipated by a visit to the farm, where photographic evidence was taken and farmers responses verified upon.

Chapter 5

Description of the cases

This chapter provides a description of the two cases investigated in this research with an explanation of the SDM employed by each entity.

5.1 Case 1: Fedecacao

Established in 1960, Fedecacao is the the National Federation of Cocoa producers in Colombia. Their organisation mission is to 'improve the quality of the producers and represent the cocoa community, promote cocoa cultivation in Colombia through programs on research, knowledge transfer and support to commercialisation, while being sustainable, competitive and friendly with the environment' (Fedecacao , 2017).

With a physical presence in 23 municipalities across Colombia, Fedecacao is the sole entity responsible for managing the National Cocoa Fund and provide services to farmers (Fedecacao , 2017). This fund originates from a 3% tax applied to any volume of cocoa purchased, imported or exported to and from Colombia.

However, since 2013 the organization decided to also promote itself as a private company, by purchasing cocoa directly from producers and exporting it to international buyers. This activities are separated from their commitments as managers of the National Cocoa Fund and relative service delivery.

The causal model was used to investigate further training, inputs and rejuvenation strategies promoted by the organisation, but also how these integrate with other services provided, the relationships established with the farmers, and the benefits that the latter have from the delivery of these services.

5.1.1 Fedecacao service delivery model

The service model employed by Fedecacao results to be an hybrid form between an informal and intermediary SDM (figure 5.1). The system shares features with informal SDM as the off-takers, which in this case are international buyers of cocoa from the Federation, do not have any contact with the farmers. Nonetheless, these buyers do have buying contracts with Fedecacao, who is responsible to deliver them pre-agreed quantities of cocoa of a specific quality, and grain size. This is an activity which Fedecacao accomplishes as a private entity. On the other hand, Fedecacao is also in charge of managing the public National Cocoa Fund, with which it delivers services to farmers, and therefore resembles an intermediary SDM. Yet, the federation does not sign any contract with its farmers, who are free to sell to whoever they want. Since the National Fund managed by the Federation originates from a tax taken from farmers, the latter are also indirectly investing in their services when selling their cacao. Interviewee 6 explained that the hybrid public/private form of the Federation does not allow for any contract signing, as providing services with public funds while buying cocoa as a private entity would be a conflict of interest and therefore illegal.

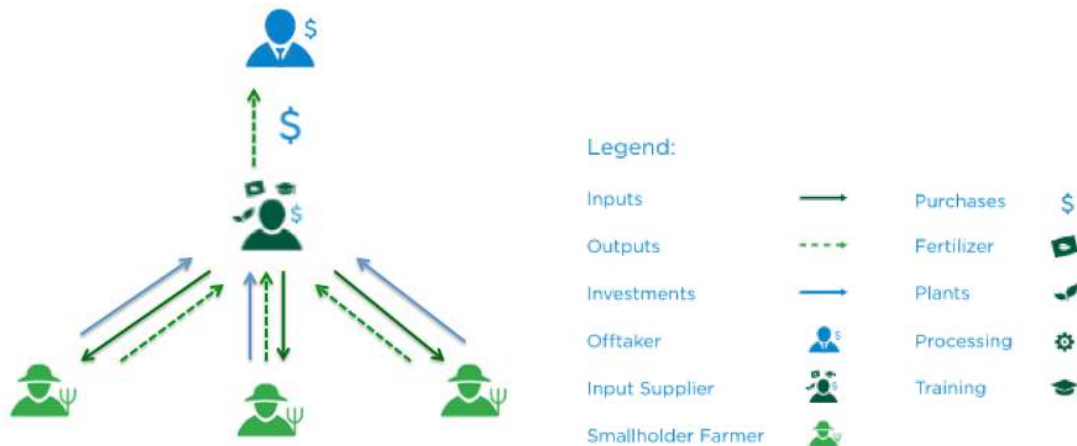


Figure 5.1. SDM Fedecacao. Hybrid informal and intermediary SDM found in literature

5.2 Case 2: Casa Luker

Casa Luker is a family owned business established in 1906, representing the second largest manufacturer and producer of fine flavoured chocolate in the country (Casa Luker, n.d.-a). While today the company offers a wide portfolio of products, manufacturing and selling of ‘fine and flavoured’ cocoa represents the main activity of the company, with Colombia being the biggest market for its chocolate products. Although the company’s aim is to establish a direct-trading business model with the farmers, today over 60% of the purchased cocoa happens via intermediaries and over 52 farmers cooperatives across the country. The latter, correspond to over 17.000 hectares of plantation and 8.000 producing families (Casa Luker, n.d. -b).

The company actualises its CSR commitments through its ‘Luker Way’ plan, with which it delivers services to farmer (Plan Cosecha) (Casa Luker, n.d. -a). Since 1962, the company has also established its own cocoa research center called Farm Luker, used for investigation and training purposes (Casa Luker, n.d.-a).

Similarly to the previous case study, the identified causal model was used to investigate further training, inputs and rejuvenation strategies promoted by the organisation, but also how these integrate with other services provided, the relationships established with the farmers, and the benefits that the latter have from the delivery of these services.

5.2.1 Casa Luker Service Delivery Model

Casa Luker employs a service delivery model which is a hybrid form between an intermediary and centralized SDM. The company currently purchases over 60% of its cocoa from around 52 farmers’ cooperatives across the country. With the majority of these cooperatives, the company establishes contracts agreeing the quantities to be purchased, in return for the delivery of inputs and other services. This is shown by the lines linking the off-taker and service provider in figure 5.2. When services are given to the cooperatives, they are provided for free during the company’s ‘harvesting plan’. With this plan, the company delivers through a raffle system twice a year free inputs to farmers with the help of the cooperatives. However, most of these intermediaries or cooperative do not establish any contracts with the farmers, as in the case examined in this study. While most of the purchasing occurs through cooperatives, some of the farmers can sell directly to the company by bringing cacao to the nearest processing plant. With these farmers, the company does not sign any purchasing agreement, but delivers inputs and technical assistance upon request by the farmer (interviewee 9). In figure 5.2 this is depicted by the lines

connecting the off-taker and the farmer directly. An additional option to both cooperatives or the same farmers is to buy inputs from the company at discounted prices.

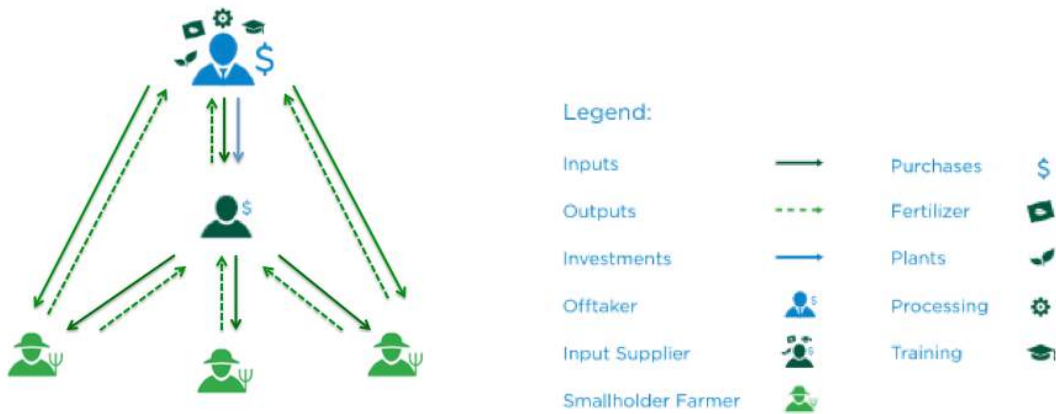


Figure 5.2. Service Delivery Model Casa Luker. Hybrid between centralised and intermediary SDM found in literature

5.2.2 Farmers' association Cortipaz

The 'Corporación Tierra para la Paz del Magdalena Medio' (Cortipaz) is one of the 52+ associations with a commercial commitment to Casa Luker. With around 600 farmers enrolled, the association has been selling almost exclusively to Casa Luker since 2008, and therefore subject to the services provided by the organisation as part of its Luker Way plan. Parallel to their commitments with the manufacturer, Cortipaz obtained in the year 2016 an UTZ Certification, which failed to be renewed for the second year. Cortipaz was included in the case study of Casa Luker thanks to its long-term commitment with the organisation, but also the accomplishment of a certification. This enabled to explore and compare the benefits obtained as part of this sustainability certification to the ones provided by the Colombian manufacturer.

Chapter 6

Delivery of services

This chapter describes the delivery of services operated by the two case studies, obtained from interviews and secondary data. Firstly, the case of Fedecacao is reported, followed by service delivery from Casa Luker. Service delivery from the association Cortipaz is also described, together with a final section on issues encountered regarding data availability. A table summarizing the findings is provided at the end of each section.

6.1 Training delivery Fedecacao

6.1.1 Training planning and design

Due to the large number of farmers it deals with, Fedecacao organises various training events with different structures and set ups.

Methods demonstration are half a day field practices, where with a number of 10 to 12 farmers they go through the most common practices such as fertilisation, pruning, side-grafting, fermentation, or quality determination. Usually, the focus is on 2-3 topics according to farmers requests on the day. Interviewees 1 and 3 asserted that even if short, methods demonstration can be highly effective with farmers, and are therefore one of the most common events organised. Cocoa schools are sign up programs of 2-3 days whereby both theoretical and practical aspects are dealt with. Finally, technical tours are week long training where all aspects of the cocoa plant and its cultivation are dealt with.

The content to be delivered depends for the most part on the nature of the event, but also on the producing region. For each municipality, Fedecacao has a number of technicians who are responsible for visiting producers on a daily basis, to provide assistance and administer running projects with farmers. Part of their role is also to compile information about producers' practices in a determined area, which are brought together at the end of each month. Based on these information, the training contents of each event is decided. For instance, one cocoa school event might be focused predominantly on pruning and fertilizations aspects, as it has resulted that participating farmers are faulting in these areas. Another cocoa school might instead be focused on other production topics. The same holds for the other events mentioned above. However, one of the technician explained that the training events held in Santander are usually more specific and practical, as farmers in this regions have been cultivating cocoa for a long time. Other parts of the country where they are active need to deal with more basic and general talks due to the 'newness' of the producers into the business. Interviewees 1 and 3 both stressed the importance of providing practical field demonstrations to the farmers during training. Both asserted that theoretical parts are usually focused on explaining general anatomic and management parts of the plantation, as well as to provide general information regarding commercialization, both nationally and internationally. Due to the variability of each event, they were not able to quantify the balance between practical and theoretical activities. Nonetheless, the training content to be delivered follows for the large part the technical norm of Fedecacao, which is active nation-wide and updated regularly on their website.

6.1.2 Training performance and management

Participation of farmers to training is voluntary. For the cocoa schools and technical tours events, sign up is required. Farmers can put forward a request to participate with the technician or alternatively by signing up

themselves directly at Fedecacao's office, which in San Vicente is located next to their buying point. They are subsequently notified in person by either the technician or upon their next visit to the office/buying point.

In San Vicente, trainings and demonstrations are usually held in two locations. The most common one is Fedecacao's farm Villa Monica (Figure 6.1).



Figure 6.1. Source: Author's photo.
Fedecacao training and research center. May 2017

Figure 6.2. Source: Author's photo.
Cocoa pods with monilla. May 2017



Here, demonstration are carried out using all the necessary harvesting and post-harvesting materials, which according to interviewee 2 is important to provide a best-practice example to the farmers. This farm is also used for research and investigations, as it can be seen from picture 6.2, where samples of cocoa with monilla¹ were collected and catalogued as part of an ongoing project, and subsequently used for training purposes. The farm is also equipped with kitchen and sleeping rooms, allowing farmers to eat and sleep in-situ during trainings. This is also an important incentive for farmers to participate to training (Interviewees 2 and 3). The other training location is a demonstration plot on a nearby farmer's plantation which has been purchased and is managed entirely by Fedecacao's technicians for training and investigation purposes. The formula of 'renting out' farmers land for training and investigation purposes is common also in other municipalities (interviewees 2). These are usually plantations left idle or which are infested by plagues or diseases.

Length of each training varies according to each event, and is therefore difficult to establish with more accuracy. The group size is kept purposely small (10-15 maximum) for each event to guarantee learning and knowledge transfer to each one of the participants. Discussions and participation among farmers is really important (interviewee 3). On many occasions, 'fun' or other group activities are carried out to keep attention and participation high throughout the event.

Despite being held on a voluntary base, all the interviewees asserted that the training events of Fedecacao in Santander are always very popular amongst farmers, and are in high demand. The same explained that out of the ~3000 producing families in San Vicente, between 1000-1500 are reached every year. However usually, each

¹ Monilla is the most widespread plant disease amongst Colombia's cacao plantations (Fedecacao, 2008)

² Product quality and productivity of each plant depends 17% on its genetics and 83% on how it is managed and

farmer receives training once a year or less. The frequency in demand allows the central office to establish a training calendar at the beginning of each year.

6.1.3 Monitoring and evaluation

In each municipality Fedecacao has a number of technicians whose everyday job is to visit producers who request a visit. Each technician is responsible for a specific area, usually rotating on a year basis. The scope of each visit is to provide assistance on specific issues the farmer might encounter, to check upon on-going projects on their plantation, and also to complement the knowledge acquired during training. Following talks with the farmer and a tour of the plantation, a form is compiled and left to the producer, where based on the scope of the visit, areas of improvements and/or tasks until the next visit are prescribed.



Figure 6.3. Fedecacao technician providing feedback and assigning tasks until next visit. May, 2017.

Source: Author's photo.

According to the interviews, evaluation of the trainer or training programme from farmers is not very common. Training methods are based on 'established' delivery practices and experienced trainers.

6.1.4 Features of the trainer

Fedecacao employs a large number of personnel to deliver training across the country. Interviewee 3 was an agronomist and producer himself, with 29 years of experience working with Fedecacao as a trainer. He was in charge of delivering training to farmers, as well as other trainers across the country. However, interviews with other technicians explained that all employees liaising with farmers need at least a technical specialisation to be hired by the Federation. Interviewee 5 explained how each unit across the country divides its personnel to operations and investigation. The first are in charge of visiting farmers, provide support, and small trainings when needed in the field. The ones in charge of investigations, usually spend most of the time at the training and research center conducting studies, or collecting data. During an event, they are the ones in charge of providing training, if needed with other technicians from other municipalities specialised in a determined area.

All employees receive training and knowledge upgrading, with events happening on average every two months. All the technicians of the unit were from the municipality of San Vicente, and had either a cocoa farm they managed themselves or their parents had one. All therefore had affinity with and knowledge of the industry and of the area in which they operated.

Training	Training planning and design	Various training events with content and knowledge tailored around farmers needs
	Training performance and management	Participation held on a voluntary basis. Good infrastructures in place for demonstrations and research purposes. Training events are set up very frequently but training to individual farmers is not very frequent
	Monitoring and evaluation	Regular, planned follow up and assistance provided to farmers in place to verify implementation of practices
	Features of the trainee	Large number of high qualified personnel in place for training delivery and technical assistance across the country. Limited personnel in San Vicente

Table 6.1. Summary of training delivery Fedecacao

6.2 Inputs provision Fedecacao

6.2.1 Delivery of agricultural inputs

The delivery of agricultural inputs happens predominantly as part of ongoing national projects. When fundings from the national governments are available as part of a project or plan, Fedecacao is in most cases the entity to which they refer to for the delivery of inputs (interviewees 1, 2, 3, 5). This happens because of their extension and presence across the country. Usually each project comes with specifications for delivery. Based on these specifications, Fedecacao selects the farmers in the area which qualify. Inputs consists usually in fertilizers, utensils, seeds varieties for planting, but at times also wood boxes for fermentation. Upon delivery of fertilizers or request from a farmer, the federation also provides free soil analysis to be able to identify which types best suit the individual farm.

Inputs are also delivered following a determined training event. For instance, one of the technician explained that if a farmer receives training regarding seeding or renovation, they will be given seeds at the end of that training. Likewise, if a farmer who receives visits is planning to renew its plantation, they will deliver some seeding material for free. The same technician explained that they do so in order to incentivize rejuvenation of the plantations, which in the short-term leads to lower yields for the farmer and thus lower income. However, the same technician asserted that once the initial input is given, they encourage the farmers to obtain the material for side-grafting and rejuvenation from the plantation itself. A number of utensils are also available for farmers to borrow, such as woodchoppers, shovel or hoes. These can be requested and returned to the main office, to be used by another farmer.

The contribution of Fedecacao to farmers in terms of agricultural inputs delivery was also recognised by interviewee 10. In particular, it was explained that while in the process of training a group of 120 farmers in San Vicente's region to obtain an UTZ certification, they were very careful in the type and number of agricultural inputs to be delivered as many were already being provided by Fedecacao .

6.2.2 Assistance to commercialisation

Part of their objectives as administrators of the National Cocoa Fund is to provide assistance to commercialisation to farmers and farmers' cooperatives across the country. Interviewees 5 and 6 described diverging responsibilities of Fedecacao in terms of commercialisation, revealing that the coverage of seemingly different roles as an hybrid public/private organisation in reality complement each other.

Interviewee 5 described that the role of Fedecacao in terms of commercialisation and as managers of the public cocoa fund is to provide knowledge to farmers on how to improve the quality of their products, which would then facilitate the selling of their products to a buyer. This happens mostly via the provision of extensive training on post-harvesting practices. However, the interviewee 6 explained that the decision to begin working as a private company was to be able to commercialise large quantities of cocoa, leveraging on their ability to reach around 32 000 out of the 38 000 farmers present in the country. As part of this exercise as a private company, their role is to buy Colombian cocoa of good quality and to promote it to international buyers worldwide, thus increasing the reputation of Colombian cocoa across the country.

Another role as part of their assistance to commercialisation is to help smaller cooperatives commercialising their cocoa internationally. This is achieved by letting international buyers know about good quality cocoa originating from a specific cooperative, by providing them with financial assistance or up-front payments for any logistic costs they might encounter, and by supporting their farmers with training on post-harvesting practices to be able to improve their cocoa quality (interviewee 5). However, these statements were verified when visiting the association Cortipaz. Interviewee 7 revealed that on many occasions they had tried contacting Fedecacao to be able to sell some of their cocoa internationally or to be 'lent' some of their local technicians to help with some training activities while in the process of certifying. However, they always received elusive answers and no help was eventually provided. When asked about clarifications regarding these findings, interviewee 6 at Fedecacao explained that the smaller quantities which most of the cooperatives ask help with are not sufficient to be able to cover the logistic costs of the operation. For a container of 25 t, they need to be offering at least 12.5 t in order to be financially viable, but most cooperatives cannot reach these numbers.

Fedecacao also offers support to associations who are willing to obtain a certification. They assist with knowledge transfer and provision of agricultural inputs in the process leading up to an audit. This was confirmed by interviewee 10, who explained that Fedecacao provided a lot of help and training to the selected group of farmers for certification. Likewise, discussion with a farmer belonging to a women association explained that Fedecacao was providing them with technical assistance and support in finding a buyer for the UTZ certification they were planning to obtain by the end of 2017. Interviewee 5 at Fedecacao explained that this exercise was part of their responsibility as a public entity. However, the same interviewee revealed that their future intentions as a private entity is to certify farmers and to act as a 'bridge' between them and potential buyers of certified cocoa, benefitting by maintaining some of the provided premium.

Finally, the Federation provides support to farmers to obtain agricultural loans by guaranteeing the farmer's involvement in a plantation renovation or improvement project which will generate future higher yields, thus allowing the farmer to pay off the debt.

Inputs provision	Delivery of agricultural inputs	Agricultural inputs delivered mostly as part of national projects, but also following training events. Wide range of inputs delivered covering both harvesting and post-harvesting process.
	Assistance to commercialisation	Wide range of assistance to commercialisation provided to farmers and cooperatives. However, the approach and strategy as public institution seem to overlap and complement interests as private entity. This can result in less help provided to other cooperatives.

Table 6.2. Summary of inputs delivery Fedecacao

6.3 Rejuvenation Fedecacao

Fedecacao's strategy on plantations rejuvenation started in the early 2000s, with the aim of counteracting the ageing process affecting the majority of Colombian plantations, and to homogeneously increase the quality of the country's cocoa. Back then the emphasis was on the introduction of new clones varieties originating from the trinitario family and discovered in other Latin American countries. Subsequently, through their research activities they succeeded in discovering and certifying 8 new cocoa varieties (Annex IV). Today, their rejuvenation approach consists in the promotion of 'plantation models' consisting of 4-5 different types of material for each cultivation. In each model varieties are combined depending on features such as resistance to diseases, intercompatibility, productivity, grain size and other plant features. The aim is to be able to provide the farmer with a 'menu' of available models, each one with different features such as productivity, resistance to diseases, quality, grain size etc (interviewee 1, 2). The farmer can then choose which one to adopt based on preferences but also on local climatic conditions, and to slowly regenerate their plantation. On this note, interviewee 2 explained that high climatic variability in Colombia is also an important reason why they decided to embark on this strategy. In fact, this approach allows for more flexibility and adaptability to the country's numerous climates. In Arauca for instance, the Federation is now currently working on what they call a 2020 strategy, whereby they aim to plant 20 000 h of the Araucan model by 2020, which is focussed on high quality Criollo varieties such as FEAR 5, FSA 12, FEC 2 (Annex IV). High climatic variabilities is also a reason why the federation is promoting the utilisation of lower quality varieties such as the CC51 in their models, especially in Santander and San Vicente area. The variety, which is now very common among Ecuadorian plantation, is usually identified as being able to produce more pods per tree, each pod providing a larger grain number and size, while having high resistance to diseases. Yet, the high acidity results in a rather bitter taste, classifying it as a low quality product. However, interviewee 4 asserted that CCN51 planted and grown in Santander results in lower acidity and thus overall better quality, thanks to the different climates at which the plant is cultivated². Therefore when post-harvested separately, the variety can produce more cocoa of good quality.

² Product quality and productivity of each plant depends 17% on its genetics and 83% on how it is managed and the environment in which it is planted (Fedecacao, 2008).

In terms of approaches promoted amongst farmers, Fedecacao is encouraging the diffusion of new clones via side-grafting technique³, which is highly stressed during training (interviewees 1, 3). During projects, they also deliver the materials to be planted directly to the farmer, or send a professional side-grafter to carry out the job on their plantation. The materials are identified according to the farm characteristics and plantation, trying to follow the established models described above (interviewee 1, 3).

However, discussions at the cooperative members revealed that this might not always be the case in practice. In fact, interviewee 7 asserted that professional side-grafters are usually paid per day by the Federation, and with that amount they are responsible to obtain the materials and cover other transport expenses. In order to save on costs, it is common amongst the latter to purchase the cheapest available varieties such as CCN51 instead of the higher quality, more costly varieties such as regional Criollos or the ones discovered by the Federation. According to them, these actions on the ground highly counteract the good intentions promoted at higher levels by the organisation.

Rejuvenation	Rejuvenation strategy and approach	<p>Strong rejuvenation approach and strategy in place nationwide linking by the delivery of specific planting material to farmers and in depth research.</p> <p>Large number of farmers to be reached, large national coverage, and lack of personnel can result in less efficient actualisation of their strategy on the ground.</p>
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Table 6.3 Summary of rejuvenation delivery Fedecacao

6.4 Financing and scalability Fedecacao

The provision of training and inputs, as well as the rejuvenation approach promoted by Fedecacao, are all financed with the national cocoa fund. This fund originates from a 3% tax on every selling happening in the country, either nationally or internationally. Fedecacao is the sole entity in the country in charge of managing this fund. The exercise the Federation carries out as a private entity are instead financed by means of private investments and loans (interviewee 6).

With regards to the scalability of training as well as inputs delivery, a great barrier is the lack of personnel to be able to cover larger areas in each municipality across the country, but particularly in the area of the study (interviewees 1,2,3,5). Lack of infrastructures, and in particular of good terrestrial connections, allows only a certain number of farmers to be visited per day, as accessibility is possible in most areas only on motorcycles or larger trucks. Given the amount of work and follow up required for each farmer, the current number of field technicians is not sufficient to cover the entire territory.

With regards to the costs, none of the interviewees could provide detailed information regarding the costs of training and inputs delivery per farmer.

³ Side grafting consists in the plantation of a new variety into the mother trunk of an older tree, in order to favour faster growth of the tree



Figure 6.4. Road quality in San Vicente Area.
May 2017 Source: Author's photo.

Financing and scalability	Good funding available alimented by the National Cocoa Fund. Lack of personnel does not allow to expand services to be delivered to farmers. Poor infrastructures also directly impact the number of farmers to be reached.
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Table 6.4. Summary of financing and scalability Fedecacao.

6.5 Training delivery Casa Luker

6.5.1 Training planning and design

The planning and training offered by Casa Luker varies according to the location where the training is provided. Groups of farmers are either invited directly to their farm, or are visited at their municipalities by one of their field officers.

When invited to the farm, a diagnostic of the group is carried out in the field by one of the technicians before the group visit. During this preliminary visit, the technician consults with the farmers and cooperative members selecting the areas they would like to receive training on more than others. Based on these information, a training plan is laid out with the various activities to be delivered during the training. Interviewee 8 at the farm explained that the methodology mostly used to deliver trainings follows the Farmer Field Schools structure. This means that each event is highly structured and participative, where farmers are informed about the intended learning and outcomes of the event from the start. On average, classes are 60 % theoretical and 40 % practical. In particular, the technician explained that practical demonstrations and DIY is highly encouraged during each training event. At the end of each meeting, small group activities are promoted to verify and solidify the learning which occurred during the entire event (interviewee 8).

On the other hand, training events held at a farmers' group municipalities tend to be one day activities, where farmers are gathered and the topic of each event decided on the spot based on the farmers requests. These events are usually highly practical, but much less structured than the events held at their farms. The content of each training varies according to the necessities of each group of farmers. However, a training manual to be analysed by the author was not available at the time of the visit, but was in the makings and should be available to all associations by the end of 2017. At the time of the visit by the author, none of Cortipaz's farmers had ever received training at Casa Luker's farm. However, interviewee 7 confirmed that usually one training event each year

is organized and held at their municipality. According to the manager, since from 2008 to 2015 around 300 farmers had received at least once training from Casa Luker.

6.5.2 Training performance and management

Participation to training both at the farm and in the municipality is voluntary for farmers. When visiting the farm, farmers or the associations are responsible for covering the travel expenses. However, all other living and accommodation expenses are offered by the company. As explained by interviewee 8, only if a full training on agricultural practices is necessary farmers are invited to the farm, as best practices and examples on cocoa cultivation can be delivered. The farm is also used for training and investigation purposes, hosting around 20 employees who permanently live on the farm.



Figure 6.5 From left to right: drying stall and classroom (background), entrance to the farm and accommodations. April 2017.
Source: Author's photo



Figure 6.6. Farmers in class during Training. Retrieved July 2017.
Source: Casa Luker presentation

When training is provided at farmers' municipalities, this is generally held at a farmer's farm, usually one of the best performing producers of the group with good organization of the farm. In the municipality of El Carmen, the farm where trainings are usually held was also UTZ certified. The length of each training varies according to the typology and event location. The ones held in the farm usually lasts three days, with group size reaching a maximum of 30 farmers. The ones held at the municipalities only last 1 day, but group size are usually larger. Food and beverages are provided to incentivize farmers to participate.

6.5.3 Monitoring and evaluation

Follow up from training occurs via five regional technicians employed by the organization. They are in charge of visiting cooperatives or farmers directly, and to provide ad hoc support when needed. The company has in place a suppliers' evaluation scheme where they monitor the volume, quality and frequency of the cocoa provided by their main suppliers. Based on these data, they identify their best and worst performing suppliers and classify

them as A, AA, AAA. This information is used to guarantee that the supply of material remains stable or improves over time. When it lowers, field interventions are organized to identify areas of improvements (interviewee 8).

Field visits by the farmers are mostly for training purposes, or to fulfill specific requests by a farmer or organization. According to both Cortipaz manager (interviewee 7) and Casa Luker manager (interviewee 8), the purpose of Casa Luker’s visit is not to verify that the farmers are actually implementing the practices which have been taught. According to Cortipaz, Casa Luker technicians would visit twice a year on average.

6.5.4 Features of the trainee

The 5 field technicians are usually deployed to deliver training during their field visits, and when needed at the farm. They all possess high education qualifications, but with specialization in different fields. Some are agronomists, other economists, biologists. According to interviewee 8 at Casa Luker, the reason for this is to provide diversity to the group to be able to tackle different issues from more than one angle. When needed, external consultants are hired to provide training for a specific topic, but this happens predominantly during training held at the company’s farm .

Training	Training planning and design	Two main types of training events are offered, varying according to location. Content and knowledge is tailored around farmers needs
	Training performance and management	Participation held on a voluntary base. Good infrastructure in place for demonstration and research purposes. Trainings events are not very frequent, especially to individual farmers
	Monitoring and evaluation	Technical follow up in place but not very frequent, mostly connected to individual requests or company’s suppliers performance system.
	Features of the trainee	Few technician available but highly qualified. Additional external trainers hired if necessary

Table 6.5. Summary of training delivery Casa Luker

6.6 Inputs provision

6.6.1 Delivery of agricultural inputs

Casa Luker delivers agricultural inputs to producers associations through what they call ‘Plan Cosecha’, or harvesting plan. According to the this plan, the best performing associations receive agricultural inputs, to be re-distributed randomly by the cooperative to its farmers. These include fertilizers, herbicides, seeds and planting material, pruning kit, and other cultivation related utensils.

According to interviewees 8 and 9, input delivery occurs as a marketing strategy to incentivize the producers to sell to the cooperative, who in turn are committed to sell to Casa Luker.

Interview with interviewee 7 at Cortipaz provided more details regarding the modes of delivery. During one of the two harvesting seasons of cocoa, that is the months of November, December and January, the association would receive a track with the agricultural material, together with raffle tickets. For every 30 kg of cocoa sold to the association as bulk or premium, a farmer would receive respectively one or two raffle tickets. Extractions would occur every 2 weeks for the duration of the harvesting plan or until the material run out. Pictures of the farmers

receiving the material and a detail report with their information needed to be sent over at the end of the period. Notably, the association explained that the delivery of material would occur once a year, instead of the two times indicated by the manager at Casa Luker. Furthermore, no follow up nor verification was provided regarding ways to apply the received material.

Besides free delivery as part of the plan cosecha, Casa Luker provides discounts on agricultural inputs purchases through them. According to the manager, this should facilitate the utilisation of good agricultural inputs to improve productivity at the farm.

6.6.2 Assistance to commercialisation

The company also offers assistance to the commercialisation of cocoa via up-front payments, long-term contracts, and inclusion in development project with specific associations.

With regards to upfront payments, interviewee 8 explained that with specific associations, the company pays cocoa to be delivered at the beginning of each year, based on projected production. Adjustments are then made depending on the actual volumes and quality delivered. This is done in order to allow each cooperative to make investments aimed at improving the productivity of their farmers and quality of the product.

However, interviews at Cortipaz revealed that to date the association had not received any up-front payments from the organisation. According to interviewee 7, in order to deliver loans, Casa Luker requested property liens on a good of choice owned by the association. An external evaluator would then value the property, based on which Casa Luker would provide 80% of the value in up-front payment. As a collateral, Cortipaz offered their farm utilised for post-harvesting treatments to cocoa, but 80% of the external evaluation corresponded to an very small amount which according to the manager ‘was not worth the hassle’.

The company is now also assisting in commercialisation through a project called Entrepreneurial Cocoa Cultivations, where they provide capital, external investment opportunities, new planting material, technical assistance and long-term buying contract to farmers, investors, farmers groups or landowners who are willing to start or switch to cocoa cultivations. The plan is now being promoted with greater attention to conflict areas, as a way to incentivize conversion to cocoa production and help families affected by armed conflicts. Finally, the company also acts as an intermediary between external clients and farmers for the donation of infrastructures or other assets useful for cultivation. This way the clients accomplish their CSR commitments while providing benefits to the farmer with which Casa Luker shares business agreements.

Inputs provision	Delivery of agricultural inputs	Wide range of inputs delivered, but only during harvesting season and to randomly selected number of farmers through raffles. Discount are given on inputs purchased via the company
	Assistance to commercialisation	Good variety of approaches delivering assistance to commercialisation to suppliers, which are however not as efficient in practice.

Table 6.6. Summary of inputs provision Casa Luker

6.7 Rejuvenation

Results from interviews show that the company has a rejuvenation strategy in place, which is actualised through investigation on their farm, provision of training, and through the delivery of inputs as part of their ‘plan harvesting’.

The farm, since its first inception in the 1960s, has served the purpose of providing an environment where new materials and varieties could be investigated freely. The center is famous within the Colombian cocoa community for having given birth to high quality clones such as Luker 40 and Luker 50, varieties with high productivity and larger-than-average grain size.

Figure 6.8. Seed bank Casa Luker. May 2017 Source: Author’s photo



Figure 6.7. Varieties managed within Casa Luker farm Source: Author’s photo

From this high quality materials, workers feed the farm seed bank, and distribute the materials during their plan cosecha, specific project such as the entrepreneurial cocoa cultivation projects, or sell it at advantageous conditions to farmers and other associations upon request. Interviews with cooperative staff confirmed that the organisation only provides materials during harvesting plans. Besides training on side-grafting and rejuvenation of the plantation, the company never made explicit requests regarding varieties to be planted. However, the manager did mention the importance given by Casa Luker during training of reproducing the material on the farm rather than buying it.

However, the company does not have a specific rejuvenation plan upon which it acts in isolation (interviewee 8). Rather, they follow and support public rejuvenation plans and initiatives promoted by entities such as Fedecacao , providing assistance and/or material when needed. Nonetheless, the same manager expressed concerns over the rapid spreading of low quality varieties such as CCN51 introduced from Ecuador (see Annex IV), which according to him represented a threat for the company in maintaining their offer of fine flavoured quality cocoa.

Rejuvenation	Rejuvenation strategy and approach	Approach in place linking delivery of planting material and in depth research. No larger strategy is place but technical support is provided to nationwide rejuvenation strategies
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Table 6.7. Summary of rejuvenation Casa Luker

6.8 Financing and scalability

The company makes a return on their investments through the increase in productivity and quality which originate from the delivery of services (interviewees 8, 9). Likewise, the largest impediments to scaling up the delivery of inputs and training lay in maintaining a balance between the cocoa received and the costs of delivering inputs. Lack of personnel is also an issue, as the company can only afford five field technicians across the entire country.

Regarding costs, the interviewees could not provide more detail breakdown of the costs of training or inputs provision.

Financing and scalability	Return on investment made via constant supply of good quality product. Lack of personnel hinders adequate follow-up after training events, as well as efficient delivery of inputs. This also reduces the coverage of rejuvenation approaches. Limited infrastructures also directly impact the number of farmers to be reached.
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Table 6.8. Summary financing and scalability .

6.9 Service Delivery as part of Certification

Visit and interviews at Cortipaz revealed that the association delivers certain services to its producers independently from Casa Luker or other clients. This predominantly occurs as part of external projects to which the associations decides to participate.

The association changed management in 2013, taking up a more internationally oriented attitude. Of relevance to this investigation, the association took part in a 1 year project with the international agency Swiss Contact in 2015. The project aimed to increase the quality and productivity of the association's farmers, through the delivery of training and agricultural inputs. The project and practices change would then culminate with the achievement of an UTZ certification in year 2016.

The agency Swiss Contact provided funding for training and inputs delivery. 2 experts were brought from Germany to El Carmen de Chucurí, and provided training to a group of 20 leading farmers, 6 technicians and the association's management. These 6 technicians are employed by the association ad hoc during external projects and are all farmers themselves but with agronomic qualifications. Training lasted for two consecutive weeks at the municipality, where every aspect pertaining to the UTZ Code of Conduct was explained. The technicians had then the role of training themselves the 100 producers who decided to participate in the certification program, throughout the following year. When the process was completed, 5 leading farmers were given responsibility to carry out internal controlling, checking up on the farmers' implementation of practices. When a farmer was found to be faulting in a determined aspect, a technician would pay a visit.

The association was also given a number of agricultural inputs from the agency to distribute at will to the farmers. These were predominantly fertilizers, and tools required by the certification, such as protective gear. The agency Swiss contact also provided financial assistance to cover the auditing costs of certification, as well as the payments of all its technicians to implement the project. Interviewee 7 explained that doubling of prices for the auditing costs did not allow to renew the certification to the second year.

6.10 Issues with data availability

6.10.1 Fedecacao

Detailed information on training length and content to be delivered were difficult to obtain due to variability and specificity of each training. Furthermore, more detailed financial information regarding costs of trainings and of input delivery were also not available to the interviewees and therefore not reported.

6.12.2 Casa Luker

More specific information on training length and content to be delivered were difficult to obtain due to variability and specificity of each training. Furthermore, no training manual was available for comparison at the time of this research. This will only be made available at the beginning of 2018.

Furthermore, detailed financial information regarding costs of trainings and of input delivery were also not available to the interviewees.

Chapter 7

Agricultural practices utilisation

This chapter describes the findings on farmers' agricultural practices utilisation obtained from farms' surveys. Results from both groups of farmers in San Vicente and El Carmen de Chucurí are compared. A final section highlights the main points from the chapter.

7.1 Farm characteristics and management

In both locations, cocoa is produced on average within optimal altitudes ranges for cocoa production, with average altitude of 799 m for San Vicente and 679 m for El Carmen. Average size of the farms results to be larger than the national average in both location, and in El Carmen more than San Vicente. However, this is not the case for the actual hectares cultivated in cocoa, with averages being very similar for both locations and the rest of the country. The share of cocoa plantation to total farm area is larger in San Vicente. On the other hand, tree density in San Vicente (784 trees per hectare) results to be in line with the national average, while slightly higher in El Carmen (960 trees per hectare).

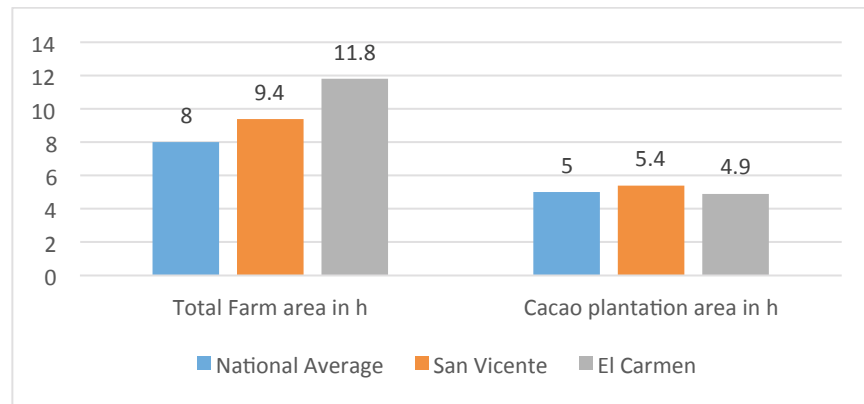


Figure 7.1. Total farm area and total cocoa plantation area.

More farmers are owners of their farm in El Carmen, and for almost all the farmers in both locations cocoa represented their main source of income. Around half the farmers in both locations declared to have other sources of income, which in most cases were fruits and wood originating from other trees on the plantation. On this note, all farmers interviewed had shade-trees planted on their farm, indicating that one possible explanation for this might be their provision of additional income.



Figure 7.2 Example of an agro-forestry system at Casa Luker's Farm. April 2017. Source Author's photo.

Most the farmers in both locations declared to have other sources of income, which in most cases were fruits and wood originating from other trees on the plantation. On this note, all farmers interviewed had shade-trees planted on their farm, indicating that one possible explanation for this might their provision of additional income.

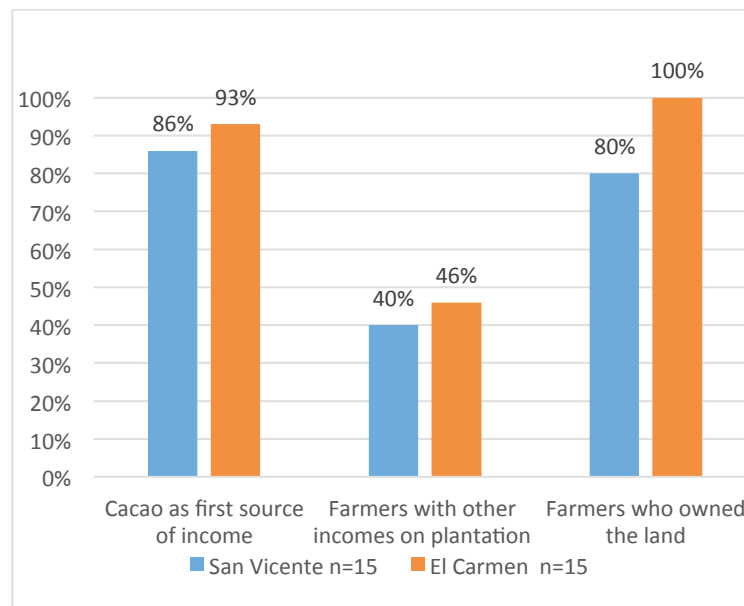


Figure 7.3. Ownership characteristics in both municipalities.

In both locations, all but one farm had clones varieties planted on their farm, with El Carmen showing a slightly larger share of clones to normal trees than in San Vicente. The most frequently cited varieties were CCN51 and ICS 39 in San Vicente, and CCN51 and ICS 95 in el Carmen. While the rejuvenation strategy adopted by Fedecacao justifies the presence of the CCN51 clone, this resulted by far the most cited variety by the farmers, confirming the concerns expressed by Casa Luker. Some farmers in particular, explicitly expressed appreciation for the plant, which according to one 'is able to produce always and a lot'. Overall, the large presence of old trees justifies the

focus on rejuvenation promoted by both organisations. Finally, the majority of farmers in both locations obtained new planting materials from seed banks, rather than their own plantation, as recommended by both entities. On this note, it is important to mention that by law, all seed banks across the country need to have an ELICA certification, which guarantees the origin of the plant, as well as the provision of other details relative to the material being sold. This means that all planting material bought at seed banks in Colombia is of good quality and known origin to the farmer.

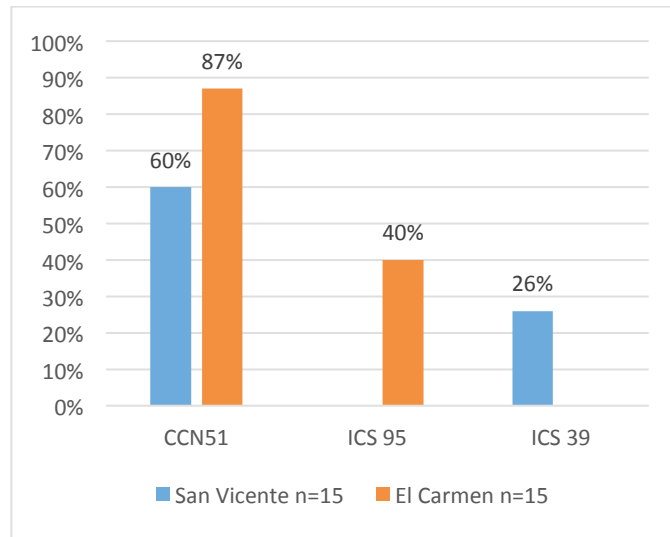


Figure 7.4. Most cited clones varieties

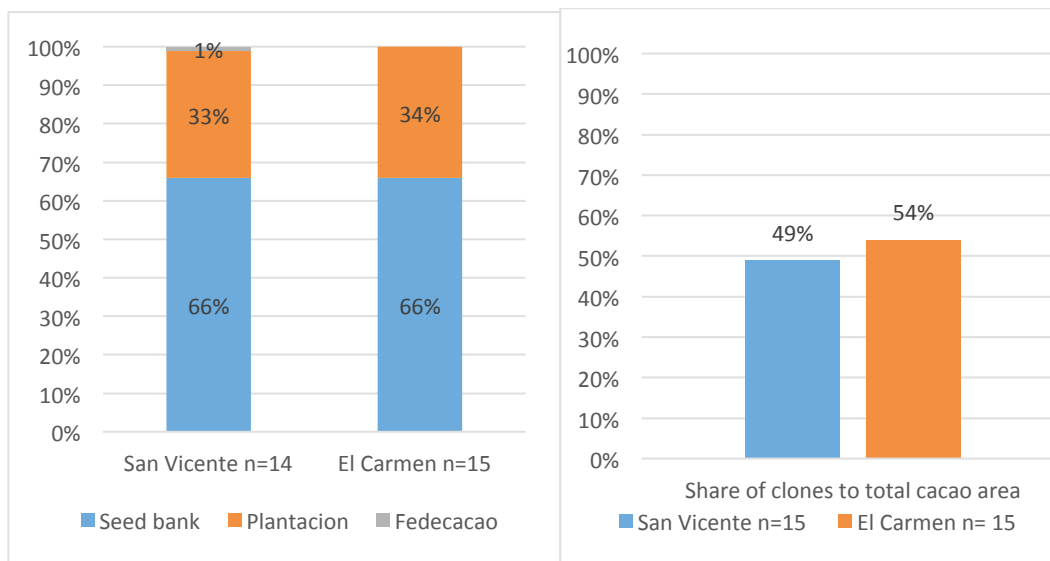


Figure 7.5. Sources of new planting materials

Figure 7.6. Percentage of clone area to total farm area

Almost all farmers in El Carmen (93%) and more than half in San Vicente (67%) declared of having invested in their plantation. In El carmen, the majority of these had taken up loans, while in San Vicente most of the farmers financed the investments with the same production. In both locations, the most cited improvements brought

about with these loans was side-grafting, followed by pruning in San Vicente, and fertilizers application in El Carmen.

Finally, almost all farms in El Carmen declared of keeping records on their farm, while very few in San Vicente. However, less farmers kept records specifically of the prices received.

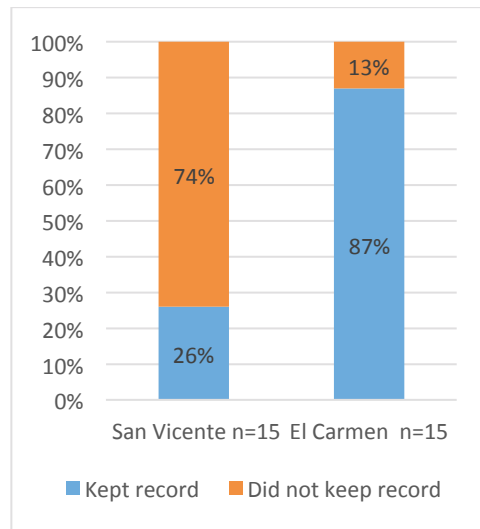


Figure 7.7. Farmers keeping records

7.2 Harvesting practices

Almost all farmers from both groups utilised fertilizers. All of these farmers utilised organic fertilizers, mostly material from chickens and sheep breeding. Twice as many farmers utilised chemical fertilizers in El Carmen than in San Vicente, all of whom held an UTZ certification. However, quantities utilised resulted within the safety amounts prescribed by the code of conduct (250 ml per tree in San Vicente and 215 ml per tree in El Carmen). According to guidelines, fertilizers should be applied at least twice a year in order to bring about some benefits to the plant. There were more farmers who applied fertilizers more than one time in a year in El Carmen de Chucurí than in San Vicente; here the majority of farmers applied fertilizers only one time a year. According to one of Fedecacao's technicians, costs were the main factor influencing the application of fertilizer, including the utilisation of organic fertilizers rather than chemical. During visits, one of the farmers confirmed that making and applying (organic) fertilizers was a lengthy process, and that there were other things that needed priority' in his farm.

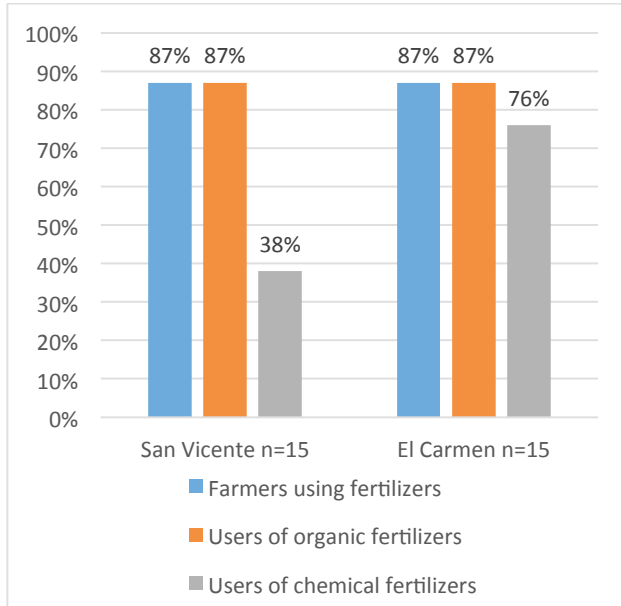


Figure 7.8. Farmers using different types of fertilizers

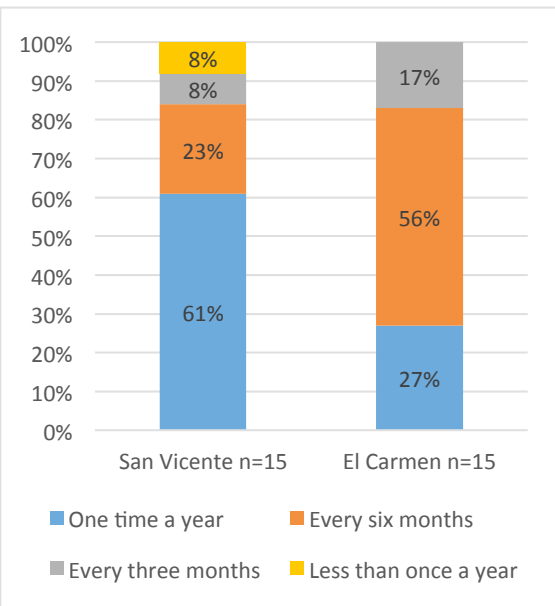


Figure 7.9. Frequency of fertilizers usage of any type

In terms of diseases, the most frequently mentioned by both groups of farmers was monilla, followed by witches' broom in San Vicente and phytophthora in El Carmen. These trees' diseases are very common, but only require manual rather than chemical control. Pruning and timely harvest are also useful preventions.



Picture 7.10. From Left to Right: Monilla inside and outside a fruit. Phytophthora on a tree bark. Source: Author's photo

In terms of plagues, bedbugs were the most common plagues in both groups, followed by ants infestations in El Carmen. In San Vicente, most of the farmers treated them manually, while in El Carmen the majority of farmers used insecticides to prevent spreading of plagues, which is more efficient.

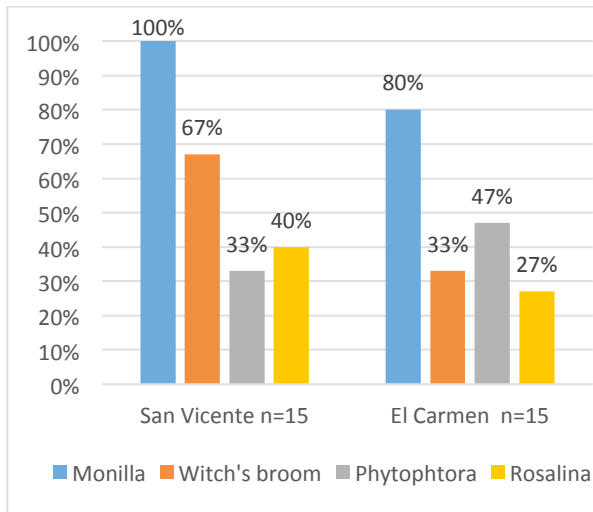


Figure 7.11. Most cited diseases on plantations

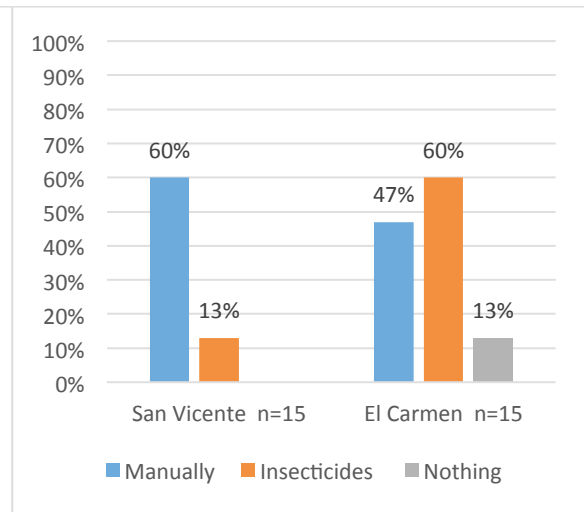


Figure 7.12. Most cited ways to treat plagues

All farmers controlled their weeds, the majority from both groups mechanically using brush cutters. Some farmers in San Vicente also used herbicides (27%). As explained by one of the technician, the use of brush cutter is much more efficient and time saving than other manual tools. However, it is only very recently that most farmers started utilising this type of tool for weed control.



Figure 7.13. Ants infestation. May 2017. Source: Author's photo

All farmers pruned their trees, which according to technicians and guidelines should be done 2 to 3 times a year in order to provide benefits to the plant and productivity. Almost all farmers in San Vicente pruned one time a year, while there were a few farmers who pruned 2 or more times a year in El Carmen. As explained by technicians of Fedecacao as well as by farmers, pruning is also a very intensive process which most of the times requires hiring of external labour and thus additional costs. However, most farmers consider pruning as an expenditure, or loss of vegetation, rather than an investment, and for this reason do it only when necessary.

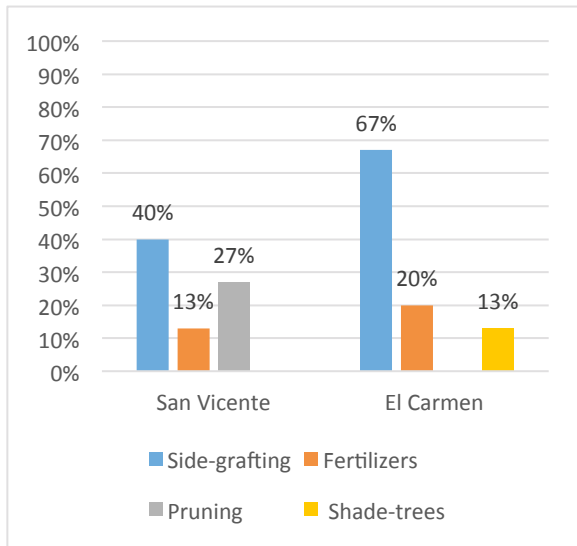


Figure 7.14. Farmers using specific harvesting practices

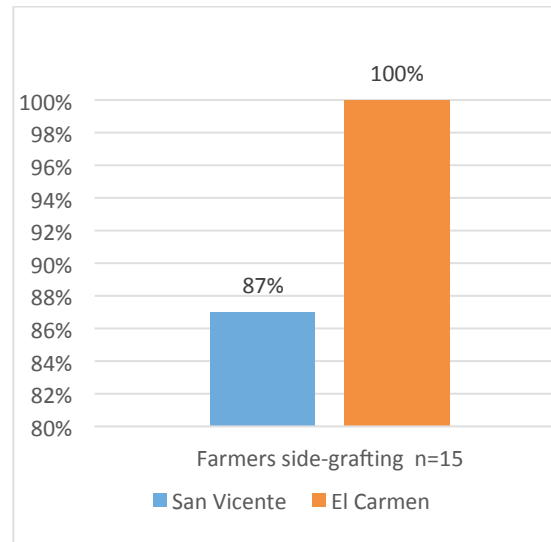


Figure 7.15. Farmers side-grafting

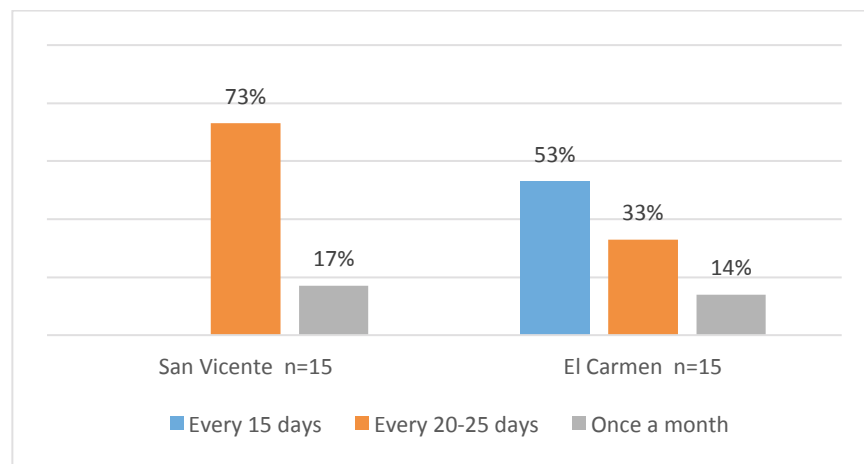


Figure 7.16. Farmers pruning frequency

Almost all farmers practiced side-grafting on their farms. While there were more farmers side-grafting in El Carmen, the farmers in San Vicente began adopting the practice earlier (9.5 years on average against 6.7 in El Carmen). Nonetheless, for both groups of farmer side-grafting represents a relatively new practice, which started to be utilised when introducing clones to their plantations.



Figure 7.17. From left to right: Side-grafting in a producing tree. Side grafting into an old three base.
 Source: Source: Author's photo. May 2017

With regards to practices to increase productivity such as cross-pollination, only one farmer between the two groups confirmed to be practicing it in San Vicente. As explained by interviewee 1, cross-pollination can be a very resourceful practice allowing to increase the number of pods from each trees, and thus productivity. However, it is a very time-consuming and manual practice. Consequently, despite the large focus during training activities, none of the farmers actually do it in practice.

Finally, pods harvesting should be carried on average every 15 days to reduce the spreading of diseases and of over-ripening pods. Many more farmers harvested their beans every 15 days in El Carmen than in San Vicente, where the majority would harvest every 25-30 days.

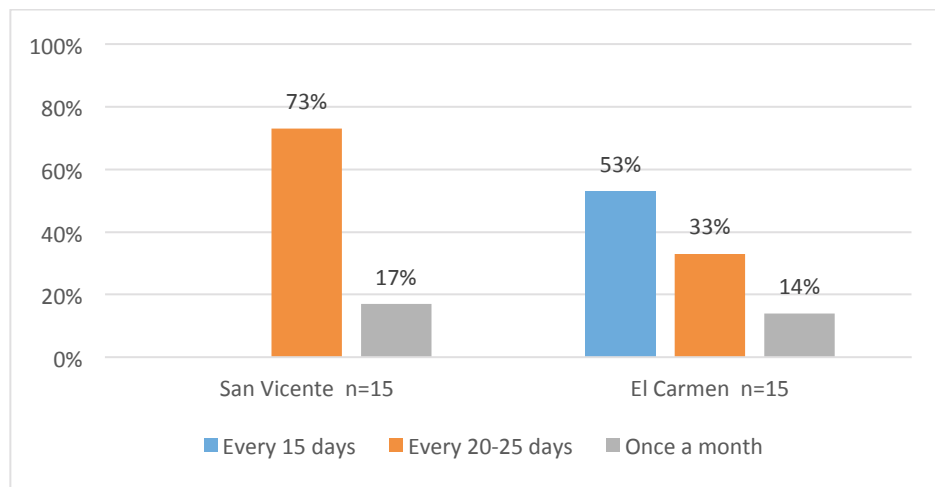


Figure 7.18. Pod harvesting frequency

7.3 Post-harvesting practices

Almost all farmers fermented cocoa in their farm and in wood boxes. The two farmers who were found to not ferment cocoa on their farm in El Carmen were selling unfermented seeds directly to the association. Cortipaz manages a post-harvesting facility where they control the entire fermentation and drying process, allowing them to produce and sell higher quality cocoa. For both groups of farmers, the fermentation times were very high, averaging 7 days. To verify the status of the beans during the process, the majority of farmers from both groups only looked at beans color and smell (93% in San Vicente and 70% in El Carmen). Only two farmers from both groups also measured beans temperature, and three farmers in El Carmen also practiced cut tests to verify beans readiness.

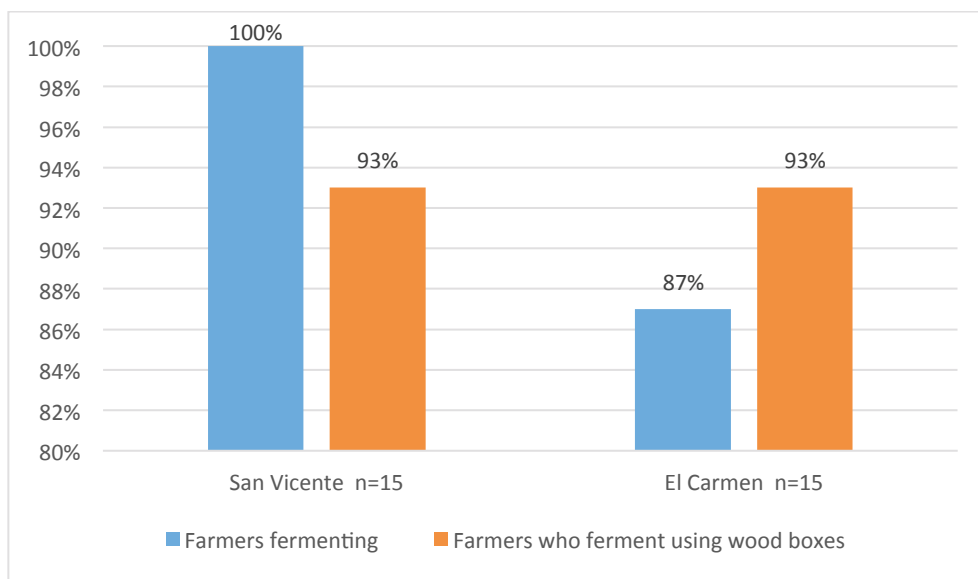


Figure 7.19. Fermentation adoption and most common way to do it

With regards to drying, the same number of farmers who fermented also dried their beans on their farm, all in a built in 'stall'.



Figure 7.20. From Left to Right. A farmer's drying stall and fermentation boxes. May 2017. Source: Author's photo

Average drying times varied between the two groups. The majority of farmers in San Vicente dried their beans between 3-6 days (80%), while half the farmers in El Carmen maintained the drying process slightly longer, to 5-7

days (46%). Nonetheless, many farmers confirmed that drying was subject to weather and heat, with wet cloudy periods requiring more drying times.

While almost all farmers made use of a 'sandbox' to separate impurities and very small beans from the rest, very few farmers in both groups purposely separated beans after drying. The ones who did, selected beans based on mold presence and size.

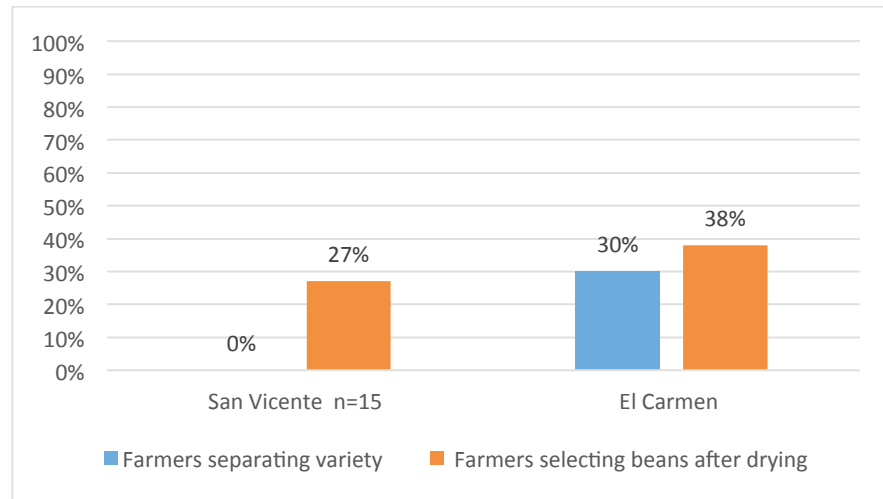


Figure 7.21. Farmers separating different varieties before post-harvesting

Farm visits in both location also revealed an important difference between the two groups in terms of post-harvesting facilities management. In fact, as it can be seen from photographic evidence, most of the farms visited in El Carmen kept fermentation boxes fenced off, to prevent animals or other contaminants to interfere in the process.



Figure 7.22. Farmer showing separation of fermentation area To prevent animal intrusion. Source: Author's photo

Importantly, none of farmers in San Vicente and only 30% of the farmers in El Carmen separated beans varieties for the post-harvesting process. As explained by one of the interviewees, Criollos older varieties and cloned ones such as CCN51 have very different fermentation and drying times, with the former generally requiring shorter processing times, due to their finer texture characterised by a whiter colour (see figure 8.8). However, as confirmed from the figure 7.23 below, the majority of the farmers do not make a distinctions between the different varieties, terminating with over-processing or under-processing one variety or the other, reducing the

overall quality. Talks with farmers explained that the reason for this was the lack of multiple facilities on their farms allowing to carry out two separated processes. Low productivity and need for capital also played a role, as many farmers confirmed of not being able to afford post-harvesting and transporting smaller quantities at each time. More than one interviewee confirmed that in other cocoa producing countries such as Ecuador, where CCN51 is very common, most farmers do separate varieties, homogenizing treatment and therefore final quality. Given the rejuvenation strategies promoted by both organisations, lack of differentiation in post-harvesting practices can create a lot of issues in the future. Figure 7.23 provides evidence regarding the lack of separation of different varieties from the farmers. The picture on the left shows beans that when different beans are post-harvested together, some beans can result to be much less than others (purple beans in the picture). The picture on the right instead, shows cocoa beans with monilla (black) and with different drying times at Cortipaz post-harvesting facility. The association has to manually separate all damaged beans before selling.



Figure 7.23. Different cocoa varieties treated simultaneously during post-harvesting. Source: Author's photo

7.4 Social Practices

With regards to the utilisation of chemicals, a good number of farmers from both groups used chemicals. However, more farmers in El Carmen utilised protective gears when utilising them than in San Vicente. All farmers utilising chemicals asserted to be keeping them in a separate room only for this purpose.



Figure 7.24. Fertilizers and other chemicals kept separately by former certified farmers. Source: Author's photo

More farms in El Carmen (73%) than in San Vicente (66%) relied on seasonal workers to carry out some labour intensive work on their farms. The most mentioned reasons were harvesting and pruning in El Carmen, and harvesting in San Vicente. Between both groups, only on 2 farms workers were permanently employed. On both, farmers confirmed that their employees did not receive any training, but that they would be the ones passing on what had been thought and supervising their work.

7.5 Sources of knowledge

When questioned about practices utilisation, farmers were also asked whether they could recall where they had learnt that practice, to understand how effective training might have been on the farmers.

For both group of farmers, trainings from Fedecacao and Cortipaz were the two mostly cited sources respectively in San Vicente and El Carmen. This is particularly true for fertilizer utilisation and side-grafting. Fedecacao was mentioned most of the time for pruning, while in El Carmen farmers mentioned the cooperative as well as family member, usually parents who were also cocoa producers. With regards to fermentation, Cortipaz was mentioned most of the times in El Carmen, while family was the main source of knowledge on fermentation for farmers in San Vicente. Family members were also cited the most for drying and weed control. Finally, all farmers in El Carmen mentioned having learnt how to take records from the cooperative.

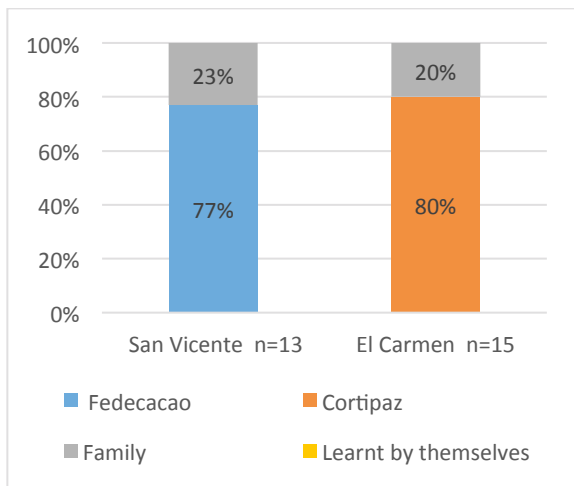
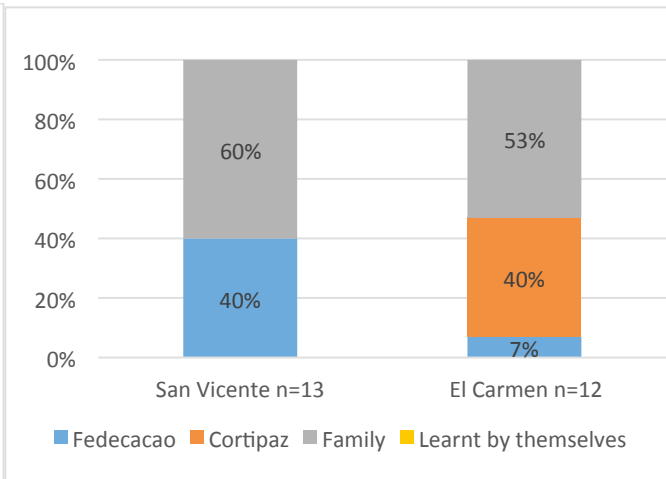


Figure 7.25. Where farmers have learnt to use fertilizers

Figure 7.26. Where farmers have learnt to control weed



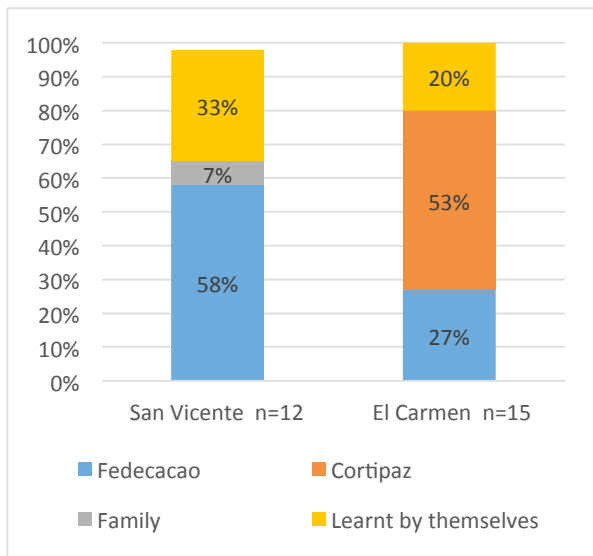


Figure 7.27. Where farmers have learnt to side-graft

Figure 7.28. Where farmers have learnt to prune

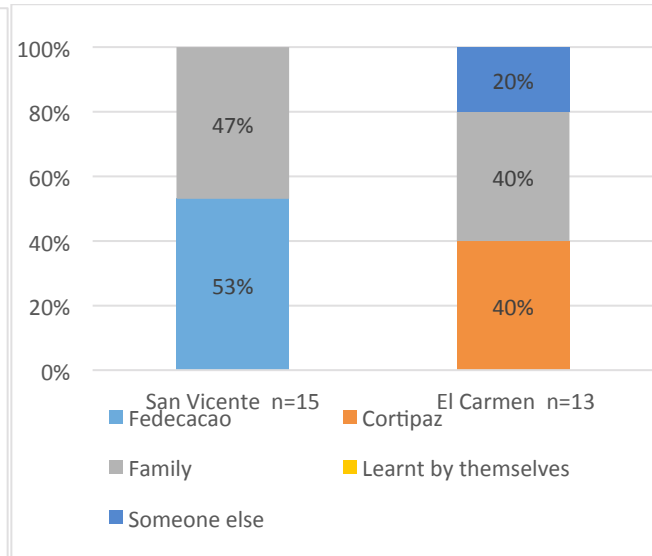


Figure 7.30. Where farmers have learnt to dry their beans

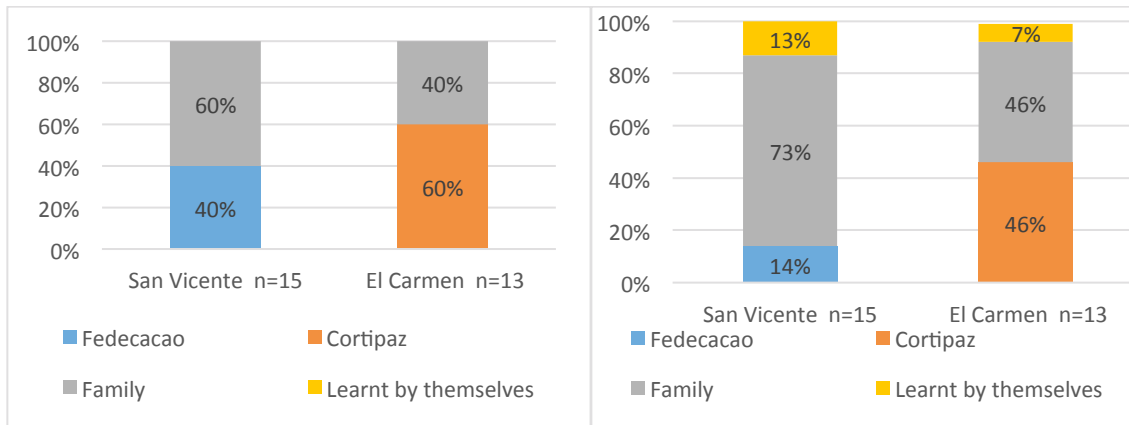


Figure 7.29 Where farmers have learnt to ferment

When asked for clarification during interviews, interviewee 7 at Cortipaz explained that when referring to the association, farmers were mostly referring to the training provided as part of the project promoted by Swiss Contact aimed at certification. The reason for this is because through the fundings available with this project, the associations could train and reach the highest number of farmers ever. Even though many of these practices might have been covered by some of the training events organised by Casa Luker, the lack of follow up and constancy in training deliver would make farmers 'forget' either the practice or the source of training. The same interviewee insisted that the constant visits of the cooperative's technicians to the farmers in the period leading up to the auditing, ensured that the farmers really changed practices. As an example, the manager described that as part of a previous project, USAID delivered books for record keeping and training on how to use them to about 150 farmers. However, lack of follow up made none of the farmers actually start using the material, until 'pressurised' by the technicians to do so in the following project. To verify what mentioned by the manager, farmers who were certified were also asked to name what they changed the most following training for certification. The most frequently mentioned changes were fertilizer utilisation, tidying up of the farm facilities, and book keeping.

7.6 Farmers' satisfaction with services provision

With regards to satisfaction to training provision, in both groups farmers seemed satisfied with the training received by Fedecacao and the cooperative Cortipaz, with the latter showing a higher number of very satisfied farmers.

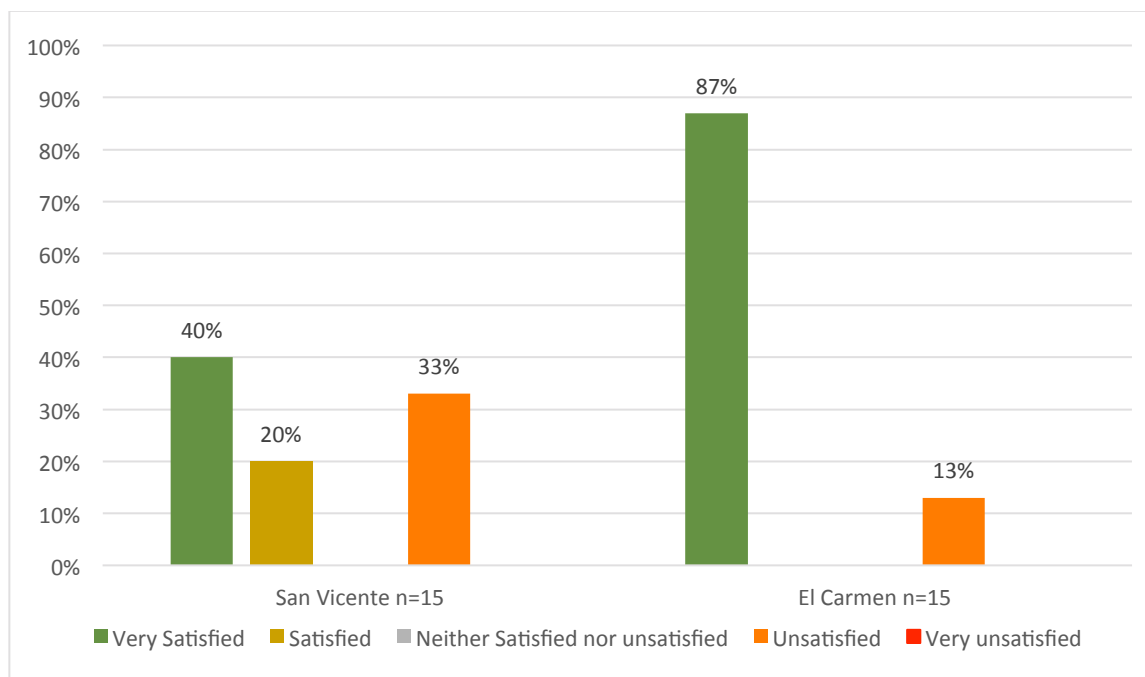


Figure 7.31. Farmers' satisfaction with training provided

With regards to input provision however, there was a larger difference between both groups. Farmer in El Carmen were all positively satisfied by the provision of inputs, while this was not the case for farmers in San Vicente. Reasons for dissatisfaction were mostly related to the sporadicity of input provision, which according to some farmers could have been more constant and not only related to projects implementation.

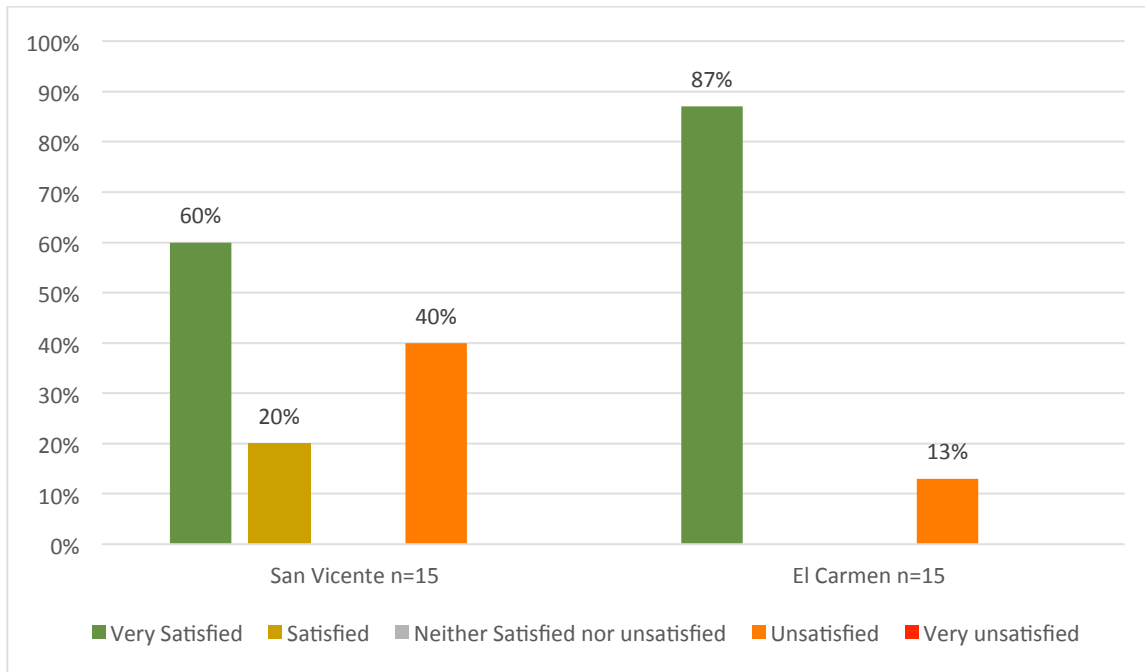


Figure 7.32. Farmers satisfaction with inputs provided

Finally, some differences were also found with regards to farmers' satisfaction on the provision of support. In El Carmen, all farmers were satisfied with the support provided by the association, while in San Vicente there was a good portion of the farmers who were dissatisfied. In particular, some farmers mentioned that support and visits to farms were not as constant as they wanted, and that they felt support would reduce if they were not to be selling for longer periods of time at Fedecacao's selling points.

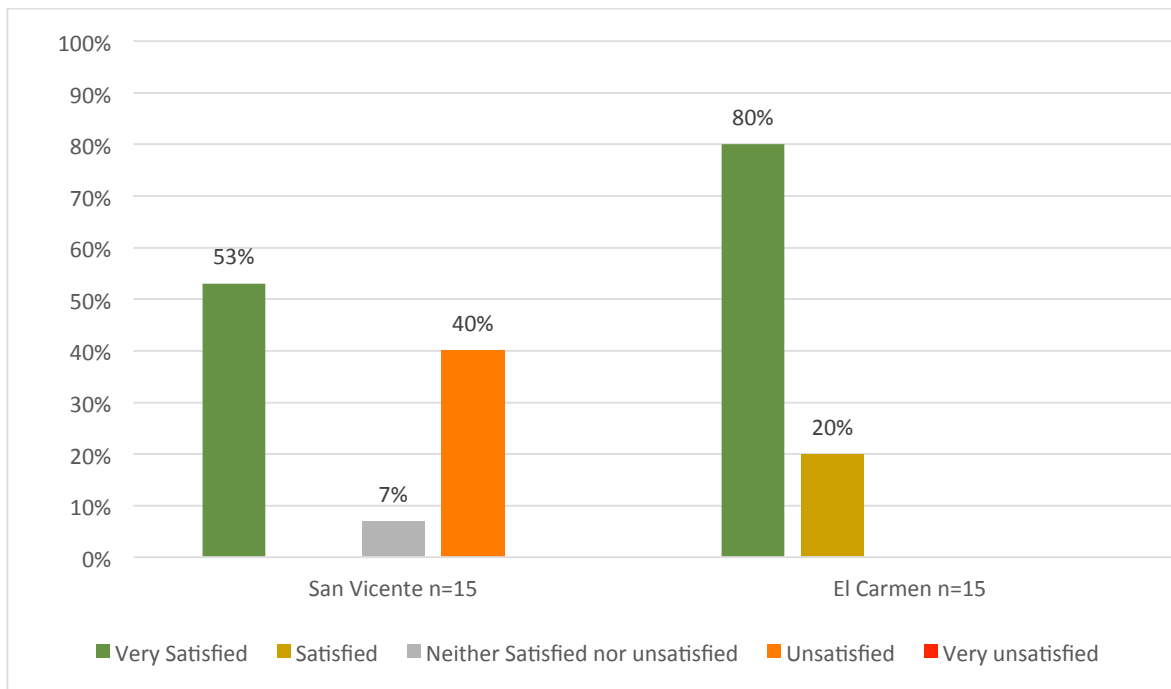


Figure 7.33. Farmers' satisfaction with support provided

7.8 Summary of findings on agricultural practices utilisation

In terms of farm management and characteristics, both groups of farms show farm size and tree density to be in line or higher than the national average. Cocoa represents the main source of income for most farmers. Some also have other sources of income, predominantly from other trees on the farm. All farmers have shade-trees on their farm, demonstrating other tangible benefits of having different trees on the same plantation. Farms of both groups showed that around half of their cocoa plantations still have old trees varieties, justifying the rejuvenation approaches promoted by the organizations. The most cited clone by both groups of farmers is CCN51, presence of which is justified by the rejuvenation strategy promoted by Fedecacao . However, the fact that almost no farmers separate this lower quality variety from more fine and flavoured ones also confirms the worries expressed by Casa Luker regarding future quality of Colombian cocoa .

In terms of harvesting practices, farmers in El Carmen seemed to perform better in fertilizers application and timing, pruning and timely harvesting. Side-grafting was applied almost equally by both groups of farmers, while almost none of the farmers applied cross-pollination to improve productivity.

Both farmers in San Vicente and El Carmen fermented and dried beans according to recommended times, although some farmers in El Carmen took additional measures to ensure beans readiness after fermentation, as well as dried beans for slightly longer. However, very few farmers from both groups selected beans after the drying process. Field visits indicated that an important difference between the two groups consists in fencing off post-harvesting facilities to exclude possible contamination from animals.

Training from Fedecacao in San Vicente seemed to have influenced mostly practices such as fertilizer utilisation, side-grafting and pruning. In El Carmen, training from the cooperative as a result of certification was useful in influencing fertilizers utilisation, side-grafting, fermentation, but also record keeping and tidying of farms facilities. In particular, regular follow-up more than training itself for certification seemed to have played an important role in making farmers change their practices. The mentioning of family members as a source of knowledge for fermentation and drying practices, indicates that on this aspect, practices historically utilized were already satisfactory.

Overall, farmers in El Carmen resulted to be more satisfied with the training, inputs and support provided by the cooperative than farmers in San Vicente. In particular, the concerns of the latter revealed some potential relationship between support provision and selling of cocoa at Fedecacao points.

Finally, considerably more farmers in El Carmen than in San Vicente utilised protective gear when using chemicals. Likewise, more farmers in El Carmen utilised seasonal workers on their farms, who do not directly receive training but are rather guided by the farmer when hired for the job.

Chapter 8

Outcomes on farmers' performance

This chapter describes the findings on quality, productivity and price obtained from interviews and secondary data. The two case studies are reported separately. A section reporting issues with data availability is provided at the end. Tables summarize the findings from each section.

8.1 Quality Fedecacao

8.1.1 Quality determination process

All the cocoa bought by Fedecacao across the country and in San Vicente follows the norm 1252. This is a national norm which determines the technical characteristics of bulk and 'premium' cocoa. The main features are reported in table 8.1. The quantities reported represent the max number of beans allowed with a particular defect or characteristic every 100 beans.

Requirements	Premium	Bulk
<i>Humidity level in %</i>	7	8
<i>Foreign material or impurities presence in %</i>	0	0,3
<i>Beans with internal mold, number of beans/ 100 beans max</i>	2	2
<i>Beans damaged due to insects and/or diseases, number of beans/ 100 beans max</i>	1	2
<i>Beans with less than 50% of the kernel, number of beans/100 beans max</i>	1	2
<i>Average weight, grams/100 beans min.</i>	120g	105- 119g
<i>Grains well fermented, number of beans/100 beans min.</i>	65	65
<i>Beans not sufficiently fermented, number of beans/100 beans max</i>	25	35
<i>Slaty beans presence, number of beans/100 beans max</i>	1	3

Table 8.1. Quality requirements detailed in the Norma 1252.

In order to be bought by the Federation, the cocoa needs to comply with the bulk requirements of the norm. According to interviews with managers, Fedecacao does not distinguish between bulk or premium cocoa at their selling points, but requires the cocoa to be of higher quality standards in order to be purchased. The reason for this is to incentivize the producer to deliver a good quality product, but also to promote Colombian cocoa sold by the Federation. This means that determining quality improvements over time is not possible.

When delivered to the warehouse, cocoa is sampled to determine whether it meets the necessary basic criteria. Cut tests to verify internal impurities and humidity determination are usually employed to determine quality.

However, at the time of the author's visit, only cut tests were being applied as the humidity machine was temporarily out of order.



Figure 8.1. From Left to right: Piling up of cocoa and sorting machine. Cut test at buying point of Fedecacao . May 2017

Once purchased, all cocoa is piled up together to homogenise quality. This means that the cocoa which only meets basic requirements of the norm as well as higher quality cocoa are all mixed up. This exercise is carried out level up positively the overall quality of the batch. The cocoa is then transferred to a special machine which separates impurities and also beans with different grain sizes. According to a manager, larger grains are delivered to international buyers, while smaller ones are sold on the domestic market, generally to Casa Luker or Nacional de Chocolate. This happens because larger grain size requires less processing inputs, and are thus more appealing to the international market. These larger beans usually originate from clones varieties (interviewees 4,5)

Internationally, Fedecacao sells its cocoa as bulk, despite the recognition given to Colombia as a fine and flavoured producing country. As explained by the manager, this happens because cocoa's quality is still not good enough to be able to sell it as fine flavoured. However, Colombian cocoa is highly appreciated by international buyers thanks to the high fat content of its beans compared to African and Asian cocoa (52-55% fat content against 46-47%). The latter is used to produce cocoa butter. Mixing Colombian cocoa with other varieties enables processors in other countries to level up the fat content of the batch (Interviewees 5,6).

According to Fedecacao, their intentions is to consolidate the international reputation of the Colombian cocoa so as to receive a premium for quality on the market. However, as explained by interviewee 6, this is a slow process because not all buyers in the country are requiring higher quality standards such as Fedecacao; this does not incentivize nor educate the farmers to deliver higher quality to the market, aware of the fact that there will always be a buyer for their cocoa somewhere in the municipality. Evidence of what mentioned by the manager is provided in figure 8.2. The figure shows cocoa beans being dried on the street to decrease humidity and meet quality criteria of a buyer in the municipality. Drying on street is prohibited by the norm 1252 given that cocoa is a food product and should be treated hygienically. However, not all buyers in the municipality follow the norm when purchasing.



Figure 8.2 . Cocoa being dried on the street

8.1.2 Farmers perception of quality

Most of the interviewed farmers perceived their quality as having improved in the past 5 years (80%). Those who did not see any improvements, reported the persistence of monilla and lack of rejuvenation through side-grafting as main reasons. Size of the grain was the most cited improvement (40%), followed by humidity levels (27%). 80% of the farmers reported paying particular attention to fermentation practices, which is confirmed by the results of Part 2, as farmers in San Vicente were found to all be fermenting in wooden boxes and for on average of 7 days.

When asked whether there was anyone requiring them to adopt these practices for quality improvements, 75% of the farmers affirmed that nobody asked them to do so, while the remaining 25% indicated Fedecacao . However, only 40% of the farmers interviewed confirmed to be selling regularly at Fedecacao , with price received being the most cited reason for this (cited by 80% of the farmers). Given that Fedecacao has been described as paying the highest prices in the municipality, there is reason to believe that the majority of these farmers might not be producing good enough cocoa to be able to sell to Fedecacao .

Quality	Quality determination process	Classification of quality according to national regulation 1252. No distinction is made regarding bulk or premium features
	Changes in quality	Impossible to detect due to no distinction on higher quality
	Farmers perception of quality	Improved for most of the farmers. Reflected in the utilisation of post-harvesting practices. However, low number of farmers selling at Federation might be indication of low quality

Table 8.2 Summary of findings on quality Fedecacao

8.2 Productivity Fedecacao

As almost none of the farmers were found to take records in San Vicente, tracing productivity levels in the municipality resulted extremely difficult. Data provided by the federation, show that total volumes purchased at their selling point in San Vicente increased slightly over the past three years. However, also the number of farmers selling increased⁴, suggesting that these increase should be treated with caution. Furthermore, the Federation does not take note of purchased quantities from individual farmers at their selling point (interviewee 4).

⁴ Due to confidentiality, exact volumes of production and number of farmers selling cannot be displayed in this report.

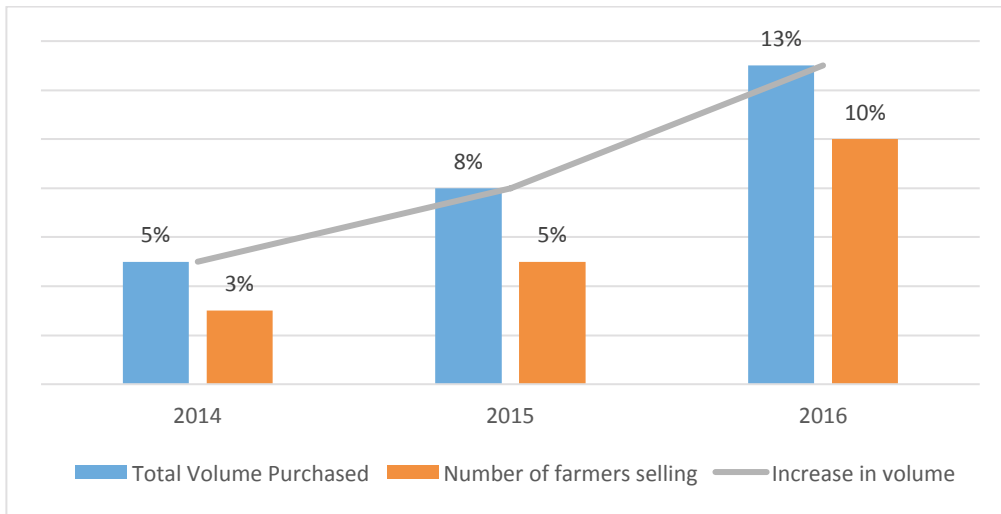


Figure 8.3 . Percentage increase of volumes of cocoa purchased and farmers selling between 2013-2015..

From interviews with farmers, 80% could respond indicating an average production for 2016 of 552 kg/ha, which is in line with the regional average and slightly higher than the country’s average. 53% of the farmers affirmed that their production increased since the past 5 years, while 47% indicated that it didn’t. Amongst the mostly cited reasons, was the recent rejuvenation of the plantation with clones varieties which reduced slightly their total production. 80% of the farmers kept the same plot size in the past 5 years, while 13% reduced it to convert to other crops. Only one farmer increased the land size.

8.2.2 Average precipitation San Vicente

Detailed precipitation averages specific for San Vicente after 2010 were not found. These are available at the aggregate level between 1980 and 2010. However, annual precipitation anomalies are available for the city of Bucaramanga, 60 km from San Vicente. The graphs below show monthly precipitation anomalies for the years 2014- 2017. Although not conclusive, the figures seem to suggest a higher number of precipitation anomalies for the year 2016 and beginning in 2017. However, no data were found regarding mean temperatures to be able to compare with the graph. Likewise, none of the interviewees reported anomalies in precipitation patterns when asked about productivity levels and their cause. Furthermore, reported improvements on productivity in section 8.2 are too weak to be linked to changes in precipitation averages.

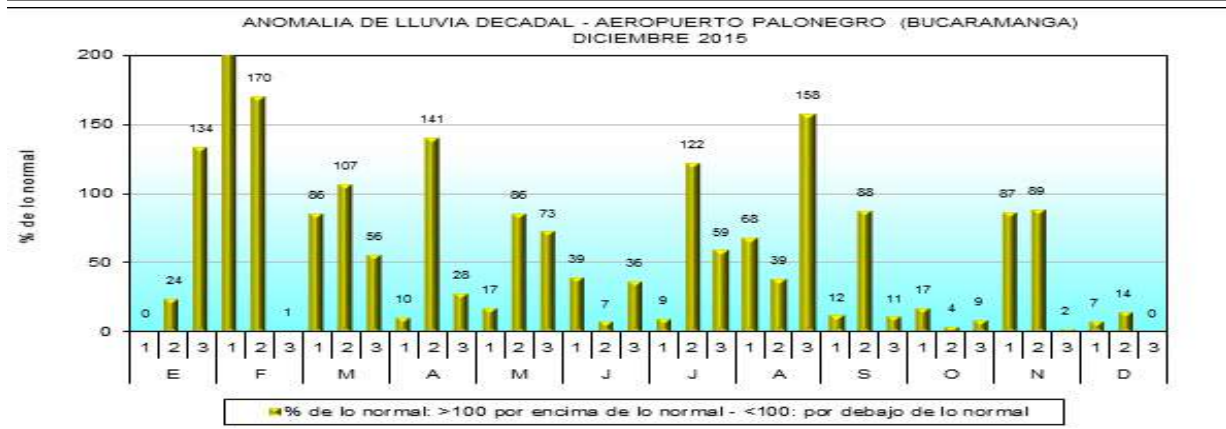
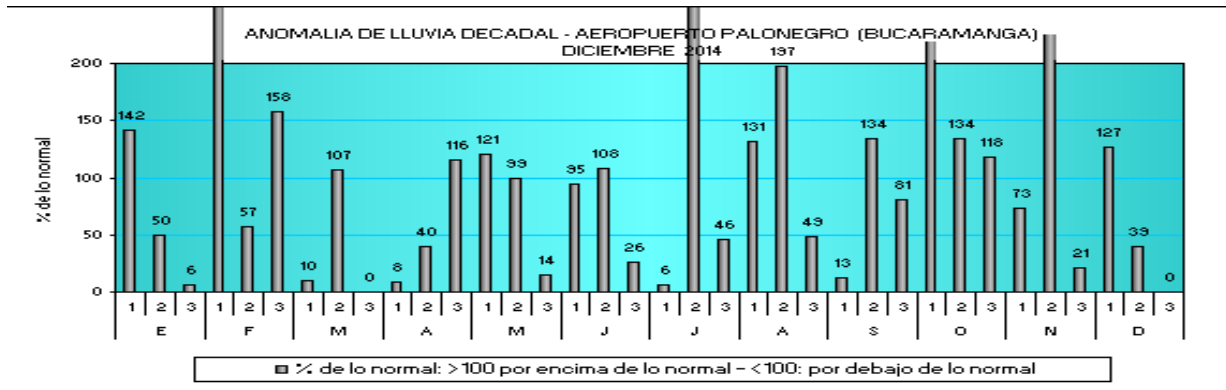


Figure 8.4. Precipitation levels between 2014 and 2017 in the city of Bucaramanga, Colombia. (Source, ideam.gov.co)

Productivity	Changes in productivity	Difficult to detect due to farmers not taking record of their practices and Fedecacao not recording individual farmers features
	Farmers perception of productivity	Improved according to half the farmers. Last year production in line with national average
	Average precipitation	<i>Higher but difficult to compare with productivity changes based on available data</i>

Table 8.3. Summary of findings on productivity Fedecacao.

8.3 Price Fedecacao

8.3.1 Identification process and price paid to farmers

Prices paid by Fedecacao are calculated based on both internationally and nationally dependent factors. The price determination goes as follows; first the New York stock exchange price of cocoa in dollars is converted to Colombian pesos. To this, the country differential needs to be subtracted. This differential is specific to each country, and depends on the internal supply and demand. At the time of the interview, this corresponded to -\$50 per ton of cocoa. Costs of logistics and margin for the company need also to be subtracted. All together, it results that the payments to farmers corresponds to 80-90% of the New York stock exchange price. As confirmed by both the farmers and managers, the price paid by Fedecacao is usually the highest in the municipality of San Vicente (interviewees 4, 5,6).

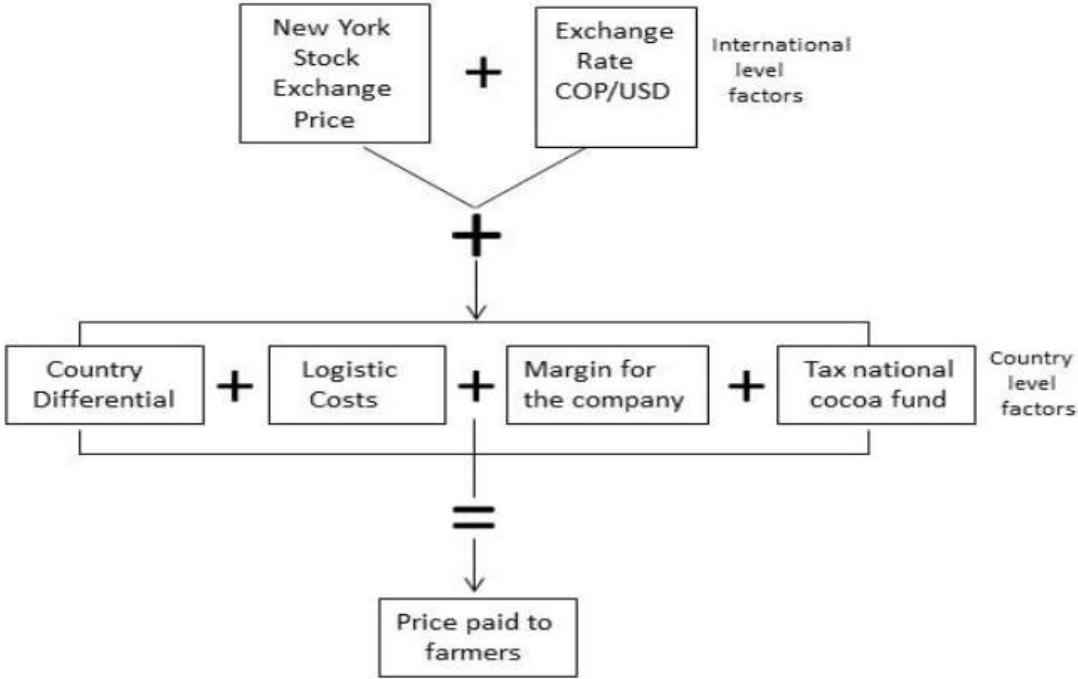


Figure 8.4. Price calculation Fedecacao

When compared to other countries, it can be seen that the price paid to Colombian farmers are regularly the highest amongst other cocoa producing countries in the world (figure 8.5).

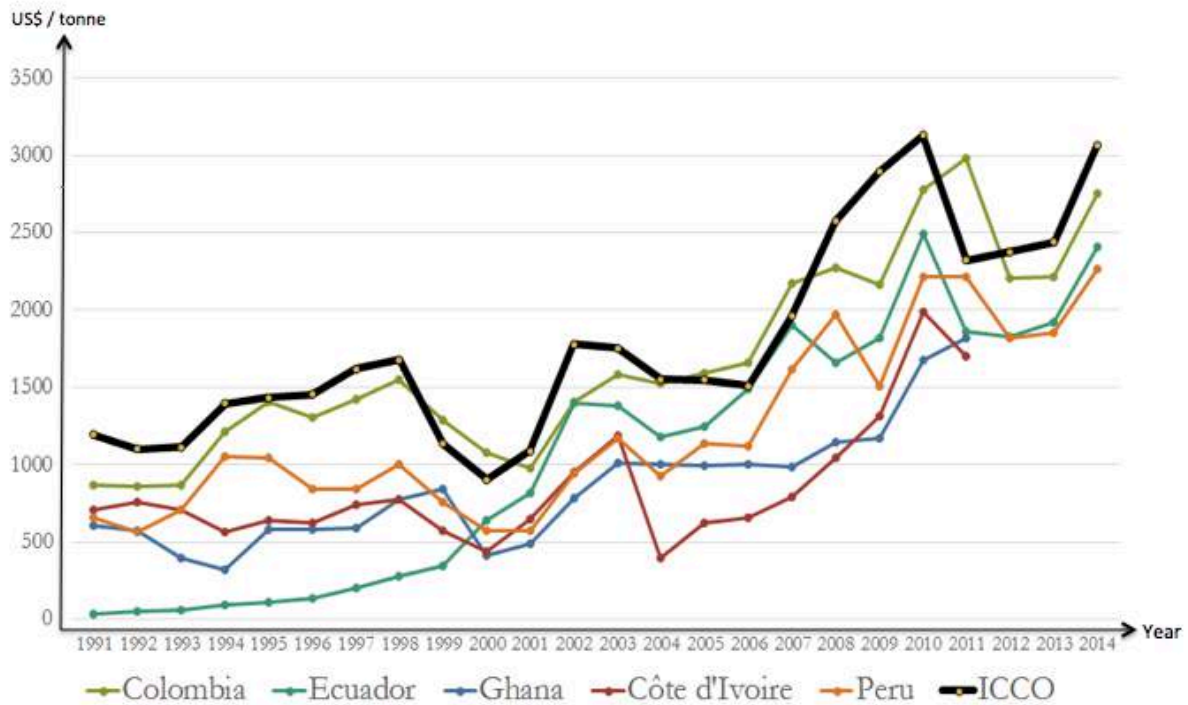


Figure 8.5. Price paid to farmers in Colombia in comparison to other cocoa producing countries and the international stock exchange price reported by the ICCO (Source: FAO, 2016b)

This depends on external factors such as exchange rates, but also on internal dynamic determined by supply and demands of cocoa in the country, and logistic costs incurred when exporting, as in the case of Fedecacao. According to interviewees 5 and 6, two factors are mostly responsible for the high prices paid in Colombia. The first is that the supply and demand in the country are balanced, meaning that the majority of the cocoa produced is consumed domestically. This allows the country differential to be lower than in other countries. According to a manager for instance, the differential under the stock exchange price to be applied in Ecuador was \$100 per ton, as national production is much larger than in Colombia (~240.000 tonnes a year) but there are less buyers available. The second, is that the majority of the cocoa is processed and sold by two main local companies, Casa Luker and Nacional De Chocolate. This means that the logistics costs incurred are much lower, enabling them to pay a higher price. These two factors also explain why prices paid in Colombia show some resilience against international prices, remaining on top when there are drastic falls on the stock exchange (figure 8.5). According to interviewee 6 at Fedecacao, offering higher prices than the competition is also a tactic employed by the two main companies. This guarantees them a supply of cocoa to fulfil the country's stable demand and thus the majority of their trade.

8.3.2 Farmers' perception of prices

Although not all farmers who received training by Fedecacao also sold their product to the Federation, for 80% of the farmers interviewed in San Vicente, price was the main determinant when choosing who to sell to. Even though only 20% of the farmers affirmed to keep record of the prices received, and therefore had a clear picture of how much they were receiving over time, 87% of the farmers affirmed that the prices they were receiving were not higher than the previous 5 years. Figure 8.6 shows price evolution between 2008 and 2016, with the red bars showing a decrease in price for the month, while green an increase. Indeed, when looking at prices since 2012 (figure 8.6), it is noticeable that from a low base these have raised considerably in 2014-2015, to then fall dramatically like never before in the past 10 years. Furthermore, 86% of the farmers affirmed of having never received a premium for higher quality of their cocoa, meaning that the price evolution internationally reflects closely what they have been receiving.



Figure 8.6. International cocoa price fluctuation between 2008-2016. (Source, nasdaq.com).

Price	Price determination process	Price paid to farmers is 10-15% lower than NY Stock Exchange. Highest prices paid in the municipality.
	Farmers perception of price	Prices have not improved for the majority of farmers. Price is the most important determinant in deciding who to sell to.
	Comparison of prices internationally	Colombian prices are among the highest across cocoa producing countries. This depends on the external factors such as exchange rate, but also country's supply and demand balance and players in the industry

Table 8.4. Summary of findings on price Fedecacao

8.4 Quality Casa Luker

8.4.1 Quality determination process

Casa Luker also follows the norm 1252 when determining cocoa quality. However, as explained by Cortipaz managers, as of 2013 the company also distinguishes between bulk and premium cocoa, paying a premium for higher quality cocoa delivered.

Interviewee 9 at Casa Luker described that the company only utilises flavoured cocoa within its products. However, talks to quality controllers at their processing plant, as well as interviews with at both Cortipaz and Fedecacao revealed that this might not always be the case. Picture 8.7 shows the different qualities of cocoa taken by the author from samples at the post-harvesting facility of Cortipaz. The figure shows regional and hybrid varieties of superior quality, and bulk beans affected by monilla. According to interviewee 7 at Cortipaz, some intermediaries accept all sort of qualities, including beans with monilla, and mix them up. This allows to 'mask' the worst quality cocoa, which is then purchased by the company. Although this is an exercise not practiced by Cortipaz, it remains very common amongst other buyers. Even though not confirmed by the company, this lower quality cocoa might be utilised for every-day consumer products very popular in Colombia, such as chocolate powder. On the other hand, as confirmed by talks with managers, the company has set long-term plans to expand and promote their products within the european markets. For these products, the company only utilises cocoa premium and of specific regions.

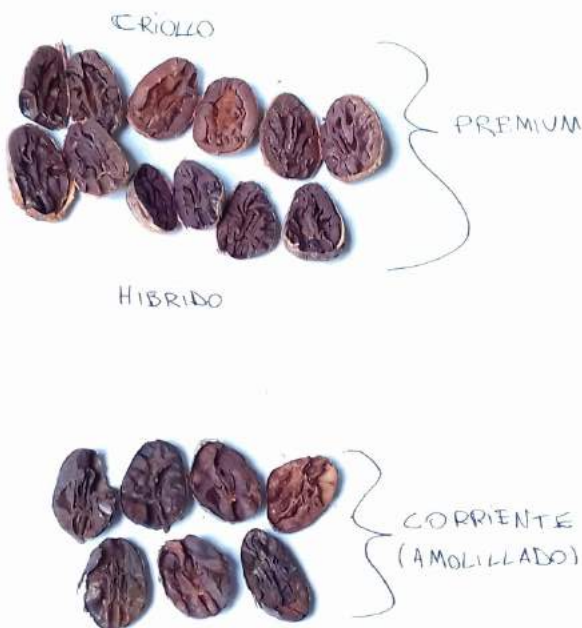


Figure 8.7. Differences in color between cocoa Criollo and hybrid and cocoa with monilla
Source: Author's photo

8.4.2 Quality improvements with certification

Interviews at Cortipaz revealed that the quality of the product increased following certification. In particular, the manager affirmed that the total amount of cocoa purchased by the cooperative in 2013 was almost entirely bulk cocoa, while at the end of 2016 almost 60% of the cocoa purchased by the farmers was premium. Data provided to the author seemed to confirm this increase (figure 8.9). However, when compared to the actual volumes of bulk and premium sold to Casa Luker, this increase does not match. According to the manager, this is explained by the fact that the associations also sold to other clients in 2016, both nationally and internationally.

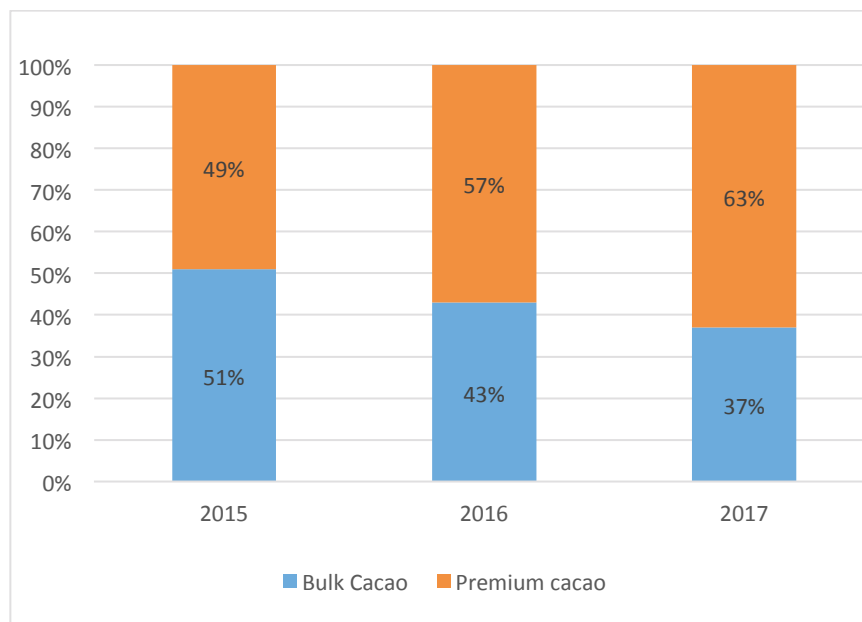


Figure 8.8. Share of cocoa purchased by farmers as bulk and premium over total volume purchased (source: secondary data provided by Cortipaz)

Importantly, in order to establish production before 2014, both the association and Casa Luker were asked to provide delivered volumes of cocoa. However, up until beginning of 2014 Cortipaz had 10 different buying point in the municipality and outside, which made traceability extremely difficult. Similarly, part of the cocoa delivered by Casa Luker from the association between 2008 and 2013 was done via another association called Copecafenord, which sold to Casa Luker cocoa from Cortipaz and 4 other associations in Santander, making also in this case traceability particularly difficult. For this reason, data are only available from the first quarter of 2015.

8.4.3 Farmers perception of quality

100% of the farmers interviewed perceived their quality as having improved. Talks with the manager at the association as well as farmers explained that this change in quality originated predominantly from the change in attention given to post-harvesting practices as a result of the certification. Indeed, 80% of the farmers affirmed that humidity was the quality aspect which mostly improved, followed by fermentation levels (60%) and size (53%).

67% of the farmers confirmed that it was Cortipaz who requested them to pay particular attention to post-harvesting practices. 100% of the interviewed farmers sold regularly to Cortipaz, with technical assistance during project being the most cited reason, followed by price.

Quality	Quality determination process	Classification of quality according to national regulation 1252. Distinction is between bulk and premium cocoa
	Changes in quality	Improved, but as a result of training for certification
	Farmers perception of quality	Improved for most of the farmers. Reflected in the utilisation of post-harvesting practices.

Table 8.5. Summary of findings on quality Casa Luker

8.5 Productivity Casa Luker

8.5.1 Productivity improvements as a result of certification

According to the interviewee 7 at Cortipaz and farmers interviews, productivity increased considerably in the years following training for certification. As part of the project with Swiss Contact, the association undertook a detail survey with the 100 farmers who certified. From the beginning of 2014 before undergoing training, to the end of 2015 after receiving training, total yearly production per farm had increased 15%, from an average of 2362 kg to 2810 kg. However, given that not all hectares generating 2014 production were certified, production per hectare went from an average of 450 kg/ha in 2014 to 650 kg/ha in 2015, raising 30%. This is also confirmed by the total volumes purchased by the cooperative from farmers, which increased from 2015 until 2017.

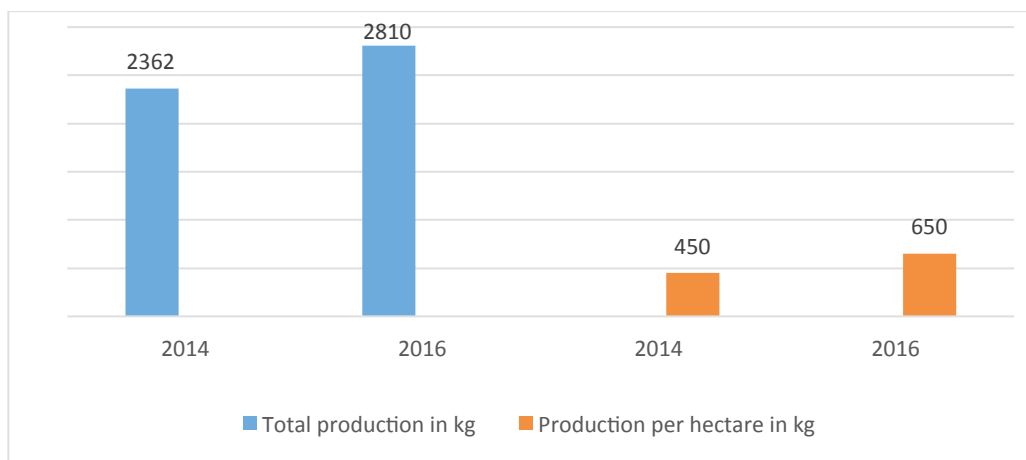


Figure 8.9. Total average production per farm and total average production per hectare in 2014 and 2016 (Source: secondary data provided by Cortipaz)

As confirmed by the survey, farmers only began keeping record after receiving training from certification. Furthermore, due to the same reason cited in section 8.5.2, traceability before 2015 was not possible.

From the 13 farmers who could respond in the survey, average productivity per farm resulted to be 836 kg, slightly higher than the survey carried out by Cortipaz. However, this average also included one highly technified farm which produced 2000 kg/ ha a year. Without the latter, the average production was of 700 kg. 92% of the farmers

confirmed that their production increased in the past 5 years. For the majority of farmers (60%) land size had stayed the same, while it had increased for 33% of the farmers and reduced for 7% of the farmer.

8.5.2 Average precipitation El Carmen

Detailed precipitation averages specific for El Carmen after 2010 were also not found. Similarly to the other case study, these are available at the aggregate level between 1980 and 2010. However, annual precipitation anomalies are available for the city of Bucaramanga, 100 km from El Carmen. Contrarily to the other case study, the higher number of precipitation anomalies showed in figure 8.4 for the year 2016 and beginning of 2017 do match years in which the cooperative registered increases in productivity (section 8.5.1). However, no data were found regarding mean temperatures to be able to compare with the graph. Likewise, none of the interviewees reported anomalies in precipitation patterns when asked about productivity levels and their cause.

Productivity	Changes in productivity	Improved, but as a result of training for certification
	Farmers perception of productivity	Improved for most farmers
	Weather	Precipitation levels in line with improvements, but not conclusive

Table 8.6 Summary of findings on productivity Casa Luker

8.6 Price Casa Luker

8.6.1 Price determination

According to the interviewees 7 and 8 at Casa Luker, the company carries out the same exercise proposed by Fedecacao in order to calculate the price to be paid to the farmer, showed in figure 8.10. Dependent on both international and international factors, it corresponds to 78 to 80% of the New Yor Stock Exchange price.

At the time of the interview, Casa Luker was paying the association 4800 pesos per kg for bulk cocoa, which corresponded to 82% of the stock exchange price for the day (interviewee 7). However, for premium cocoa Casa Luker pays the bulk price plus 3% of this price, which for the day corresponded to 144 pesos per kg. Additionally, the company pays 200 pesos per kg to cover the costs of transportation from El Carmen to their plant in Bucaramanga, the capital of Santander. Therefore, the total price paid to the association for the day were 5000 pesos/kg for bulk and 5144 pesos /kg for premium, corresponding respectively to 85% and 87% of the stock exchange price for the day. However, this payment includes the costs of transportation which the association pays upfront, and does not include the 3% tax to be paid for the National Cocoa Fund. To this, the association subtracts between 150 and 200 pesos/kg for operational costs. This means that the farmers were paid between 4600 and 4650 pesos/kg for bulk cocoa on the day of interview, corresponding to circa 78-80% of the NY stock exchange.

Visits to Casa Luker plant in Manizales revealed that for farmers delivering directly at the plant, beans with a larger humidity percentage of 8 are still accepted, up until a max of 10. However, the difference in percentage is

subtracted from the price of the total volume of cocoa delivered⁵. This is only carried out if all the other parameters fall into norm.

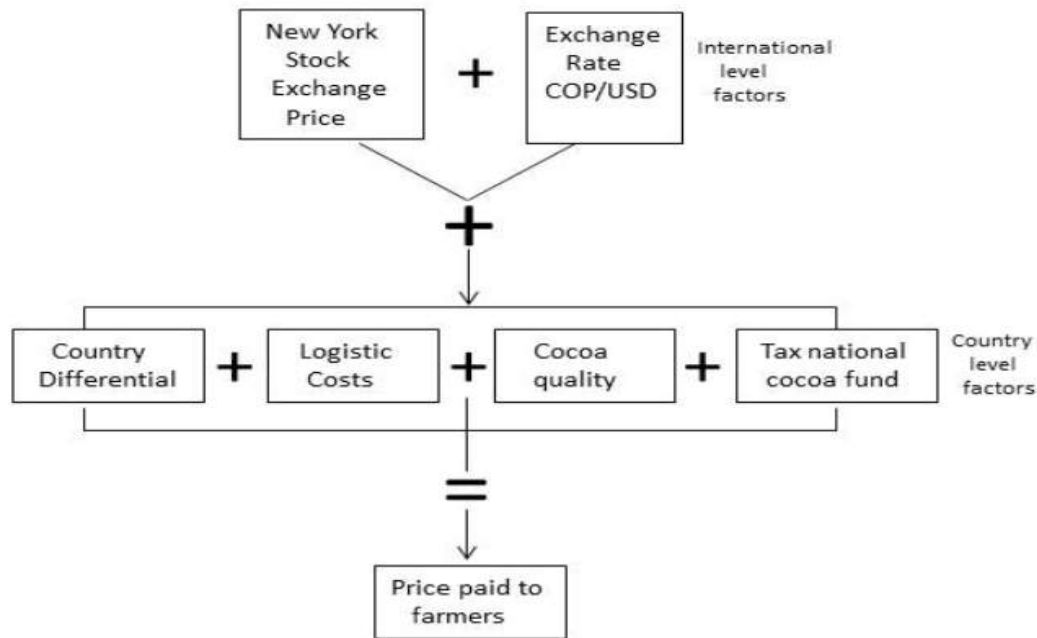


Figure 8.10. Price calculation process Casa Luker

As revealed by the manager at Cortipaz and confirmed by interviewees at Casa Luker, during the time they held a certification the company refused to pay an additional price for the certified cocoa, but paid differentiating between bulk and premium cocoa only. On the other hand, during the year of certification, the association managed to find two buyers, selling 25 t the first time and 12.5 t the second, receiving respectively a 500 and 350 pesos/kg as premium.

8.6.2 Farmers' perceptions of price

100% of the farmers interviewed sold their cocoa regularly at Cortipaz, with 20% also selling at Fedecacao when prices were higher. 93% of these farmers were aware of the price before selling their cocoa, with the latter being the most important reason for selling at Cortipaz. 27% of the farmers also mentioned trust and inclusion in projects as an important reason for selling to the association. 40% of the farmers affirmed of regularly receiving premium price for their cocoa. Finally, 80% were convinced that the prices had not improved compared to 5 years before.

⁵ For instance: a cocoa with a humidity level of 8.5 is subtracted 0.5% from the full paying price for the day (8.5-8.0)

Price	Price determination process	Price paid to farmers through cooperative corresponds to around 75-80% of the NY Stock Exchange
	Farmers perception of price	Prices have not improved for the majority of farmers. Price together with provision of technical assistance is the most important reason for selling to a cooperative
	Comparison of prices internationally	Colombian prices are among the highest across cocoa producing countries. This depends on the external factors such as exchange rate, but also country's supply and demand balance and players in the industry

Table 8.7 Summary of findings on price Casa Luker.

8.7 Data availability

8.7.1 Issues with data availability Fedecacao

With regards to the outcome, the findings show that data availability on all three outcomes is limited. This is attributable predominantly to the fact that almost all farmers do not keep record, but also due to the Federation not keeping information on producers.

8.7.2 Issues with data availability Casa Luker

The results show that data are available at the aggregate level on all three outcomes. This is attributable to efforts taken by the cooperative and the company itself as part of their internal suppliers control system, but also to the fact that almost all farmers kept record of prices. However, longitudinal data longer than three years resulted difficult also in this case.

Chapter 9

Linking service delivery and outcome

9.1 Fedecacao

Interviews with managers and technicians reveal that Fedecacao delivers a wide range of services to cocoa farmers which are complementing each other. When delivering training, the federation tailors the content to farmers needs, using both practical and theoretical approaches. Good infrastructures are in place to provide best-practice examples to the farmers. Thorough support and follow-up occurs after each training by means of highly qualified personnel. Agricultural inputs are delivered as part of national projects but also following training events, with adequate selection of the farmers mostly needing assistance. The federation has also in place a strong rejuvenation strategy nationwide, complemented by research and development and delivery of agricultural inputs.

However, interviews revealed that actualization of these service in practice has some set backs. Farmers who received training from Fedecacao in San Vicente show mixed feelings regarding the delivery of training, of inputs and general support by the Federation. Likewise, assistance to commercialisation does not always occur as claimed. Reasons for this are attributable to the lack of personnel available to cover all farmers, but also to their hybrid form as a public-private entity.

This discrepancy between the organisation on paper and delivery in practice is reflected in the adoption of agricultural practices. While the training resulted mostly effective in changing fermentation times and pruning technique, the farmers interviewed scored worse than their counterpart in El Carmen in a number of fields. Fertilizer application, pruning times and harvesting times were not carried out according to the guidelines. With regards to fertilizer application, only a few farmers had received chemical fertilizer from the federation, while the majority utilising organic fertilizers one time a year. On the same note, considerably less farmers possessed protective equipment to be used when managing chemicals. Finally, while side-grafting was practiced by most of the farmers interviewed, confirming the efforts employed in their rejuvenation approach, none of the farmers separated varieties during post-harvesting practices. This counteracts in practice their rejuvenation plans and strategy, keeping into account that the majority of farmers had low quality varieties such as CCN51 present on their plantations.

Although little longitudinal data are available in practice to be able to identify strong patterns in the outcomes, the information available seem to confirm this pattern. Overall reported productivity is considerably less than the farmers in El Carmen, with half the farmers perceiving no improvements in the last 5 years. This is in line with the findings on harvesting practices utilisation, most notably less fertilizer utilisation, less pruning, and longer harvesting times. While Fedecacao pays higher prices than the average in the country, which compared to prices paid in other cocoa producing countries are also much higher, it only buys high quality cocoa from farmers. From the survey, very few farmers of the ones interviewed and who received training from Fedecacao actually sold at the federation. Given that the most important stated reason determining where to sell is price, it is likely that these farmers do not produce good enough quality to be able to sell at the Federation. The reason for this can be explained by how training is delivered in the field, and what practices the farmers utilise in practice.

9.2 Casa Luker

Interviews with managers reveal that Casa Luker also delivers a wide range of services to cocoa farmers which are complementing each other. Training is delivered by tailoring content and modes to the audience, including both theoretical and practical approaches. There are good infrastructures in place for farmers, and follow-up by qualified personnel is carried out in concomitance to internal monitoring and evaluation system of suppliers. Agricultural inputs and assistance to commercialisation are also offered by the company, although the former only during specific times of the year. The company also has a rejuvenation plan in place linking research and development at their training center with delivery of agricultural inputs.

Interviews and visits to one of the company's supplier revealed that while well set out, these services are not delivered with enough frequency to guarantee positive changes in farmers agricultural practices and outcomes. In particular, findings in chapters 7 and 8 revealed that the observed positive changes in adoption practices and outcomes are attributable to training and organisational changes to obtain an UTZ certification. According to a manager at Cortipaz, regular intense follow-up after training made farmers adopt practices in order to pass the audit and receive the certification. This is supported by interviews with farmers, who showed great appreciation for the services provided by the association, but did not recognise the efforts put forth by Casa Luker.

Indeed, surveys demonstrate that farmers in El Carmen score better in a number of harvesting, post-harvesting and farm management practices. More efficient chemical fertilizers were applied by more farmers and with more frequency. Pruning was carried out more frequently, and pods harvested with shorter time intervals. Although both group of farmers utilised similar post-harvesting practices, farmers in El Carmen dried beans for slightly longer, as well as taking extra hygiene measures during fermentation processes. However, very few farmers were found separating varieties, confirming the worries expressed by some managers at Casa Luker regarding the diffusion of lower quality varieties. As part of the program, farmers in El Carmen were also provided with protective material, which seemed to be used more often than from farmers in San Vicente.

Better record keeping from farmers as well as the cooperative allowed to obtain longitudinal data to observe changes in outcomes. In particular, differentiation between bulk and premium cocoa allowed to identify positive changes in quality. These changes were very recent and attributable to changes in post-harvesting practices from the certification. The recent increases in productivity, overall higher than in San Vicente, are also attributable to the certification. This difference reflects the better performance observed in harvesting practices between the two groups of farmers. On this note, precipitation levels seem to be higher for the years 2016 and 2017, but no historical data are available to be able to confirm a pattern. Finally, the prices paid by the company are in line with national average and also reward superior quality. However, they did not reflect in full the additional efforts taken by the farmers to become certified, as the company refuses to pay an additional premium for certified products.

Table 9.1 Table summarising the findings from chapter 9

	Fedecacao	Casa Luker
Delivery of Agricultural services	Delivery of wide range of services which complement each other and were tailored to farmers needs. Infrastructures were in place to support the delivery of services	Delivery of good range of services which complement each other and are tailored to farmers' needs, although infrastructures and number of personnel were less comprehensive as in other case. Services and follow-up were not delivered with enough frequency.
Utilisation of Good Agricultural Practices	Overall farmers did not perform as good as farmers in the other case study. Issues were found with regards to harvesting and post-harvesting practices, use of protective equipment, farm management and quality control	Overall farmers performed much better than farmers in the other case study in a number of harvesting, post-harvesting and farm management practices. This difference was particularly evident with regards to record keeping, use of protective equipment and other farm management areas.
Farmers performance	Overall farmers did not perform as good as farmers in the other case study. Lower productivity rates than farmers in other case study is in line with less fertilizers usage, pruning and optimal harvesting. Quality levels are not high enough to be able to sell to the Federation for many farmers. However, when this happens prices paid were amongst the highest in the country.	Overall farmers performed better in terms of productivity and quality of the product, reflecting larger utilisation of good agricultural practices. In particular, improvements in these two outcomes were observable for the last 3 years. Prices paid to farmers are in line with the national average and reward differences in quality.
Contextual factors	Lack of personnel on the ground and hybrid public/private institutional arrangement were hindering adequate delivery of services in practice	Better utilisation of good agricultural practices and changes in outcomes are not attributable to Casa Luker but to changes in the internal organisation undertaken by the cooperative Cortipaz to obtain UTZ certification. This is attributable to the lack of frequency and follow-up of Casa Luker when delivering services
Data Availability	Issues with data availability were present at the farmer level and higher. The majority of farmers did not keep track of changes in productivity, quality nor of the price received. Likewise, the Federation could not provide data on purchases quantities, quality levels or price paid for individual farmers, but only aggregate data on purchased quantities. Difficult to link international stock exchange price to price paid on the ground to farmers at farm gate, and consequently to changes in volumes and quality of the product. Overall, both quantitative and qualitative data were necessary to explore the causal relationship	Issues with data availability were present but to a lesser extent than in the other case study. This is attributable to better record keeping of farmers on the ground, of the association Cortipaz and of Casa Luker via their internal suppliers' control system. Differentiation of quality levels made traceability of changes in quality possible. This is also true for productivity. However, no longitudinal data were available on prices paid to farmers. Linking international price to prices on the ground, and changes in volumes and productivity was an issue. Overall, both quantitative and qualitative data were necessary to explore the causal relationship

Chapter 10

Discussion

Although the aim of exploratory research is to lay the ground for future research rather than provide conclusive evidence (Robson, 2011), there are a number of setbacks within this investigation which should be taken into account when considering the findings. One of the most significant drawbacks of the research is the relatively low number of farmers sampled. The initial research plan included a much higher number of certified and non-certified farmers to be visited. However, delay in responses and safety, logistics and budget issues made this extremely difficult. Related to this, an additional barrier is the low number of certificate holders of any certification in the Colombian cocoa sector. Indeed, the certificate for the farmers who were visited expired in early 2017. While the changes that occurred as a result of certification are still visible, the missed renewal made collaboration with certification (UTZ in this case) not possible, which meant that a significant amount of resources and help with logistics on the ground were missing.

Having included an approach built from evaluation literature, the study partially resembles impact evaluation research. However, this type of research explicitly requests the inclusion of large sample populations, using statistical analysis and control populations (Blackman and Rivera, 2010; Gertler, 2016), which in the case of the present research was not possible. Although the utilisation of an open-questionnaire allowed to gain additional insights regarding the motivation of farmers for utilising certain practices to be included, the patterns identified are not conclusive and purely indicative.

Another issue related to data collection process relates to the impossibility to compare farmers utilisation of practices to training content delivered, in order to verify the extent to which farmers actually utilise what they have been taught during training. Similarly, because previous studies were not available for comparison, it was impossible to identify the starting capability of the farmer, to establish the extent to which these were captured in pre-training diagnosis and in turn the training content. These are important aspects reflected in the identified causal model. However, the findings show that training events held by both the organisations were very much context dependent making a uniform comparison difficult. Similarly, data collection revealed the difficulty of farmers to relate the learning of a determined practice to a specific source. These issues are mentioned also by other studies investigating training effectiveness (Kuit et al., 2013; Aidenvironment, 2016), who highlight how farmers tend to recall mostly recent interventions, with backtracking relying on farmers' judgment being difficult. Bias regarding the source of learning might have occurred when visiting farmers at Cortipaz, who could recall having learnt the majority of practices from the training delivered by the association as a result of certification. However, since 2008, around 300 farmers received training from Casa Luker, indicating that perhaps their impact is actually larger than the one emerged from this study findings. Overall, the findings of this research confirm that data collection in the agricultural contexts of developing countries still remains an issue.

Studies conducted by IDH and NewForesight consultants investigating SDM express the importance of determining financial viability and scalability of each SDM, with the utilisation of detailed financial input and output from each actor in the model (IDH, 2015). These data are usually obtained from specialised agencies whose only role is to sample farmers and collect these type of information. In this research, the author did not have access to detailed quantitative data due to limited time and finances, having therefore to rely on qualitative data. This does not allow to have a solid understanding of the viability of each SDM, nor the provision of further improvements recommendations. Moreover, the model highlights contextual factors such as weather occurrences to be able to affect the results on outcomes. Although the findings seem to suggest favourable conditions for the years 2016-

2017 in congruence with increases in productivity, the data are too weak to be able to identify a pattern. However, the approach highlights the importance of including such type of data in future research.

Despite these drawbacks, some patterns are identifiable allowing discussion of contributions and comparison with the existing literature. A first contribution concerns the exploration of rejuvenation approaches within the Colombian cocoa value chain. In particular, the analysed case studies allowed the documentation of an on-going planned approach to innovation in a food commodity value chain, linking and providing evidence for other discussions regarding innovation in global food value chains (FAO, 2016; FAO, 2014b; Deloitte, 2013). Furthermore, the described approach allows for comparison with other larger scale rejuvenation approaches occurring in other cocoa producing countries (Asare *et al.* 2016), promoted by both public and private entities. Regarding the latter, evidence show some similarities between the approach undertaken by Casa Luker and some larger competitors in other cocoa producing countries, linking research and development to services delivery (Barry Callebaut, 2015; Mars, n.d.r)

The results show the central role covered by Fedecacao in the provision of services across the entire country, indicating that future volume and direction of the cocoa sector depends to a great extent on the work the organisation will promote. However, the results also indicate a potential clash of their role as sole managers of the national cocoa fund with their strategy as a private enterprise. This hybrid public-private form of governance is similar to other entities in other cocoa producing countries. The most notable example is the COCOBOD in Ghana. In the latter however, the congruence of public and private roles is much clearer, as the institution is in charge of regulating virtually the entire cocoa sector within the country: from the purchase of all cocoa produced to the setting of prices (Steijn, 2016). On this note, the findings from both case studies revealed that the prices paid in Colombia are amongst the highest of the entire cocoa industry, with farmers in high producing countries of cocoa such as Ghana and Cote d'Ivoire receiving far less for their product. The price determination process identified within the two case studies can be compared with recent investigations conducted in Ghana (Steijn, 2016), highlighting a number of factors explaining this difference. Firstly, prices in Colombia are not fixed nor based on projected crop size⁶ for the year. Furthermore, although Fedecacao plays a central role in the provision of services, it does not have the monopoly on all the cocoa purchased in the country. These elements allow for greater flexibility and price competition on prices within the country's industry, in turn enabling the two main Colombian manufacturers to pay higher prices to cooperatives and larger farmers. This ensures a constant supply of cocoa, while providing incentives to farmers to deliver a better quality product. In Ghana for instance, annual fixed prices do not necessarily reward this quality (Beg *et al.*, 2017). Finally, the internal balance between supply and demand enables on one side the manufacturers to have a large domestic market, and therefore low processing and logistic costs; on the other, to have a low country differential (used in the calculation of prices) in comparison to other countries such as Ecuador, who use a similar system and produce much more, but have less buyers. Nonetheless, other important similarities emerged between the two organisations is the assistance provided to cooperatives to obtain certifications. Although much evidence is not yet available due to the low presence of certificate holders in the country's cocoa sector, the strategy and goals of Fedecacao foresee some developments which would be interesting to investigate further.

As previously mentioned, the findings from the quantitative data need to be treated with caution. However, there is indicative evidence highlighting the important role of certification in increasing productivity and quality of the product, and thus of generating additional benefits which go beyond the payments of a premium. On this note,

⁶ According to many, erroneous projections of future crop productions made in 2016 are also the cause of the drastic decreases in the world prices of cocoa currently experienced by the sector

interviewee 7 at Cortipaz affirmed that they would be more than happy to renew their certification even if no buyers of certified cocoa showed up, as to her the benefits in quality and productivity were clear (Cortipaz manager, interview 30/05/2017). This stress the additional benefits which originate from certification. However, it is important to point out that the results suggest that improvements in farmers' practices occurred rather than from the training itself, from the organisational arrangements and follow-ups carried out by the cooperative to obtain the certification.

Other findings emerged from this research which are in line with the literature on certifications concern market access and payments to farmers. In fact, according to other studies carried out in the sector (Aidenvironment, 2016; Resolve, 2012), the ability to find a buyer willing to pay the additional premium remained an issue. This was the case for the cooperative Cortipaz as well as other processors in the country. Low market access, as well as high domestic prices were the two prominent reasons for the low number of certification in the Colombian cocoa sector.

As the cooperative is one of the key suppliers of Casa Luker, the findings also provide evidence comparing third-party sustainability approaches against individual companies' codes of conducts. In particular, the results highlight the practical implications of adopting different approaches to ensure sustainability across value chains, including the benefits for private organisations of adopting stronger commitments starting at the beginning of their production chain (Rueda *et al.* 2017; Vermeulen, 2015)

With regards to the SDM model proposed by IDH, the findings highlighted that the model currently employed by the two case studies seem to be 'a mixture' of two forms of the identified models by the organisation, suggesting the existence of additional arrangements available in practice. Importantly, this research contributed to highlight the usefulness of SDM when trying to understand service deliveries in agricultural settings. In particular, the model enables to identify relatively easily the key actors active within these settings and how they interact with each other. Nonetheless, the research findings also revealed the important role played by international actors in the delivery of services, and therefore in influencing the performance of farmers. One example is the assistance provided by Swiss Contact to the association Cortipaz to obtain an UTZ certification. Although not directly investigated in this research, future SDM would be improved by also including interactions with actors acting at higher levels, which at the moment are not taken into account in the model.

Directly related to this last point are the findings of this research regarding data availability. The results on outcomes reveal that data availability still remains an issue at different levels of the value chain, from the individual farmer level to the more aggregate levels of cooperatives and buyers of cocoa. This was particularly evident in the case studies when trying to link the international price of cocoa to prices paid at farm-gate, together with changes in quality and volumes. However, in order to understand whether farmers' performance – and thus their livelihood - is actually improving, monitoring how these three factors change simultaneously is crucial, as they are directly related to farmers' environmental, social and economic performance. Unless systemic efforts are undertaken aimed at collecting coordinated data at the various levels of the chain, it will be extremely difficult to verify whether the international cooperation initiatives initiated at the higher levels are actually bringing about the desired changes on the ground when trying to improve farmers' livelihoods. This will make the systemic changes required by the agri-sector to move beyond simple certification of practices more difficult (Simons, 2015)

Chapter 11

Conclusion

The cocoa sector worldwide is challenged by a number of sustainability issues which are seriously hindering future availability of the crop and the well-being of communities involved in its production. Stakeholders in the cocoa value chain have responded to these challenges by embracing new forms of cooperation and self-regulation, resulting in the emergence of various Sustainable Supply Chain Governance (SSCG) arrangements. Voluntary Sustainability Standards are amongst the most common form of SSCG, followed by other government led initiatives or individual companies codes of conduct. All these arrangements are characterised by the provision of agricultural services to the producers. Yet, little is known regarding the underlying mechanisms and processes characterising the provision of these services.

Taking an explorative approach based on quantitative and qualitative research methods, this thesis wished to contribute to this knowledge by aiming to better understand the relationship between the provision of agricultural services, day-to-day practices utilisation and sustainability performance of farmers. Review of the literature led to the identification of a causal model and of six sub-questions guiding the research approach. The model describes the actors active in agricultural value chains and the type and quality of services provided to farmers, while highlighting farmer's adoption of good agricultural practices and changes in their performance at farm level. Importantly, the model also highlights external factors potentially affecting this relationship, while taking into account data availability at different stages of the causal process between service delivery and outcomes at farm level. This enables to explore the extent to which it is possible to attribute changes in farmers' performance to interventions undertaken on higher levels.

The validity of this model was tested by means of two case studies in the Colombian cocoa sector. Fedecacao represents the main public-private body of the country, and is in charge of managing the largest public cocoa fund in the Colombian sector. Casa Luker is the second largest processor of chocolate in the country. Given their presence and importance within the Colombian cocoa value chain, investigating these two organisations provided good indication of the present and future direction of the Colombian cocoa sector. The six sub-questions are answered individually below.

1. What type of actors and Service Delivery Models are observable in practice?

The application of Service Delivery Model emerged from the literature were useful in helping identifying the role of the two organisations taken in consideration and their relationships with farmers. In particular, the findings show that in both case studies, hybrid forms of the SDM identified in chapter 3 best describe the observed exchange of services and outcomes between the main stakeholders.

Fedecacao's SDM is an hybrid form between an informal and intermediary SDM. The organisation is the main provider of services to farmers. This activity is carried out as a public entity and by managing the National Cocoa Fund. However, they also purchase cocoa from farmers and sell it to international buyers. With the latter they have buying agreements, but not with the farmers. These in turn provide the Federation with their cocoa but are also indirectly funding the provision of services from the Federation. This occurs through the payment of a 3% tax on any sell, which goes directly to fill the National Fund.

Casa Luker's SDM is an hybrid form between an intermediary and centralised SDM. The company purchases the majority of its cacao from farmers cooperatives, such as Cortipaz, with which the company has in place buying agreements. The latter does not generally sign any contracts with the farmers. The company provides the majority of its agricultural services to the cooperatives, with inputs being distributed to farmers by means of a raffle system twice a year during harvesting times. However, some of the farmers also sell directly the company by taking cacao to the nearest processing plant. With these farmers, the company does not sign any purchasing agreement, but delivers inputs and technical assistance upon request by the farmer

2. How are training processes, inputs and rejuvenation approaches identified and delivered in each Service Delivery Model?

Training set up from both parties takes well into account farmers needs, making use of mixed approaches and of good facilities for demonstration. Follow up is carried out from both organisations with the use of qualified personnel. Delivery of agricultural inputs and assistance to commercialisation are also offered by both entities, which although differing in volume and constancy of delivery, both complement the delivery of training as well as their respective rejuvenation approaches. Rejuvenation is encouraged by both entities, yet with stronger emphasis and more concrete procedures by Fedecacao. For both organisations, rejuvenation is also well linked to research and development on cocoa varieties and other harvesting and post-harvesting processes.

3. How is the delivery of services reflected in farmers' adoption of good agricultural practices?

The findings indicate that overall farmers in El Carmen scored better in a number of harvesting and post-harvesting practices. This include fertiliser application, pruning, pod harvesting and drying times, but also hygiene and quality control of the fermentation process. The author's visit, and discussions with farmers and the cooperative's manager revealed that farms in El Carmen were also better organised logistically, with records of inputs being taken on almost all farms. Furthermore, measures to ensure health safety when applying hazardous materials were also adopted more often by farmers in El Carmen. Both groups of farmers shared similar farm characteristics, with farmers in El Carmen having a slightly larger tree average than those in San Vicente. Importantly, none of the farmers separated different cocoa varieties. This directly counteracts the efforts undertaken by both organisations in the promotion of better producing varieties as part of their rejuvenation approaches.

4. What are the influences on product quality, productivity and price paid to the farmers as a result of a Service Delivery Model?

Differences in the adoption of practices are also echoed on the results on outcomes. Although long-term longitudinal data were not available for both case studies, the findings indicate better outcomes in productivity and quality for farmers in El Carmen. Here, differentiation between bulk and premium cocoa quality made traceability of changes possible at the aggregate level. Likewise, better internal organisation of the cooperative allowed the tracing of productivity levels before and after the intervention of certification, showing significant improvements in a short period of time. Prices paid to farmers by both organisations are determined taking into account national and international factors. While being dependent to a large extent on the New York Stock exchange prices, national industry mechanisms and internal supply and demand balance enable prices paid in Colombia to be amongst the highest of all cocoa producing countries. For Fedecacao, this corresponds to a payment of 80-90% of the stock exchange price, while for Casa Luker to 78-80%.

5. Are there other contextual factors present in practice which might influence the relationship between the services delivered and observed changes in quality, productivity and price paid?

Interviews revealed the presence of contextual factors hindering the delivery of services in practice, with consequences on practices implementation and outcomes for both parties. These were not all identified in the causal model that emerged from the literature. With regards to Fedecacao, the lack of personnel does not allow it to reach adequately to all farmers requiring attention. Secondly, their strategy as a private company seems to create some unintentional conflict of interests between the provision of services to farmers, and their assistance to other cooperatives. This is supported by some farmers expressing dissatisfaction towards the services they received, delivery of which might be in some cases linked to the selling intentions of the farmers. Similarly, lack of personnel, resources and constancy in service delivery reduces significantly the potential impacts of Casa Luker on farmers' performance. In particular, visits to one of the company's suppliers revealed that training and organisational changes to obtain a sustainability certification were decisive in changing farmers practices and outcomes positively, which need therefore to be attributed to the latter rather than the company's intervention. Contextual data on precipitation patterns seem to be favourable for the years 2016 and 2017, but are not conclusive to be able to identify a pattern A revised version of the model incorporating the newly identified external factors is provided below.

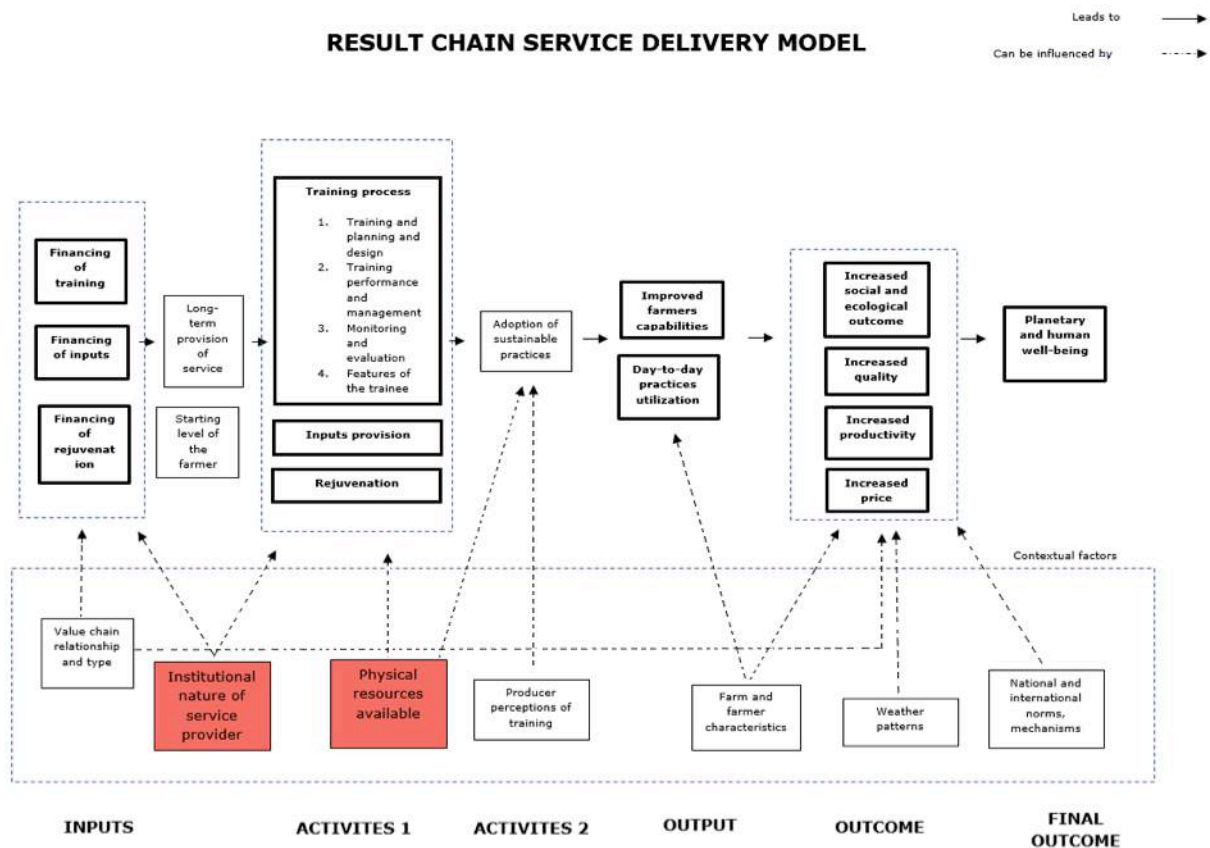


Figure11.1 Revised causal model

6. What type of data are available in practice to be able to apply this approach to other contexts?

Issues with data availability emerged with both qualitative and quantitative type of data, however without hindering the identification of important patterns. The analysis of the case studies showed that data on outcomes are available at the aggregate level but are to a large extent dependent on the internal arrangements of the organisations close to the farmers; the association Cortipaz resulted to be much more meticulous than Fedecacao in keeping track of sells and individual farmers productivity, allowing some longitudinal information to be available. Therefore, the findings demonstrate that while key quantitative data are needed to explain farmers performance, qualitative data are also important to be able to explain patterns at the quantitative levels. In particular, the results show that the relationship between the provision of services and results on farm performance for both case studies is explainable by qualitative evidence such as lack of follow up and organisational arrangements, but also quantitative data such as farmers adoption of practices. Overall, the approach results to be replicable to other contexts. However, the findings demonstrate the persistence of issues with data availability and collection at different levels of the value chain. In particular, it was clear that more cooperation is needed between the many actors operating at each level of the chain. This would help ensuring that efforts undertaken at the international level truly foster knowledge transfer and learning in agricultural settings, in turn leading to changes in performance at the farmers' level and therefore improvements to their livelihood.

Chapter 12

Recommendations

From the analysis of the case studies emerged some areas of improvements, leading to a number of recommendation below for both practitioners and academia.

12.1 Recommendations for practitioners

12.1.1 Casa Luker

The company has in place its own CSR program called Luker Way. However, besides the delivery of service, no follow-up nor control is carried out to ensure that the farmers are actually implementing the practices they have been taught. Visits to the association Cortipaz indicated that the organisational changes and measures adopted in order to obtain a sustainability certification did help increasing productivity and quality of cocoa . Given that the latter are amongst the top priorities of the company, particularly the delivery of fine flavoured cocoa, the management should consider adopting a certification with some of its key suppliers. To assure that this would be of relevance, the company has recently proposed a project to the association Cortipaz involving the production of a special cocoa classified as ‘Santander origin’ with distinctive organoleptic features. This cocoa will be promoted on the international market. Discussions with manager at Cortipaz revealed that the farmers they will include will be the former certified farmers, who are now amongst the best producing of their group.

Alternatively, an internal management system similar to the one promoted by the certification in collaboration with key supplier could also lead to desired improvements at the farm level. Higher prices or other rewards could be provided for the achievement of a ‘Luker Way’ certificate. Additional benefits of such an approach would also consists in better control over the social and environmental aspects of production, allowing the company to make stronger sustainability claims and improving its credibility and brand image.

12.1.2 UTZ Certification

The main reason for the organisation not to renew its certification were the prohibitive auditing costs requested by the auditor, who doubled the prices for the second year round. However, none of the management at the organisation was aware of the existence of other auditors within the country who could perhaps offer a more accessible price. Better communication with new certifying groups would therefore be beneficial. In particular, a list of available auditors, or perhaps of best available auditors based on prices or other features would make the certifying groups more aware of available possibilities. Likewise, better communication between the country representative/s and new certifying groups would also provide additional support and avoid potential future miscommunications.

12.1.3 Fedecacao

Talks with farmers revealed that a number of them felt unassisted by Fedecacao , mostly due to their decision to not to sell at the federation. Although not explicitly investigated in the survey, this might be due to the fact that their cocoa quality is not high enough to be able to sell at the federation, who is recognised almost unanimously to be paying higher prices, but also of requiring higher prices. More attention should be paid to these farmers regardless of their selling decisions. Likewise, talks with the cooperative revealed some reluctance to provide technical assistance or support in commercialisation on some occasions. However, some of these cooperative provide excellent support to their farmers with whom they have established really good relationships over the years. Increasing collaboration and assistance also with these cooperatives would allow to achieve the Federation’s

objectives more efficiently. Moreover, even though these cooperatives might be a source of competition to the federation, cocoa of higher quality exported from Colombia would contribute to increase the credibility of the country on the international market, directly benefitting the federation and its future objectives. Finally, no individual data regarding purchase from farmers was carried out, nor of specific quality features. Beginning this type of exercise might be beneficial to monitor increases in farmers productivity and quality in the future.

12.1.4 Colombian Government

Fedecacao is partly a public entity, as they are the sole managers of the National Cocoa Fund. However, this research highlighted that the hybrid form of the organisation might be hindering an efficient distribution of services originating from the fund. With some internal controls the government could identify a better re-distribution on the budget to also other non-public entities, such as best-performing cooperatives or even private sector, however provided that certain performance conditions are met. At the moment, some of these cooperative such as for instance Cortipaz are achieving very good results in improving their farmers' performance with little or no budgets. These organizations would therefore benefit enormously from additional money coming from the fund. This re-distribution could be based on volume of sales or number of farmers. Furthermore, a careful re-distribution of the fund to other entities as well or even better rooted on the ground than Fedecacao could also benefit on-going re-conversion plans from coca to cocoa plantation.

12.1.5 Other entities operating in agricultural sector

An important finding emerging from this research concerns the difficulty in obtaining longitudinal data to identify improvements in performance. The findings show that when attempts to keep such record were carried out it is possible to obtain such evidence, although not strong enough in this investigation to make conclusive remarks. A way to overcome these challenges and really identify improvements in performance is to promote a culture aimed at systematically record different aspects of the production process. While costs remain important barriers to data collection, cost-efficient data technologies are on the rise, making data cheaper to obtain. Similarly, investing from the beginning in structured monitoring and evaluation systems can help facilitating the process in the longer-term as well as provide useful information on how and where to maximize farmers' performance. This would enable to align intervention at the international level and to monitor how it trickles down to farmers and their performance.

12.2 Recommendations for academia

Building on the main discussion points emerged from the previous section, some opportunities for further research are proposed below.

- i. Given the important role covered by Fedecafé in Colombia in promoting the country's coffee across the world, further investigations could be aimed at comparing Fedecacao and Fedecafé and identify potential new approaches to be utilised by Fedecacao to intensify scalability, outreach and efficiency of its programs.
- ii. Being the only managers of the public Cocoa National Fund, it would be beneficial to assess the decision-making process beyond the utilisation of the fund, the institutional and political set up and whether these could be improved. Given the similarities with entities in other cocoa producing countries, detailed comparative analysis could produce useful findings for both.
- iii. Given the small sample of farmers involved in this research, an impact study focussed on price, productivity and quality improvements with a control population and systemic analysis of external contextual factors would produce much more solid evidence of the additional benefits originating from certification beyond payments of premium.
- iv. The findings show that the organisational changes and learning occurred at the cooperative level in order to pass the certification audit were the main factors influencing changes in farmers practices. Further studies focussed on how changes occur at the organisational level of the cooperative could provide additional insights upon the benefits of certification.

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ANNEX 1
LIST OF INTERVIEWS AND ANNOTATIONS

List of recorded interviewees

Organisation	Position	IV number	Date of the interview
Fedecacao	Field technician – farmers visits	1	21/04/2017
Fedecacao	Field technician – investigation	2	25/04/2017
Fedecacao	Trainer	3	22/04/2017
Fedecacao	Quality Controller	4	26/04/2017
Fedecacao	Chief San Vicente Unit	5	25/04/2017
Fedecacao	Chief exports	6	09/05/2017
Cortipaz	Ceo cooperative	7	30/05/2017
Casa Luker	Manager training center	8	02/04/2017
Casa Luker	Director of trading	9	28/04/2017
EcomTrading	Sustainability manager	10	22/04/2017

List of annotations

Organisation	Position	Date of the discussion
Cortipaz	Field technician	28/05/2017
Cortipaz	Quality controller	29/05/2017
Cortipaz	Technician post-harvesting practices at Cortipaz center	28/05/2017
Casa Luker	Worker at farm Luker	02/04/2017
Casa Luker	Hired trainer	01/04/2017
Fedecacao	Farmers San Vicente	22-27/04/2017
Casa Luker	Farmers El Carmen	28-04/02/05/2017

ANNEX II
CONSENT FORM AND FARMERS' QUESTIONNAIRE

RESEARCH ANDREA FERRAZZO (ENGLISH)

My name is **Andrea Ferrazzo** and I am a student at the University of Utrecht, Netherlands. I am currently doing an exchange at the Universidad de Los Andes, Bogotá. I am carrying out this research as part of the necessary requirements to complete my Master in Sustainable Business and Innovation.

I **do not** work for any operator, trader, processor or association; **nor** for any entity belonging to the national government of Colombia. This is an independent work for my university. The objective of the study is to understand more over the type of agricultural services offered to farmers and their effect on productivity, quality and price received for their products.

The research is divided in two parts: the first one consists in interviewing actors belonging to the cocoa sector, such as program managers and technicians. The second, to interview directly the farmers at their farms.

The results of this project will be put together in a report, which will be available to whoever would like to access it. This report **will not** at any point mention your name, your personal data, nor the location of your farm (if applicable). All the compiled information will be used only and exclusively for this investigation.

The interview will take around 1h of your time. You have the right to not answer any questions and of terminating this interview at any point.

Authorization

I _____, with ID number _____, give my consent to be interview and recorded by Andrea Ferrazzo, master student at the University of Utrecht. I am aware that the information delivered will be used exclusively for the development of the research. I understand that the report of this research will be public and available to anyone interested in its content. I confirm to have read this document, that I have understood it and I sign it voluntarily.

Signature

Date

INVESTIGACIÓN ANDREA FERRAZZO (SPANISH)

Me llamo **Andrea Ferrazzo** y soy un estudiante de la Universidad de Utrecht, en Holanda, de intercambio en la Universidad de Los Andes, Bogotá. Estoy realizando esta investigación como parte de los requisitos de grado de la Maestría en Sostenibilidad e Innovación de empresa.

NO trabajo para ningún operador, fabricante, transformador o asociación; ni para ninguna entidad del Gobierno Nacional. Esta investigación es un trabajo independiente para mi universidad. El objetivo del estudio es entender más sobre de los servicios rurales ofrecidos a los productores y el efecto que estos tienen sobre la productividad, la calidad del producto y el precio pagado a los productores.

La investigación se divide en dos etapas: la primera consiste en entrevistas a los actores que hacen parte del sector cacaotero, como administradores de programas, técnicos y productores; la segunda consiste en realizar entrevistas grupales con productores de cacao para conocer su opinión

Los resultados de este proyecto serán compilados en un informe, que estará disponible para quien quiera revisarlo. Este reporte **NO MENCIONARÁ** su nombre, sus datos personales, ni la ubicación de su cultivo (si aplica). Toda la información recopilada será utilizada única y exclusivamente para esta investigación.

La entrevista tomará alrededor de una hora de su tiempo. Usted posee el derecho de no contestar a preguntas si no lo desea y de terminar esta entrevista en cualquier momento.

Autorización

Yo _____, con documento de identidad número _____, doy mi consentimiento para ser entrevistado y grabado por Andrea Ferrazzo, estudiante de maestría en la Universidad de Utrecht. Estoy de acuerdo con que la información entregada sea utilizada solamente para el desarrollo de la investigación. Entiendo que el reporte de esta investigación será público y estará disponible para cualquier persona interesada en su contenido. Confirmando que he leído este documento, que lo he entendido y que lo firmo de manera voluntaria.

Firma

Fecha

GENERAL INFORMATION

1. **Gender**
M F
Province
.....
2. **Name of the finca**
.....
3. **Altitude**
.....
4. **Total area of the finca in hectares**
.....
5. **Total area of the finca in cacao in hectares**
.....

PLANTACION

6. **How many trees do you have per hectare**
.....
7. **Do you have regional varieties in your plantation (if yes, see number 8,9)**
YES NO
8. **What type?**
.....
9. **How many hectares do you have of regional varieties**
.....
10. **Do you have clones? (If yes, see number 11,12,13)**
YES NO
11. **What type?**
.....
12. **How many years have you been having clones for?**
Years.....
13. **Who gave you the material?**

PRACTICES

Harvesting

- 14. How many years does this plantacion have?
Years.....
- 15. Do you use fertilizers? (If Yes, see 16, 17,18, 22)
YES NO
- 16. If so, are they organic fertilizer?
YES NO
- 17. If so, what type?
.....
- 18. How much do you use per tree?
Quantity
- 19. Do you use chemical fertilizers? (If Yes, see 19, 20, 21)
YES NO
- 20. If so, what type?
.....
- 21. How much do you use per tree?
Quantity
- 22. With what frequency do you use fertilizers?
.....
- 23. Where did you learn how to use fertilizers and with this frequency
.....

- 24. What is/are the most common diseases affecting your plantation?
.....
- 25. What plagues affect your plantation?
.....
- 26. How do you control them?
.....
- 27. Where did you learn how to control them?
.....
- 28. How do you control weeds?
.....
- 29. Do you have shade trees in your cocoa plantacions? (if yes, see 30)
YES NO
- 30. Do you know how many trees you have per hectares?
.....
Materials and Sources of new trees
- 31. When you plant new cocoa trees, where do you get the new trees?
.....
- 32. Do you cross pollinate flowers on your trees?
YES NO
- 33. Do you side-graft your trees? (if yes, see 34)
YES NO
- 34. How many years ago did you start side-grafting your trees?
.....
- 35. Where did you learn how to side graft?
.....
- 36. Do you plant seeds? (if so, see 37)
YES NO

37. If so, with what frequency?

.....

38. Do you burn vegetation before planting?

YES NO

39. Do you have any practice to increase pollination? (if yes, see 40)

YES NO

40. If so, which one?

.....

Pruning

41. Do you prune? (if Yes, see 42,43)

YES NO

42. If so, with what frequency?

.....

43. Where did you learn how to prune?

.....

Harvesting

44. With what frequency do you harvest the pods?

.....

45. Do they get damaged when you harvest them? (If no, see 46)

YES NO

46. How do you make sure they are not damaged?

.....

Post-harvesting

47. Do you ferment your cacao? (If yes, see 48, 49, 50, 51)

YES NO

48. If so, where do you do it?

.....

49. For how many days?

.....

50. Where did you learn to ferment this way?

.....

51. How do you recognise if they are ready?

.....

52. Do you dry your beans? (If yes, see 53,54,55)

YES NO

53. If so, where do you dry them?

.....

54. For how many days?

.....

55. Where did you learn this way of drying your beans?

.....

56. Do you make a selection of the beans after drying? (if Yes, see 57)

YES NO

57. What criteria do you use?

.....

58. Do you make use of an 'arenero'?

YES NO

59. Do you store your beans somewhere? (if yes, see 60)

YES NO

60. If so, where do you do it?

.....

61. Do you maintain any registry?

YES NO

PRODUCTIVITY

62. How many kg did you produce last year?

YES NO

63. Do you think your production has increased since 5 years ago? (if yes, see 64)

YES NO

64. Of how many kg?

.....

PERCEIVED QUALITY

65. Do you focus on any practices in order to increase quality (if yes, see 66, 67)

YES NO

66. What do you do?

.....

67. Who asks you to do so?

.....

68. Do you think your quality has improved since 5 years ago? (if yes, see 69)

YES NO

69. What aspects of your quality?

.....

PRICE

- 70. Do you know the price before selling?
YES NO
- 71. Where do you sell your cacao?
.....
- 72. Do you have a contract with your buyer?
YES NO
- 73. Do you agree on a price before selling?
YES NO
- 74. Are there other buyers in the municipality where you sell?
YES NO
- 75. How do you decide who to sell to?
.....
- 76. Do you keep record of your prices?
YES NO
- 77. With what frequency do you go to the municipality to sell?
.....
- 78. Do you receive a quality premium for your cacao? (if yes, see 79)
YES NO
- 79. If so, how much per kg?
.....

- 80. Do you think the price you receive from your cacao is higher than 5 years ago?
YES NO

NETWORK

- 81. Do you belong to any cooperative? (if yes, see 82,83,84)
YES NO
- 82. If so, which one?
.....
- 83. How many years have you been part of this association?
.....
- 84. What are the advantages?
.....

LAND USE TENURE AND CHANGES

- 85. Have you invested in improving your farm? (If yes, see 86,87)
YES NO
- 86. What did you improve?
.....
- 87. How did you finance the investments?
.....
- 88. Is cacao your first source of income?
YES NO
- 89. Do you have other sources of income? (if yes, see 90)
YES NO
- 90. If so, which one?
.....
- 91. Do you think your kid will be cocoa producers like you?
YES NO
- 92. Who does the land belong to?
.....
- 93. Has the number of hectares in cacao increase, reduced or is the same than 5 years ago? (if increased, see 95)
Increased Reduce Stayed the same
- 94. If it has increased, how did you finance it?
.....
- 95. If it has increased, how was the land before?

WORKER PRESENCE

- 96. Do you contract workers on your cacao plantacion? (if yes, see 97)
YES NO
- 97. If so, for what jobs?
.....
- 98. With what frequency?
.....

CERTIFICATION

- 99. Does your farm have a certification? (If yes, see 99, 100, 101,102, 103, 104)
YES NO
- 100. If so, with what program?
.....
- 101. Since what year?
.....
- 102. Why did you decide to participate in the program?
.....
- 103. What do you think were the biggest changes as a consequence of your participation to the program?
.....
- 104. Did you receive a premium for your participation (if yes, see 105)
YES NO

105. If so, how much?

106. Is it different from the premium for quality?

SOCIAL SECURITY

107. Do you utilise any chemicals in your farm? (if yes, see 108, 109, 110)
 YES NO

108. If so, do you wear the same clothers or put something different on?

109. What do you wear?

110. If you utilise chemicals, where do you store them?

111. What do you think are the most important things Cortipaz/Fedecacao helped you with?

FARMER SATISFACTION

1. How satisfied are you with the training provided by Fedecacao/Casa Luker/Cortipaz? (If applicable)

Very Unsatisfied Unsatisfied Neither Satisfied or Unsatisfied

Satisfied Very Satisfied

2. How satisfied are you with the inputs provided by Fedecacao/Casa Luker/Cortipaz? (If applicable)

Very Unsatisfied Unsatisfied Neither Satisfied or Unsatisfied

Satisfied Very Satisfied

3. How satisfied are you with the support provided by Fedecacao/Casa Luker/Cortipaz? (If applicable)

Very Unsatisfied Unsatisfied Neither Satisfied or Unsatisfied

Satisfied Very Satisfied

ANNEX III

QUESTIONS SEMI-STRUCTURED INTERVIEWS

Background of the trainer

1. Can you tell me about your educational background, including level of education and specialisation?
2. How many years have you been giving training in agriculture, and how many in cocoa?
3. Where your family into the cocoa sector, and have you always lived in the area where you provided training?
4. How many technical workshops (training of trainers) on agricultural practices have you attended in the past 5 years?
5. How many workshops on training methodology have you attended in the past 5 years?

Training characteristics

Training performance and management

6. Where does training usually occur?
7. How do you prepare for a training event? Is there a plan of each training been done before?
8. How many farmers attend each training event and for how long? And how many in a year?

Training planning and design

9. Can you tell me in detail what topics are delivered in training?
10. Who makes decisions about the training content that needs to be delivered? And based on what aspects do you make these decisions?
11. . Is there a different time of the year in which you provide certain topics rather than other? Why?
12. 10b. Do you evaluate farmers knowledge before attending training? Why? How do you make sure that what you deliver to the farmer is needed?
13. How many training events are delivered in a year? what % have field practices?
14. For these one which include field practice, how much time is spent (in hours) a. discussing between participants b. discussing with the trainer b. practice in the field?
15. For those which are only lecturing, can you tell me how much time is spent (in hours) lecturing, discussion between participant, discussion between trainers.

Monitoring and evaluation

16. Do you evaluate farmers knowledge after each training? How? Why do you do so?
17. How are farmers encouraged to attend a training?
18. What happens after farmers have received training? Is there a follow up to verify implementations?

Support provided to farmers

19. What type of support do you provide farmers?
20. How can farmers ask for help if they need something, and to who?
21. What are the costs of training each farmer?
22. Which is the most expensive part, and who pays for it?

Inputs

23. Do you provide any agricultural inputs to farmers ? What type of inputs do you provide (e.g. fertilizers, pesticides)?
24. How do you select the type of agricultural inputs and quantities to provide farmers with?
25. Do you provide any type of assistance with each agricultural input? If so, what type of assistance?
26. Which inputs are the most expensive to deliver? What are the costs per farmer?
27. Who pays for these inputs?
28. Do you provide any financial assistance to farmers? What type of assistance?
29. Do you take any efforts to guarantee sells to farmers? What type?

Rejuvenation

30. Do you provide any planting material to farmers? Why? If not, who does it?
31. How do you identify the type and quantity of material to provide farmers with?
32. Who pays for the planting material?
33. What type of rejuvenation practices do you recommend your farmers to utilise? Why?
34. Do you have a rejuvenation strategy or plan in place which you carry out with farmers?

Costs of training and financial structure

35. What are the main barriers to scaling up training to more farmers? Why?
36. What are the main challenges to scaling up input and rejuvenation to more farmers? Why?
37. How do you make a return on the investments for providing training, inputs and rejuvenation to farmers? (If applicable)

Outcomes of the service

Quality

38. How important are quality and productivity of the product in the program you deliver? Why?
39. What are the steps you take for improving quality?

Productivity

40. What are the steps for improving productivity?
41. Do do you monitor improvements over time of quality and productivity? How
42. How do you select the price to be paid to farmers?

ANNEX IV

The development of different cacao genetics and their characteristics

Cacao families

The cocoa plant known today can be distinguished in three main families: Criollos, Trinitarios, and Forasteros. While the plant of cacao was originally discovered in center America and later exported to Africa during the colonial period, the three families are not evenly widespread across all cocoa producing countries. In fact, the Criollo and Trinitario families are mostly widespread amongst Latin American countries, while the Forastero varieties are more common to larger producing countries in Africa and Asia.

There are a number of studies highlighting organoleptic, physical and chemical differences between the various families and the countries where they are cultivated. However, a general pattern is that Criollo and Trinitario varieties tend to be more delicate, with lower acidity, higher fat content and fruity taste than the Forastero counterpart, therefore being more likely to produce a fine and flavoured cocoa (Villamil *et al.*, 2013).

Genetics improvements

Genetics improvements programs in cocoa producing countries started in 1920. In particular, mixing of Criollo and Forastero varieties in Trinidad enabled to obtain the first Trinitario plants. Further research between 1933 and 1935 allowed subsequently to identify materials today known as 'Imperial College Selection' (ICS). These materials are known for their Trinitario flavour characterised by fruity and flowery attributes, with secondary tastes close to caramel and apple. These materials were largely distributed forming today the base of the existing Trinitario varieties world-wide (Villamil *et al.*, 2013).

The mixing of ICS varieties with other local varieties in various cocoa producing countries in Latin America enabled with time to identify key varieties originating from each country, such as the 'Hybrid trinitario Selection' (TSH), the (EET) in Ecuador, UF in Costa Rica and IMC and PA in Perú. These material formed the base for the hybrid selection subsequently introduced in different countries (Villamil *et al.*, 2013).

During the second half of 20th century and beginning of 21st century, the mixing of **hybrid** introduced varieties with more **regional** varieties peculiar to each country enabled to discover a number of key varieties to be utilized in each country. Each one has different features, such as better quality but lower productivity or viceversa, or higher productivity and resistance to diseases but lower quality etc. In Colombia, the joint efforts of Fedecacao, Corpoica, Casa Luker and Nacional de Chocolate allowed to identify a number of varieties, which are today the most common in the country, and the ones mostly utilised by the farmers sampled in this investigation. These are reported in table 1.

	Material Denomination	Country of Origin
Introduced	ICS 1, ICS 6, ICS 39, ICS 60, ICS 95	Trinidad
	TSH 565, TSH 812	Trinidad
	EET 96	Ecuador
	EET 8	Costa Rica
	CCN51	Ecuador
	IMC 67	Perú
Regional	FLE 2, FLE 3	Colombia
	FSA 12, FSA 13	Colombia
	FEAR 5	Colombia
	FTA 2	Colombia
	FSV 41	Colombia
	FEC 2	Colombia
	CAU 39, CAU 43	Colombia
	SCC 61	Colombia
	LUKER 40	Colombia

Table 1. Most common varieties utilised in Colombia and their origin.