

**COFFEE GROWERS' KNOWLEDGE, ATTITUDE AND PRACTICE
OF STARBUCKS' COFFEE AND FARMERS EQUITY CERTIFICATION
SCHEME IN MBINGA DISTRICT**

SALUM, SALUM

**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF
SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION
OF SOKOINE UNIVERSITY OF AGRICULTURE,
MOROGORO, TANZANIA.**

ABSTRACT

The study was carried out in Mbinga District, Tanzania to assess smallholder coffee growers' knowledge, attitude and practice of Coffee and Farmer Equity (C.A.F.E) Practice certification scheme and associated implementation challenges among farmers in the study area. The study employed a cross-sectional research design. The sample size of 188 respondents obtained by using Slovin's sample size formula was randomly selected and surveyed. A questionnaire, Focus Group Discussions, Key Informant Interview and documentary review were the data collection instruments used to collect data for the study. Descriptive statistic and content analysis were used to analyze quantitative and qualitative data respectively. The study found that the majority of coffee growers were knowledgeable of the scheme, had a favourable attitude towards the scheme and implemented the standards moderately. Moreover, price volatility, the continued incidence of coffee diseases and limited farmers' participation in standard-setting were the main challenges experienced by coffee growers in the implementation of the C.A.F.E Practices scheme. The study recommends that more training and guidance should be provided to farmers; key actors in coffee certification should enhance farmers bargaining power and access to more profitable certified markets, farmers participation in the process of standard-setting should be given priority, coffee service providers in collaboration with agro-inputs dealers should ensure availability of organic coffee inputs and provision of subsidy on personal protective gears used by farmers during agrochemicals application in coffee farms.

DECLARATION

I, SALUM SALUM, do hereby declare to the Senate of the Sokoine University of Agriculture that this dissertation is my original work done within the period of registration and that it has neither been submitted nor being concurrently submitted in any other institution.

.....

SALUM SALUM

(MSc. Student)

.....

Date

The above declaration is confirmed by;

.....

Dr. ATHMAN KYARUZI AHMAD

(Supervisor)

.....

Date

COPYRIGHT

No part of this dissertation may be reproduced, stored in any retrieval system, or transmitted in any form or means without prior written permission of the author or Sokoine University of Agriculture in that behalf.

ACKNOWLEDGEMENTS

In the name of the Almighty God the most merciful and compassionate, I thank you for wonderful blessings, strength, patience and passion during my study period. Exceptionally, I would like to express my gratefulness thanks to my supervisor Dr. Athman Kyaruzi Ahmad. The supervisor you have been with me all the time providing guidance, support, encouragement and constructive advice throughout the development of this work. You are the great man to me and may Almighty God bless you abundantly. I also extend my special thanks to Mr. Bernard J. Mwakisunga, Miss Zahara H. Mkuki, Miss Mwajabu Msuya, Miss Lucy Damas; Mr. Kenneth Mapunda, Mr. Respikius Martin Dr. Siwel Nyamba and Mr. Vituce Kalungwizi for exceptional advice in the entire development of this study. Similarly, I wish to express my sincere thanks to my employer, the Sokoine University of Agriculture for granting me a scholarship and study leave.

Special thanks go to my family, first my lovely mother Nuru Selemani Shomari, my father Salum S. Makangila, my lovely wife Aisha V. Mbena, my children Latifa, Baraka, Nuru, Jasmine, Hamidah and Mustafa for their love and support to me.

Moreover, I am grateful to thank Conrad Nchimbi, Ernest Komba, Aron Komba, Keneth Komba and Method Nchimbi for the delightful cooperation during the data collection period. Also, I exceptionally thank Godfrey Selisi Mosha, Joseph Mapunda, Bakari Sechonge and Mwajabu Kamili for unconditionally supporting during the data collection period. I extend my sincere thanks to all coffee growers and members of KIMULI AMCOS for good cooperation during my study. Finally, I say thank you all who helped me in one way or another during my study but not mentioned; may God bless you all.

DEDICATION

I am exceptionally grateful to dedicate this work to champion of my life, my lovely father the late **Mr. Shabani Salum Makangila**. Thank you, father, you made me who I am today.

TABLE OF CONTENTS

ABSTRACT.....	ii
DECLARATION.....	iii
COPYRIGHT.....	iv
ACKNOWLEDGEMENTS.....	v
DEDICATION.....	vi
TABLE OF CONTENTS.....	vii
LIST OF TABLES.....	x
LIST OF FIGURES.....	xi
LIST OF APPENDICES.....	xii
LIST OF ABBREVIATIONS.....	xiii
CHAPTER ONE.....	1
1.0 INTRODUCTION.....	1
1.1 Background Information.....	1
1.2 Problem Statement.....	4
1.3 Justification of the Study.....	6
1.4 Overall Objective of the Study.....	7
1.4.1 Specific objectives.....	7
1.5 Research Questions.....	7
1.6 Conceptual Framework.....	8
CHAPTER TWO.....	10
2.0 LITERATURE REVIEW.....	10
2.1 Overview	10

2.2	Operational Definitions of Key Concepts.....	10
2.2.1	World prominent coffee certification schemes.....	11
2.2.2	Tanzania coffee industry and coffee certification.....	15
2.3	Coffee Certification Pathways.....	16
2.4	Benefit of Coffee Certifications to Smallholder Coffee Growers.....	18
2.5	Coffee Growers' Knowledge of Coffee Certification Scheme.....	19
2.6	Coffee Growers' Attitude toward Coffee Certification Scheme.....	19
2.7	Coffee Growers' Practice of Coffee Certification Standards.....	20
2.8	Challenges of Coffee Certification to Smallholder Coffee Growers.....	21
2.9	Identified Gap.....	21
CHAPTER THREE.....		23
3.0 RESEARCH METHODOLOGY.....		23
3.1	Overview	23
3.2	Description of the Study Area.....	23
3.3	Research Design.....	25
3.4	Population of the Study.....	26
3.5	Sampling Frame.....	26
3.6	Sampling Procedure and Sample Size.....	26
3.7	Validity and Reliability of the Instrument.....	27
3.8	Data Collection Procedures.....	28
3.9	Data Processing and Analysis.....	30
CHAPTER FOUR.....		31
4.0 RESULTS AND DISCUSSION.....		31
4.1	Overview	31

4.2	Respondent Demographic Characteristics.....	31
4.3	Respondents Knowledge of C.A.F.E Practices Coffee Certification Scheme.....	33
4.4	Respondents' Attitude of C.A.F.E Practices Coffee Certification Scheme.....	39
4.5	Respondents' Levels of Implementation of C.A.F.E Practice Standards.....	45
4.6	Challenges of C.A.F.E Practices Implementation to Coffee Growers.....	50
4.7	Relationship between Respondents' Knowledge, Attitude and overall Implementation of C.A.F.E Practices.....	56
4.7.1	Relation between Farmers' knowledge and Attitude of C.A.F.E Practices Coffee Certification Scheme.....	56
4.7.2	Relationship between Farmers' knowledge of C.A.F.E Practices and Level of Standards Implementation.....	58
4.7.3	Relationship between Farmers' Attitude of C.A.F.E Practices and Implementation of C.A.F.E Practices Standards.....	59
	CHAPTER FIVE.....	62
	5.0 CONCLUSION AND RECOMMENDATIONS.....	62
5.1	Overview	62
5.2	Conclusion.....	62
5.3	Recommendations.....	63
	REFERENCES.....	65
	APPENDICES.....	73

LIST OF TABLES

Table 1:	Respondents Demographic Characteristics.....	32
Table 2:	Respondents 'overall score on knowledge of C.A.F.E Practices Coffee Certification Scheme.....	35
Table 3:	Respondents score on C.A.F.E Practice knowledge statements.....	37
Table 4:	Respondents 'overall score on the Attitude of the C.A.F.E Practices Coffee Certification Scheme.....	41
Table 5:	Respondents score on attitudinal statements.....	43
Table 6:	Level of Implementation of C.A.F.E Practices Standards.....	46
Table 7:	Respondents score on the practice of certification standards.....	48
Table 8:	Challenges encountered by respondents.....	51
Table 9:	Influence of the Respondents' knowledge on the attitude of C.A.F.E Practices Coffee Certification Scheme.....	57
Table 10:	Influence of the Respondents' knowledge on the overall implementation of C.A.F.E Practices Standards.....	59
Table 11:	Influence of the Respondents' attitude on the overall implementation of C.A.F.E Practices Standards.....	60

LIST OF FIGURES

Figure 1: Conceptual framework of the study: Path modelling of knowledge,
attitude and practice of C.A.F.E Practice coffee certification scheme.....8

Figure 2: Map showing the location of the study area.....25

LIST OF APPENDICES

Appendix 1: Questionnaire.....73

Appendix 2: Interview Questions for key informants.....78

Appendix 3: Questions for focus group discussion with farmers.....79

LIST OF ABBREVIATIONS

AMCOS	Agricultural Marketing Cooperative Society
ASDP	Agricultural Sector Development Programme
C.A.F.E	Coffee and Farmer Equity
CBD	Coffee Berry Disease
DCO	District Cooperative Officer
CSP	Coffee Service Provider
4C	Common Code for Coffee Community
FGDs	Focus Group Discussions
GAP	Good Agricultural Practices
NBS	National Bureau of Statistics
NGOs	Non-Governmental Organizations
SAN	Sustainable Agriculture Network
SPSS	Statistical Package for Social Sciences
WAEOs	Ward Agricultural Extension Officers

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Coffee certification schemes emerged in the late 1980s in coffee-growing regions of the world such as Brazil, Vietnam, Columbia, Indonesia and Costa Rica (Ibnu, 2017). Coffee certification is a process through which a certification body confirms that coffee product, process or service complies with specific standards. The Standards specify technical characteristics of coffee product, specific production and processing methods, quality traits and safety issues. Increasingly, they include sustainability and ethical trade specifications relating to environmental management, social aspects and economic welfare (Ponte, 2004).

Coffee certification schemes were introduced to the coffee supply chain by Non-governmental organization (Fair-trade labelling and Rainforest Alliance) and coffee business companies such as Starbucks and Nestle. It was introduced to address sustainable coffee production challenges such as price volatility, high cost of production and unreliable markets (Borrella *et al.*, 2015). Other reasons are well summarized by Grabs *et al.* (2016) and Snider *et al.* (2016). Demand for consumers' food safety, complex nature of coffee value chain, lack of social responsibility, economic accountability and environmental leadership are the key ones. Different coffee certification schemes have been introduced and implemented by coffee growers, processors and exporters (Grabs *et al.*, 2016). They include Fairtrade, Organic certification, Good certified coffee (UTZ), Global Good Agricultural Practices (GAP), Rainforest Alliance/Sustainable Agriculture Network (SAN). Others are Coffee and Farmer Equity (C.A.F.E) Practices, Bird-friendly

certification and Common Code for Coffee Community (4C)/Global coffee platform. Today's coffee certification practice is everywhere in coffee-producing countries. Coffee producers, processors, exporters and roasters want to satisfy consumers by informing them where and how their purchases are originating and how they are produced.

In Tanzania, UTZ was the first coffee certification scheme and was introduced in the year 2003 in Kilimanjaro coffee, Machare coffee and Uru North plantations by two certified coffee exporting companies (Dorman Tanzania Limited and Taylor Winch Tanzania Limited). Later it was introduced to smallholder farmers in 2006 (Lazaro *et al.*, 2008). Compared to uncertified coffee, certified coffee has unique characteristics which include; high quality and is produced in environment-friendly agricultural practices. Also certified coffee access lucrative markets and therefore farmers receive high price and premium.

The Coffee and Farmer Equity Practices coffee certification is a private scheme established by the Starbucks Company since the year 2004. The scheme evaluates, recognize and reward producers of high quality sustainably grown coffee for Starbucks' stores (Starbucks, 2016). It focuses on improving sustainable coffee production through regulating traditionally coffee production and processing methods, open opportunities for better access to lucrative markets and build competitiveness coffee business. The scheme comprises of standards grouped into five categories: environmental leadership, social responsibility, economic accountability, traceability and quality traits which are further described in the following section.

The environmental leadership category comprises of standards that protect water resources in coffee-growing areas, proper soil management, waste management, safe and controlled use of agrochemicals. The standards specifically entail no application of

agrochemicals within 30meters from any permanent water body, keeping buffer zone of 30m adjacent to permanent water bodies, protecting soil erosion by mulching, planting of cover crops and shade tree. Others are the construction of contour lines and/or bench terraces in the farm with slopes more than 20% and zero use of banned pesticides such as pyriminil (copper arsenate) and glamaxone (Paraquat Dimethyl Sulphate).

Social responsibility category touches on smallholder farmers and coffee casual workers' welfare. The standards specifically involve wearing personal protective gears, paying casual workers sectorial minimum wages, working for 8 hours and restriction of child labour. Likewise, in economic accountability category, smallholder farmers are required to keep coffee production and sales records in an exercise book. The required records include cherry or parchment sells receipts, the number of coffee trees, fertilizers and pesticides use and C.A.F.E Practices training attendance. Additionally, traceability category tracks coffee from tree to cup. The standards include no mixing of certified with uncertified coffee and presence processing documents such as tags specifying certified coffee. On the quality category, the standards include coffee safety, taste and quality of the bean.

The main interventions of C.A.F.E Practices to smallholder farmers include capacity building to coffee producers (training and extension services for better coffee farming and processing practices), building strong producers organization, producers support and marketing of coffee (Oya *et al.*, 2017). These four pathways are organized along with four compass directions - sustain certified coffee supply, improve farmers' livelihoods, conserve nature and strengthen certified coffee demand. Apart from coffee marketing, C.A.F.E Practices aims at promoting coffee growers' knowledge and skills related to sustainable coffee production. Therefore, knowledgeable and skilled farmers adopt trained

coffee production best practices in coffee farming which lead to sustainable coffee production (Filippa and Hatab, 2018).

Cognizant of the above and in line with Tanzania government intension to improve peoples' livelihoods through agriculture in general and coffee in particular in Mbinga, C.A.F.E Practices coffee certification to smallholder farmers was introduced in 2010. Credits go to Starbucks in partnership with TechnoServe Tanzania who introduced the scheme as a pilot through a coffee initiative project which phased out in 2012. From 2013, Taylor Winch Tanzania Limited engages more farmers under the umbrella of Agricultural Marketing Cooperatives (AMCOS) and farmers' associations. The AMCOS and associations were used to mobilize farmers to collect coffee as a group to meet the minimum requirement of producing 40tonnes of green coffee for export. Also provide a platform for group training, link farmers with producer support organization and markets connections. Since its inception, approximately 4500 coffee growers, six extension agents and eight farmers' trainers have been engaged in coffee certifications training. The coffee growers have been trained by Starbucks Tanzania farmer support experts and Taylor Winch Tanzania agronomists. They have trained coffee agronomy best practices such as soil erosion control, weed control, fertilizer application, safe use of pesticides, integrated pest and diseases management, shade management, record keeping, occupation health and safety as well as coffee harvesting and processing.

1.2 Problem Statement

There have been efforts taken by coffee stakeholders to introduce the C.A.F.E Practice coffee certification scheme in Mbinga since the year 2010. The efforts were aimed at enabling farmers to produce quality products while enjoying good prices and conserving production resources. However, coffee growers were observed to practice such activities that are not in line with the requirements of C.A.F.E Practices standards. For instance, the

disposal of agrochemicals containers is still not well managed and for the majority of the coffee farms adjacent to permanent water sources, there is no buffer zone kept. Besides many farmers were spotted applying agrochemicals without wearing proper personal protective gears and several coffee farms are generally not well managed (Kagezi *et al.*, 2018). Despite the efforts which have been taken to introduce the C.A.F.E Practices scheme to coffee growers its contribution to improving farmers' coffee certification knowledge and practices from their perspectives have not been documented in the study area. In the literature, there is no consensus among scholars on farmers' knowledge, attitude and practice of coffee certification schemes. Vellema *et al.* (2015) reported that training associated with coffee certification resulted in improvements in agronomic practices to smallholder farmers in South America. However, Ruben and Heras (2012) maintained that smallholder farmers in Ethiopia had poor knowledge of coffee certification schemes due to limited capacity building. Furthermore, a study by Ibanez and Blackman (2016) in Columbia revealed that smallholder farmers perceived that the effort and expenses they incurred in coffee certification processes were higher than what they gain from it. Nevertheless, Ruben and Hoebink (2014) found that smallholder coffee farmers in Uganda felt that certified coffee secured high price compared to uncertified coffee.

Therefore, this study based on knowledge, attitude and practice (KAP) model (Schwartz, 1976) aimed to assess coffee growers' knowledge, attitude, the practice of C.A.F.E Practices and the challenges encountered by coffee growers when implementing the scheme. KAP model is a quantitative method (predefined questions formatted in standardized questionnaires) that provides access to quantitative and qualitative information. It is a typical model useful for studying a specific population on what is known, believed and done concerning a particular topic. In most KAP model data are

collected by questionnaire and analyzed quantitatively or qualitatively depending on the objectives and design of the study. Furthermore, KAP model has also been used to identify knowledge gaps, cultural beliefs or behavioural patterns and barriers of programme delivery.

1.3 Justification of the Study

About two-third of coffee produced in Tanzania are exported to countries with high and medium interest on certified coffee such as the United States of America, United Kingdom and Japan (Kimariyo 2017). Similarly, the global market trend shows that shortly uncertified coffee will experience a declining market due to increased demands for sustainably grown coffee. However, coffee certification in Tanzania is voluntary and few (around 30%) of farmers are certified to different schemes while large number remains uncertified (Mtaki, 2016).

Therefore, this study provides knowledge which informs the policy-makers status of coffee growers' knowledge, attitude, the practice of certification standards and associated implementation challenges. The policy-maker can take necessary action where possible to intervene or promote farmers' participation in coffee certification in terms of rules, regulations or bylaws. This is important to meet coffee market demand and improving the income of four hundred thousand farmers who depend on coffee as a cash crop (Kimariyo, 2017).

Moreover, the findings of the study ascertain useful information to extension activities in the study area. The information will be useful in designing and delivery of appropriate extension programs responsive to farmers' needs. Additionally, findings of the study

provide useful information to Starbucks to improve the scheme by increasing farmers' participation in standard-setting. On top of that, the study was in line with national agricultural policy 2013, Tanzania Development Vision 2025 (TDV), Agricultural Sector Development Programme (ASDP) II, Tanzania Coffee Industry Development Strategy (TCIDS) 2011-2021 and United Nation Sustainable Development Goals (UN-SDG) - number one (SDG1) poverty alleviation, (SDG6) clean water maintenance, (SDG8) economic development, (SDG13) combating climate change and (SDG15) conservation of life on land.

1.4 Overall Objective of the Study

The overall objective of the study was to assess smallholder coffee growers' knowledge, attitude, the the practice of C.A.F.E Practices coffee certification scheme and the associated implementation challenges in the study area.

1.4.1 Specific objectives

The specific objectives of the study were;

- i. To determine smallholder coffee growers' knowledge of C.A.F.E Practices coffee certification scheme.
- ii. To examine the attitude of smallholder coffee growers toward C.A.F.E Practices coffee certification scheme to enhance sustainable coffee production.
- iii. To evaluate smallholder coffee growers' level of implementation of C.A.F.E Practices certification standards in the study area.
- iv. To explore the challenges encountered by smallholder coffee growers in the implementation of C.A.F.E Practices coffee certification.

1.5 Research Questions

- i. To what extent coffee growers are knowledgeable of C.A.F.E Practices coffee certification scheme?
- ii. What is the attitude of coffee growers toward C.A.F.E Practices coffee certification scheme to enhance sustainable coffee production?
- iii. To what extent coffee growers implemented C.A.F.E Practices coffee certification standards in coffee production activities?
- iv. What are the challenges faced by smallholder coffee farmers in the implementation of C.A.F.E Practices coffee certification schemes?

1.6 Conceptual Framework

The conceptual framework underlying this study was based on the analysis of coffee certification schemes to smallholder farmers' level. The Starbucks C.A.F.E Practices coffee certification scheme was established after the global coffee crisis (Ponte, 2004). It was thought that the scheme would sustain coffee supply and improve producers' quality of life. However, the success and sustainability of the schemes depend on the number of different components. These include farmers understanding of the certification standards, certification structures, environmental and socio-economic incentive (Grabs *et al.*, 2016). Therefore, the introduction of the scheme generated a need for new knowledge and advisory services to help farmers change their coffee production practices to comply with certification requirements (Snider *et al.*, 2016). Conceptually knowledge is influenced by awareness, but knowledge influences attitude and practice. Nevertheless, the practice is influenced by both knowledge and attitude. In general, there were some challenges which affected the process of accessing information and developing knowledge as well as putting it in practice developed knowledge and skills.

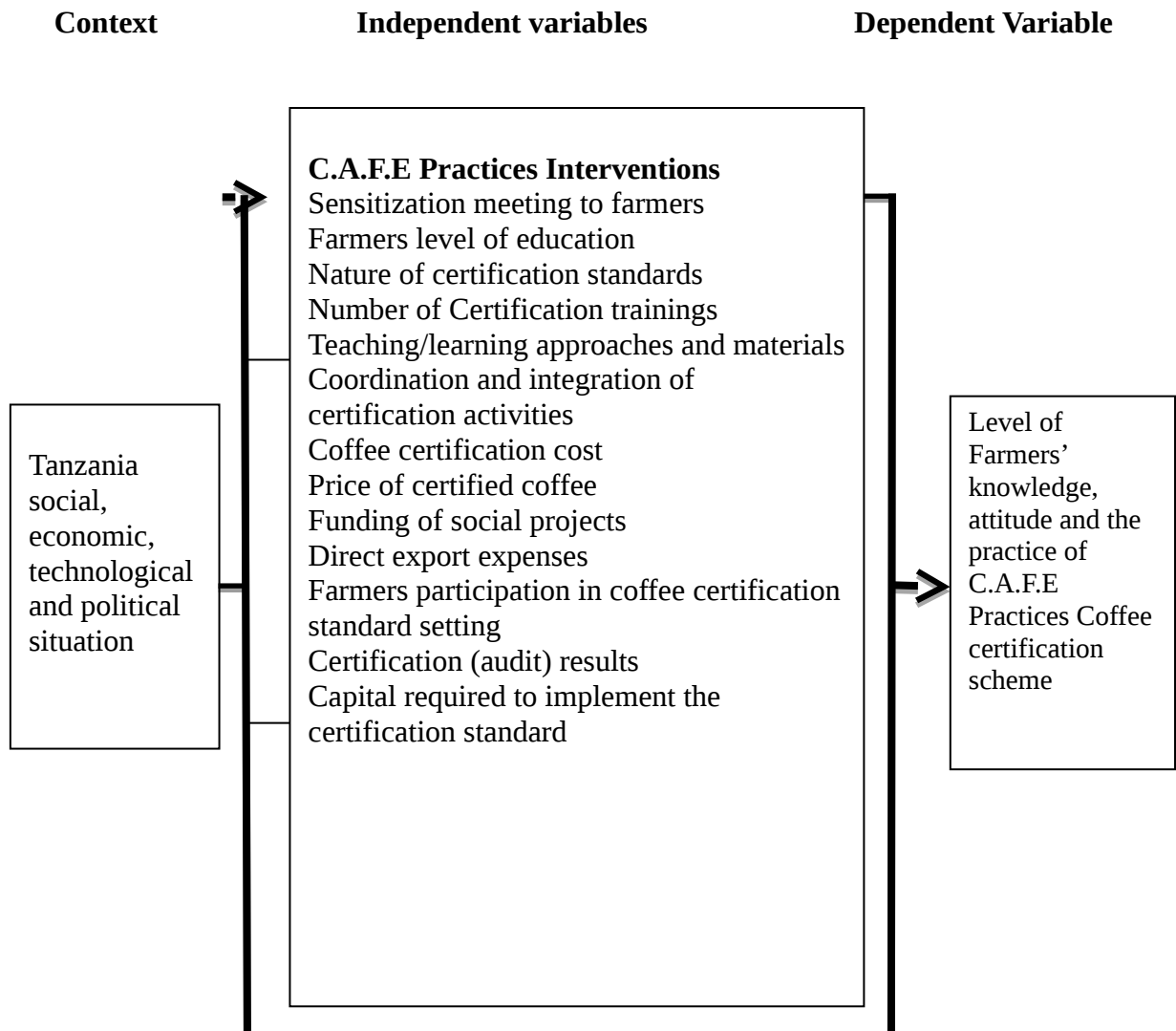


Figure 1: Conceptual framework of the study: Path modelling of C.A.F.E Practice coffee certification scheme. Adopted and modified from Schwartz (1976)

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Overview

This chapter recaps literature related to coffee certification scheme as a mechanism to promote sustainable coffee production. The attention was made on the literature related to coffee certification concepts, Tanzania coffee industry and coffee certifications, world prominent coffee certification schemes, the benefit of coffee certification scheme to coffee growers, coffee growers' knowledge of coffee certifications, the attitude of coffee growers towards coffee certification schemes, the practice of coffee certification standards, challenges of the coffee certification scheme. The chapter also presents the identified gap of the study.

2.2 Operational Definitions of Key Concepts

- i. **Certification** – Raynolds (2009) defined certification as a way of communicating information about the quality, traceability, social, environmental and financial conditions surrounding the production of goods and services.
- ii. **Coffee certification standards** - guidelines structured to verify that produced coffee meet environmental, social and economic performance at each stage of the supply chain - from the tree to the point of shipment. Coffee certification standards generate a need for new knowledge and advisory services to help farmers comply with certification requirements (Sneider *et al.*, 2016).
- iii. **Sustainable coffee certifications** – refers to coffee certification processes which take into account the development of human capital, the economic viability of

farmers, environmental conservation, social responsibility and consumer demands (Giovannuccia and Ponte, 2005).

- iv. **Certified coffee farmer** - defined as a farmer who participated in the implementation of the certification scheme as an individual farmer or through their collective organizations such as agricultural marketing cooperatives, farmers' business group, farmers' associations or networks.
- v. **Smallholder farmer** - Starbucks (2016), defined smallholder farmer as a farmer with coffee farm size below 12 hectares and deliver coffee as an individual to the central pulping unit (CPU) of farmers' organization such as agricultural marketing cooperative, farmers' business groups, associations or networks.
- vi. **Awareness** - Is a state of being conscious or well informed of something or situation (Librahim, 1995).
- vii. **Knowledge** - is the understanding of the subject, facts, information or skills acquired through experience or training theoretically or practically (Daniel, 2013).
- viii. **Attitude** - is the way something received/regarded, judged, understood, or interpreted by the people (Librahim, 1995).
- ix. **Practice** - is the actual application or use of information or innovation/idea or method as opposed to theory (Librahim, 1995).

2.2.1 World prominent coffee certification schemes

Increased awareness among coffee consumers on the impact of their consumption habits on the human and environment in coffee-producing countries has made the world to move towards sustainable coffee production (Muriithi, 2016). For this reason, the implementation of various certification programs in coffee-producing regions had started since the 1960s (Muriithi, 2016). The most commonly known are Good Certified Coffee (UTZ), Fairtrade Labeling Organization (FLO), Rainforest Alliance/Sustainable

Agriculture Network (RA/SAN), Starbucks Coffee and Farmer Equity (C.A.F.E) Practices, Common Code for Coffee Community (4C), Global Good Agricultural Practices (GAP), Organic certification and Bird-friendly certification. These coffee certification schemes are further described in the following sections.

Good certified coffee (UTZ) certification scheme

The UTZ certification is the largest certification program in coffee and cocoa (UTZ, 2017). It aims at making sustainable farming norms by encouraging farmers to implement good agricultural practices and manage their farms profitably with respect for people and planet (UTZ, 2017). The standard stands for ‘sustainable farming and better opportunities for farmers, their families and our planet’. UTZ standards require efficient use of resources, development of record-keeping, managing harvest risks, the right ways of treating crops and better working conditions.

The Fairtrade coffee certification scheme

The FLO coffee certification scheme is the most widely recognized ethical label in the global (Grabs *et al.*, 2016). Fairtrade is a trading partnership based on dialogue, transparency and respect that seeks greater equity in international trade (FLO, 2013). It supports a better life for farming families in the developing countries by guaranteeing farmers a minimum price above the world market price, the fixed premium fund, linking them directly with exporters and creating long-term environmental stewardship. Similarly, to that, Fairtrade standards focus on workers’ rights of association, rights to safe and healthy work conditions, freedom from discrimination and prohibition of child and forced labour. Others include minimum and safe use of agrochemicals, proper management of waste, maintenance of soil fertility and water resources and no use of genetically modified organism (Negash, 2016).

Rainforest Alliance/Sustainable Agricultural Network

The RAN/SAN coffee certification integrates biodiversity conservation, community development and implementation of effective farm management systems to improve the livelihood of farmers and their families in coffee-growing regions (Rainforest Alliance, 2016). The RA/SAN composed of 16 critical criteria which all need to be met to obtain the certification. The criteria aimed at eliminating unacceptable practices regarding social and environmental issues. These include avoidance of the use of child labour, protection of permanent water sources and no hunting of endangered animal species.

Common Code for Coffee Community/Global Platform

The 4C coffee certification scheme is an open and inclusive membership involving coffee producers, traders, industries and civil societies. Members work jointly towards improving economic, social and environmental conditions through more sustainable and transparent practices for all who make a living in the coffee sector (Negash, 2016). The 4C Association has the goal to ‘unite all relevant coffee stakeholders in working towards the improvement of the economic, social and environmental conditions of coffee production and processing’ (4C Association, 2015). Furthermore, the 4C Association standard has set out 28 social, environmental and economic principles for the sustainable production, processing and trading of green coffee. These include freedom of bargaining, conservation of biodiversity, access to market data and prices, traceability and transparent pricing mechanisms.

Coffee and Farmer Equity Practices

The Coffee and Farmer Equity (C.A.F.E) Practices coffee certification scheme started in 2001. Its goal was to establish sustainable supplies of high-quality coffee and to inform the consumer where and how the coffee produced, processed and marketed (Starbucks, 2016). The standards include a broad set of social, economic, environmental and quality guidelines developed by Starbucks in collaboration with Conservation International. The standards promote coffee production practices that protect biodiversity, maintains healthy ecosystems and supports economic and social development in coffee production supply chain (Conservation International, 2012).

To support its goal, Starbucks provides technical support through farmer support centers established in all countries where the coffee supply chain implements C.A.F.E Practices scheme. The certification process involves supply chain identification, engagement, training and auditing (Starbucks, 2016). The Coffee Service Provider (CSP) involved in supply chain identification, engagement and training. The auditing is done by separate private auditing firm approved by Scientific Certification Systems (SCS) Global while Starbucks verify/certify the supply chain. Concurrently, Starbucks expertise collaborates with coffee service provider agronomist to deliver C.A.F.E Practices guidelines training to coffee producers and processors. Starbucks, (2016) pointed out that the guidelines help farmers grow coffee in a better way for both human and the planet.

It can be concluded that all certification standards share common principles but vary on the emphasis put on the different principles. In general, all certification standards require a producer to fulfil various criteria relating to traceability, social, environmental and economic aspects (Lentijo and Hostetler, 2017). Additionally, they all provide capacity-building and market linkages to coffee growers. The schemes furthermore use the third party accredited auditing certification bodies to ascertain standards compliance. However,

apart from those similarities, C.A.F. E Practices differ from others as it emphasizes aspects related to coffee traceability, quality traits, environment and economic accountability.

2.2.2 Tanzania coffee industry and coffee certification

Coffee production in Tanzania is a significant aspect of the country's economy. It is Tanzania's largest export crop and counts for about 5 % of total exports to a value of 100 USA Dollars. The sub-sector employs about 2.4 million people including 400 000 smallholder coffee growers (Kimariyo, 2017). On average the annual coffee production is 30 000-50 000 metric tons of which approximately 70% is Arabica and 30% is Robusta. Despite owning small coffee farms (mostly less than 10acres), smallholder coffee growers are the backbone of coffee production in Tanzania. On average they produce more than 80% of the total country's coffee production. The smallholder coffee farmers are organized into various form of farmers' organization. These include cooperatives, farmers' groups, networks and associations. The farmers are organized in groups so that they collect and sale their coffee as a group in auctions or direct export. The main growing regions of Arabica coffee are Kilimanjaro, Arusha, Mbeya, Ruvuma, Njombe, Songwe, Kigoma, Morogoro and Mara.

Parallel to that, almost 25% of Tanzania coffee is exported to countries with high interest in certified coffee such as United States of America, United Kingdom, Switzerland and Germany. Similarly, on average 45% are exported to countries with medium interest to certified coffee which include France, Belgium, Italy, Spain and Scandinavia while 30% are exported to countries with low or no interest on certified coffee in the Southern Europe, China and Japan (Mtaki, 2016). Currently, the effort to build a more competitive and sustainable coffee industry in Tanzania is directed towards sustainable coffee production by promoting large volume of coffee to be certified to various certifications schemes such as FLO, RA/SAN, C.A.F.E Practices, UTZ and 4C.

2.3 Coffee Certification Pathways

In the effort to realize sustainable coffee production, coffee certification schemes adopted four primary pathways (Bray and Neilson, 2017). The pathways include human capital development, social capital development, financial capital and physical capital development. The pathways show the actions that help coffee supply chain advance to sustainable coffee production outcomes. The four common pathways are organized along with four compass directions - sustaining certified coffee supply, improving farmers' livelihoods, conserving nature and strengthening certified coffee demand. Although each pathway has a specific type of interventions, they are all interconnected leading toward the same goal - achieving a sustainable coffee production to smallholder farmers as describe in the following sub-sections below.

2.3.1 Human capital development pathway

The human capital development pathway is focusing on smallholder farmers' capacity building on coffee agronomic practices, supporting farmers' social project such as education and health through the allocation of premium fund for certified coffee and improving farmers' income (Bray and Neilson, 2017). Snider *et al.* (2016) revealed that advisory services designed in coffee certification provide an opportunity for coffee growers to learn best practices related to coffee farming, processing and trading. The core activities in this pathway include, training needs assessment, the establishment of demo plots, development and provision of training materials, training the trainer, training farmers' coffee certification standards, monitoring adoption of the standards and certification/verification of standards performance. The knowledgeable coffee producers have a direct impact on the adoption of sustainable farming practices, coffee productivity,

better financial management, improved environment conservation and enhanced occupation health and safety (Bray and Neilson, 2017).

2.3.2 Social capital development Pathway

Similarly, social capital pathway strengthens producer organizations. It enhances networking opportunities for farmers thereby facilitate access to services from public and/or private organizations and improve negotiating capacity (Bray and Neilson, 2017). Vellema *et al.* (2015) revealed that social capital generated through coffee certification facilitates active farmers' participation, enhance stable social relations and transparency. Core activities in this pathway include training of producer organization leaders on leadership and negotiation skills, business record-keeping and group dynamics skills. Therefore, a social capital pathway leads to farmers' empowerment and positive functioning of the producer organization (Ruben and Hoebink, 2014).

2.3.3 Physical capital development pathway

In addition to that, physical capital pathway involves the direct provision of inputs and equipment such as personal protective gears to coffee growers, investment of premium fund on infrastructure such as roads, bridges and coffee processing facilities (Chiputwa *et al.*, 2015). Also, it involves relationship establishment with input distributors, support negotiation of bulk inputs with distributors, communicate input options to farmers and advocacy of a supportive policy environment (Klaus, 2015). The author revealed that the positive outcomes in this pathway include increased adoption of best practices and improved farm performance (productivity, quality and cost savings).

2.3.4 Financial capital development pathway

On top of that, financial capital development pathway involves the establishment of coffee pre-financing, building strong and long term relationships with buyers, product

communication to buyers, markets connections and price negotiation. Some studies including Ruben and Heras (2012) and Rijsbergen *et al.* (2016) found an increase in household revenue as a result of financial capital development in coffee certification. The authors add that the increased household revenue was due to higher farm-gate prices, reduced vulnerability to price fluctuations, strong and long term relationships with buyers. Conclusively, the reviewed literature revealed that coffee certification pathways had more positive impacts on smallholder coffee growers' human, social, physical and financial capital development than negative impacts.

2.4 Benefit of Coffee Certifications to Smallholder Coffee Growers

There has been extensive debate on the benefits of coffee certification to the producers due to different expectations. Some studies on coffee certifications tend to report mixed findings of its results. Nguyen and Sarker (2018) reported that certified coffee from developing countries secures markets in countries with high interest on a certified product such as United States of America, United Kingdom, Switzerland and Germany. In addition to that, a study done by Vanderhaegen *et al.* (2018) revealed that coffee certification improves production and processing methods and access to new lucrative markets to smallholder farmers.

On the other hand, Panhuysen and Pierrot (2018) reported that coffee certification limit smallholder farmers scope of decision making, impose high transaction costs on growers and squeeze out smallholders' farmers who are unable to comply with certification standards. Concurrently, Chiputwa *et al.* (2015) reported that certified supply chains were associated with unreliable or delayed payments. From the cited literature, it was vivid that the studies on benefits of coffee certification to smallholder farmers were not conclusive

in coffee-growing areas including Mbinga context in Tanzania. Other perspectives that social, cultural and economic conditions under which participating farmers operate may influence the levels of benefits and adoption of practices, Therefore, the study was aimed at enriching the debate by assessing coffee growers' knowledge, perception, practices and challenges of C.A.F.E Practices as a mechanism to promote sustainable coffee production.

2.5 Coffee Growers' Knowledge of Coffee Certification Scheme

Coffee certification Standards both voluntary and mandatory generate a need for new or adapted knowledge and services to help farmers comply with certification requirements. Some of the studies performed to date such as of Vellema *et al.* (2015), Bose *et al.* (2016) and Filippa and Hatab (2018) show that adoption of coffee certification schemes improved farmers knowledge regarding coffee production and processing methods. Bray and Neilson (2017), exposed that, the quality, relevance, and effectiveness of knowledge received by coffee growers was heavily influenced by the management capacity of producer organizations and other supporting structures. On the other hand, a study was done by Ibnu (2017) in Indonesia revealed that weak planning and limited resources for training farmers resulted in poor smallholder farmer's knowledge of coffee sustainability. Based on the cited scholars, this study aimed at assessing to what extent C.A.F.E Practices coffee certification scheme empowered smallholder farmers in terms of knowledge and skills in implementing the scheme in the study area.

2.6 Coffee Growers' Attitude toward Coffee Certification Scheme

Evidence from studies indicated that smallholder farmers' attitude toward coffee certification is shaped by many factors. These are the context, benefit and level of compliance with certification standards (Elliott, 2018; Quan *et al.*, 2019). Farmer's

attitude is significantly important as it influences their participation in coffee certification or not (Bravo *et al.*, 2012; Conservation International, 2012). For example, in Costa Rica, coffee certification schemes were perceived positively by pro-active attitude and risk-taking farmers (Sneider *et al.*, 2016). Likewise, Conservation International (2012) found that a high degree of awareness and understanding of C.A.F.E Practices coffee certification benefits made smallholder farmers perceive it positively. Therefore, understanding of farmers' attitude towards C.A.F.E practices coffee certification scheme was an important factor shaping their commitment to the scheme.

2.7 Coffee Growers' Practice of Coffee Certification Standards

Several studies use the phrase 'practice' to describe the implementation of theoretically developed innovation into actual situations. Some of the studies including Oya *et al.* (2017) and Bravo *et al.* (2016) reported that smallholder farmers' overall implementation of coffee certification standards depends on the number of factors. These include clear purpose, content/standards, training approach to farmers and emphasis on applying theory to practice. Others include alignment with existing knowledge of the farmers and its affordability. According to Snider *et al.* (2016), the factors are market incentives for a certified product, the quality of the advisory services, the multiple objectives, resources and attitude regarding sustainable coffee production.

However, in practice, the outcomes of the overall implementation of the standards are contested. For instance, Kuit and Waarts (2016) found that in Uganda farmers received more coffee certification training and appreciate it, but few changes in practices or results were detected. On top of that, Elder *et al.* (2013) pointed out that, despite cooperative members' access to advisory services, differences between the agricultural practices of certified and uncertified farms may be small. Nevertheless, Kraus (2015) revealed that

effective coffee certification training was associated with the adoption of soil conservation practices in coffee farms in the Tarrazú region, Costa Rica.

Additionally, Elliott (2018) also found that smallholder coffee producers seem to adopt and maintain practices that either improve profitability such as reducing input costs through more efficient fertilizer use or have clear health benefits, such as water and waste management.

2.8 Challenges of Coffee Certification to Smallholder Coffee Growers

Elliott (2018) pointed out that, while sustainable coffee certification has seen growing rapidly, there are challenges experienced from several angles. The most cited are high costs and limited perceived benefits to farmers. Further, explained that there is evidence that certification improves prices for farmers and can increase income from coffee, but, for a variety of reasons, these benefits may not lead to increases in overall net income of the farmer. On top of that, Wahyudi *et al.* (2020) revealed that development of sustainable coffee production through coffee certifications faces many challenges such as coffee pests, coffee price fluctuation in the world markets, product quality and the limited capacity of coffee farmers to implement certification standards. Furthermore, Muriithi (2016) indicated that coffee certification being global, its standards are universal as well but smallholder farmers are claiming some of the standards are irrelevant. Thus, while coffee certification schemes grow and become more popular, there are also new challenges associated with its implementation. In this understanding, to improve the implementation of C.A.F.E Practices in the study area it is important to identify the challenges experienced by smallholder coffee growers.

2.9 Identified Gap

The literature revealed that coffee certification schemes have inconclusive outcomes to smallholder coffee growers' side. The outcomes tend to depend on coffee growers' context, expectations, performance and facilitation conditions (Grabs *et al.*, 2016). Besides that, coffee certification trend grows worldwide as many coffee producers join various schemes; this is because major coffee roasting companies such as Nestlé, Starbucks, Philip Morris and Sara Lee are increasingly interested in buying sustainably produced coffee. However, the literature does not explicitly demonstrate how farmers' knowledge, attitude and practice of certification standards link to each other in various circumstances and to what extent affect the implementation of the coffee certification scheme. Therefore, the current study attempted to close this gap by studying smallholder coffee growers' knowledge, attitude and the practices of C.A.F.E Practices coffee certification scheme and associated implementation challenges among farmers in the study area and establish their relationship.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Overview

This chapter describes the research methodology employed in the study. The chapter is divided into eight sections. The sections include; description of the study area, research design, population of the study, sampling frame, sampling procedure and sample size, data collection, data analysis.

3.2 Description of the Study Area

This study was conducted in Mbinga District in Ruvuma region (Fig.2). The region has five Districts which include Mbinga, Nyasa, Namtumbo, Tunduru and Songea. Mbinga District is located at latitude 10°50'00.0"S and longitude 34°50'60.0"E with a total area of 4,840km². The district is bordered with Namtumbo in East, Nyasa in West, Songea in the North and Nyasa again in the South. According to NBS census report 2012, the District has a population of 353 683 people whereby 172,402 are males and 181,281 females. The District has a population density of 73.08/km². Administratively, the District consists of five divisions, 34 wards and 170 villages. The livelihoods of the majority depend on crop production, livestock keeping, mining and small to medium scale business (Mbinga District Profile Report, 2017). The District experience uni-modal heavy rainfall from November to May with an average of 1622mm per year. The rainfall is very essential for the onset of coffee flowering on November while temperature which ranges from 20°C to 29°C catalyze coffee berry maturity and ripening from March to August.

Agriculture is the main income-generating activity for most of the people, so a large area is mostly dominated by agricultural fields. Agricultural activities are done in highland, midland and lowland zones. Arabica coffee is the main cash crop grown in the highland zone of the district. Other crops include maize, cassava, beans, wheat, banana, timber trees, vegetables, tomatoes, avocado, mango trees and macadamia. The Arabica coffee is grown by smallholder farmers in a deep, well-drained and fertile soil at an altitude not less than 900m above sea level. The altitude above 900m enhances the production of coffee which has a better taste. The annual coffee production ranges from 8000 to 12 000 tones (Kimariyo, 2017). In Mbinga district, coffee business involves smallholder farmers who operate in collectives as farmers' business groups, cooperatives, networks and associations. Therefore, the District was purposively selected because it is the only one in Tanzania where the C.A.F.E Practices coffee certification scheme implemented to a large extent compared to other Districts and has high coffee production potential.

In Mbinga Districts coffee certifications movement was started since the year 2006 (Lazaro *et al.*, 2008). Tutunze Kahawa Company Limited, TechnoServe Tanzania and Taylor Winch Tanzania Limited were the key actors introduced the movement. A decade later more coffee companies such as Coffee Management Specialist (SMS), Dan and Associates Enterprise (DAE) Limited and SUCA sustainability are implementing various coffee certification projects to smallholder coffee growers. For that reason, coffee certification is common aspects to smallholder coffee farmers in Mbinga Districts. However, Starbucks C.A.F.E Practice is the most popular scheme among others. Given that, it was important to understand the present status of coffee growers' knowledge, attitude, the practice of C.A.F.E Practices and the associated implementation challenges.



Figure 2: Map showing the location of the study area. Source: Google map, 2020

3.3 Research Design

The Cross-sectional design was used in this study. The design allowed data collection at

comprehensive survey technique. Furthermore, the study adopted
it was aimed at describing population which differ in



variables of interest but share some common socioeconomic characteristics (Cherry, 2019).

3.4 Population of the Study

The study population consisted of smallholder coffee growers' members of KIMULI Agricultural Marketing Cooperative Society who participated in the implementation of the

C.A.F.E certification scheme in Mbinga District.

The list of 356 C.A.F.E practices certified coffee growers under KIMULI AMCOS was used as a sampling frame to draw a sample of the study. The KIMULI AMCOS was purposively selected based on the fact that it is the only one which implements C.A.F.E Practices coffee certification up to date since 2013.

3.6 Sampling Procedure and Sample Size

Simple random sampling (SRS) procedure was used to select respondents from KIMULI AMCOS using a table of random number techniques. Kothari (2004) revealed that a simple random sampling procedure provides an equal chance for all study population members being selected in the study. The sample size of 188 respondents was randomly selected from a list of 356 certified smallholder farmers who are members of KIMULI AMCOS.

The Slovin's (1960) sampling formula was used to determine sample size.

$$n = \frac{N}{1+N(e)^2}$$

Where n = sample size, N = Population size and e = allowed error which is 5%.

3.7 Validity and Reliability of the Instrument

3.7.1 Validity and reliability of the Questionnaire

To ensure validity and reliability of the tool, the questionnaire was reviewed by the supervisor and three members of Sokoine University of Agriculture (SUA) academic staffs at the Department of Agricultural Extension and Community Development (DAECD). The comments received include proper phrasing and consistency of questions. The comments from them were incorporated.

In addition to that, the questionnaire was pre-tested to nineteen (19) coffee growers who were the member of the Association of Mbinga Premium Coffee Growers (AMPCG) who was also implemented C.A.F.E Practices coffee certification scheme from 2013 to 2017. After pre-testing, some amendments were made on the questionnaire to incorporate the changes. The amendments' made include restating all knowledge statements in a simple and understandable language and inclusion of negatively stated attitudinal statements.

3.7.2 Validity and reliability of Focus group discussion and Key informant interview

To ensure validity and reliability of Focus Group Discussions (FGDs) the study adopted the following processes; setting of guiding questions, three groups each consist of six members (3women and 3men) were composed, a note-taker/recorder and timekeeper was selected, identified venues were the AMCOS village offices, the time agreed per FGD was three hours and researcher facilitated the discussions.

Furthermore, the key informant interview was capitalized by setting the guiding questions, involved note-taking and recording of oral responses, conducted for one hour at the interviewee office and researcher facilitated the interview.

3.8 Data Collection Procedures

Data were collected through questionnaires, Focused Group Discussions and Key Informant Interview. The collected data include respondents' social demographic characteristics, knowledge and attitude of C.A.F.E Practices, implementation of C.A.F.E Practices standards, challenges encountered by coffee growers in the implementation of C.A.F.E Practices and suggested solutions for the challenges. Primary quantitative data were collected by using a questionnaire. The researcher assisted by two assistants collected data from individual respondents at their home places.

3.8.1 Questionnaire

A structured questionnaire was used to collect both quantitative and qualitative primary data of this study (Appendix 1). The questionnaire consisted of closed-ended and open-ended questions. The close-ended question items were used to tap respondents' knowledge, attitude and implementation of C.A.F.E Practices standards. In addition to that, open-ended questions were employed to explore the challenges of C.A.F.E Practices and suggested solutions.

The questionnaire was organized into five sections 'A'; 'B', 'C', 'D' and 'E'. The section 'A' embraced of questions that explored respondent social demographic data such as sex, level of education and farm size. These social demographic data provide evidence that data were collected from the right respondents (Dobronte, 2013).

Furthermore, other sections as mentioned above was comprised of statements that captured coffee growers' knowledge, attitude, the practice of certification standards and the challenges experienced in the implementation of the scheme.

3.8.2 Focus Group Discussions

Focus Group Discussions (FGD) were conducted in three villages (Utiri, Kitanda and Mahande) to correct qualitative primary data. The guiding questions (Appendix 2) were used to explore further information related to the C.A.F.E Practices coffee certification scheme and the responses were documented.

3.8.3 Key Informant Interview

Key Informant Interviews (KII) was used to collect secondary qualitative data from six key informants purposively selected from coffee certification value chain. The key informants include two KIMULI AMCOS leaders, Taylor Winch Tanzania Mbinga field officer, Utiri ward agricultural extension officer, Tanzania Coffee Board Mbinga zone manager and Mbinga District Cooperative Officer (DCO). The guiding questions (appendix 3) were used to seek further clarification related to implementation of the C.A.F.E Practices coffee certification scheme.

3.8.4 Documentary review

Documents review was conducted to collect secondary quantitative data from KIMULI AMCOS office, Tanzania Coffee Board Mbinga zone office, Taylor Winch Tanzania Mbinga office and Mbinga District cooperative office. Documents related to coffee certification such as training program, training attendance, farmers ledger books, certified coffee selling contracts and coffee certification certificates were reviewed and important information was documented and reported.

Therefore, by using abovementioned instruments, data were collected from January 27 to February 12, 2020. The respondents willingly participated in the study and were visited by the researcher and enumerators at their homes. The FGDs, KII and documentary review were conducted in the identified places.

3.9 Data Processing and Analysis

Data obtained from the respondents were prearranged, coded and entered in the computer. The Statistical Package for Social Sciences (SPSS) version 20 was used to analyze quantitative data which produce descriptive statistics (Ali and Bhaskar, 2016). The descriptive statistics consisted of frequencies and percentages which then used to report the study findings.

The qualitative data were analyzed by using content analysis techniques whereby emerged themes from FGDs and KII were identified, described and reported. The content analysis involved transcription, translation of the content and coding theme development. The first step in the theme development process involved listing and categorization of different types of information. Subsequently, the information listed was reviewed to notice its applicability and relationship to the study. Then the relevant responses were analyzed into various themes. Finally, the developed themes were reported as the study findings.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Overview

This chapter presents and discusses the results of the study. The chapter is organized into five sections. The first section describes respondent information, followed by a section of respondents' knowledge of C.A.F.E Practices and respondents' attitude of C.A.F.E Practices. Other sections are the practice of certification standards and the challenges experienced by the respondent in the implementation of the C.A.F.E Practices coffee certification scheme.

4.2 Respondent Demographic Characteristics

Study findings indicated that of all 188 respondents, 37(19.7%) were women and 151 (80.3%) were men (Table 1). Traditionally in the study area, cash crops are dominated by men. The dominance of men was also demonstrated by membership in KIMULI AMOCS where the majority of members 75% were men. The current study findings resonate well with Bayisenge *et al.* (2019) study which found that in Rwanda women participation in coffee production was very minimal because most of the women informed by traditions and cultural norms perceived that cash crops are for men. This implies that despite efforts taken to attract women in economic activities including coffee certification, few have managed. However, in countries with a high level of mechanization such as Brazil and Vietnam women involvement in coffee certification activities is high (International Coffee Organization, 20218).

In respect to respondents' age, of all respondents, 75 (39.9%) were between 18 and 40years, 88 (46.8%) were between 40 and 60years and 25 (13.3%) were above 61years. The study findings imply that 87% of farmers were in their active age (18-60years). This is important as coffee certification is an energy-demanding activity. Therefore, those involved were physically energetic and able to supply the required labour. The study finding is in line with Filippa and Hatab (2018) who found that 91% of coffee growers who participated in Fairtrade coffee certification in Kagera, Tanzania were aged between 15 and 60years.

Table 1: Respondents Demographic Characteristics (N=188)

Variable	Frequency	Per cent
Sex		
Women	37	19.7
Men	151	80.3
Total	188	100
Age in year		
18-39	75	39.9
40-60	88	46.8
>61	25	13.3
Total	188	100
Education level		
None	3	1.6
Primary	163	86.7
Secondary	20	10.6
Post-secondary	2	1.1
Total	188	100
Farm size (acre)		
Below 3	105	55.9
3-6	74	39.4
>7	9	2.8
Total	188	100
Number of coffee trees		
<1000	52	27.7
1000 – 3000	106	56.4
>3001	30	15.9
Total	188	100
The coffee main source of income		
Yes	157	83.5
No	31	16.5
Total	188	100

On

educational attainment, study findings showed that majority of respondents (86.7%) had completed primary school, followed by 11% who completed secondary education, 1.1% had post-secondary education and only 2% of the respondents had no formal education (Table 1). This implies that the majority of respondents were able to follow training and instructions as they could read and write. This finding is in agreement with Bray and Neilson (2017) who found the majority of farmers in coffee-growing areas were educated. Education appears to be a key factor determining the likelihood of becoming involved in

certification programs in the first instance and the capacity to benefit from certification. This is because they can read and understand guidelines associated with certification schemes and more importantly the requirements of record keeping.

With regards to the size of coffee farms, the study findings indicated that the average farm size was 3acres with 2094 mean number of coffee. The present finding agrees with Kirumba (2010) who found that farmers in the Mount Kenya region had the average farm size of 2.5acres and a mean of 2000 coffee trees in total. Furthermore, study findings indicated that, although respondents own small farm sizes with few coffee trees but coffee production still the main source of income to 83.5% of farmers (Table 1). However, farm size was not one of the criteria for involvement in the C.A.F.E Practices coffee certification scheme. This is because farmers were certified as a group under KIMULI AMCOS. According to Hidayat *et al.* (2017) group certification as a means to increase smallholder farmers' participation through economies of scale was the most common practice.

4.3 Respondents Knowledge of C.A.F.E Practices Coffee Certification Scheme

To determine coffee growers' knowledge of C.A.F.E Practices standards, twenty statements were used to measure respondents understanding of certification standards as stipulated in Starbucks smallholder producers' generic scorecard version 3.4 of 2016. For each statement, respondents were required to indicate their position concerning their level of understanding of the content contained in the statement by writing 'False' for incorrect statement and 'True' for the correct statement. Each correct score was assigned one mark (1) while a false answer was scored zero marks (0). If a respondent scored all statements correctly the expected maximum score was 20 and if incorrectly, the expected score was

zero (0). To determine the level of knowledge, a decision rule was made as follows: 0 to 9 scores were labelled as *not knowledgeable*, 10 to 15 scores were labelled as *knowledgeable* and 16 to 20 was labelled as a *highly knowledgeable* category. Therefore, the overall scores of respondents were computed and the level of knowledge determined as per decision rule above.

Study findings showed that the 61% of the respondents were in the category of highly knowledgeable, 27.1% were in the category of knowledgeable and only 12 % were in the category of not knowledgeable (Table 2). This implies that the majority of coffee growers (88.3%) in the study area knew about the C.A.F.E practices coffee certification scheme. This could be attributed to capacity building activities in terms of training and communication which were made by the Coffee Service Provider (Taylor Winch Tanzania). This was revealed by respondents during FGDs. For example, one participant during the FGD at Mahande Village conducted on January 30, 2020. The participants said that those training sessions were organized and delivered every week for four months before the inspection of standards compliance (audit) was done. They added that there was close supervision and routine follow up from Taylor Winch experts, government extension officers and KIMULI AMCOS leaders.

It is well established that, any decision to adopt agricultural innovation/practices must be supported by knowledge and skills. Farmers have to learn and understand the innovation and its benefits. Janvry *et al.* (2016) found that knowledge plays a vital role in the actual implementation of innovation/practice to smallholder farmers in developing countries. Indeed, capacity building activities are essential to help farmers gain new knowledge, understand and comply with the requirements of innovations including that of C.A.F.E Practices coffee certification standards.

Table 2: Respondents ‘overall score on knowledge of C.A.F.E Practices Coffee Certification Scheme (N=188)

Knowledge level	Frequency (N)	Percentage (%)
Highly knowledgeable	115	61.2
Knowledgeable	51	27.1
Not knowledgeable	22	11.7
Total	188	100

The current study findings confirm those of Bray and Neilson (2017) and Hoebink and Ruben (2014). The authors found that training associated with coffee certification schemes improved human capital, particularly agronomic knowledge, farm management, health and safety measures. Nevertheless, the study findings disagree with Vein *et al.* (2011) and Ruben and Heras (2012) who found that farmers’ knowledge of coffee certification standards in Ethiopia was poor. The author adds that the state of affair was because of the limited and poor involvement of farmers in capacity building activities. This was reported to be caused by the failure of coffee marketing cooperatives to effectively disseminate information about certifications to the members.

To understand what exact aspects farmers were knowledgeable or not knowledgeable, a statement-wise analysis was made. The study findings showed that of the 20 knowledge statements, eleven statements were scored highly (over 80 %) by respondents. Most of these statements were about prohibited practices focusing on the application of agrochemicals, child labour and sourcing of coffee. Others focused on certification favourable practices such as record keeping, the use of mulching, planting of shade trees and construction of terrace in the coffee farm with a slope greater than 10% (Table 3).

Data from FGDs revealed that coffee service provider placed special emphasis on communicating information targeting these statements and every farmer was encouraged to fully understand and observe them. Further analysis showed that the statements reflected standards that had direct effects on coffee marketability and farmers'/consumers' health and safety. The following remarks by one of the participants interviewed attributed the level of knowledge and training provided by the coffee service provider. He remarked;

“Before C.A.F.E Practices training, I used to burn empty agrochemical containers or left it in coffee farms, but after the training, I knew that the proper way to dispose of the empty containers is to bury in the pit” (FGD, Utiri Village; January 29, 2020).

The study findings imply that farmers were highly knowledgeable on the standards which have direct effects in coffee marketability and are beneficial to farmers' health and safety. Similarly, Rijsbergen *et al.* (2016) found that training associated with coffee certification schemes such as Fair Trade, UTZ and Rainforest Alliance triggered high knowledge of farmers on record keeping, traceability and environmental protection in Kenya.

Table 3: Respondents score on C.A.F.E Practice knowledge statements (N=188)

Knowledge Statement	Response			
	TRUE		FALSE	
	N	%	N	%
C.A.F.E Practices require farmers to keep coffee production and sales records	186	98.9	2	1.1
C.A.F.E Practices standards require proper mulching of coffee farms	185	98.4	3	1.6
C.A.F.E Practices standards require proper storage of agrochemicals	184	97.9	4	2.1
C.A.F.E Practices require proper disposal of empty agrochemical containers	181	96.3	7	3.7
C.A.F.E Practices prohibit entrance in coffee farm applied agrochemicals without protective gears in 3days	179	95.2	9	4.8
C.A.F.E Practices standards prohibit child labour employment in coffee farm activities	179	95.2	9	4.8
C.A.F.E Practices require wearing of protective gears when applying agrochemicals	179	95.2	9	4.8
C.A.F.E Practices certified coffee should be grown under shade tree ranging 20% - 40%	170	90.4	18	9.6
C.A.F.E Practices require the construction of terrace in the coffee farm with a slope greater than 20%	169	89.9	19	10.1
C.A.F.E Practices do not allow the use of Gramaxone to control weed in a coffee farm	158	84.0	30	16.0
C.A.F.E Practices standards do not allow mixing of certified and uncertified coffee	156	83.0	32	17.0
C.A.F.E Practices prohibit the application of pesticides 5m before permanent water sources	139	73.9	49	26.1
The buffer zone of at least 30m adjacent to permanent water bodies should be maintained	137	72.9	51	27.1
C.A.F.E Practices require the use of traps to control coffee insects and pests	117	62.2	71	37.8
C.A.F.E Practices promote maintenance of healthy soil for sustainable coffee production	117	62.2	71	37.8
C.A.F.E Practices require routine scouting of coffee farms	114	60.6	74	39.4
C.A.F.E Practices require the use of premium to fund social projects	62	33.0	126	67.0
C.A.F.E Practices cover economic, environmental and social standards	56	29.8	132	70.2
C.A.F.E Practices social responsibility standards touch casual workers welfare	26	13.8	162	86.2
C.A.F.E Practices prohibit the use of agrochemicals as the first option to control coffee pests, diseases and weeds	25	13.3	163	86.7

Furthermore, respondents moderately scored (61 to 74%) five statements, implying that they were moderately knowledgeable on these statements (Table 3). Four out of five of these statements were on prohibitive behaviour and one on the favourable practices that are important for soil fertility management. These standards have an indirect outcome in coffee production as they are concerned with conserving productive resources and environment (Rueda *et al.*, 2015).

During the interview with key informants, one of the participants mentioned that management of buffer zones around water sources was moderately taken into account since some of the farms are nearby water sources and it is difficult to remove or leave coffee trees affected by pest and diseases. The study finding implies that respondents were moderately familiar with C.A.F.E standards which have an indirect but important outcome on coffee production. These findings confirm Gole (2015) study who found that farmers in Ethiopia had moderate knowledge of environment protection regulations due to a lack of meaningful specifications on environmental protection in coffee certification standards.

Additionally, study findings showed that four statements were lowly scored (13 to 33%) by the respondents, implying that respondents were not knowledgeable about them. These knowledge statements touched issues of “the use of premium to fund social projects, categories of C.A.F.E Practices standards and the use of chemicals as the first option to control coffee pests, diseases and weed”. Study finding revealed that these standards were very new to most of the farmers. Majority of them mentioned that they had never been experienced before. For instance, during FGD at Utiri Village on January 29, 2020, it was mentioned that C.A.F.E Practices discourage dependence on agrochemicals to control pest and diseases. The scheme encouraged the use of cultural, physical and biological methods.

However, respondents mentioned that more agrochemicals are needed to control pest and disease to raise coffee quantity and quality. These could be attributed to the lack of availability of organic inputs in the study area and exclusion of smallholder farmers during standard-setting.

This finding is in line with Klaus (2015) who found that certified farmers in Costa Rica applied agrochemicals to their coffee fields as their first option to combat diseases and maintain adequate levels of production. The current study finding implies that coffee growers perceived the use of agrochemicals to control coffee pest and disease as the first option. They disclosed that agrochemical play important role in maintaining coffee quantity and quality although it is against health and safety standards. This contradicts with the requirement that pesticides are only applied as a last resort (after cultural, physical and biological) controls have failed (Starbucks, 2016). The implication is that the mentioned standard lack credibility to smallholder coffee growers and do not fits in their situation.

Conclusively it can be said that respondents to a larger extent were highly knowledgeable of C.A.F.E Practices mainly on standards that focused on prohibited behaviours and favourable practices for the marketability of coffee and conservation of productive resources. On the other hand, they were not knowledgeable about additional standards that touch categories on social welfare. The implication is that maybe coffee certification promoters are putting much emphasis on standards/practices that had zero tolerance on business and less emphasis on equity.

4.4 Respondents' Attitude of C.A.F.E Practices Coffee Certification Scheme

To examine coffee growers' attitude of the C.A.F.E Practices coffee certification scheme, twenty attitudinal statements were presented to respondents to respond. Five points Likert

scale was used to measure attitude. The respondents were required to specify whether they strongly agreed (5), agreed (4), undecided (3), disagreed (2) or strongly disagreed (1) with given statements. Later, Strongly Agree and Agree were grouped as Agree and scored three (3), Disagreeing and Strongly Disagree were grouped as Disagree and scored one (1) and Undecided remained unchanged and scored two (2). If one disagreed with each of the 20 statements, one would have scored 20 (i.e. 1x20); if one agreed towards each of the 20 statements, one would have scored 60 (i.e. 3x20) and if one undecided in each of 20 statements, one would have scored 40 (i.e. 2x20). Scores were combined to give a score range of 20 to 60. The score below 39 was considered as a reflection of unfavourable attitude, 40 score represented a neutral attitude and above 40 score indicated favourable attitudes.

4.4.1 Respondents' general attitude

Study findings showed that about 64% of respondents had a favourable attitude towards the C.A.F.E Practices coffee certification scheme (Table 5). Some (32.4%) had unfavourable attitude while few (4.2%) had a neutral attitude. The favourable attitude of the C.A.F.E Practices coffee certification scheme meant that farmers' expectations were met to a large extent. During FGDs respondents mentioned that through C.A.F.E Practices farmers obtained a better knowledge of coffee production, certified coffee accessed new market (Starbucks market), farmers received inputs support from premium fund and certified coffee relatively secured high price. Study finding implies farmers' favourable attitude on C.A.F.E Practices coffee certification scheme was influenced by capacity building activities, agro-inputs obtained from the premium fund and access to a new market for their coffee.

A study that was done by Ruben and Hoebink (2014) found that farmers in Ankole, Uganda had a favourable attitude of coffee certification schemes. The reason was that

certified coffee secure high prices compared to uncertified coffee. Similarly, Conservation International (2012) study found a positive attitude of C.A.F.E Practices among the majority of coffee farmers in Colombia. This was attributed by premium price secured certified coffee from Starbucks Company. Furthermore, study finding coincides nicely with the study done by Mugagga (2017). The author found that smallholder coffee farmers around Mount Elgon in Uganda had a favourable attitude on coffee certification. The farmers appreciated that coffee certification addresses the negative impact of climate change in coffee production such as early ripening and drying of premature coffee berries. It is imperative to say that price factor may be a driving factor that shapes farmers' attitude of certification standards. This seems to be rational since for the producers any innovation at the end of the day should result in increased income.

Table 4: Respondents 'overall score on the Attitude of the C.A.F.E Practices Coffee Certification Scheme (N=188)

Attitude	Frequency (n)	Percentage (%)
Favourable	121	64.4
Neutral	8	4.2
Unfavourable	59	31.4
Total	188	100

On the contrary, the findings disagree with the study done by Akoyi and Maertens (2017) who reported a negative attitude toward coffee certification schemes to the majority of certified farmers in Mount Elgon, Uganda. According to Akoyi and Maertens (2017), certified farmers perceived that coffee certification neither increased income nor reduced poverty and it was perceived to be too costly. This is because farmers had to absorb a share of the certification costs (fees and training facilitation) while received price and premium did not compensate it.

To understand what specific aspects respondents had favourable or unfavourable attitude a statement-wise analysis was carried out: The mean score of each statement was obtained by adding the weights given to the statement by respondent divided by the total number of respondents. The mean score was worked out for each statement and rank positions were assigned based on the mean score obtained. It should be noted that scores for negative statements were reversed to make sense, therefore these statements although were negatively sated; their interpretation is based on positive connotation.

Study findings (Table 5) showed that the highest mean score (2.8) was for the statements “*C.A.F.E Practices audit and results were fair*”. This indicates that the C.A.F.E Practices audit was conducted in a transparent, coffee growers were involved in all audit stages and results were unbiased. The Fair audit results (82% in 2014 and 84% in 2018) had opened a new market (Starbucks Company) for certified coffee since 2014. The second-highest ranked statement was “*C.A.F.E Practices standards are relevant to coffee growers’ demands (2.78); this was followed by C.A.F.E Practices coffee certification scheme widens coffee markets(2.67), C.A.F.E Practices standards covered all aspects of coffee production best practices (2.65) and C.A.F.E Practices training were delivered in good ways (2.62)*” which ranked 3rd 4th and 5th respectively (Table 5). This finding implies that coffee growers were comfortable with C.A.F.E Practices content, capacity building approaches and coffee export opportunities obtained after being certified.

Table 5: Respondents score on attitudinal statements (N =188)

ATTITUDINAL Statement	A (3)	U (2)	DA (1)	Total score	Mean score	Rank
C.A.F.E Practices audit and results were fair	160(85.1)	18(9.6)	10(5.3)	526	2.80	1
C.A.F.E Practices standards were relevant to coffee growers demands	165(87.8)	4(2.1)	19(10.1)	522	2.78	2
C.A.F.E Practices coffee certification scheme widen coffee markets	155(82.4)	4(2.2)	29(15.4)	502	2.67	3
C.A.F.E Practices standards covered all aspects of coffee production best practices	155(82.4)	1(0.5)	32(17.1)	499	2.65	4
C.A.F.E Practices training were delivered in good ways	151(80.3)	2(1.1)	35(18.6)	492	2.62	5
The priority of C.A.F.E Practices training was given on passing the audit and practice of standards	148(78.7)	2(1.1)	38(20.2)	486	2.59	6
Certified coffee secured high price than uncertified coffee	139(73.9)	8(4.3)	41(21.8)	474	2.52	7
C.A.F.E Practices training increase awareness of environmental management.	126(67.0)	9(4.8)	53(28.2)	449	2.40	8
C.A.F.E Practices training reduce the problem of coffee diseases	126(67.0)	3(1.6)	59(31.4)	443	2.36	9
Enough information was given before joining C.A.F.E Practices	127(67.6)	0(0)	61(32.4)	442	2.35	10
C.A.F.E Practices training improved coffee farm management	120(63.8)	4(2.2)	64(34.0)	432	2.30	11
It was not labour intensive to implement C.A.F.E Practices requirements	120(63.8)	4(2.2)	64(34.0)	432	2.30	11
C.A.F.E Practices training provided an opportunity for developing new farming skills	114(60.6)	4(2.2)	70(37.2)	420	2.23	13
C.A.F.E Practices improved farmers bargaining power	101(53.7)	12(6.4)	75(39.9)	402	2.14	14
Profit secured from certified coffee was higher than of uncertified coffee	100(53.2)	12(6.4)	76(40.4)	400	2.13	15
Implementation of the C.A.F.E Practices requirement did not increase the cost of coffee production	104(55.3)	1(0.5)	83(44.2)	397	2.11	16
C.A.F.E Practices training reduced the application of allowed agrochemicals in a coffee farm	73(38.8)	6(3.2)	109(58.0)	341	1.81	17
Joining the C.A.F.E Practices certification scheme addressed the problem of coffee price volatility	70(37.2)	12(6.4)	106(56.4)	340	1.80	18
C.A.F.E Practices certification costs and benefits were clear to coffee growers.	61(32.4)	10(5.4)	117(62.2)	320	1.70	19
C.A.F.E Practices certification scheme improved the safe use of allowed agrochemicals.	37(19.7)	1(0.5)	150(79.8)	263	1.40	20

Considering the least ranked statements with a mean score below 2.0, study findings (Table 5) shows that the statement, “*C.A.F.E Practices training reduce the application of allowed agrochemicals in a coffee farm (1.81) ranked 17th*”, “*Joining C.A.F.E Practices certification scheme addressed the problem of coffee price volatility (1.80) ranked 18th*”, “*C.A.F.E Practices certification costs and benefits were clear to coffee growers (1.70) ranked 19th*” whereas the statement “*C.A.F.E Practices certification scheme improve the safe use of allowed agrochemicals (1.40); ranked 20th*”. These statements were least ranked maybe had little potential to create value to coffee growers, implying that there were unconvincing effects on reduction and safe use agrochemical, control of coffee price volatility and transparency.

Respondents indicated that it is burdensome to own set of personal protective equipment which cost approximately Tanzania Shillings 90 000 while receiving moderate returns from coffee certification. The study finding implies that coffee growers were sensitive to cost often required in coffee certification compliance than expected benefits from it. Furthermore, the finding implies that access and/or use of personal protective gears to the majority of farmers were limited. Similarly, Elliot (2018) reported that protective gears called for in the training were often unavailable to coffee farmers in Costa Rica due to insufficient budget for personal protective gears.

In conclusion, it can be said that coffee growers appeared to have a favourable attitude of the C.A.F.E Practices coffee certification scheme. The favourable attitude is very important as it determines farmers’ commitment to the scheme. If evidence of the impact is not convincing, coffee growers may resistant to participate in coffee certification. However, they perceived that the scheme has not dealt with coffee price volatility, has minimum transparent and the safe use of allowed agrochemical not improved.

4.5 Respondents' Levels of Implementation of C.A.F.E Practice Standards

To investigate the implementation of C.A.F.E Practices standards to Coffee growers, twenty-three standards were presented to respondents to specify to what extent they implemented them. To determine this, Starbucks producers' assessment form 3.4 editions of 2016 which set criteria for appraising standards implementation was used. Where the implementation level below 50% was considered to be poor implementation, 50 to 80% moderate and 81 to 100% high implementation. In this case, where there were 23 standards, implementation of less than 12 was considered poor; 12-17 moderate and 18-23 high implementation.

The study finding indicated that 14% of respondents highly implemented the standards, about 52.1% moderately implemented and 33.5 % implemented poorly the standards (Table 6). The findings imply that the overall implementation of C.A.F.E Practices standards was moderate to the majority of coffee growers in the study area. The moderate implementation rate implies that only committed, better prepared and more capable farmers implemented the certification standards. During FGDs participants pointed out that they moderately implemented the standards because they were not assured of obtaining better farm gate prices, rather than improving farming practices and quality assurance (FGD, Kitanda Village; January 31, 2020). Indeed, analysis of the results implied that respondents were of the views that changes in coffee production practices depend on different factors including market incentives for certified coffee, quality of the advisory services, resources of the farmers and the attitude regarding the benefit of sustainable coffee production.

Similarly, Kuit *et al.* (2016) found that coffee producers in Vietnam and Uganda received more coffee certification training and appreciate it, however few changes in practices were detected. For the Vietnam case, because productivity was already high while in Uganda farmers claimed that it increases cost and workload in coffee production while the price and premium did not compensate it. Consistency to the current study finding, Elder *et al.* (2013) found that, despite accessing coffee certification advisory services, differences between the agricultural practices of certified and uncertified farms in Rwanda were small.

Therefore, the overall implementation of new agricultural technologies including C.A.F.E Practices standards requires farmers' understanding of the technology and its benefits. Regardless of the visible benefits of C.A.F.E Practices standards, few farmers implemented them. However, Mottaleb (2018) suggest that farmers require a long time (more than ten years) to implement technologies to the fullest.

Table 6: Level of Implementation of C.A.F.E Practices Standards (N=188)

Implementation level	Frequency (n)	Percentage (%)
High	27	14.4
Moderate	98	52.1
Poor	63	33.5
Total	188	100

To understand what exact standards which had been highly, moderately or lowly implemented by farmers' statement-wise analysis was carried out: The mean score of each standard was obtained by adding the weights given to the standard by respondent divided by the total number of respondents. The mean score was worked out for each standard and rank positions were assigned based on the mean score obtained.

Study findings (Table 7) showed the highest mean score (2.84) was for the standards “*C.A.F.E Practices require proper record keeping of coffee production and sales*”. FGDs with respondents revealed that coffee service provider distributed exercise book to coffee growers during capacity building activities. One of the respondents disclosed that Taylor Winch experts visited every coffee farmer and provided exercise book and trained them how to keep required records such farm size, the number of the coffee trees, the pesticides used and coffee harvesting. Similarly, Rijsbergen *et al.* (2014) found improved record-keeping and traceability to smallholder farmers in Kenya due to the practice of standards related to bookkeeping.

Then followed by the standards such as “*C.A.F.E Practices require deliverance of cherry to processing unit on the same day (2.82)*”, “*C.A.F.E Practices require proper storage of agrochemicals away from food crops (2.81)*”, “*C.A.F.E Practices prohibit child labour employment (2.79)* and “*C.A.F.E Practices require children of legal school age to attend schools (2.78)* ranked 2nd, 3rd, 4th and 5th. These standards were highly implemented because had no cost implication and the majority of farmers were familiar with as it touches their everyday life. For example, during the interview one of the respondents mentioned that “*Although C.A.F.E Practices require farmers to send the children of school age to school it was for our benefits*”. This finding implies that C.A.F.E Practices standards which were very common to coffee growers and addressed their well-being were highly implemented.

Table 7: Respondents score on the practice of certification standards (N=188)

Practice requirements	Poorly(1)		Moderately(2)		Highly(3)		Total score	Mean score	Rank
	n	%	n	%	n	%			
C.A.F.E require proper record keeping of coffee production and sales	8	4.3	14	7.4	166	88.3	534	2.84	1
C.A.F.E require deliverance of cherry to the processing unit on the same day	4	2.1	26	13.4	158	84.0	530	2.82	2
C.A.F.E roper storage of agrochemicals away from food crops	9	4.8	18	9.6	161	85.6	528	2.81	3
C.A.F.E prohibit child labour employment	6	3.2	27	14.4	155	82.4	525	2.79	4
C.A.F.E require children of legal school age to attend schools	7	3.7	28	14.9	153	81.4	522	2.78	5
C.A.F.E require proper disposal of empty chemical containers	3	1.6	119	63.3	66	35.1	439	2.34	6
C.A.F.E require proper pruning of coffee tree	8	4.3	117	62.2	63	33.5	431	2.29	7
C.A.F.E require buffer zones of 30m adjacent to permanent water sources	20	10.7	98	52.1	70	37.2	426	2.27	8
C.A.F.E prohibits the use of banned pesticides	13	6.9	115	61.2	60	31.9	423	2.25	9
C.A.F.E prohibit entrance without protective gears in coffee farm applied pesticides in 48hrs	31	16.5	105	55.8	52	27.7	397	2.11	10
C.A.F.E require proper harvesting coffee cherries	22	11.7	127	67.6	39	20.7	393	2.09	11
C.A.F.E requires coffee to be grown under shade ranging 20% - 40%.	15	8.0	142	75.5	31	16.5	392	2.09	12
C.A.F.E require agrochemicals to be stored in a well-ventilated locked place	35	18.6	105	55.9	48	25.5	389	2.07	13
C.A.F.E P require spot-application of pesticides	37	19.7	107	56.9	44	23.4	383	2.04	14
C.A.F.E require soil erosion control in farm with slope above 20%	41	21.8	112	59.6	35	18.6	370	1.97	15
C.A.F.E require composting of all coffee trees	38	20.2	119	63.3	31	16.5	369	1.96	16
C.A.F.E require mulching of all coffee farm	36	19.1	142	75.5	10	5.4	350	1.86	17
C.A.F.E require rejuvenation of old coffee tree	84	44.7	79	42.0	25	13.3	317	1.69	20
C.A.F.E require 50% of farm to be planted nitrogen-fixing plants	92	48.9	88	46.9	8	4.2	292	1.55	22
C.A.F.E require routine scouting of coffee farm	102	54.3	77	41.0	9	4.7	283	1.51	21
C.A.F.E require agrochemicals only used as the last option to control pest, diseases and weeds	120	63.8	50	26.6	18	9.6	274	1.46	13
C.A.F.E require the use of traps to control coffee insects	117	62.2	56	29.8	15	8.0	274	1.46	13
C.A.F.E require the use of appropriate protective gears	146	77.7	41	21.8	1	0.5	231	1.23	23

Considering the poorly implemented standards (1.69-1.23), study findings (Table 7) shows that the standards “*C.A.F.E Practices require rejuvenation of old coffee trees (1.69) ranked 18th*”, “*C.A.F.E Practices require 50% of the farm planted nitrogen-fixing trees (1.55) ranked 19th*”, “*C.A.F.E Practices require routine scouting of coffee farm (1.51) ranked 20th*”, “*C.A.F.E Practices require agrochemicals use as last option to control pest, diseases and weeds (1.46) ranked 21st*”, “*C.A.F.E Practices require the use of traps to control coffee pests (1.46) ranked 22nd*” and “*C.A.F.E Practices require proper use of appropriate protective gears when spraying pesticides (1.23) ranked 23rd*”. These standards were poorly implemented because they have little effects on coffee production and have cost implication that is increasing cost of production to coffee growers as revealed by the following remarks from one of the participants during FGD:

“a complete set of personal protective gears (gumboots, overalls, gloves, mask, goggles and gum cap) cost Tanzania Shillings 90000 which is very expensive for a farmer to afford” (FGD, Mahande Village; January 30, 2020).

This remark implies that the protective gears are expensive for the farmers to afford. This follows that although they may be aware of the standards and the need to use protective gears, they are not in practice using them not because they do not know their importance but because they cannot afford to buy them.

Indeed, the majority of farmers were observed using second-hand gumboots, worn-out trousers and coats when spraying pesticides. Unfortunately, all pesticides are poisonous and have long term negative effect on farmers’ health. Improper wearing of personal protective gears during pesticides application certainly endangers coffee growers’ health. Study finding is in line with of Kagezi *et al.* (2018) who reported that usage of gumboots only or non-use or use of worn-out personal protective equipment to the majority of

coffee farmers in Uganda because the cost for protective equipment seemed to be the most significant factors that affecting the use of personal protective equipment.

Conclusively, it can be said that the implementation of C.A.F.E Practices standards by smallholder coffee growers was moderate. Coffee growers implemented to the most standards which were familiar with and touch their life whereas those with little effects in coffee production and with cost implication were poorly implemented.

4.6 Challenges of C.A.F.E Practices Implementation to Coffee Growers

C.A.F.E Practices coffee certification tend to grow and become more popular among smallholder coffee growers in Mbinga District. However, in the effort of certifying farmers, there are some challenges which have been induced. Analytical findings indicated that the main challenges that faced coffee growers in the implementation of C.A.F.E Practices were (i) price volatility, (ii) the limited ability of farmers to achieve economic efficiency, (iii) continued incidence of Coffee diseases, (iv) lack of transparency in the direct export of certified coffee and (v) limited farmer participation in standard-setting (Table 8).

Price volatility

The study finding showed that the first challenge encountered by smallholder farmers was coffee price volatility. There was a general agreement among participants that although one of the aims of C.A.F.E Practices coffee certification schemes was to mitigate coffee price volatility, it seems this has not been the case (FGD, Utiri Village; January 29, 2020). Participants further revealed that a lot is needed to be done to achieve this because of recurrent price volatility. The study finding implies that coffee growers as a key actors in

the C.A.F.E Practices coffee certification scheme require the Starbucks to revisit the standards and include the one which will set minimum price and premium for certified coffee.

In line to the study finding, Wahyudi *et al.* (2020) reported that coffee certification faces many challenges such as global economic conditions that have caused a fluctuation in the world coffee prices. To minimize coffee price volatility, Wahyudi *et al.* (2020) found that the right guidelines and guidance are required for all coffee certification schemes. In connection to that, Borrela *et al.* (2015) expounded that low and fluctuating coffee price of the global market has shown to be a major challenge of coffee certification to small scale coffee farmers. Similarly, Panhuysen and Pierrot (2018) revealed that there is a tendency among farmers to stop involving in coffee certification due to decreased income per smallholder farm unit caused by low market prices, lower productivity and higher labour cost. Respondents suggested that there should be known minimum price for certified coffee and clear formula for calculating the premium amount. Indeed a minimum price reduces the negative effects of coffee price volatility as it set a price which benefits farmers in any circumstances. The setting of the minimum price will obligate the certified buyers to pay that price even if it is above market price because it honours farmers' effort to produce coffee sustainably. In addition to that during KII one participant suggested the introduction of coffee insurance to compensate farmers in case price goes down to cover production cost (KII, Mbinga town, February 5, 2020).

Table 8: Challenges encountered by respondents (N=188)

S/No.	Challenge	Suggested solutions by respondents
i.	Coffee price volatility	the setting of the minimum price
ii.	The limited ability of farmers to achieve economic efficiency	Premium price for certified coffee
iii.	Continued incidence of Coffee diseases	Application of agrochemical
iv.	Lack of transparency in the direct export of certified coffee	Direct price negotiation with the coffee buyer
v.	Limited farmer participation in standard-	Full participation of farmers

The limited ability of farmers to achieve economic efficiency

In addition to price volatility, the study revealed that limited ability to achieve economic efficiency was another challenge encountered by coffee growers in the implementation of the C.A.F.E Practices coffee certification scheme. The limited ability of farmers to achieve economic efficiency was caused by high coffee production cost among other reasons. It seems that agrochemicals cost, farm management, coffee processing, payment of casual workers and certification cost reduced farmers income. Participants in FGDs disclosed that for each 1kg of cherry farmers were deducted 5Tsh to share operation cost. These include C.A.F.E Practice training logistics, direct export cost and payment of minimum wage to casual labourers working at the coffee pulping unit (CPU). In this regard, one participant had this to say!

“Although certified coffee secured relative high price which is 15USA Dolar/50kg bag above auction price, additional certification cost lowed farmers income”.

(FGD, Mahande village; January 30, 2020).

The study finding implies that actions and regulations should try to the best to reduce unnecessary cost which at the end lower profit margin. On the other hand, producers should produce high-quality coffee to certify the demands of the consumers. The present study finding is in line with of Astuti *et al.* (2015) who reported that economic benefits to smallholders are statistically significant but extremely small compared to economic rent received by exporters or roasters who got between 83 and 95%. Similarly, Rijsbergen *et al.* (2016) informed that smallholder farmers only receive 6-8% of the consumer price due to additional certification costs such administrative tasks which undermine part or all of the certification benefits. This means that the business of certified coffee is not paying

thus leaving farmers in poverty. As Astuti *et al.* (2015) observed, even when certified coffee receives a price premium; the price differential with non-certified coffee is very small which is probably not enough to allow smallholders to improve their living conditions.

On the contrary, a study by Latynskiy and Berger (2016) who conducted a study in Uganda found out that, coffee certifications enabled certified smallholder farmers in Uganda to achieve economies of scale as they were able to bypass local middlemen and negotiate better prices. The respondent suggested that certified coffee should fetch premium price which will benefit farmers after offsetting all production cost.

Continued Incidence of Coffee diseases

Furthermore, study findings indicated the incidence of coffee diseases was another challenge encountered by farmers in the implementation of the C.A.F.E Practices coffee certification scheme. The expectation was that the implementation of integrated pest and disease management as proposed by the standards could help to control coffee pests and diseases, unfortunately, this did not happen in this case. Incidences of pests and diseases were still experienced by farmers. This was pointed out by Ward Agricultural Extension Officer (WAEO), who had this to say;

“coffee pest and diseases is still a problem to many farmers who participated in the implementation of coffee certification in the study area” (KII, WAEO, Utiri Ward; January 29, 2020).

Similarly, Sneider *et al.* (2016) indicated that in Costa Rica certified farmers confronted similar challenges of coffee disease and pests plaguing coffee. On coffee growers' side, they propose the application of allowed agrochemicals to be the first option for controlling coffee pests and diseases. About that, respondents suggested that *“harmful*

coffee pest and disease should be only controlled or cured by allowed agrochemicals and not otherwise". However, coffee growers should be advised to prepare and apply organic inputs, maximize the use of biological, physical or cultural practices and ensure farm hygiene to control coffee pest and diseases. For example, some of the coffee diseases such as coffee leaf rust, coffee berry disease (CBD) and mealybug can be easily controlled by ensuring farm hygiene through proper and routine coffee trees pruning and weeding.

Lack of transparency in the direct export of certified coffee

Furthermore, study findings showed that a lack of transparency was one of the challenges in the implementation of the C.A.F.E Practices coffee certification scheme. During FGDs participants reported indirect negotiations of coffee price between AMCOS leaders and buyers. Coffee Service Provider links the AMCOS leaders with buyers; receive a price from buyer and communicate it to the leaders and vice versa. When the price is agreed coffee selling contract is sent to AMCOS leaders for signing. FGDs Participants aired out that CSP act as middlemen connecting leaders with the buyer. Another participant mentioned that;

"There is a need for AMCOS Leaders to negotiate coffee price direct with the buyers instead of passing through the coffee service provider" (FGD, Kitanda Village; January 31, 2020).

The implication is that despite the knowledge but the process of price negotiation sidelined the farmers. This assertion is also supported by Rios (2014) who found that farmers in Western Kenya were more knowledgeable about coffee prices; however, there was an information gap that undermined trust between farmers and the middlemen. The author adds that the farmer's major concern was related not only to understand how the price is determined but also wanted to be involved directly in the negotiations. Coffee

growers in the study area suggested that there should be direct coffee business between farmers and buyers since it increases transparency during price negotiation among other issues.

Limited farmer participation

Moreover, limited participation in standard-setting caused by lack of representation in coffee certification boards was mentioned as a challenge to coffee growers' side. During FGDs it was revealed that coffee growers were not involved in the process of standard-setting. One of the participants disclosed by giving the following remarks,

“there was no farmers or representative involved in the formulation of C.A.F.E Practices standards and the standards were implemented without adjustments”

(FGD, Utiri Village; January 29, 2020).

Another participant added that

“if they were involved in the standard-setting some of the standards like contracts to casual labour was irrelevant to farmer's level and could suggest being removed or revised differently” (FGD, Utiri Village; January 29, 2020).

The study findings imply that, while coffee growers are interested to be part of the certification board, certification schemes pay little to no attention to farmers' preferences in the formulation and adoption of standards.

The finding of the study is in line with that of Potts *et al.* (2014) who indicated that compliance with coffee certification standards is difficult because farmers and their organizations often have little or no representation on the decision-making boards of standard-setting organizations. Upendranadh and Subbarah (2012) found that certified coffee growers in India felt that the guidelines were imposed on them without considering the local context and realities. To overcome this challenge, the respondent suggested joint

participation of all actors in coffee certification to all stages from standard-setting, implementation and evaluation. Therefore, it can be said that while coffee certification is important and popular in the coffee business, there are challenges associated with its implementation on smallholder coffee growers' side. For the benefit of both involved parties, these challenges need to be addressed immediately

4.7 Relationship between Respondents' Knowledge, Attitude and Implementation of C.A.F.E Practices Coffee Certification Standards

The relationship between coffee growers' knowledge, attitude and level of C.A.F.E. Practices standard implementation was determined in this study. The knowledge score, general attitude and level of standard implementation were cross-tabulated to each other to define the nature of the relationship among these variables. Then, Chi-square tests were conducted to determine whether the relationship was significant or not.

4.7.1 Relation between Farmers' knowledge and Attitude of C.A.F.E Practices Coffee Certification Scheme

In this case, farmers' knowledge and attitude of C.A.F.E Practices were cross-tabulated to each other. Then, the Chi-square test was conducted to determine whether the relationship was significant or not.

Study findings (Table 9) revealed a statistically significant relationship between respondents' knowledge and their attitude of C.A.F.E Practices certification scheme. The overall chi-square ($p=0.019$) indicate that respondents knowledge of C.A.F.E Practices did strongly influenced the attitude positively.

Furthermore, the cross-tabulation test showed that all respondents (115) who were highly knowledgeable of C.A.F.E Practices coffee certification scheme had a favourable attitude towards the scheme (Table 9). On the other hand, respondents (22) who were not knowledgeable of C.A.F.E Practices majority of them (63.6%) had the unfavourable attitude of the scheme and the remained minority (36.4%) had neutral attitude. Study findings imply that knowledgeable farmers had a favourable attitude towards the scheme. This was revealed during FGDs by one participant who had this to say!

“Proper record keeping of coffee sales receipts improved transparency in the final payment of coffee sales” (FGD, Mahande Village; January 30, 2020).

This favourable attitude was influenced by the understanding of record-keeping, hence, increased credibility of the certification scheme to farmers.

Table 9: Influence of the respondents' knowledge on the attitude of the C.A.F.E Practice coffee certification scheme: (N=188)

Knowledge level	Respondents attitude						Total N	Chi-Square Test		
	Favourable		Neutral		Unfavourable			Count- value	d f	P- value
	n	%	n	%	n	%				
Not Knowledgeable	0	0	8	36.4	14	63.6	22			
Knowledgeable	6	17.7	0	0	45	82.2	51			
Highly knowledgeable	115	100	0	0	0	0	115			
Total	121		8		59		188			
Pearson Chi-Square results								11.783	4	0.019*

*significant at p=0.05; ** not significant at p=0.05.

Similarly to the current study findings, Rijsbergen *et al.* (2016) found that smallholder coffee farmers in Central Kenya had high knowledge and positive attitude of Fair-trade, UTZ and Rainforest Alliance coffee certification schemes. The author adds that training associated with coffee certification schemes triggered farmers' knowledge which made

them access new markets for their certified coffee. Access to new markets made farmers positively accepted coffee certification schemes. Therefore, it can be said that level of farmers' knowledge and attitude of coffee certification scheme was almost similar in a way that knowledge created many advantages to the coffee grower which lead to the development of favourable attitude.

4.7.2 Relationship between Farmers' knowledge of C.A.F.E Practices and Level of Standards Implementation

To determine the relationship between farmers' knowledge of C.A.F.E Practices and level of C.A.F.E Practices standards implementation, the score of respondents' knowledge was cross-tabulated with the level of the standard implementation. Then, the Chi-Square Test was conducted to test whether the relationship was significant or not.

The overall Pearson Chi-Square results from $p=0.042$ showed a statistically significant relationship between respondent knowledge and level of C.A.F.E Practices standard implementation (Table 10). It was evident that all 22(100%) respondents who were on the category of not knowledgeable of the scheme were poorly implemented the standards. On the other hand, 115 respondents who were highly knowledgeable of the scheme, 23.5% have highly implemented the standards while 76.5% implemented the standards moderately. The study findings imply that knowing about the C.A.F.E Practices coffee certification scheme had not necessary lead to high implementation of the standards. This was revealed during FGDs at Mahande villages on 29 January 2020. The participants mentioned that moderate overall implementation of standards was caused by lack of guarantee of securing the high price for certified coffee. However, implementation of the standards had a cost implication to them.

Table 10: Influence of the respondents' knowledge on the overall implementation of C.A.F.E Practices standards (N=188)

Knowledge level	The overall level of Implementation							Chi-Square Test	
	Poor		Moderate		High		Total	Count	P-
	n	%	m	%	n	%	N	value	df
Not Knowledgeable	22	100	0	0	0	0	22		
Knowledgeable	41	80.4	10	19.6	0	0	51		
Highly knowledgeable	0	0	88	76.5	27	23.5	115		
Total	63		98		27		188		
Pearson Chi-Square results								9.910	4 0.042*

*significant at $p=0.05$; ** not significant at $p=0.05$.

Study findings confirm those of the study done by Rios (2014) to smallholder coffee farmers in Western Kenya. The author revealed that training associated with coffee certification schemes improved farmers' knowledge of coffee certification schemes. However, implementation of certification standards was low due to lack of transparency in the setting of the coffee price which leads to low final price to farmers.

Therefore it is imperative to say that farmers' knowledge of coffee certification scheme had significance influence on the level of C.A.F.E Practices standards implementation. However other factors such as coffee price volatility and low final income of the farmers count a lot. These factors had caused the moderate implementation of the standards.

4.7.3 Relationship between Farmers' Attitude of C.A.F.E Practices and Implementation of C.A.F.E Practices Standards

In this case, coffee growers' attitude of C.A.F.E Practices and level of standards implementation were cross-tabulated. Then, the Chi-Square Test was done to test whether the relationship is significant or not.

The overall chi-square ($p=0.046$) (Table 11) showed a statistically significant relationship between respondent attitude and level of C.A.F.E Practices standards implementation. In addition to that cross-tabulation results indicated that of all 59 respondents who had the unfavourable attitude of C.A.F.E Practices 93.2% had poorly implemented the standards and the remained 6.8% had implemented the standards moderately. On the other hand, for 121 respondents who had the favourable attitude of C.A.F.E Practices scheme 77.7% had implemented the standards moderately and 22.3% had highly implemented the standards. This implies that despite the significant relationship among these variables moderate implantations of the standards were revealed to smallholder farmers' side. During the FGD respondents perceived that the scheme did not deal with coffee price volatility and not transparent in pricing the certified coffee (FGD, Kitanda Village, January 30. 2020).

Table 11: Influence of the Respondents' attitude on the implementation of C.A.F.E Practices Standards (N=188)

Respondents' attitude	Overall level Implementation						Total	Count	d	P-value
	Poor		Moderate		High					
	n	%	n	%	n	%				
Favourable Attitude	0	0	94	77.7	2	22.3	121			
Neutral Attitude	8	100	0	0	0	0	8			
Unfavourable Attitude	5	93.2	4	6.8	0	0	59			
Total	5	2	98		2	7	188			

Pearson	10.251	4	0.046
----------------	---------------	----------	--------------

*significant at $p=0.05$; ** not significant at $p=0.05$.

The current study finding coincides nicely with a study done by Mugagga (2017) to smallholder coffee farmers around Mount Elgon in Uganda. The author reported that farmers had a favourable attitude on coffee certification because addressed negative impact of climate change in coffee production. However level of response to climate change was moderately influenced by attitude rather socio-economic factors such as access to climate change information and level of education.

In conclusion, Chi-square results revealed a statistically significant relationship between farmers' knowledge, attitude and level of standards implementation when interacting with each other (Shwartz, 1976). The Cross-tabulation results confirmed that coffee growers' attitude was positively influenced by knowledge. However due to various internal and external challenges both knowledge and attitude moderately influenced implementation of the certification standards. Those challenges include coffee price volatility limited farmers participation in standard-setting and inadequate income from certified coffee. Therefore, the implementation of coffee certification standards did not only influence by farmers' knowledge and attitude but also socio-economic challenges mentioned above.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Overview

This chapter presents the conclusions and recommendations of the study based on the findings. The chapter is structured into two sections: conclusion and recommendations.

5.2 Conclusion

Generally, the study assessed the implementation of C.A.F.E Practices coffee certification scheme in the study area. Specifically, it determined coffee growers' knowledge of C.A.F.E Practices coffee certification scheme, examined the attitude of coffee growers towards sustainability of the scheme, evaluated coffee growers' implementation of C.A.F.E Practices certification standard and explored the challenges encountered by smallholder farmers in the implementation of C.A.F.E Practices coffee certification.

Based on the study findings, the following are the main conclusions;

- i. In general, the majority of respondents were knowledgeable about the C.A.F.E practice coffee certification. However, they scored highly mainly on the standards which had direct effects on coffee quality, marketability and prohibitive standards concerned with farmers' health and safety. Besides they scored lowly on standards that touched social warfare such as proper use of the premium fund.
- ii. Coffee growers have a favourable attitude towards the C.A.F.E Practices coffee certification scheme. However, they opined that the scheme had failed to address the coffee price volatility issue and thus not benefit them economically. Favourable attitude raises the chances or probability of technology adoption (Meijer et al 2015). This indicates the likelihood of farmers to accept and use the proposed standards to

improve coffee production and thus benefit from coffee export opportunities. The favourable attitude is very important as it determines farmers' commitment to the scheme. It is therefore important to note that C.A.F.E practices in the study areas have high chances to be accepted by farmers if all other factors are also favourable.

- iii. The overall implementation of C.A.F.E Practices by smallholder coffee growers in the study area was moderate. Coffee growers reported implementing mostly those standards which were more or less routine practices like record keeping and proper storage of chemicals. Unfortunately, those standards which had cost implication to farmers such as rejuvenation of old coffee trees, planting nitrogen-fixing trees and proper use of appropriate protective gears were poorly implemented.
- iv. The main challenges that smallholder coffee farmers in Mbinga experienced in the implementation of C.A.F.E practices were coffee price volatility, the limited ability of farmers to achieve economic efficiency, the continued incidence of coffee diseases, lack of transparency and limited farmer participation in standard-setting.

5.3 Recommendations

Based on the conclusion made from the study findings, it is recommended as follows;

- i. Taylor Winch in collaboration with Mbinga district council should continue providing training and guidance to increase farmers' knowledge specifically on coffee agronomic practices and processing, health and safety measures.
- ii. The study recommends that coffee certification promoters including Tanzania Coffee Board and C.A.F.E Practices Board should enhance smallholder coffee growers bargaining power as well as access to more profitable certified markets rather than only Starbucks market as it is recently.

- iii. KIMULI AMCOS, Taylor Winch Tanzania and Starbucks should find ways to motivate coffee growers to increase practices of certification standards. For example, rewarding best performers.
- iv. Farmers' participation in the process of setting certification standards should be given priority. Coffee growers should be in the front seat during standard-setting. This increase possibility of standard efficiency, credibility and creativity.
- v. Coffee Service Providers in collaboration with the agro-dealers should ensure availability of organic coffee inputs to smallholders coffee farmers.
- vi. To protect the health and safety of the farmers, study recommend that Tanzania coffee development fund should find a way to subsidize personal protective gears to enhance coffee growers to produce coffee sustainably.

REFERENCES

- Ali, Z. and Bhaskar, B. (2016). Basic statistical tools in research and data analysis; [<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5037948>] site visited on 13/8/ 2019.
- Akoyi, K. and Maertens, M. (2017). Walk the talk: Private sustainability standards in the Ugandan coffee sector. [<http://dx.doi.org/10.1080/00220388.2017.1327663>] site visited on 24/6/2020.
- Astuti, E. Offermans, A. Kemp, R. and Corvers, R. (2015). Impact of coffee certification on the economic performance of Indonesian actors. *Asian Journal of Agriculture and Development* 12 (2): 7-15.
- Bayisenge, R. Shengde, H. Harimana, Y. Karega, J. Nasrullah, M. and Tuyiringire, D. (2020). Gender equality, Agriculture and rural development: Evidence from Nyamasheke coffee production in Rwanda. *International Journal of Gender and Women's Studies* 7(1): 29-40.
- Borrella, I. Mataix, C. and Carrasco, R. (2015). Smallholder farmers in the speciality coffee industry: Opportunities, constraints and the businesses that are making it possible. *Institute of Development Studies Bulletin, Oxford UK* 46(3):3-12.
- Bose, A. Vira, B. and Garci, C. (2016). Does environmental certification in coffee promote the business as usual? A case study from the Western Ghats, India. *Ambio Journal* 45: 946–955.
- Bravo, M., Potts, G. and Tzanopoulos, J. (2016). Drivers influencing farmer decisions for adopting organic or conventional coffee management practices. [<http://www.sciencedirect.com/science/article>] site visited on 12/7/2020.

- Bravo, P. Spiller, A. and Villalobos, P. (2012). Are organic growers satisfied with the certification system? Causal analysis of farmers' perceptions in Chile. *International Food and Agribusiness Management Review* 15(4): 7-15.
- Bray, G. and Neilson, J. (2017). Reviewing the impacts of coffee certification programmes on smallholder livelihoods. *International Journal of Biodiversity Science, Ecosystem Services and Management* 13(1): 216-232.
- Conservation International. (2012). Assessment of Starbucks Coffee and Farmer Equity Practices in Colombia. [<https://www.conservation.org/docs/default-source/publication>] site visited on 3/4/2020.
- Cherry, K. (2019). Cross-sectional research method: How does it work? Advantages and challenges: [<https://www.verywellmind.com/what-is-a-cross-sectional-study>] site visited on 14/8/2019.
- Chiputwa, B., Spielman, J. and Qaim, M. (2015). Food standards, certification and poverty among coffee farmers in Uganda. *World Development Journal* 66: 400-412.
- Daniel, E. (2013). [The shape of knowledge: Children and the visual culture of literacy and numeracy](#). *Journal of Science in Context* 26 (2): 215–245.
- Dobronte, A. (2013). The importance of socio-demographics in online surveys. [<https://www.checkmarket.com/blog/socio-demographics-online-surveys>] site visited on 26/6/2020.
- Elliott, K. (2018). *What are we getting from voluntary sustainability standards for coffee?* Center for global development. 2055 L Street NW Fifth Floor Washington DC 20036. 129pp.
- Elder, S. Zerriffi, H. and Philippe, B. (2013). “Is Fairtrade certification greening agricultural practices? An analysis of Fairtrade environmental standards in Rwanda”. *Journal of Rural Development Studies* 32: 264–274.

- Fairtrade Labeling Organization. (2013). Fairtrade international report from 2012 to 2013. [<https://www.fairtrade.org.uk/Media-Centre/News/September-2013/Fairtrade-International-Annual-Report-2012-to-2013>] site visited on 7/6/2019.
- Fillippa, P. and Hatab, A. (2018). Sustainability motivation from fair-trade certification among smallholder coffee growers in Tanzania. *Journal of Sustainability* 10(1551): 24-39.
- Giovannucci, D. and Ponte, S. (2005). Standards as a new form of a social contract: Sustainability initiatives in the coffee industry. *Food Policy* 30(3): 284-301.
- Gole T. (2015). Coffee: Ethiopia's Gift to the World; The traditional production systems as living examples of crop domestication and sustainable production. Assessment of different certification schemes. Proceedings coffee forum workshop, Addis Ababa, Ethiopia, 23rd June 2015. 41pp.
- Grabs, J., Kilian, B., Hernandez, D. and Dietz, T. (2016). Understanding coffee certification dynamics: A spatial analysis of voluntary sustainability standard proliferation; *International Food and Agribusiness: Management Review* 19(3): 3-6.
- Hidayat, K., Offermans, A. and Glasbergen, P. (2017). *Sustainable palm oil as a public responsibility: On the governance capacity of the Indonesian standard for sustainable palm oil*. International Center for integrated assessment and sustainable development, Maastricht University, Kapoenstraat 2, Maastricht, The Netherlands. 76pp.
- Ibanez, M. and Blackman, A. (2016). Is eco-certification a win-win for developing country agriculture? Organic coffee certification in Colombia. *Journal of World Development* 2016(82): 14-27.

- Ibnu, M. (2017). Gate Keepers of Sustainability: On coffee smallholder standards and certifications in Indonesia. Published Dissertation for Award of PhD Degree at Maastricht University. 180pp.
- International Coffee Organization, Gender Equality in the Coffee Sector. [<http://www.ico.org/documents/cy2017-18/icc-122-11e-gender-equality.pdf>] site visited on 12/7/2020.
- Janvry, A., Macours, K. and Sadoulet, E. (2016). *Learning for Technology adoption in developing country agriculture*. Ferdi Publisher, 63 000 Clermont-Ferrand, France. 92pp.
- Jezeer, R. (2020). Effects of shade and input management on the economic performance of small scale Peruvian coffee systems. [<https://www.sciencedirect.com/science/article>] site visited on 20/5/2020.
- Kagezi, G. Kucel, P. Kobusinge, J. Olango, N. Nakibuule, L. Nanjogo, W. Nambozo, B. Olal, S. and Wagoire, W. (2018). Farmers' knowledge and perception of the use of pesticides in Arabica coffee, in Uganda. *Journal of Agriculture and Environmental Sciences* 7(2): 173-188.
- Kimaryo, K. (2017). Tanzania Coffee Industry Report 2016-2017. [<https://afca.coffee/tanzania-coffee-industry-report-2016-2017/>] site visited on 2/6/2019.
- Kirumba, G. (2010). Determinants of farmers' compliance with coffee eco-certification standards in Mt. Kenya region. [<https://econpapers.repec.org/paper>] site visited on 4/5/2020.
- Kothari, C. (2004) Kothari, C.R. (2004). *Research Methodology: Methods and Techniques*. 2nd Edition, New Age International Publishers, New Delhi. 94pp.
- Kuit, M. and Waarts, Y. (2014). Small-scale farmers, certification schemes and private Standards: Costs and benefits of certification and verification systems for

- small-scale producers in cocoa, coffee, cotton, fruit and vegetable sectors. [<https://research.wur.nl/en/publications/small-scale-farmers-certification-schemes-and-private-standards-i>] site visited on 6/8/2019.
- Kraus, E. (2015). The impact of sustainable certifications on coffee farming practices in Tarrazu, Costa Rica. Published Dissertation for Award of MSc Degree at the University of Copenhagen, Denmark. 87pp.
- Latynskiy, E. and Berger, T. (2016). Assessing the income effects of group certification for smallholder coffee farmers: *Environment and Ecology Research* 5(5): 13-18.
- Lazaro, E., Makindara, J. and Kilima, T. (2008). Sustainability Standards and Coffee Exports from Tanzania. Danish Institute for International Studies, DIIS Strandgade 56, DK-1401 Copenhagen, Denmark. 34pp.
- Lentijo, G. and Hostetler, M. (2017). Evaluating certified coffee programs. The Institute of Food and Agricultural Sciences, Gainesville, FL 32611. Florida, USA. 69pp.
- Librahim, G. (1995). Knowledge, attitude and practice the three pillars of excellence and wisdom: a place in the medical profession. *Eastern Mediterranean Health Journal* 1(1): 8-16.
- Meijer, S. Cutacutan, D. Ajayi, O. Sileshi, G. and Maarten, N. (2014). The role of knowledge, attitudes and perceptions in the uptake of agricultural and agroforestry innovations among smallholder farmers in sub-Saharan Africa. *International Journal of Agricultural Sustainability* 13(1): 2-18.
- Mottaleb, K. (2018). Perception and adoption of new agricultural technology: Evidence from a developing country. [<https://doi.org/10.1016/j.techsoc>] site visited on 21/6/2020.

- Mugagga, F. (2017). Perceptions and response actions of smallholder coffee farmers to climate variability in Montane Ecosystems. *Environment and Ecology Research* 5(5): 357-366.
- Muriithi, L. (2016). Impact of Coffee Certification on Small Holder Coffee Farming In Embu County, Kenya. Published Dissertation for Award of MSc Degree at University of Nairobi, Kenya. 101pp.
- Mtaki, B. (2016). Tanzania coffee annual report. United States Department of Agriculture. [<https://gain.fas.usda.gov>] site visited on 6/7/2019.
- Negash, R. (2016). Impact of Fairtrade coffee certification on smallholder producers: A review paper. *Global Journal of Management and Business Research* 16(5): 2-13.
- Nguyen, G. and Sarker, T. (2018). Sustainable coffee supply chain management. *International Journal of Corporate Social Responsibility* 3(1): 7-9.
- Oya, C., Schaefer, F., Skalidou, D., Kosker, C. and Langer, L. (2017). Effects of certification schemes for agricultural production on socio-economic outcomes in low and middle-income countries: *Systematic Review* 2017(34): 49-50.
- Ponte, S. (2004). Standards and sustainability in the coffee sector: A global value chain approach. [<https://www.iisd.org/library/standards-and-sustainability-coffee-sector-global-value-chain-approach>] site visited on 12/5/2019.
- Potts, J. Matthew, L. Ann, W. Gabriel, H. Cunningham, M and Vivek, V. (2014). The state of sustainability initiatives review: Standards and the green economy. International Institute for Sustainable Development and the International Institute for Environment and Development. 87pp.
- Panhyusen, S. and Pierrot, J. (2014). Coffee barometer. Hivos IUCN, Nederland Oxfam Novib Solidaridad WWF. 63pp.

- Quan, L. Jovanovic, G. Don, L. and Sanya, C. (2020). Understanding the perceptions of sustainable coffee production. *Journal of Sustainability* 12(3): 101-110.
- Rubben, R. and Hoebink, P. (2014). *Coffee certification in East Africa*. Wageningen Academic Publishers, The Netherlands. 265pp.
- Snider, A., Krams, E., Sibelet, N. and Faule, S. (2016). Influence of voluntary coffee certifications on cooperatives' advisory services and agricultural practices of smallholder farmers in Costa Rica. *Journal of Agricultural Education and Extension* 10: 2-6.
- Starbucks, (2016). Coffee and Farmer Equity Practices terms and conditions. [<https://www.scsglobalservices.com/starbucks-cafe-practices>] site visited on 12/7/2019.
- Schwartz, N. (1976). Nutrition knowledge, attitudes and practices of Canadian public health nurses. *Journal of Nutrition Education* 8(2): 28-31.
- Rainforest Alliance, (2016). Our global impact: Agriculture. [<http://www.rainforest-alliance.org/work/impact/map/agriculture>] site visited on July 12, 2019.
- Raynolds, T. (2009). Mainstreaming Fairtrade coffee: From partnership to traceability. *World Development* 37(6): 1083–1093.
- Rijsbergen, B., Elbers, W., Ruben, R. and Njuguna, S. (2016). The Ambivalent impact of coffee certification on farmers' welfare: A matched panel approach for cooperatives in central Kenya. *Journal of World Development* 77: 277–292.
- Rios, C. (2019). Impacts of certification on small coffee farmers western Kenya, [<https://www.evidensia.eco/resources/263/impacts-of-certification-on-small-coffee-farmers-western-kenya-2014-2017-podcast/>] site visited on 3/7/2020.
- Slovin, R. (1960). Slovin's formula sampling techniques. [<https://sciencing.com/slovins-formula-sampling-techniques-5475547.html>] site visited on 3/5/2019.

- Tanzania Coffee Board. (2011). Tanzania coffee industry development strategy 2011-2021. [https://en.wikipedia.org/wiki/Coffee_production_in_Tanzania] site visited on 3/6/2019.
- UTZ, (2017). The UTZ standard. [<https://UTZ.org/what-we-offer/certification/the-standard/>] site visited on 30/9/2019.
- Vanderhaegena, K. Kevin, T. Wouter, D. Rudy, J. Bart, M. Bruno, V. Maertens, M. (2018). Do private coffee standards ‘walk the talk’ in improving socio-economic and environmental sustainability? *Journal of Global Environmental Change* 51: 11-18.
- Vellema, W., Buritica, C., Gonzalez, C. and Haese, M. (2015). The Effect of speciality coffee certification on household livelihood strategies and specialization. *Journal of Food Policy* 57: 13–25.
- Wahyudi, A., Wulandari, S., Aunillah, A. and Alouw, J. (2020). Sustainability certification as a pillar to promote Indonesian coffee competitiveness [<https://iopscience.iop.org/article/10.1088/1755-1315/418/1/012009>] site visited on 23.6/2020.
- Wunderlich, C. (2019). Should farmers who follow sustainable practices be rewarded? [<https://www.iisd.org/blog/farmers-sustainable-standards>] site vised on 18/5/2020.
- Zakaria, M., Abujaja, A. and Yakub, W. (2015). “Does gender make any difference in livelihoods diversification”? Evidence from Northern Ghana. *International Journal of Agricultural Extension and Rural Development Studies* 1(1): 36–51.

APPENDICES

Appendix 1: Questionnaire

Questionnaire for Data Collection for Research Titled Assessment of Coffee Growers Knowledge, Attitude and Practice of Starbucks C.A.F.E Practices Certification Scheme in Mbinga District.

For certified smallholder coffee growers at KIMULI AMCOS:

GENERAL INFORMATION

Questionnaire Number Date

Village Ward

Section A: Demographic information

A1. Name/Number of the respondent (Optional)

.....

A2. Phone number

A3. What is your age (Years)?

A4. Sex of respondent [Please tick (√)]: 1. Female 2. Male

A5. What is your education level [please tick (√)]: 1. None 2. Primary

3. Secondary 4. Post-secondary

A6. What is the size of your farm? -----

A6. What is the number of coffee trees on your farm? -----

A7. For how long in years you have been growing coffee? -----

A11. Coffee is your main source of income? 1. Yes 2. No

Section B.

Objective 1: To determine coffee growers' knowledge of C.A.F.E Practices coffee certification scheme.

Instruction: In each of the statement in the table below, please tick (√) in the TRUE column for correct statements and put (X) in the FALSE column for incorrect statements.

S/N	Knowledge Statement	TRUE	FALSE
B1	C.A.F.E Practices require farmers to keep coffee production and sales records		
B2	C.A.F.E Practices standards require proper mulching of coffee farms		
B3	C.A.F.E Practices standards require proper storage of agrochemicals		
B4	C.A.F.E Practices require proper disposal of empty agrochemical containers		
B5	C.A.F.E Practices prohibit entrance in coffee farm applied agrochemicals without protective gears in 3days		
B6	C.A.F.E Practices standards prohibit child labour employment in coffee farm activities		
B7	C.A.F.E Practices require wearing of protective gears when applying agrochemicals		
B8	C.A.F.E Practices certified coffee should be grown under shade tree ranging 20% - 40%		
B9	C.A.F.E Practices require the construction of terrace in a coffee farm with a slope greater than 20%		
B10	C.A.F.E Practices do not allow the use of Gramaxone to control weed in a coffee farm		
B11	C.A.F.E Practices standards do not allow mixing of certified and uncertified coffee		
B12	C.A.F.E Practices prohibit the application of pesticides 5m before permanent water sources		
B13	The buffer zone of at least 30m adjacent to permanent water bodies should be maintained		
B14	C.A.F.E Practices require the use of traps to control coffee insects and pests		
B15	C.A.F.E Practices promote maintenance of healthy soil for sustainable coffee production		
B16	C.A.F.E Practices require routine scouting of coffee farms		
B17	C.A.F.E Practices require the use of premium to fund social projects		
B18	C.A.F.E Practices cover economic, environmental and social standards		
B19	C.A.F.E Practices social responsibility standards touch casual workers welfare		
B20	C.A.F.E Practices prohibit the use of agrochemicals as the first option to control coffee pests, diseases and weeds		

Section C. Objective 2: To examine the attitude of Smallholder farmers of C.A.F.E Practices

Being involved in the implementation of C.A.F.E Practices coffee certification scheme; please in each of the following statement provide your opinion whether you “strongly Agree”, “Agree”, “Undecided”, “Disagree”, or Strongly Disagree” by ticking (√) to the respective statement.

S/N	Attitudinal Statement	Strongly Agree (5)	Agree (4)	Undecided (3)	Disagree (2)	Strongly Disagree (1)
C1	C.A.F.E Practices audit and results were fair					
C2	C.A.F.E Practices standards were relevant to coffee growers demands					
C3	C.A.F.E Practices coffee certification scheme widen coffee markets					
C4	C.A.F.E Practices standards covered all aspects of coffee production best practices					
C5	C.A.F.E Practices training were delivered in good ways					
C6	The priority of C.A.F.E Practices training was given on passing the audit and practice of standards					
C7	Certified coffee secured high price than uncertified coffee					
C8	C.A.F.E Practices training increase awareness of environmental management.					
C9	C.A.F.E Practices training reduce the problem of coffee diseases					
C10	Enough information was given before joining C.A.F.E Practices					
C11	C.A.F.E Practices training improved coffee farm management					
C12	It was not labour intensive to implement C.A.F.E Practices requirements					
C13	C.A.F.E Practices training provided an opportunity for developing new farming skills					
C14	C.A.F.E Practices improved farmers bargaining power					
C15	Profit secured from certified coffee was higher than of uncertified coffee					
C16	Implementation of the C.A.F.E Practices requirement did not increase the cost of coffee production					
C17	C.A.F.E Practices training reduced the application of					

	allowed agrochemicals in a coffee farm					
C18	Joining the C.A.F.E Practices certification scheme addressed the problem of coffee price volatility					
C19	C.A.F.E Practices certification costs and benefits were clear to coffee growers.					
C20	C.A.F.E Practices certification scheme improved the safe use of allowed agrochemicals.					

Section D: Objective 3: To evaluate smallholder farmers practices of C.A.F.E Practices coffee certification standards.

In each of the following please indicate whether you have been “highly”, “moderately” or “poorly” implemented the standard by ticking (✓) in the respective statement.

SN	Standard	Highly ent	Moderately	Poorly ent
D1	C.A.F.E Practices require proper record keeping of coffee production and sales			
D2	C.A.F.E Practices require deliverance of cherry to the processing unit on the same day			
D3	C.A.F.E Practices proper storage of agrochemicals away from food crops			
D4	C.A.F.E Practices prohibit child labour employment			
D5	C.A.F.E Practices require children of legal school age to attend schools			
D6	C.A.F.E Practices require proper disposal of empty chemical containers			
D7	C.A.F.E Practices require proper pruning of a coffee tree			
D8	C.A.F.E Practices require buffer zones of 30m adjacent to permanent water sources			
D9	C.A.F.E Practices prohibit the use of banned pesticides			
D10	C.A.F.E Practices prohibit entrance without protective gears in coffee farm applied pesticides in 48hrs			
D11	C.A.F.E Practices require proper harvesting coffee cherries			
D12	C.A.F.E Practices require coffee to be grown under shade ranging from 20% - 40%.			
D13	C.A.F.E Practices require agrochemicals to be stored in a well-ventilated locked place			
D14	C.A.F.E Practices require spot-application of pesticides			
D15	C.A.F.E Practices require soil erosion control in a farm with a slope above 20%			
D16	C.A.F.E Practices require composting of all coffee trees			
D17	C.A.F.E Practices require mulching of all coffee farm			
D18	C.A.F.E Practices require rejuvenation of old coffee tree			
D19	C.A.F.E Practices require 50% of farm to be planted nitrogen-fixing plants			
D20	C.A.F.E Practice require routine scouting of coffee farm			
D21	C.A.F.E Practices require agrochemicals only used as the last option to control pest, diseases and weeds			
D22	C.A.F.E Practices require the use of traps to control coffee insects			

D23	C.A.F.E Practices require the use of appropriate protective gears			
-----	---	--	--	--

Section E: Objective 4: To examine the challenges encountered by smallholder farmers in the implementation of C.A.F.E Practices coffee certification.

E1. Are there any challenges have you encountered in the implementation of C.A.F.E Practices?

Please tick where appropriate 1. Yes 2. No

E2. If your answer is Yes in question E1 above, what were the challenges did you face in the implementation of C.A.F.E Practices coffee certification?

S/N	Challenges associated with the C.A.F.E Practices coffee certification scheme
1	
2	
3	

E3. For the above-mentioned challenges in question E2, propose their respective solutions

S/N	Solutions for the challenges mentioned above
1	
2	
3	

Appendix 2: Interview Questions for key informants

1. Based on C.A.F.E Practices standards/requirements to smallholder farmers, what is your opinion on the coffee growers' knowledge of C.A.F.E Practices?
2. In your opinion, what are the outcomes of C.A.F.E Practices to coffee growers in terms of coffee quality, market price, the relevance of certification standards, C.A.F.E Practices training facilitation and market availability?
3. Do C.A.F.E Practices coffee certification scheme address coffee growers' problems such as price volatility and coffee diseases?
4. Are there any remarkable practices brought out by C.A.F.E Practices which are vividly practised by coffee growers in coffee production activities?
5. Is there any significant difference between price secured by certified coffee and uncertified coffee?
6. Based on your experiences in the C.A.F.E Practices coffee certification scheme, in what ways do coffee growers are profitable from the program?
7. Based on your experience on coffee certification, point out the challenges faced coffee growers in the implementation of the C.A.F.E Practices coffee certification scheme?
8. Propose the respective solutions for the challenges pointed out in the question above.

Appendix 3: Questions for focus group discussion with farmers

1. In your opinion what do you say about C.A.F.E about C.A.F.E Practices coffee certification scheme?
2. How do C.A.F.E Practices coffee certifications scheme organized, implemented and evaluated?
3. What went well in the implementation of the C.A.F.E Practices coffee certification scheme?
4. What went wrong in the implementation of the C.A.F.E Practices coffee certification scheme?
5. Why the implementation of C.A.F.E Practices went well or wrong?

