

**CHRISTIAN SERVICE UNIVERSITY COLLEGE  
SCHOOL OF BUSINESS  
DEPARTMENT OF ACCOUNTING AND FINANCE**

**ASSESSING THE RISK MANAGEMENT SYSTEMS AMONG COCOA FARMERS.  
THE CASE OF EJISU JUABENG DISTRICT**

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A PROJECT SUBMITTED TO THE SCHOOL OF BUSINESS, CHRISTIAN SERVICE UNIVERSITY COLLEGE, IN PARTIAL FULFILLMENT OF THE REQUIREMENT OF THE AWARD OF BACHELOR OF BUSINESS ADMINISTRATION. (BANKING AND FINANCE)

## DECLARATION

We hereby declare that this submission is our own work towards the Masters of Business Administration and that, to the best of my knowledge, it contains no material previously published by another person or material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text. However, references from the work of others have been clearly stated.

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## **DEDICATION**

We humbly dedicate this case study to the enhancement of Business students in making case studies.

The student's aim to develop a study that is worthy of credit as a certificate reference in the continuing implementation of Business practice in assessing risk management systems among cocoa farmers – Hence, the contents of this study should be able to provide data for future researchers and studies in the area covered.

We finally dedicate this study to our families whose untiring support and assistance have made possible the fruition of our efforts. To our friends and classmates for their cooperation while conducting the study.

And most of all to our great creator our Almighty God the author of knowledge and wisdom who made this possible.

## **ACKNOWLEDGEMENT**

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## ABSTRACT

Cocoa is the backbone of Ghana's economy and a major foreign exchange earner. It is the most important agricultural export crop accounting for between 25-30 percent of total export earnings (\$1.2 billion in 2007) and contributes about 10 percent to GDP. Ghana was formally the leading exporter of cocoa in Africa but for the past two years, she has lost that title, although we still produce the finest beans. For the past two years, the production of cocoa has gone down despite government's intervention. In line with, the study sought to ascertain the risks and vulnerabilities in the supply of cocoa from farmland to the Produce Buying Companies for a sustainable cocoa production, to identify the prevalent risk and vulnerabilities in the supply of cocoa from farmland to PBC in Ghana. Specifically, the study sought to ascertain the risks and vulnerabilities' impact on sustainable cocoa production and to determine the challenges in managing these risks and vulnerabilities. The source of data was basically primary through the administration of questionnaires and interviews. The population included the cocoa farmers in the Ejisu Juabeng District, COCOBOD officials and the licensed buying companies. A simple random sampling technique was used to select 50 farmers out of the population. And purposive sampling was used in the selection of 5 officials each from COCOBOD and LBC. From the research, three broad categories of risks were identified viz. production, market and the enabling environmental risks. There were three main production risks that affected the supply of cocoa. They are the black pod disease, Mirids/Capsids and the swollen shoot virus. The market risks identified were counter party risk, cocoa price volatility and input price volatility. The enabling environmental risks identified were industry regulatory risk and logistic breakdown. The multiple regression equation identified to establish the impact of the risks and vulnerabilities on the supply of cocoa was  $y = 4.281 + -1.787(X_1) + -1.507(X_2) + -.160(X_3)$ . From the analysis above, the study found that all the risks negatively impacted on the supply of cocoa but the market risk was not statistically significant. It was recommended that farmers should have joint farmer's organizations. This was due to the numerous benefits associated with these unions and also be educated formally and informally. Government and other stakeholders should also put in extra efforts in helping out farmers.

## CONTENTS

DECLARATION .....	ii
DEDICATION.....	iii
ACKNOWLEDGEMENT.....	iv
ABSTRACT .....	v
CONTENTS .....	vi
LIST OF TABLES .....	ix
LIST OF FIGURE.....	x
CHAPTER ONE.....	1
INTRODUCTION .....	1
1.1 BACKGROUND TO THE STUDY .....	1
1.2 PROBLEM STATEMENT .....	2
1.3 OBJECTIVES OF THE STUDY.....	3
1.4 RESEARCH QUESTIONS.....	3
1.5 JUSTIFICATION OF THE STUDY .....	3
1.6 BRIEF METHODOLOGY TO THE STUDY .....	4
1.7 SCOPE AND DELIMITATIONS OF THE STUDY .....	4
1.8 LIMITATIONS OF THE STUDY.....	4
1.9 ORGANIZATION OF THE STUDY .....	5
CHAPTER TWO .....	6
LITERATURE REVIEW.....	6
2.1 INTRODUCTION .....	6
2.2 THE HISTORY OF COCOA PRODUCTION IN GHANA .....	6
2.3 THE CONCEPT OF RISK.....	7
2.4 TYPOLOGY OF RISKS IN AGRICULTURE.....	8
2.5 COCOA PRODUCTION RISKS .....	9
2.5.1 Black Pod Disease .....	9

2.5.2	Cocoa Mirids/Capsids .....	10
2.5.3	Swollen Shoot Virus Disease .....	11
2.5.4	Mistletoe.....	11
2.5.5	Cocoa Stem-borers.....	12
2.5.6	Drought/Dry Spell.....	12
2.5.7	Bushfires.....	12
2.5.8	Cocoa Acreage Loss .....	12
2.6	RISK MANAGEMENT PRACTICES .....	13
2.6.1	Agricultural Risk Management Strategies .....	15
2.6.2	Supply Chain Risk Management .....	16
2.8	CONCLUSION.....	19
CHAPTER THREE.....		20
RESEARCH METHODOLOGY.....		20
3.1	INTRODUCTION .....	20
3.2	RESEARCH METHODOLOGY .....	20
3.3	RESEARCH DESIGN .....	20
3.4	POPULATION OF THE STUDY .....	21
3.5	SAMPLING SIZE.....	21
3.6	SAMPLING TECHNIQUE.....	21
3.7	SOURCES OF DATA.....	22
3.8	DATA COLLECTION INSTRUMENT .....	22
3.9	DATA ANALYSIS.....	22
3.10	PROFILE OF EJISU JUABENG .....	22
3.10.1	Introduction .....	22
3.10.2	Land location and area .....	23
3.10.3	Topography and drainage.....	23
3.10.4	Climate and vegetation.....	23

3.10.5	Geology and soils.....	24
3.10.6	Demographic characteristics .....	25
3.10.7	Population density.....	25
3.10.8	Estimated agricultural land area .....	26
3.10.9	Land ownership (land tenure).....	26
3.10.10	Average farm land.....	26
CHAPTER FOUR.....		27
DATA ANALYSIS AND DISCUSSIONS.....		27
4.1	INTRODUCTION .....	27
4.2	BACKGROUND OF RESPONDENTS .....	27
4.3	RISK AFFECTING COCOA CULTIVATION .....	31
4.4	RISK MITIGATION MEASURES .....	35
4.5	EFFECTIVENESS OF THE RISK MITIGATION MEASURES .....	37
4.6	CHALLENGES FACED IN RISK MITIGATING.....	38
4.7	IMPACT OF PRODUCTION RISKS ON YIELD (BAGS).....	39
CHAPTER FIVE .....		41
SUMMARY, CONCLUSION AND RECOMMENDATIONS .....		41
5.1	INTRODUCTION .....	41
5.2	SUMMARY OF FINDINGS.....	41
5.3	CONCLUSIONS .....	42
5.4	RECOMMENDATIONS .....	42
REFERENCES .....		44
APPENDIX I .....		51
QUESTIONNAIRE-FARMERS.....		51
INTERVIEW GUIDE-COCOBOD OFFICIALS .....		54
INTERVIEW GUIDE-LINCENSED BUYING COMPANY .....		55

## LIST OF TABLES

Table 4. 1 Demographics.....	27
Table 4. 2 Frequency of Production Risks .....	31
Table 4. 3 Severity of Production Risks.....	34
Table 4. 4 Risk Mitigation Measures .....	35
Table 4. 5 Effectiveness of Risk Mitigation Measures .....	37
Table 4. 6 Regression.....	39
Table 4. 7 Monetary Loss .....	40

## **LIST OF FIGURE**

Figure 2. 1 Conceptual frameworks on production risks on the supply of cocoa. ....	18
Figure 3. 1 Map of Ejisu Juaben District.....	24

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background to the study

Cocoa production in Ghana has been carried out in two main regions: the moist semi-deciduous forest (Eastern, Ashanti, Brong-Ahafo, Central and Volta Region) and high rainforest (Western Region) agro-ecological zones. Cultivation has been done under shade regimes that have evolved over the decades. Once established in Ghana, cocoa production expanded rapidly in Africa and by the mid-1920s, West and Central Africa (WCA) has become the main producer (FAO, 2009). Cocoa grows naturally well in tropical rain forests and this is because the habitat provides heavy shade and rainfall, uniform temperature and constant relative humidity and is typically only found within 10° of the equator. There are basically three group types of cocoa grown: Criollo, Forestaro and Trinitario (a cross between Criollo and Forestaro). Each type has its own characteristics of growth vigour, fermentation requirements, disease susceptibility and fat content. Forestaro is the most commonly grown comprising some 93% of world production.

As it is in any sector of the economy, risk is a central issue that affects many different aspects of farmer's livelihoods in the developing world. In the empirical literature, many researchers have found that risks cause farmers to be less willing to undertake activities and investments that have higher expected outcomes, but carry with them risks of failure (Adebusuyi, 2004, Alderman, 2008). One aspect of this reluctance is reaction to risk. Hence, knowledge on how farmers make decisions as well as their attitudes towards risks is important in determining the strategies for agricultural development. Agricultural risks are especially important if they result in income and consumption fluctuations. Fluctuations in consumption usually imply relatively high levels of transient poverty. High income risk may also be a cause of persistent poverty. This is likely when insurance and credit markets are absent or incomplete as it is the case for developing countries. The failure to cope with income risk is not only reflected in household consumption fluctuations but affect nutrition, health and education and contribute to inefficient and unequal intra-household allocations (Dercon, 2002). However, the absence of formal credit and insurance markets does not imply that rural households have no strategies left to deal with income uncertainty. Traditional risk reducing strategies, however incomplete, helps to cope with risky incomes. There is a vast literature which documents

strategies used by rural households to offset the adverse effects of income shortfalls and entitlement failures.

In Ghana, rural households producing cocoa are exposed to a variety of income uncertainties, both market related such as price variations, as well as non-market related, such as unstable weather patterns and pest/disease of cocoa plants. Dealing with risk in Ghana cocoa sector remains of crucial importance not only for farmers but also for the government given the importance of cocoa in the economy of the country. Ghana is trailing behind Côte d'Ivoire is the leading cocoa producing country in the world. Despite the contribution of cocoa to household livelihoods and the risks inherent to cocoa production, both insurance and financial markets are missing in the Ghanaian agricultural sector. Therefore, Ghanaian cocoa farmers heavily rely on the use of traditional risk management strategies to reduce their exposure to risks and try to secure their income; even though these traditional strategies mitigate only a small part of overall risk (Alderman, 2008; Dercon, 2002). The objective of this study is to assess the risk management systems among cocoa farmers and how it impacts their financial performance.

## **1.2 Problem statement**

Risk is a central issue that affects many different aspects of people's livelihoods in the developing world. It affects whether people can maintain assets and endowments, how these assets are transformed into incomes via activities and how these incomes and earnings are translated into broader development outcomes. In rural area, risk is present in all management decisions of agricultural systems, as a result of price, yield and resource uncertainty. The existence of such risks has been found to alter household behaviour in ways that at first glance seem suboptimal (Alderman, 2008). Indeed, farmers take their decisions in a risky environment so that the consequences of these decisions are often not known with certainty until long after those decisions occur (Adebusuyi, 2004). As a result, outcomes may be better or worse than expected. In the empirical literature, researchers have found that risks cause farmers to be less willing to undertake activities and investments that have higher expected outcomes, but carry with them risks of failure (Adebusuyi, 2004, Alderman, 2008). For example, it has been found that farm households use less fertilizer, improved seeds and other production inputs than they would have used if they simply maximized expected profits. It is also common to observe farm households in developing countries being reluctant to adopt

new technologies even when those technologies provide higher returns to land and labour than traditional technologies. It is for these reasons the researcher decides to assess the risk management systems among cocoa farmers in Ghana but with specific focus on the Ejisu Juabeng district.

### **1.3 Objectives of the study**

The main goal of the study was to assess the risk management systems among cocoa farmers in Ghana. The specific objectives to be addressed are;

- i. To identify the various forms of risk that affect cocoa cultivation
- ii. To assess the impact of risk on the financial performance of the cocoa farmers
- iii. To assess the effectiveness of the risk mitigation measures used by cocoa farmers
- iv. To identify the challenges, they face in mitigating these risks

### **1.4 Research questions**

- i. What are the various forms of risk that affect cocoa cultivation?
- ii. What is the impact of risk on the financial performance of the cocoa farmers?
- iii. How effective are the risk mitigation measures used by cocoa farmers?
- iv. What are the challenges faced by farmers in mitigating these risks?

### **1.5 Justification of the study**

Dealing with risk in Ghana cocoa sector remains of crucial importance not only for farmers but also for the government given the importance of cocoa in the economy of the country. Cocoa remains a backbone to the economy of Ghana, employing over a million people in six cocoa growing regions (Ashanti, Brong Ahafo, Eastern, Central, Volta and Western Regions). This shows the role the production of cocoa plays in the life of the Ghanaian farmer. The farmers depend on cocoa production for economic and social benefits.

Understanding the relationship between farm characteristics, farmers' risk attitude and risk perception and their use of risk management strategies is important for two other reasons. First, most producers are averse to risk when faced with risky outcomes. Someone who is risk averse is willing to accept a lower average return for lower uncertainty, with the trade-off depending on the person's level of risk aversion. This means that strategies cannot be evaluated solely in terms of average or expected return, but that risk must also be considered.

Second, knowledge of small-scale producer's attitudes to risk and their risk management strategies is important in determining strategies and formulating policies for agricultural development. However, to the researcher's knowledge, no empirical information is available on farmers' risk attitude and their preference over available risk management strategies in Ghana. This study fills this lacuna.

Aside all these outstanding benefits, this research would also add to the body of knowledge in the academia.

### **1.6 Brief methodology to the study**

The study was both exploratory and explanatory. Exploratory because it assessed the risk management systems among the Ghanaian cocoa farmers. It is also explanatory because it assessed the impact of the risk management systems on the financial performance of the cocoa farmers. The study area was Ejisu Juabeng district.

In particular, the researcher used data from a survey on 70 households to examine factors influencing farmers' adoption of three major traditional risk management strategies (crop diversification, precautionary savings and social network). Considering the link between risk aversion and risk management, the achievability of the objective of this study may require knowledge of farmers' risk attitude. After recognizing the limited arrangements for traditional risk management strategies, the paper also discuss farmers' interest on modern risk management instruments such as insurance and how these new instruments can overcome the pitfalls of traditional risk management strategies.

### **1.7 Scope and delimitations of the study**

In general, the study was confined to Ejisu Juabeng District. It mainly concentrated on the risk management systems among the cocoa farmers and how this impacted their financial performance.

### **1.8 Limitations of the study**

The first limitation was the time scope for the study. The time limit for the research was not sufficient. This therefore limited the scope to Ejisu Juabeng District which may not be a good source of generalization. Also most of the farmers interviewed were illiterates and therefore the items on the questionnaire had to be translated to Twi and responses back to English. This

could affect the validity of the data however attempts were made to control these challenges hence rendering any possible error negligible.

## **1.9 Organization of the study**

The study is organized into five main chapters. Chapter one consists of the background of study, problem statement, objective of study, research questions, justification of the study, brief overview of research methodology, scope, limitation of the study and organisation of the study. Chapter two reviews literature on the risk management systems. Chapter three looks at the methodological framework of the study. The chapter discusses the types and sources of data, sampling techniques, size and procedures for data collection and analysis of data. Chapter four entails presentational analysis of data. Chapter five presents the summary of key findings from the field survey, conclusion and further makes appropriate recommendation.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter reviews literature on the risks and the risk management systems among agriculture (cocoa farmers). A summary of the chapter was also given.

#### **2.2 The history of cocoa production in Ghana**

The Cocoa tree (*Theobroma cacao*) originated from the river valleys of the Amazon and the Orinoco in South America where the beans were used by the Natives to prepare a chocolate drink or chocolate. It was also used as a form of currency for trading purposes and payment of tribute to the king. Its discoverers, the Maya people, gave it the name 'cocoa' or 'God's food' (Norde and van Duursen, 2003; Cappelle, 2009). After the conquest of Central America, cocoa was introduced to Europe through Spain in the fifteenth century. When the demand for cocoa as a drink and chocolate bar increased, it led to the expansion of cocoa production, which eventually led to the introduction of the crop in Africa (Gibson, 2007; Cappelle, 2009). From the first plantation in Africa established in Fernando Po (now part of Equatorial Guinea) in 1840, it moved to the western parts of Africa (COCOBOD, 2011). In the case of Ghana, available records indicate that Dutch missionaries planted cocoa in the coastal areas of the then Gold Coast as early as 1815, whilst in 1857 Basel missionaries also planted cocoa at Aburi. These however did not result in the spread of cocoa cultivation in Ghana until 1878 when Tetteh Quarshie, who took some seeds with him on his return from Fernando Po, established Ghana's first cocoa farm at Akwapim Mampong in the Eastern Region (Norde and van Duursen, 2003; COCOBOD, 2011). Though the first export of cocoa from the Gold Coast was said to have been made in 1885, the first documented shipment of two bags, which was sent to Hamburg, was in January 1893 (Asuming-Brempong *et al.*, 2007).

Production grew rapidly to reach 20,000 metric tons by 1908. At a production level of 41,000 metric tons in 1911, Ghana was rated the world's leading producer. In the early 1920's, Ghana was contributing about 40 percent of the total global cocoa supply with production of 165,000 metric tons to 213,000 metric tons. The volume of exports grew rapidly to 218,000 metric tons in 1925, reaching a level of 311,000 metric tons in 1936 after which it dropped to between 200,000 metric tons and 300,000 metric tons in the 1940s due to severe drought and

outbreak of diseases and pests. (Norde and van Duursen, 2003; Asuming-Brempong *et al.*, 2007) In 1977, Côte d'Ivoire, with government-supported price incentives, overtook Ghana as the world's dominant cocoa-producing country, now accounting for 39 percent of world cocoa production and 36 percent of worldwide cocoa exports (Gibson, 2007). Today West Africa is the largest supplier of cocoa, accounting for 70 percent of global cultivation. Ghana is the second largest global producer of cocoa – being responsible for nearly a fifth of the world's supply (ul Haque, 2005; Laven and Baud, 2007; Ton *et al.*, 2008; Cappelle, 2009).

Cocoa is a tropical tree crop that grows best in shaded areas. Once planted, cocoa tree seedlings become productive in three to five years, although newer hybrid varieties are being developed that mature more quickly. Generally, a cocoa tree will remain productive for approximately 25 years, without any age-related decline in production. Cocoa pods take five to six months to grow, resulting in two harvest periods during the year: a main crop and a mid-crop. The mid-crop is typically much smaller than the main crop, and the cocoa beans are slightly lower in fat content than those harvested during the main harvest period. The harvest periods vary by climate and type of cocoa tree, but in Côte d'Ivoire and Ghana, the main crop harvest period is October to March and the mid-crop period runs from May to August. In these countries, the main crop typically accounts for 80– 85 per cent of the total harvest (Mull and Kirkhorn, 2005; Gibson, 2007).

### **2.3 The concept of risk**

Originally, the concept of risk was used primarily to mean loss or hazard to a person or self. In 1719, the concept took on an expanded definition to include the commercial loss of insured property or goods. In 1798, the concept was used in the law literature to describe the liability of a loss or damage. Much later, in 1964, the combined term 'risk analysis' was used to describe the systematic investigation and forecasting of risk in business and commerce. At this time, other variations and combinations began to be used in business and commerce such as risk aversion, risk factor, risk-bearing, risk-benefit analysis, risk capital, risk management, risk money, risk premium, risk rate, and risk-taking (Shattell, 2004). In today's literature, risk is subject to various definitions, and as explained by Meyfredi (2004), the answer to the meaning of risk is far from the simple expectation of hazard. However the definition depends on the context and is highly subjective. Durodié considered risk as an abstraction that represents the likelihood of specific outcomes. As such, risks appear largely to be external to

us. To Durodié, risks have always been around, however, that we conceive of something as being a risk, is a product of social progress and the evolution of human consciousness (Durodié, 2006). Risk is a product of the uncertainty of future events and is a part of all activities (Meyfredi, 2004), thus as used in daily activities, risk and uncertainty may be used interchangeably. Knight however distinguished between these two concepts and defined uncertainty as a situation where the decisions of every economic agent depend on exogenous factors whose state could not be predicted with certainty. Only when uncertainty could be quantified with the possibility of assigning a probability distribution is risk spoken of (Knight, 1921). It is usual to distinguish between market risk, credit risk, and liquidity, operational and legal risks. All these risks could generate losses that would be more or less detrimental, to the institution or the investor (Meyfredi, 2004). Recent advances in the theory of credit risk allow the use of standard term structure machinery for risk modeling and estimation. Because all decisions have an element of uncertainty about them, all decision-makers are risk takers. The degree to which decision-makers enjoy taking risk depends on individual attitudes (Jarrow *et al.*, 2005). The traditional approach to risk is to incorporate margins in the valuation assumptions, however, a stochastic approach allows the user to evaluate specific and quantifiable risk and performance measures in respect of alternative funding and investment strategies (Haberman *et al.*, 2003).

#### **2.4 Typology of risks in agriculture**

All agricultural enterprises, most especially in developing countries, operate under a situation of risk or uncertainty. The various sources of risk can be grouped into business risk and financial risk. Business risk occurs when there is variation in income levels and it is divided into the categories of technical, market and social risk. The technical risk is the risk associated with adverse variation in yield because of abnormally bad weather, disease or other climatological events. Market risk is that borne when actual prices are different from that originally expected. Social risk derived from human factors such as theft, strikes, sudden death, accidents, wars etc, which can lead to unexpected decline in yield or total loss of output. The use of debt in financing farm enterprise exposes it to financial risk. Financial risk occurs when enterprise profitability (rate of return) is less than the cost of capital. It varies directly with financial leverage ratio (debt/equity ratio) and inversely with profitability. Since level of profitability of an enterprise depends on yield and prices of output and, inputs (cost of capital inclusive), financial risk is thus a by-product of business risk.

The risk sources vary in importance from one enterprise to another and from a group of farmers to another. The California agricultural producers ranked output price and input cost highest among their production and financial risks (Blank and McDonald, 1995). Ezeh and Olukosi (1991) identified irregularity in input availability, fluctuations in market prices, irregularity in water supply and variability in weather conditions as major risk sources responsible for variation in farmers' income in dry season farming. Osotimehin (1996) opined that many factors including vagaries of nature, diseases, insect infestations, general economic and market conditions contribute to the price, yield or net return variability of agricultural producers. Kinsey et al (1998) identified harvest failures of rural households in a resettlement area in Zimbabwe as the major risk source. In an empirical analysis of Dutch livestock farmers' risk perception and risk management decision, Meuwissen, Huirne and Hardaker (2001) found that, in general, price and production risks were perceived as important sources of risk. Salimonu and Falusi (2009) classified market failure, price fluctuation, drought, pest and diseases attack and erratic rainfall are the most important sources of risk facing by food crop farmers in Osun State, Nigeria. Results from Tru and Cheong (2009) show that, in general, price and production risks were perceived as the most important risk in Vietnamese Catfish Farming.

## **2.5 Cocoa production risks**

In the cocoa sector as a whole, risk factors such as demand forecasting, market price fluctuations, environmental risks and the cocoa bean safety and regulations are prevalent. Furthermore, costs of transactions, investments in business transactions, information asymmetries between parties (leading to bullwhip effect), are also militating against the industry (Otchereet *al.*, 2013b; Vickery, Jayaram, Droge and Calantome, 2003; Khan and Burnes, 2007). According to the World Bank report (2012), the major risk of the cocoa supply chain can be grouped into three main categories: Production risk, Commercial or Market risk and Environmental risk. However, this study concentrates on the production risks, since they directly affect cultivation.

### **2.5.1 Black Pod Disease**

Black pod disease is nearly ubiquitous in cocoa growing areas. It is caused by a pathogen called *Phytophthora*, of which several species infect pods (Opoku et al., 1999):

- *Phytophthora megakarya* is unique to Central and West Africa. It is thought to have originally infected cocoa from local forest trees and has been identified on the fruits of *Cola* and *Irvingia* species. Until 1985, it was unknown in Ghana. *P. megakarya* in some years causes widespread crop loss in West Africa: it may result in 85-95% yield losses if left untreated.
- *Phytophthora palmivora* has a worldwide distribution and is found in tropical and subtropical regions. It infects cocoa and over 200 other plant species.
- Other *Phytophthora* species may be a local concern to some cocoa growers in Ghana.

In Ghana and Cote d'Ivoire, black pod disease caused by *P. palmivora* is less pathogenic and can be largely controlled with regular phytosanitary procedures (i.e., removal of diseased pods, canopy management to reduce shade, etc.). Following the arrival of *P. megakarya*, these practices were insufficient to reduce losses. Fungicides are now widely used for control of the disease. The most widely used include a range of copper products and metalaxyl. Phenylamide compounds have protective, curative, and systemic properties, whereas the older copper fungicides are only protective and must be applied liberally in order to be most effective.

### **2.5.2 Cocoa Mirids/Capsids**

Cocoa mirids (*Sahlbergella singularis* and *Distantiella theobromae*), also known as 'capsids', have been important pests of West African cocoa for over a century. They are favoured by high light intensity and humidity in the cocoa micro-environment (WACRI, 1951). Industry sources suggest that these insects cause annual crop losses in excess of an estimated 100,000 tons in Ghana (ARD, 2012). They are an example of 'new encounter' pests: local insects that adapted to a new food source when a non-indigenous crop (in this case, cocoa from the Amazon region of South America) was introduced to West Africa in the 19<sup>th</sup> century. Mirids damage cocoa trees by feeding on tree sap. They cause characteristic lesions on the surface of cocoa pods, and often introduce pathogenic fungi. Nonetheless, the greatest damage from mirids is to the tree itself. Mirid infestation typically leads to the destruction of growing shoots and, in severe cases, the loss of the tree.

Practical control measures include good tree maintenance (i.e., prevention of gaps in the canopy and removal of chupons) and applications of insecticides.

### **2.5.3 Swollen Shoot Virus Disease**

Cocoa swollen shoot virus disease (CSSVD) is a plant pathogenic virus spread primarily by the mealy bug. The virus is retained when the insect moults, but it does not replicate in the insect. Alternate hosts include red mistletoe. The disease can also spread via roots and interlocking branches, thus necessitating the cutting of neighbouring cocoa trees for effective control (Dakwa, 1984). Many strains of the virus exist, each varying in symptoms and virulence. Infected trees are infectious before they show symptoms, but severe CSSVD will kill traditional West African tree varieties in 2 to 3 years. In 1993-94, a virulent outbreak of CCSVD resulted in approximately 10 million cut trees, representing an immediate loss of US \$20.2 million (Opoku et al., 1999).

Farmers typically need considerable guidance on making the connection between early leaf symptoms and eventual tree death. To reduce infestation and create awareness, COCOBOD issues posters to help farmers and control officers recognize early symptoms. Early detection is crucial for limiting destruction in cocoa farms. Before the characteristic swollen shoots become visible, there are quite a wide variety of symptoms that manifest on mature leaves. Depending on cocoa variety and virus strain, these can include the reddening of primary veins in flush leaves; pinpoint to larger spots; diffused blotching; streaks; and yellow, white, or clear 'fern-patterns'.

During the 1970s, studies looking at the use of early systemic insecticides to control mealy bugs appeared to dismiss this method of control. This remains the most commonly held view. Surveying, diagnosis and replanting of infected areas remains the most effective (perhaps, the only) long-term control method.

### **2.5.4 Mistletoe**

At least six different species of mistletoe have been found growing on cocoa trees in West Africa. One species (*Tapinanthus bangwensis*) accounts for about 70% of infestations in Ghana and is recognized by its red flowers and berries (Blencowe and Wharton, 1961). It flowers twice a year and can live for up to 18 years. Mistletoe growth, if left unchecked, can impact yield. Regular removal of mistletoe is essential for good crop management and large populations can be considered a sign of farm neglect. Mistletoe may also provide a suitable habitat for ants that cultivate CSSVD vectors.

### **2.5.5 Cocoa Stem-borers**

Cocoa stem-borers are widespread across West Africa. They are also known to attack other crops such as coffee and cola. Regular outbreaks occur in cocoa producing countries in West Africa. In Ghana, the Ashanti, Brong Ahafo, and Western regions are most affected (ARD, 2012).

### **2.5.6 Drought/Dry Spell**

By and large, Ghana's cocoa production belt receives sufficient rainfall and cocoa production has not been exposed much to drought stress. Nonetheless, the Harmattan winds are closely monitored by the industry as there does appear to be a causal link between severity of Harmattan winds and cocoa yields and quality (Jaffee et al. 2008). While many older farmers recalled hardships resulting from the 1982-83 drought, cocoa farmers as a whole did not consider drought to be a major risk (ARD, 2012). The early 1980s drought affected numerous districts, but perhaps most severely, in the north. The total crop loss does not appear to be significant even in this extreme year. Nonetheless, many climate change simulation models predict that weather-induced production losses might increase significantly in the future.

### **2.5.7 Bushfires**

Bushfires memorably accompanied the 1982-83 drought, causing localized severe tree losses. Based on data available, related losses are estimated at more than US\$36 million (Harun and Hardwick, 1986). This historical event possibly marks the subsequent rise of the Western region as the most important cocoa region by the early 1990s. Bushfires can have a significant to severe impact on local cocoa communities whose trees (and thus, short-term to near-term livelihoods) are damaged or destroyed. However, its large-scale, widespread occurrence is relatively limited.

### **2.5.8 Cocoa Acreage Loss**

Loss of land devoted to cocoa production is yet another risk faced by the cocoa supply chain in Ghana. Principal drivers that could potentially contribute to acreage loss, and thus, a decline in output are: 1) increasing competition over land and labour from other sectors; and 2) declining terms of trade for cocoa, thereby encouraging farmers to switch to alternative,

more remunerative crops (e.g., oil palm) or abandon their farms in search of off-farm employment.

Anecdotal evidence would suggest that growth in mining concessions and in localized illegal mining is encroaching on cocoa communities and other agricultural communities who depend on the same land for their livelihoods. A 2010 study of Ghana's mining sector chronicled widespread abuses including lack of cooperation with and consent of local communities, corruption, and inadequate compensation (ARD, 2010). Most often, affected communities have little recourse as mining interests hold significant sway both at the federal and local levels. The lack of a transparent land use policy only adds to the uncertainty over land rights. This situation also serves as yet another disincentive for farmers to invest in replanting and productivity-enhancing upgrades.

## **2.6 Risk management practices**

Risk management is an independent function responsible for planning, directing and organizing measures to reduce, mitigate, and control the impact on an institution, of risks arising from its operations. More specifically, risk management may be defined as the systematic application of management policies, procedures and practices to the task of identifying, analyzing, assessing, treating and monitoring risk (ADB, 2002). Financial risk management has been defined by the Basel Committee (2001) as a sequence of four processes: the identification of events into one or more broad categories of market, credit, operational, and "other" risks and into specific subcategories; the assessment of risks using data and a risk model; the monitoring and reporting of the risk assessments on a timely basis; and the control of these risks by management.

The role of risk management in financial firms has evolved far beyond the simple insurance of identified risks, to a discipline that centres on complex econometric and financial models of uncertainty (Alexander, 2005). Thus risk management is the total process of identifying, measuring, and minimizing uncertain events affecting resources, therefore helping to control an institution's use of capital while limiting default risk, and helping to mitigate agency problems (Pedersen and Garleanu, 2007). But even with careful planning and preparation, risks cannot be completely eliminated because they cannot all be identified beforehand. Various paradigms are used by different organizations to organize their risk management activities. While there are variations in the different paradigms, certain characteristics are

universally required for the program to be successful. These include the planning and structuring of the risk management process; integration of the risk and acquisition processes, and the working together of developers, users, procurers, and all other stakeholders in its implementation. Risk management is an ongoing process, with continual monitoring and reassessment. A set of success criteria is defined for all cost, schedule, and performance elements of the project. Metrics are defined and used to monitor effectiveness of risk management strategies. An effective test and evaluation program is planned and followed. All aspects of the risk management program are formally documented. Communication and feedback are an integral part of all risk management activities (GSAM, 2003).

While risk management approach should be tailored to the needs of a project, it should incorporate these fundamental characteristics. The process is iterative and worth noting that, while planning appears as the first step, there is a feedback loop from the monitoring activity that allows planning and the other activities to be redone or controlled by actual results, providing continual updates to the risk management strategy. In essence, the process is a standard approach to problem solving which involves planning or defining the problem solving process, defining the problem, working out solutions for those problems and tracking the progress and success of the solutions (GSAM, 2003).

Risk management is usually applied to only a portion of a company's production, trade or consumption. The size of this part depends on that company's risk exposure and hedging strategy. A key element in any hedging strategy is to determine the desired level in the trade-off between risk and return. Although most companies may claim their objective is to "maximize returns", this involves an inherent contradiction, since maximizing returns implies accepting maximum risks. The part of production, trade or consumption which is hedged mainly depends on the level of income flow an enterprise wants to ensure.

In addition, the size of this part depends on whether or not the available means of assessing the level of risk at any time (the fundamentals of supply and demand, technical analysis and "psychological" factors) are perceived to be reliable, the relationship with and status of the enterprise's trading partners, and a number of other particular conditions (e.g. the marketing structure for the underlying commodity, the acceptable price level, the cost of using risk management instruments and flexibility of production or consumption) (UNCTAD, 1998). Risk management has been an area of explosive development over the last decade in both

business and academia (Drzik and Wyman, 2005). Positive theories to explain financial risk management require a considerable number of assumptions concerning the objectives of management (Benson and Oliver, 2004).

### **2.6.1 Agricultural Risk Management Strategies**

Rural Africa is characterized by the lack of formal insurance. What is more surprising is that there are no credit and other financial markets which can substitute for the lack of insurance. However this does not mean that farmers are uninsured against the different risks listed above. Farmers come up with many strategies to manage risk and to cope with shocks. Alderman and Paxson (1994) presented a whole range of strategies and distinguished between risk management strategies and risk coping strategies. Each category involves a number of specific actions but can be summarized as in Fafchamps (1999). He classified actions as follows: 1) to reduce exposure to shocks *ex-ante* (fear) farmers carefully choose their location or diversify their plots and crops; 2) to cope with shocks *ex-post* (fate), rural households use 'self-insurance' via precautionary savings, borrowing, liquidation of assets, smoothing consumption, labour sales and solidarity through risk sharing networks.

Indeed, when farmers happen to be unable to or fail to reduce their exposure to risks *ex-ante*, they have to deal with the shocks *ex post*. Their precautionary savings include assets like food stocks, gold, jewellery, cash or when possible, deposits on savings and checking accounts (Berhman, Foster and Rosenzweig, 1997; Fafchamps, 1999). Sometimes, when they face a long series of negative shocks their precautionary savings run out and they have to borrow.

Productive assets usually liquidated to face shocks are livestock, oxen, bullocks, farm tools, artisanal equipment, vehicles and farm buildings (Rosenzweig and Wolpin, 1993; Fafchamps, 1999). Instead of selling their productive assets, some farmers prefer to reduce their consumption even in the face of extreme shocks like drought (Fafchamps et al. 1998; Kazianga and Udry, 2006). When farmers do not have or when they are not willing to sell their productive assets, they increase their labour supply. This includes being engaged in nonfarm activities during less extreme conditions, using child labour and labour bonding during extreme conditions (Fafchamps, 1999; Barrett et al. 2000).

In a survey administered in rural Tanzania, De Weerdt and Dercon (2006) found that risk sharing was the most frequently mentioned coping strategy. They also discovered that risk

sharing is mainly achieved through private gifts, private loans and private labour transfers. However, risk sharing among households from the same village will not adequately insure them against covariate risks like floods, hurricanes, drought or other negative shocks that have a positive covariance between households such as price shocks. All households in the same area are affected at the same time. Therefore, nobody in the same area can help the other. Assistance has to come from outside the affected area. Rosenzweig and Stark (1989) found that Indian families marry their daughters in distant villages as a coping strategy against covariate risks. Salimonu and Falusi (2009) identified cooperative society, borrowing of money and off farm-work as major risk management strategies used by Nigerian food crop farmer.

Although traditional risk management strategies mitigate only a small part of overall risk (Alderman, 2008; Dercon, 2007), in the absence of insurance and financial markets, households use a combination of these strategies as substitutes to deal with agricultural risks. According to Tomek et al. (2001), farmers are assumed to select a combination of strategies that, for example, maximize net expected returns (profits) subject to the degree of risk they are willing to accept. Clearly, risk management strategies in agriculture vary with farm characteristics and the risk environment (Hope and Lingard, 1992). Farmers' risk perceptions, risk attitudes, objectives as well as the available resource base, influence their decisions and actions.

### **2.6.2 Supply Chain Risk Management**

Large number of links that need to be created between members of the SC has increased the possibility of risks being transmitted along the chain, so that a small incident in one distant area can grow into adverse consequences for other associates within the SC (Christopher *et al.*, 2006, Otchere *et al.*, 2013a; Faisal & Banwat, 2006; Chopra and Sodhi, 2004). Because of Supply chain's vulnerability and exposure to many internal and external risks, most businesses have started to realize the need for mechanism to identify and assess those risks in early stages and then manage them in the most effective way to survive the adverse consequences that may come about especially when introducing new products to the market. The ultimate results that arise from effective risk management is to ensure improved productivity within the cocoa supply chain (Hainmueller *et al.*, 2011; Anim-Kwapong *et al.*, 2004). SC risks vary based on the type of industry and the level of complexity of the SC

network, however, it could be seen that most of the SC related risks are common in most industries. The frequent occurrence of natural disasters, labour disputes, uncertain supply and demand, supplier bankruptcy, political changes, war and terrorism have led to deeper concerns about risk management for the supply chain (Ritchie and Brindley, 2007; Mallman, 1996; Giannakis *et al.*, 2004; Ellegard, 2008; Christopher and Lee, 2004).

It is important to develop a framework of risk mitigation strategies for supply chains, in order to create a sustainable cocoa industry so that the target set by the Ghana government will be reached. Risk management strategies may be categorized into what is termed the four 'Ts':

1. Tolerate or accept the risk
2. Transfer or spread the risk
3. Terminate or avoid and,
4. Treat, mitigate, minimize or control (Chartered Institute of Purchasing and Supply (CIPS), 2012).

Tolerating risk has to do with a situation where no further action (or deliberate action) needs to be taken to deal with the risks if the assessed likelihood or impact of the risk is negligible or within acceptable level. Transfer or spread of risk has to do with sharing the risks impact with other parties or partners. This could be by taking insurance cover or engaging in contract terms where risk is borne by the partner. For example using defect liability clauses in contracts. Terminating also has to do with avoiding the risk completely when the likelihood of impact is costly than the returns. For example, backing off from a project that has high risks with low reward; Treating risks is where a deliberate mitigation process is undertaken to minimize or control the impact

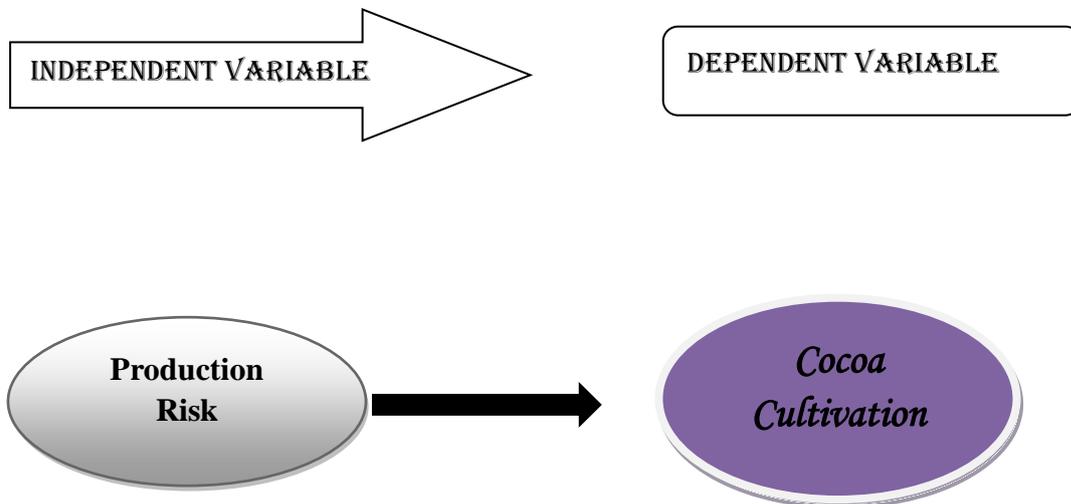
According to CIPS (2012), risk mitigation could be explained in terms of control application. Control application could take any of the following forms:

- Preventive control which is designed to limit the negative impact;
- Directive control which is designed to ensure desired outcome;
- Detective control which is also used to identify whether an undesired risk event has occurred and

- Corrective control designed to mitigate the impact of undesired outcome when it has already happened.

The assertion concludes that risk analysis could be undertaken by quantitative technique which is subject to or based on people’s perception, and quantitative technique which is objective and uses statistical analysis such as Failure Modes and Effects Analysis. A qualitative technique could take the form of scenario analysis which involves the use of “what if” questions or brainstorming to stimulate the identification of possibilities in the supply chain (CIPS, 2012).

## 2.7 CONCEPTUAL FRAMEWORK



**Figure 2. 1** Conceptual frameworks on production risks on the supply of cocoa.

**Source: Authors Construct (2014)**

Figure 2.1 above depicts the conceptual framework on the production risks cocoa cultivation in bags. It shows two main variables. These are dependent and independent variables. The dependent variable is the supply of cocoa (in bags) and the independent variable is the production risks (Black pod disease, Swollen shoot virus, Mirids/capsids, Bushfires, Drought/dry spell, Loss of cocoa acreage and Other pests, disease and weeds). From the frame work it can be seen that the dependent variable which is the supply of cocoa is influenced by the independent variable.

## 2.8 CONCLUSION

This chapter sought to review literature on the various forms of risks associated with cocoa production and the strategies employed by the farmers to mitigate those risks. Originally, the concept of risk was used primarily to mean loss or hazard to a person or self. In 1719, the concept took on an expanded definition to include the commercial loss of insured property or goods. However, recent advances in the theory of risk allow the use of standard term structure machinery for risk modeling and estimation.

All agricultural enterprises, most especially in developing countries, operate under a situation of risk or uncertainty. The various sources of risk can be grouped into business risk and financial risk. Business risk occurs when there is variation in income levels and it is divided into the categories of technical, market and social risk. Financial risk occurs when enterprise profitability (rate of return) is less than the cost of capital. It varies directly with financial leverage ratio (debt/equity ratio) and inversely with profitability. However, according to the World Bank report (2012), the major risk of the cocoa supply chain (an extension from just the production) can be grouped into three main categories: Production risk, Commercial or Market risk and Environmental risk.

Risk management is an independent function responsible for planning, directing and organizing measures to reduce, mitigate, and control the impact on an institution, of risks arising from its operations. Fafchamps (1999) classified farmers' risk mitigation strategies as 1) to reduce exposure to shocks ex-ante (fear) farmers carefully choose their location or diversify their plots and crops; 2) to cope with shocks ex-post (fate), rural households use 'self-insurance' via precautionary savings, borrowing, liquidation of assets, smoothing consumption, labour sales and solidarity through risk sharing networks. The Chartered Institute of Purchasing and Supply (CIPS) in 2012 classified risk management strategies as *Tolerate* or accept the risk, *Transfer* or spread the risk, *Terminate* or avoid and *Treat*, mitigate, minimize or control (four 'Ts').

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

Research is defined as the application of systematic and scientific techniques and methods in pursuit of answer to questions raised in a study of an experiment. It is concerned with gathering of data that can help the researcher to answer questions about various aspects of the society and thus can enable the researcher understand issues in the society (Bailey, 1987; Singlinton, et al. 1992; Otokiti, 2005). This chapter contains the research methodology, research design, population of the study, sampling Size, sampling technique, sources of data, data collection instrument and data analysis. An overview of Teachers' fund was also presented in this chapter.

#### **3.2 Research methodology**

Research methodology is regarded as the process of arriving at dependable solution to problem through objectives, planned and systematic collection, interpretation, analysis and reporting of data and information. Otokiti (2005) explained that there are four types of research methods commonly in use. These he listed as survey research, experimental research, observation and ex-post facto (historical) methods. He concluded that the nature of a research might necessitate the use of one or a mixture of two or more methodologies. This study however made use of the survey method, using Teachers' fund as the case study.

#### **3.3 Research design**

Research design is the step by step in which the research is carried out. It is actually a plan that guides the researcher in his or her data collection, and analytical phases of the research work. According to kerlinger, (1964), research design includes an outline of what the investigator will do from writing the hypotheses, research questions, operationalization of variables, to the final analysis of data. It is therefore a blueprint of detailed planned on how the research was completed. This involves operationalization of variables, sample size determination, sampling techniques adopted in this work, sources of data, instrument used in testing the variables. It also incorporated procedural plan that was adopted for answering the questions raised validly, objectively, and accurately. Saunders et al. (2009) identified three research designs namely Exploratory, Explanatory and Descriptive. Exploratory research is developed based on grounded theory which was intended as a flexible approach to formulate theory based upon generic principles of theoretical saturation, constant comparison method of

analysis and theoretical saturation (Glaser & Straus, 1967). The explanatory design establishes relationship between studies and variables, meaning that the aim is to study situations or problems, trying to find a relationship between variables (Saunders et al., 2009). However, when using the descriptive research, the goal is to reveal an accurate profile of events, persons or situations.

The study was both exploratory and explanatory. Exploratory because it assessed the risk management systems among the Ghanaian cocoa farmers. It is also explanatory because it assessed the impact of the risk management systems on the financial performance of the cocoa farmers.

### **3.4 Population of the study**

This is any complete, or the theoretically specified aggregation of study elements. It is usually the ideal population or universe to which research results are to be generalized. The Survey population which is an operational definition of the target population; that is target population with explicit exclusions-for this study include the population accessible, excluding those victims who do not have specified place of work or who were not found on the job. The population for this study was the cocoa farmers in the Ejisu Juaben District.

### **3.5 Sampling size**

A sample consists of one or more elements selected from the population. The researcher sampled on 70 cocoa farmers.

### **3.6 Sampling technique**

Sampling is very important as far as collecting data from primary sources are concerned. The sampling method used in this research was convenient sampling (a non-probability sampling). For non-probability samples, the probability of each case being selected from the total population is not known and it is impossible to answer research questions or to address objectives that require you to make statistical inferences about the characteristics of the population. Saunders et al (2009) defined convenience sampling (or haphazard sampling) as involving selecting haphazardly those cases that are easiest to obtain for your sample, such as the person interviewed at random in a shopping centre for a television programme or the book about entrepreneurship you find at the airport. The sample selection process is continued until your required sample size has been reached. Although this technique of

sampling is used widely, it is prone to bias and influences that are beyond your control, as the cases appear in the sample only because of the ease of obtaining them. However these problems are less important where there is little variation in the population, and such samples often serve as pilots to studies using more structured samples.

### **3.7 Sources of data**

The source of the data for this study was basically primary. In Jankuwics (2002), primary data is defined as consisting of materials that you have gathered yourself through systematic observation, information from archives, the results of questionnaires and case study which you have compiled. Primary data has not been published yet and is more reliable, authentic and objective. Primary data has not been changed or altered by human beings and therefore its validity is greater than secondary data.

### **3.8 Data collection instrument**

The primary data for the study were gathered using a structured questionnaire. Questionnaires were used because data collected using questions can be stable, constant and has uniform measure without variation. It also reduces bias caused by the researcher's presentation of issues. The instrument was designed based on the objectives of the study and was interviewer-administered.

### **3.9 Data analysis**

According to Bernard (1998), data analysis consists of systematically looking for patterns in recorded observations and formulating ideas that account for those patterns. The quantitative data (from the questionnaires) were analysed with the Statistical Package for Service Solutions (SPSS) 17.0. Table, frequencies, percentages, mean and standard deviation were presented.

### **3.10 Profile of Ejisu Juabeng**

#### **Introduction**

Ejisu- Juabeng Municipal is Located 20 km from Kumasi on the Kumasi-Accra highway. It is one of the 27 administrative and political Districts in the Ashanti Region with Ejisu as its capital.

### **Land location and area**

The Municipality is located in the central part of the Ashanti Region and shares boundaries with six (6) other Districts in the Region namely Kumasi, Kwabre, Afigya Sekyere, Asante Akim north, Asante Akim South and Bosomtwi Kwanwoma Districts. It lies within latitude 1.15°N and 1.45°N and longitude 6.15°W and 7.00°w.

The Municipality stretches over an area of 637.2 km<sup>2</sup> constituting about 10% of the entire Ashanti Region. The strategic location of the Municipality (especially the capital Ejisu, which lies only 20 km from Kumasi and the other communities along the Kumasi-Accra trunk road offer a lot of potentials that foster development of marketing activities along the road sides and the diffusion of information and innovation.

- **Topography and drainage**

The Municipality falls within the forest dissected plateau terrain region. This region is underlain by the pre-cambrian rocks of the Birimian and Tarkwaian formations. It rises from about 240 metres to 300 metres above sea level. The area is generally undulating and is drained by a number of rivers, notable among them being Oda, Anum, Bankro, Hwere and Baffoe. In the rainy season, occasional flooding is experienced in the inland valleys along the river basins. The construction of a dam on the Anum River at Nobewam for irrigation offers a great potential for agricultural development in the Municipality.

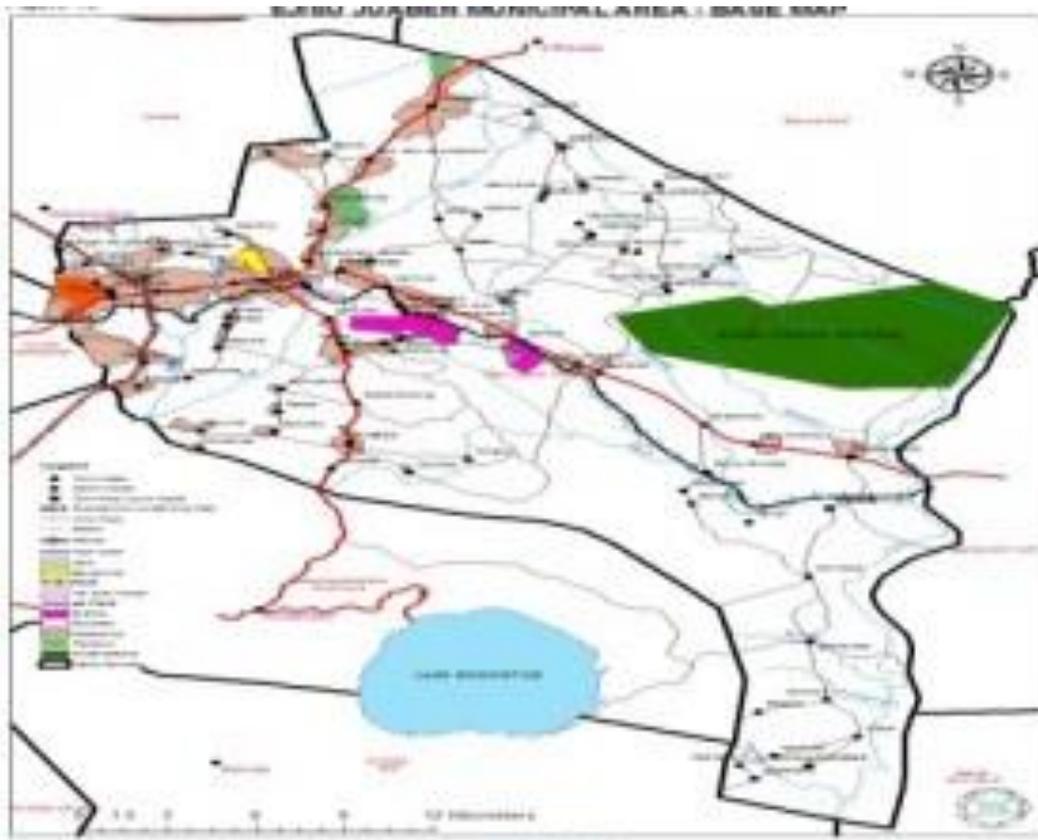
- **Climate and vegetation**

As in the case of most of the middle belt in Ghana, the municipality experiences tropical rainfall that is bi-modal rainfall pattern and wet semi-equatorial climate. It is characterized by double maxima rainfall lasting from March to July and again from September and normally ends in the later part of November. The mean annual rainfall is 1200mm which is ideal for minor season cropping. Temperatures range between 20°C in August and 32°C in March. Relative humidity is fairly moderate but quite high during rainy seasons and early mornings. The fair distribution of temperature and rainfall patterns enhances the cultivation of many food and cash crops throughout the Municipality thus making the Municipality a food sufficiency case in Ghana. The Municipality lies within the semi deciduous forest zone, which does not differ much in appearance from the rain forest. Most of the trees shed their leaves during the dry season, but not at the same time for all the trees of the same species.

The ecologically unfriendly farming practices, stone quarrying activities and illegal chain saw operations have resulted in the natural vegetation cover being degraded into secondary forest. Massive deforestation has occurred in areas such as Ejisu, Adadientem, Achiase and Peminase, resulting in the forest giving way gradually to savanna conditions.

- **Geology and soils**

The geology and soils types in the Municipality offer vast opportunity for the cultivation of traditional and non-traditional cash crops and other staple food stuff and thus present the municipality as one of food basket case in Ghana. The geology and soil types found in the Municipality include the Kumasi-Offin Compound Association, Bomso-Offin Compound Association, Swedru-Nsuba Simple Association, Boamang-Suko simple Association, Bekwai-Oda Compound Association, Kobeda-Eschiem-Sobenso-Oda Compound Association, Atunkrom-Asikuma Association, Fig. 1.4 shows the location of the types of soils in the Municipality.



**Figure 3. 1 Map of Ejisu Juaben District**

**Source: [www.mofa.gov.gh](http://www.mofa.gov.gh)**

- **Demographic characteristics**

Currently, the population of the Municipality stands at 144,272. This signifies that there has been increase in population of the Municipality over the years. The female population for 1960 was 21,264 representing 44.0% which increased to 63,456 (projected) representing 52.5%. This shows that the female population is increasing at an increasing rate. The male population on the other hand is increasing at a decreasing rate. The males constitute 56.0% (27,064) in 1960 and 47.5% (57,413) in 2005. Continuous increase in the population for the various censal years' is likely to attract entrepreneurs and investors since population increase will lead to an increase in human resource and labour.

The intercensal growth rates have been on the rise between the various censal periods whereas the population growth rates have been rising for both the Municipal and the national.

The age structure of the district is basically youthful thus indicating that the working age in the municipality is more than those in the dependant age. The working age is about 64 percent of the population whilst the dependant age forms about 36 percent of the population. The age dependency ratio in the municipality is about 1:0.3 thus substantiating the fact that there are more people in the working age than the dependant age. Children (0-14) constitute 38.5%, 58.5% for the working age group (15-64) and 3.0% fall within the aged group (65+).

The age dependency ratio for the municipality is 1:0.7. This means that 100 persons in the active population group are being depended on by 70 persons in the inactive population group.

The working population group is not overburdened since one person in the active group takes care of himself and another person in the inactive group.

- **Population density**

The size of the Municipality is 637.2 sq. Km and that of the national (Ghana) is 238,537 Sq. Km. It is realized that the population density growth rate of 2.5% (2000-2006) for the municipality is less than the national rate of 2.6 % (2000-2006).

Therefore, this increase in the density will put pressure on the available natural resources and some of the agricultural lands will be turned into residential uses especially at the peri-urban settlements.

### **Household Sizes**

The average household size in the country is about 4.2% for urban areas and 5.24 for rural areas, giving an average of 4.89% for the total country. In Ejisu-Juaben municipal, the average is 3.96 (2009 survey).

- **Estimated agricultural land area**

Agriculture land area is estimated to be 180,931 hectares (2000 DADU BASELINE).

- Area under annual crops: 76,265 Ha
- Area under tree crops. 38,113 Ha
- Area under fallow. 60,393 Ha
- Area under forest 6,160 Ha

- **Land ownership (land tenure)**

Land acquisition is also another issue of importance and there are basically three forms of land acquisitions in the municipality. These are family (inheritance), self or by lease/hiring. Quite a significant percentage (54.5%) of the farmers use family lands. This is followed by those who own the land personally. They constitute 28.8% of the farmers. The rest (16.5%) resort to the last option, which is by hiring. However, the sizes of their farms are small and keep on reducing as a result of fragmentation due to increasing family sizes. This impedes efforts to enter large-scale production.

- **Average farm land**

Average farm size is as low as 1.9 acres per farmer as against the national average of 5 acres. The small farm sizes affect production and consequently income; and therefore the standard of living of the farmers.

## CHAPTER FOUR

### DATA ANALYSIS AND DISCUSSIONS

#### 4.1 Introduction

This chapter forms an integral part of the survey and is affected by its overall quality. According to Zikmund (2000) it is important that at every stage of the data processing and analysis, the researcher ask questions relating to his objectives in order to obtain meaningful answers. In this regard the principal concepts in the study's objectives were used to examine the data. Data returned from the field were properly examined for consistency of responses as a quality control measure. Errors were detected and eliminated from the data after which the data collected were processed, presented, analysed and discussed. The study made use of computer software called Statistical Package for Social Scientists (SPSS) version 17. The analysis is presented in the form of tables, using mean, standing error and standard deviation. Responses in same category were also ranked. Out of the population, 70 cocoa farmers were sampled for the study. However after data clearing, 65 were considered valid for analysis. This represents 92.85% response rate.

#### 4.2 Background of respondents

The background represents the demographic data of the cocoa farmers. Demographics are the quantifiable statistics of a given population. Without the inclusion of demographic information, the researcher risk assuming the stance of "absolutism", which assumes that, the phenomena of interest are the same regardless of age, gender, educational level, etc. Provision of detailed information about participant characteristics allows researchers to move toward a position of "universalism," which recognizes that "there may be universal psychological processes that manifest differently" depending on the gender, age, educational level of participants, etc. (Beins, 2009, p. 356). In other words, researchers cannot assume that no differences exist between groups until this underlying hypothesis has been proven.

**Table 4. 1 Demographics**

<b>Demographics</b>	<b>Responses</b>	<b>Percentages (%)</b>
<b>Gender</b>	Male	61.5
	Female	38.5

<b>Age</b>	Less than 25 years	7.7
	26-35 years	23.1
	36-45 years	7.7
	46-55 years	38.5
	56 years and above	23.1
<b>Level of education</b>	No formal education	38.5
	Basic	38.5
	SHS	15.4
	Degree	7.7
<b>Number of years into farming</b>	Below 1 year	15.4
	1-5 years	7.7
	6-10 years	23.1
	11-15 years	30.8
	16-20 years	23.1
<b>Number of dependents</b>	1-5	50.0
	6-10	41.7
	11-15	8.3
<b>Size of cocoa farm</b>	1-5 acres	46.2
	6-10 acres	38.5
	11-15 acres	15.4
<b>Number of employees</b>	0	53.8
	1-5	30.8
	6-10	15.4

<b>Any other work apart from farming</b>	Yes	53.8
	No	46.2
<b>Farmers' organization</b>	Yes	30.8
	No	69.2

**Source: Field Survey, 2020.**

The gender distribution showed a dominance of male over females. The male represented 61.5% while the females represented 38.5%. This is an indication of the Ghanaian culture that seeks to associate farming to masculinity. Farming is considered as a profession for the males not females, so very few ladies enter into farming.

From the age distribution, farmers less than 25 years were 7.7%, those aged 26-35 years were 23.1%, those aged 36-45% were 7.7%, those aged 46-55 years were 38.5% and those aged 56 years and above were 23.1%. The distribution indicates that the farmers were aged, that is, above 46 years. They represented more than 60% of the farmers. This depicts the current trend of the farming population. There is over-emphasizing on formal education and white collar job at the expense of agriculture. It is made to believe that formal education and white collar job is the surest way to succeed in life. Even farmers would discourage their children from farming. It is as though the educated cannot engage in agriculture.

The level of education of the cocoa farmers indicates that, 38.5% had no formal education, 38.5% had basic education and 15.4% had secondary education. The 1<sup>st</sup> degree holder into cocoa farming were 7.7%. This also shows that the elite are really not going into farming. Farming is considered as a profession for the uneducated and the poor. The young guys after tertiary do not want to associate themselves with agriculture, sometimes even if they read agriculture related courses at the tertiary.

The number of years respondents had been farming was also ascertained. 15.4% of the respondents had been farming for less than a year, 7.7% had been farming for 1-5 years, 23.1% had been farming for 6-10 years, 30.8% had been into agriculture for 11-15 years and 23.1% had been farming for the past 16-20 years. The distribution shows that 77% of the farmers had been farming for more than 6 years, and 54% had also been farming for more than 10 years.

The distribution indicates that 50% of the farmers had 1-5 dependents, 41.7% had 6-10 dependents and 8.3% had 11-15 dependents. Cocoa farms therefore serves as a livelihood for only to the farmer but his entire family which normally ranges from 1-10.

The distribution on the size of cocoa farm indicates that 46.2% of the respondents had their cocoa farm of size 1-5 acres, 38.5% of the farmers had a farm of size 6-10 acres and 15.4% had a farm of 11-15 acres. This confirms the report by COCBOD (2002) that cocoa farm sizes are relatively small ranging from 0.4 to 4.0 hectare.

The Ghanaian cocoa production is based on smallholder farmers, mainly involving family labour, but also dependent on seasonal migrant labour for the clearing of land, farm maintenance and harvest. From the analysis, 53.8% (majority) employed no assistance on the cocoa farm, 30.8% employed only 1-5 labourers and 15.4% employed 6-10 people to assist on the farm.

The analysis showed that 53.8% of the respondents had other works apart from cocoa farming, and 46.2% of them only farmed cocoa as a fulltime employment.

The concern about domestic market competitiveness gives rise to the promotion of farmers' organizations (FOs). Farmers are more likely to benefit more from acting cooperatively as they are often in the position where there are very few outlets for their products (Wilcox and Abbott, 2006). A well-functioning FO is able to ensure quantity and quality, negotiate with agents downstream and transport cocoa to the buyer. If these tasks are performed efficiently, positive effects on members include a reduction in transaction costs through efficiency gains, a countervailing in the market power of buyers or competitors, or even an extraction of premiums that accrue from differentiation (product or service quality). However the analysis indicates that only 30.85 of the cocoa farmers were with an FO like the Kuapa Kokoo. The majority of 69.2% were independent and did not partake in the benefits associated with the FOs. The farmers mostly sell their produce to Adwumapa Buyers, Armajaro, Kuafo Adanfo and Kuapa.

### 4.3 Risk affecting cocoa cultivation

The risks in cocoa supply chain have been categorized into three main heading viz. production, market and enabling environment (ARD, 2012). The current study adopts production risks dimension to indicate the prevalence (frequency) and severity in the Ejisu Juabeng district. The researcher used the average of the responses (mean) in the analysis. In addition, the researcher used the standard deviation and the standard error mean. The items in each category was also ranked. The respondents were given a scale of 1=very frequently, 2=frequently, 3=neutral, 4=not frequent and 5= not frequent at all. The values would be approximated to assign meaning using the scale. In this study, the closer the mean to one (1), the better.

Standard Deviation (SD) provides an indication of how far the individual responses to a question vary or “deviate” from the mean. SD tells how spread out the responses are; are they concentrated around the mean, or scattered far and wide? SD generally does not indicate “right or wrong” or “better or worse”, so a lower SD is not necessarily more desirable. However, in a normal distribution, 68.26 percent of all scores will lie within one standard deviation of the mean; 95.34 percent of all scores will lie within two standard deviations of the mean; and 99.74 percent of all scores will lie within three standard deviations of the mean.

The Standard Error (SE), is an indication of the reliability of the mean. A small SE is an indication that the sample mean is a more accurate reflection of the actual population mean. A larger sample size normally result in a smaller SE (while SD is not directly affected by sample size). This study drew sample from the Ejisu Juabeng district cocoa farmers.

**Table 4. 2 Frequency of Production Risks**

<b>Production</b>	<b>N</b>	<b>Mean</b>	<b>Std. Error</b>	<b>Std. Deviation</b>	<b>Ranking</b>
Black pod disease	65	1.0000	.00000	.00000	1 <sup>st</sup>
Swollen shoot virus	65	1.2308	.05267	.42460	2 <sup>nd</sup>
Mirids/capsids	65	1.2308	.05267	.42460	3 <sup>rd</sup>

Bushfires	65	1.4615	.06231	.50240	4 <sup>th</sup>
Other pests, disease and weeds	65	1.5385	.10533	.84921	5 <sup>th</sup>
Drought/dry spell	65	1.7692	.13114	1.05726	6 <sup>th</sup>
Loss of cocoa acreage	65	2.1538	.14582	1.17567	7 <sup>th</sup>

**Source: Field Survey, 2020.**

From table 4.2, it was realized that the production risks that frequently affected the production of cocoa were black pod disease, swollen shoot virus, capsids, bushfires, drought, loss of cocoa acreage and other pests, diseases and weeds. These all had a mean either approximately 1 (very frequently) or 2 (frequently). All the standard deviations were below two. The standard error means were also closer to zero than one, indicating that the sample mean is a more accurate reflection of the actual population mean.

The black pod disease was first most frequently occurring risk on the cocoa farm. It is nearly ubiquitous in cocoa growing areas. It is caused by a pathogen called *Phytophthora*, of which several species infect pods (Opoku et al., 1999). Some of the species are *Phytophthora megakarya* is unique to Central and West Africa (of which is part) and *Phytophthora palmivora* has a worldwide distribution and is found in tropical and subtropical regions. It infects cocoa and over 200 other plant species.

The second most frequently occurring production risk was the swollen shoot virus. Cocoa swollen shoot virus disease (CSSVD) is a plant pathogenic virus spread primarily by the mealybug. The virus is retained when the insect moults, but it does not replicate in the insect. Alternate hosts include red mistletoe. The disease can also spread via roots and interlocking branches, thus necessitating the cutting of neighbouring cocoa trees for effective control (Dakwa, 1984). Many strains of the virus exist, each varying in symptoms and virulence. Infected trees are infectious before they show symptoms, but severe CSSVD will kill traditional West African tree varieties in 2 to 3 years. In 1993-94, a virulent outbreak of CCSVD resulted in approximately 10 million cut trees, representing an immediate loss of US \$20.2 million (Opoku et al., 1999).

Mirids/Capsids (*Sahlbergella singularis* and *Distantiella theobromae*) was the third most frequently occurring production risk to cocoa cultivation. These have been pests of West

African cocoa for over a century. They are favoured by high light intensity and humidity in the cocoa micro-environment (WACRI, 1951). Industry sources suggest that these insects cause annual crop losses in excess of an estimated 100,000 tons in Ghana (ARD, 2012).

Bush fires were the fourth most frequently occurring risks on the cocoa farms. These were very popular after the 1982-83 drought, causing localized severe tree losses (Harun and Hardwick, 1986). Bushfires can have a significant to severe impact on local cocoa communities whose trees (and thus, short-term to near-term livelihoods) are damaged or destroyed.

Other pests, diseases and weeds represented the fifth most occurring risks in cocoa cultivation. These comprised Mistletoe of which one species (*Tapinanthus bangwensis*) accounts for about 70% of infestations in Ghana and is recognized by its red flowers and berries (Blencowe and Wharton, 1961). Cocoa stem-borers are widespread across West Africa. They are also known to attack other crops such as coffee and cola. Weeds also compete with cocoa plants on nutrients and space, thereby reducing cocoa yield.

Drought/dry spell was the sixth most frequently occurring cocoa risks in Ghana. Cocoa production in Ghana is left at the mercy of the seasons (raining). Irrigation farming is very poor in Ghana and therefore farming has become seasonal in Ghana. Cocoa as a tree crop that lives for some number of years therefore is at risk during long dry seasons, especially when at a tender stage.

Loss of cocoa acreage was the last frequently occurring cocoa risks in Ghana. The loss of land devoted to cocoa production is yet another risk faced by the cocoa supply chain in Ghana. Principal drivers that could potentially contribute to acreage loss, and thus, a decline in output are: 1) increasing competition over land and labour from other sectors; 2) illegal mining ('galamse') and 3) declining terms of trade for cocoa, thereby encouraging farmers to switch to alternative, more remunerative crops (e.g., oil palm) or abandon their farms in search of off-farm employment.

**Table 4. 3 Severity of Production Risks**

<b>Production</b>	<b>N</b>	<b>Mean</b>	<b>Std. Error</b>	<b>Std. Deviation</b>	<b>Ranking</b>
Black pod disease	65	1.1538	.04510	.36361	1 <sup>st</sup>
Drought/dry spell	65	1.3077	.05769	.46513	2 <sup>nd</sup>
Swollen shoot virus	65	1.5385	.06231	.50240	3 <sup>rd</sup>
Bushfires	65	1.5385	.10533	.84921	4 <sup>th</sup>
Mirids/Capsids	65	1.6154	.06081	.49029	5 <sup>th</sup>
Others pests, disease and weeds	65	2.0769	.11458	.92378	6 <sup>th</sup>
Loss of cocoa acreage	65	2.6923	.16543	1.33373	7 <sup>th</sup>

**Source: Field Survey, 2020.**

From table 4.3, it was realized that six out of the seven had a mean either approximately 1 (very severe) or 2 (severe). All the standard deviations were below two. The standard error means were also closer to zero than one, indicating that the sample mean is a more accurate reflection of the actual population mean. The respondents were given a scale of 1=Very severe, 2=Severe, 3=Indifferent, 4=Not severe and 5=Not severe at all. The values would be approximated to assign meaning using the scale. In this study, the closer the mean to one (1), the better.

The table 4.3 above indicates six out of the seven production risks that frequently occurred were severe. All the standard deviations were below two. The standard error means were also closer to zero than one, indicating that the sample mean is a more accurate reflection of the actual population mean.

The study indicates that Black pod disease was not only the most frequently occurring production risks, but was also the most severe risks. This was followed by drought. As indicated earlier, farming in Ghana is always at the mercy of the rain. Very insignificant farming are done by irrigation. The inadequate and untimely rain therefore poses challenge to farmers. By and large, Ghana's cocoa production belt receives sufficient rainfall and cocoa production has not been exposed much to drought stress. Nonetheless, the Harmattan winds

are closely monitored by the industry as there does appear to be a causal link between severity of Harmattan winds and cocoa yields and quality (Jaffee et al. 2008).

Swollen shoot disease which was the second frequently occurring cocoa production risk was the third was severe risk. The disease spread via roots and interlocking branches, thus necessitating the cutting of neighbouring cocoa trees for effective control (Dakwa, 1984). Severe swollen shoot disease will kill traditional West African tree varieties in 2 to 3 years.

Bush fires were the fourth most severe production risk. Bushfires can have a significant to severe impact on local cocoa communities whose trees (and thus, short-term to near-term livelihoods) are damaged or destroyed. However, its large-scale, widespread occurrence is relatively limited.

Mirids or Capsids which are favoured by high light intensity and humidity in the cocoa micro-environment, was the fifth most severe production risks. Other pests, diseases and weeds also had a severe impact on the production of cocoa.

The study indicates that loss of cocoa acreage did not have any significant impact on cocoa production. The mean was 2.6923 (approximately 3).

#### 4.4 Risk mitigation measures

**Table 4. 4 Risk Mitigation Measures**

<b>Risk mitigation measure</b>	<b>True (%)</b>	<b>False (%)</b>
Stringent measures to ensure that approved farm practices are adhered to	92.3	7.7
Periodically analyses and evaluate potential risks on my cocoa farm	92.3	7.7
Risks that seen difficult to avoid entirely, there are stringent measures to reduce its impact on production	92.3	7.7
Reduces exposure to shocks I diversify my plots and crops	61.5	38.5
Stringent measures to avoid those risks whose impact on productivity seen more costly to rectify	61.5	38.5

When necessary, I implement measures to transfer risks to other primary or supporting members	53.8	46.2
Belong to association with prime objective of financing member in case of casualties	53.8	46.2
I self-insurance via precautionary savings and liquidation of assets	53.8	46.2
Reduces exposure to shocks I carefully choose my location	46.2	53.8
There are joint risks sharing programs with our chain partners	38.5	61.5

**Source: Field Survey, 2020.**

The cocoa farmers were asked to indicate whether they employed any of the risk mitigation measures enumerated in table 4.4 above. The farmers responded positive to eight out of the ten items. The study indicated that farmers employ stringent measures to ensure that approved farm practices are adhered to. In other to boost cocoa productivity in Ghana, the government and some individuals educate farmers through television and radio adverts or documentaries. The extension officers also educate farmers. As a production risk mitigation factor, farmers do their best to adhere to those practices.

Farmers periodically analyses and evaluate potential risks on cocoa farm. Risks that seen difficult to avoid entirely, there are stringent measures to reduce its impact on production. As indicated in table 4.1, 53% of farmers engaged in other activities. To reduce exposure to shocks farmers diversify their plots and crops.

Stringent measures to avoid those risks whose impact on productivity seen more costly to rectify. And when necessary, cocoa farmers implement measures to transfer risks to other primary or supporting members. Risk sharing is mainly achieved through private gifts, private loans and private labor transfers. However, risk sharing among households from the same village will not adequately insure them against covariate risks that have a positive covariance between households such as price shocks.

Farmers join an association with prime objective of financing member in case of casualties. They also self-insurance via precautionary savings and liquidation of assets. To cope with shocks ex-post (fate), rural households use ‘self-insurance’ via precautionary savings,

borrowing, liquidation of assets, smoothing consumption, labor sales and solidarity through risk sharing networks.

The study indicates that farmers do not reduce exposure to shocks by carefully choosing their location. And there was not joint risks sharing programs with supply chain partners.

#### 4.5 Effectiveness of the risk mitigation measures

**Table 4. 5 Effectiveness of Risk Mitigation Measures**

<b>Risk mitigation measure effectiveness</b>	<b>N</b>	<b>Mean</b>	<b>Std. Error</b>	<b>Std. Deviation</b>	<b>Ranking</b>
Stringent measures to ensure that approved farm practices are adhered to	65	1.6923	.14197	1.14459	1 <sup>st</sup>
When necessary, I Implement measures to transfer risks to other primary or supporting members	65	2.2308	.11131	.89738	2 <sup>nd</sup>
Periodically analyses and evaluate potential risk on my cocoa farm	65	2.2308	.14000	1.12873	3 <sup>rd</sup>
Risk that seen difficult to avoid entirely, there are stringent measure to reduces its impact on production	65	2.2308	.16374	1.32015	4 <sup>th</sup>
Reduces exposure to shocks I diversify my plots and crop	65	2.3077	.15800	1.27381	5 <sup>th</sup>
Stringent measures to avoid those risks whose impact on productivity seen more costly to rectify	65	2.3846	.12537	1.01076	6 <sup>th</sup>
Belong to association with prime objective of financing member in case of casualties	65	2.3846	.15916	1.28321	7 <sup>th</sup>
I self-insurance via precautionary savings and liquidation of assets	65	2.4615	.15974	1.28789	8 <sup>th</sup>

**Source: Field Survey, 2020.**

Table 4.5 showed that all the eight risk mitigation factors used by the cocoa were effective. These all had a mean either approximately 1 (very frequently) or 2 (frequently). All the standard deviations were below two. The standard error means were also closer to zero than one, indicating that the sample mean is a more accurate reflection of the actual population mean. The respondents were given a scale of 1=Very effective, 2=Effective, 3=Neutral, 4=Not effective and 5=Not effective at all. The values would be approximated to assign meaning using the scale. In this study, the closer the mean to one (1), the better.

The study indicates that the most effective mitigation measure was stringent measures to ensure that approved farm practices are adhered to. This was followed by the implementation of measures to transfer risks to other primary or supporting members, periodical analyses and evaluation of potential risk on cocoa farm, stringent measure to reduce the impact of risks that seems difficult to prevent, reduction in exposure to shocks by diversifying plots and crop, stringent measures to avoid those risks whose impact on productivity seen more costly to rectify a, joining an association with prime objective of financing member in case of casualties and self-insurance via precautionary savings and liquidation of assets. These were the most important risk mitigation measures used by the farmers.

Other mitigation measure used by the farmers were regular weeding to avoid competition for space and nutrients, regular pruning, cutting of infested cocoa tree to prevent the spread and the creation of fire belt to prevent bushfires during the dry season. Other farmers engage in hedging, planting of resistant trees to stand diseases and pests, periodic spraying and planting at appropriate season to prevent seedling from dying. In order to help each other, some farmers try to educate their colleagues with the knowledge acquired.

#### **4.6 Challenges faced in risk mitigating**

Amongst the challenges faced by the farmers was the inadequate finance to invest in the farming. As indicated earlier, the sources of loan facilities for the farmers are usually very expensive. These makes them unable to access them for the expansion of their farms.

Land tenure system in Ghana has also become a major issue to the cocoa farmers. This is the relationship, whether legally or customarily defined, among people, as individuals or groups, with respect to land. Rules of tenure defines how property rights to land are to be allocated within societies.

The non-availability of extension service some areas had also been challenging. The extension service is meant to provide education to farmers and to assist them with some inputs.

Illiteracy was also counted as part of the challenges to risk mitigation. There is also no coordination among farmers.

Inadequate input materials for risk mitigation. This is due to the lack of finance, interest rate volatility, inflation and exchange rate volatility imparting on input price. Farmers are unable to buy inputs for the farm.

#### 4.7 Impact of production risks on yield (BAGS)

**Table 4. 6 Regression**

Independent variables (Production Risks)	Dependent variables (Bags of Cocoa)			
	R	R <sup>2</sup>	B	Sig.
(Constant) (a)	-.567	.322	27.158	.000
Production (X)			-12.678	.000

**Source: Field Survey, 2020.**

**Note:**

*R* represents the correlation or relationship between the dependent and the independent variables

*R<sup>2</sup>* represents how much of the dependent variable can be explained by the independent variables.

*B* represents the coefficients of the independent variables.

*Sig.* represents the statistical significance level of the model (the acceptable level of significance for this research was 0.05).

The data used for running the regression analysis were generated from the questionnaires gathered. The output in the Table 4.6 above represents the linear regression to establish the impact of production risks on cocoa cultivation (in bags). The regression equation was therefore  $y = a + bx$ . When the values from the table are computed, the equation becomes;

$$y = 27.158 - 12.678 (x).$$

From the model, the correlation (R) value between the production risks and yield was -.567. This indicates a moderate relationship between the variables (when an R value falls within 0.3 to 0.7, it is considered moderate). The relationship was also inverse (negative), indicating that when production risks increases, the yield would also reduce, and the vice versa. The R<sup>2</sup> (which indicates the extent to which yield was explained by the production risks) was 0.322. This shows that 32.2% of the yield was explained by the production risks.

The coefficient value for the production risk was -12.67. This indicates an inverse relationship between the variables. When production risks increases, the yield (bags) would fall and vice versa. The 12.67 shows that when there is a change in the production risk by 1, there would be a change in the yield (bags) by 12.67. This shows how greatly the production risk impacts cocoa yield. Leaving cocoa at the mercies of these risks is therefore very devastating. This was also statistically significant (0.00 < 0.05).

**Table 4. 7 Monetary Loss**

<b>Expected/Actual</b>	<b>Yield (bags)</b>	<b>Unit price (GHC)</b>	<b>Total income (GHC)</b>
Expected yield	707.50	212	149,990.00
Actual yield	542.50	212	115,010.00
<b>Loss</b>	<b>165</b>	<b>212</b>	<b>34,980.00</b>

**Source: Field Survey, 2020.**

In ascertaining the effect of the production risks on the financial performance of the cocoa farmers, the researcher found the estimated cocoa yield per bag based on the size of farmland and the actual yield in bags. The calculation indicates that the estimated yield of the 65 cocoa farmers was 707.5, but the actual yield was 542.5 bags. The monetary value for the estimated yield was GHC149, 990.00 and the actual income received was GHC115, 010.00. This gives a deficit of GH34, 980.00, which could be attributed to the productions risks.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter presents the summary of findings, conclusions drawn from the findings and recommendations.

#### **5.2 Summary of findings**

The researcher found many production risks frequently affected the cultivation of cocoa. These are Black pod disease, Swollen shoot virus, Mirids/capsids, Bushfires, Drought/dry spell, Loss of cocoa acreage and other pests, disease and weeds.

With the level of severity, Black pod disease was the highest. This was followed by Drought/dry spell, Swollen shoot virus, Bushfire, Mirids/Capsids and others pests, disease and weeds. Loss of cocoa acreage was however not severe on cocoa cultivation.

The risk mitigation measures used by cocoa farmers were stringent measures to ensure that approved farm practices are adhered to, periodical analyses and evaluation of potential risks on my cocoa farm, there are stringent measures to reduce the risks that seems difficult to avoid, reducing exposure to shocks by diversifying plots and crops, stringent measures to avoid those risks whose impact on productivity seen more costly to rectify, implementation of measures to transfer risks to other primary or supporting members when necessary, joining an association with prime objective of financing member in case of casualties and self-insurance via precautionary savings and liquidation of assets. These were all found to be effective measures of mitigating production risks.

The challenges faced by cocoa farmers in risk mitigation were inadequate finance to invest in the farming, land tenure system in Ghana, the non-availability of extension service some areas, illiteracy on the part of some farmers and the inadequate input materials for risk mitigation.

There was a moderate relationship between the production risks and the yield of cocoa. The  $R^2$  which indicates the extent to which yield was explained by the production risks was 0.322. The coefficient value for the production risk was -12.67, indicating an inverse relationship

between the variables. When production risks increases, the yield (bags) would fall and vice versa. The model was statistically significant ( $0.00 < 0.05$ ).

In monetary terms, the farmers lost GHC34,980.00 in total. This was attributed to the production risks.

### **5.3 Conclusions**

The study concluded that, the production risks associated with cocoa cultivation were Black pod disease, Swollen shoot virus, Mirids/capsids, Bushfires, Drought/dry spell, Loss of cocoa acreage and other pests, disease and weeds. All but loss of cocoa acreage severely impacted the cultivation of cocoa. The risk mitigation measures used by cocoa farmers were stringent measures to ensure that approved farm practices are adhered to, periodical analyses and evaluation of potential risks on my cocoa farm, there are stringent measures to reduce the risks that seems difficult to avoid, reducing exposure to shocks by diversifying plots and crops, stringent measures to avoid those risks whose impact on productivity seen more costly to rectify, implementation of measures to transfer risks to other primary or supporting members when necessary, joining an association with prime objective of financing member in case of casualties and self-insurance via precautionary savings and liquidation of assets. These were all found to be effective measures of mitigating production risks. The challenges faced by cocoa farmers in risk mitigation were inadequate finance to invest in the farming, land tenure system in Ghana, the non-availability of extension service some areas, illiteracy on the part of some farmers and the inadequate input materials for risk mitigation. There was a moderate relationship between the production risks and the yield of cocoa. And it heavily impacted the cocoa yield thereby causing financial loss to farmers.

### **5.4 Recommendations**

After undertaking the research to ascertain the antecedents and consequences of social capital on managerial effectiveness, the researcher made the following recommendations;

The study showed that farmers did not accessed the formal system as a risk mitigation measure. Agriculture has therefore become an untapped market for the insurance companies. There should be much sensitization and a special package for the agriculture industry. This would motivate farmers. Premium price must be a consideration factor since farmers are highly price sensitive.

Finance for investment and expansion has also been a challenge for cocoa producers since time immemorial. This is because of the high risk involved in loaning to farmers. They are not regular income earners and therefore difficult to monitor and control. The financial institutions should open up to them, especially the rural banks and microfinance institutions. They must put stringent measures to monitor the use of the money for the rite purpose. If possible, the institutions should buy the farm inputs on behalf of the farmers. Have team that would regularly checkup on farmers, and this team must be made up of agriculture experts.

The farmers must be encouraged to join Farmers' Organization. The research showed that most of the cocoa farmers did not join any farmers' organizations (FOs). However the researcher realized that these were lots of benefits associated with the FOs. Farmers are more likely to benefit more from acting cooperatively as they are often in the position where there are very few outlets for their products. A well-functioning FO is able to ensure quantity and quality, negotiate with agents downstream and transport cocoa to the buyer.

As a way of lessoning the burden of the cocoa farmers, the government must enlarge and strengthen the mass spraying exercise. The extension officers must also be up and doing to monitor and regulate the activities of the cocoa farmers. The LBC must also try to pay the farmers on time, educate and provide financial support.

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**Q11.** Apart from cocoa, what other products do you farm?

.....  
 .....

**Q12.a** Are you in any farmers' organization?      a. Yes [ ]      b. No [ ]

**Q12b.** If yes, please state .....

**Section B: Risks and Vulnerability**

**Q13.** Kindly indicate by ticking (√), the extent to which you agree the following is a risk affecting the supply of cocoa. 1=Strongly agree, 2=Agree, 3=Indifferent, 4=Disagree and 5=Strongly disagree.

	<b>Risks</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Production</b>	Black pod disease					
	Mirids/capsids					
	Swollen shoot virus					
	Other pests, diseases, and weeds					
	Drought/dry spell					
	Bushfires					
	Loss of cocoa acreage					
<b>Market</b>	Cocoa price volatility					
	Exchange rate volatility					
	Counterparty risk					
	Input price volatility					
	Interest rate volatility					
<b>Enabling Environment</b>	Smuggling					
	Market regulatory risk					
	Policy risk					
	Logistics breakdown					
	Misappropriation of funds					

**Q14.** What other risks are you vulnerable to? .....

.....

**Q15.** In what ways do the risks affect the supply of cocoa?

.....

.....

.....

**Q15.** What challenges do you face in trying to manage the risk?

.....

.....

.....

**Q16.** What do you think could be done to mitigate the risks?

**CHRISTIAN SERVICE UNIVERSITY COLLEGE**

**SCHOOL OF BUSINESS**

**DEPARTMENT OF ACCOUNTING AND FINANCE**

**INTERVIEW GUIDE-COCOBOD OFFICIALS**

Dear Sir/ Madam,

This research is being undertaken as part of the requirements for the award of an MSC in Accounting and finance. The study seeks to examine the risks and vulnerability in the supply of cocoa. The research is strictly for academic purposes hence every information volunteered would be held in high confidence. I shall be grateful if you could take a few minutes of your time to answer the following questions.

Name of officer.....

Position.....

Contact.....

What are some of the risks and vulnerabilities that cocoa farmers face?

In what ways do these risks affect the economy as a whole?

How does it affect the production and supply cocoa?

What are some of the challenge faced in trying to manage them?

What has been the contribution of COCOBOD towards helping farmers in managing these risks?

What has been the contribution of the government in same regard?

What is the contribution of PBC in solving these challenges?

What are some individual organizations like farmers' organization doing n same regards?

What other options are available in managing these risks?

## **INTERVIEW GUIDE-LICENCED BUYING COMPANY**

Dear Sir/ Madam,

This research is being undertaken as part of the requirements for the award of a BBA in Accounting and finance. The study seeks to examine the risks and vulnerability in the supply of cocoa. The research is strictly for academic purposes hence every information volunteered would be held in high confidence. I shall be grateful if you could take a few minutes of your time to answer the following questions.

Name of Company.....

Name of Respondent.....

Position in the Organization.....

Contact.....

What are some of the risks and vulnerabilities faced by your company?

In what ways do these risks affect the economy as a whole?

What are some of the challenges faced during storage and warehousing?

How do the risks and challenges affect the supply cocoa?

What are some of the measures in place to control those challenges?

What are some of the challenge faced in trying to manage them?

What has been the contribution of the government in helping solve those challenges?

What has been some of your contributions towards helping farmers achieve high production?