

THE ROLE OF THE GHANA COMMODITY EXCHANGE



**ASHESI UNIVERSITY**

**THE ROLE OF THE GHANA COMMODITY EXCHANGE IN IMPROVING  
GENERAL AGRICULTURAL SECTOR PERFORMANCE IN GHANA**

Undergraduate Thesis

By

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Supervised by: Dr. Stephen Armah

**May 2020**

DECLARATION

I hereby declare that this thesis is the result of my own research work and that no part of it has been presented for another degree in this university or elsewhere.

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Date: 11<sup>th</sup> May 2020

I hereby declare that the preparation and presentation of this thesis were supervised in accordance with the guidelines on supervision of applied projects laid down by Ashesi University.

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## ABSTRACT

Ghana, in a bid to modernize and create an efficient agricultural market, launched the Ghana Commodity Exchange (GCX). The exchange is an organized trading hub intended to link agricultural commodity producers and buyers. However, the benefits of commodity exchanges and their impact in developing countries such as Ghana are not well known. This paper therefore explored the role of the Ghana Commodity Exchange in improving the performance of key agriculture sector players particularly farmers. The relevant question asked was, are farmers currently benefiting in some way from the GCX? Primary data in the form of interviews was collected and analyzed to answer the research question. Players in the market including farmers, buyers, middle men, and personnel of the GCX were interviewed. The findings from this research revealed that, price discovery had been achieved, to an extent, and that, farmers were in a better position to bargain because they now had access to price information which they did not have before. The exchange was also successful in centralizing trade and the transactions costs involved in finding a suitable buyer or seller at a suitable price was reduced by means of the exchange. The paper also revealed challenges which include poorly developed infrastructure such as roads and warehouses. Overall, the GCX is making steps in the right direction to create a more efficient agricultural market. The support of the government of Ghana is however needed to improve the exchanges operations and enable them to obtain their objectives.

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## LIST OF ABBREVIATIONS

ADB	Agricultural Development Bank
CBOT	Chicago Board of Trade
ECX	Ethiopian Commodity Exchange
GCX	Ghana Commodity Exchange
GGC	Ghana Grains Council
GSB	Ghana Standards Board
ICEX	Indian Commodity Exchange
KACE	Kenyan Agricultural Commodity Exchange
MoFA	Ministry of Food and Agriculture
MoFEP	Ministry of Finance and Economic Planning
NAFCO	National Buffer Stock Company Program
NCPB	National Cereals Produce Board
OEC	Observatory of Economic Complexity
RECOTIS	Regional Commodity Trade and Information Systems
UNCTAD	United Nations Conference on Trade and Development
WFP	World Food Program
ZAMCE	Zambian Agricultural Commodity Exchange
ZNFU	Zambian National Farmers Union

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## CHAPTER 1: INTRODUCTION

### 1.1 Background

Ghana is a West African country with a population of about 30 million (Worldometer, 2020). Historically, agriculture was the driver of Ghana's GDP with the sector dominated by the cocoa industry. As of 2018, the agriculture sector accounts for about 18.27% of Ghana's Gross Domestic Product (Plecher, 2018), and still continues to be one of the main driving forces behind the country's economy.

In Ghana, agriculture, understood to mean crop farming or livestock rearing, is predominantly practiced on a smallholder basis. Focusing on crop-farming, approximately, 90% of farm holdings are less than 2 hectares (Ministry of Agriculture, 2013). However, smallholder farming is characterized by price instability, pests and diseases infestation, inability to secure financing, low productivity, and heavy dependence on rainfall, among others (Asafo -Adjei & Buabeng, 2016). This is true despite the fact that the smallholding agricultural sector has the ability to contribute immensely to economic growth, job creation, and poverty alleviation (Asafo -Adjei & Buabeng, 2016). With this background, Ghana realized its need to urgently modernize and transform the current agricultural sector so that the full potential of the agricultural sector in Ghana could be harnessed for development.

On the 5th of November 2018, the President of Ghana, Nana Akufo-Addo (2016-2020) launched the Ghana Commodity Exchange (GCX). The President stated that the GCX was intended to be one of the critical drivers of accomplishing his governments' vision of becoming the agricultural center of West Africa (Ministry of Finance, 2018). Although the official launch was in 2018, discussions on the

establishment of the Ghana Commodity Exchange started in the 1980s (Ngmenipuo & Issah, 2014). Through the then Ministry of Finance and Economic Planning (MoFEP), the concept of a Ghanaian commodity exchange was contemplated and deliberated. Apart from that, other attempts have been made by other individuals to set up a commodity exchange. There was the Accra Commodity Exchange which was set up in 1995 by a group of entrepreneurs. However, they failed to get others to support the initiative and were, therefore, not able to obtain enough funding to actualize their objectives. There was also talk of a West African commodity exchange in 2008; however, this also ended up as just an initiative and did not come into reality (Ngmenipuo & Issah, 2014).

To better understand the role of the GCX, it is crucial to define what a commodity exchange market is and to explain how the Ghana Commodity Exchange operates. A commodity exchange is a well-established market that brings together several buyers and sellers to trade commodity contracts that are standardized by the rules and regulations of the exchange (Rashid, 2015). A commodity exchange facilitates the trade of contracts whose values are attached to the price of commodities such as maize, crude oil, metals, and rice, among others.

In a typical transaction, buyers of the contracts accept delivery of the commodities, and sellers of the contract accept to deliver these commodities (Pines, 2019). However, this is not always the norm in exchange transactions. Some contracts may not result in the physical delivery of the underlying commodity (USAID, 2017).

One type of contract in commodity trading is a spot contract. This type of contract is based on current market prices (also known as spot prices). Spot contracts

require the immediate delivery of the physical commodity by the seller and payment by the buyer (USAID, 2017). According to the United Nations Conference on Trade and Development (2009), price risk management is one of the functions of a commodity exchange. Price risk management involves the decisions a farmer makes to reduce the high degree of risk they face in their line of business. Sources of risk include: poor weather conditions, fluctuating prices of inputs, and trade restrictions, among others (Broll, et al, 2013). Price risk management is often needed because farmers have the problem of not knowing whether the prices received will be less than expected; making it difficult to cover input costs and make a profit (Nordier, 2013).

Forwards contracts, futures contracts and options are among the most widely used price-risk aversion contracts. This enables the farmer to set in a particular price and know what he or she will receive before planting the crop; this helps to plan better to ensure that proceeds will be able to cover production costs (Nordier, 2013).

A forward contract is a private agreement which enable buyers and sellers to agree on prices before delivery. Forward contracts obligate the seller to deliver a specified amount of the physical commodity for a specific price at an agreed-upon date (Russ, 2019). Forward contracts are traded over the counter (OTC) which means that, the terms of the contract can be customized as per the needs of the parties concerned. An example of how forward contracts operate is illustrated as follows. A farmer plans to grow 500 bushels of maize next year; when he harvests them, he could decide to sell it at whatever the current market prices are when he harvests. This will be known as a spot contract, or he could decide to lock in a price now by selling a forward contract which obligates him to sell his harvest at a fixed price.

Futures contracts, on the other hand, are standardized forward contracts which are traded on commodity exchanges (Surbhi, 2016). Futures contracts are standardized in the sense that, there is a pre-determined quantity of trade, and a pre-determined date and time of delivery on the exchange (Amadeo, 2019). For example, every soya bean futures contract traded on the Chicago Board of Trade (CBOT) is for 5,000 bushels (Kang & Nayana, 2006). The buyer and seller of a futures contract agree to purchase or sell a definite amount of a commodity on a set future date. One difference between a forward contract and a futures contract is that the terms of a forward contract are negotiated privately between the buyer and seller; therefore, making it easily customizable. On the other hand, a futures contract is a standardized one where the terms of trade relating to quantity, date, and delivery are standardized (Surbhi, 2016).

Option contracts give the right, but not the obligation, to buy or sell a futures contract at a specified price at or before a specified date (UNCATD, 2009). To obtain such a contract, the buyer needs to pay a premium - which provides the seller of a commodity with the assurance of receiving a minimum selling price and the buyer of paying a maximum purchase price. (Hall, 2019).

The Ghana Commodity Exchange is a private company that is limited by shares which are structured as a public-private partnership with the government owning 100% of the shares. The GCX is a membership-based organization which means that all buyers, sellers, and stakeholders are required to subscribe to a GCX Membership Program prior to trading or working with the Exchange (GCX, 2019).

There are currently 73 listed members of the Ghana Commodity Exchange and they are divided into trading members, associate members (a special membership for

smallholder farmers and traders), broker members, and institutional members.

Brokers are the only members who can transact on the commodity exchange for both themselves and other members or non-members of the Ghana Commodity Exchange.

Brokers can advise traders on the best deal and also accept orders from traders and place those orders on the exchange.

The GCX exists to link buyers to sellers of agricultural and, in the near future, non-agricultural produce. The exchange operates using an electronic trading platform and disseminates the data generated by the platform to its members. The GCX also operates an electronic warehouse receipt system which members can use to obtain financing from financial institutions. Commodity exchange markets exist to benefit the relevant parties to commodity trading, which include the producers, the traders, and the processors of the commodity. Currently, the GCX trades in the following commodities: maize, sorghum, soya bean, paddy rice, and sesame.

According to Kynetix (2016), there are six benefits of trading commodities on an exchange, and they are stated below:

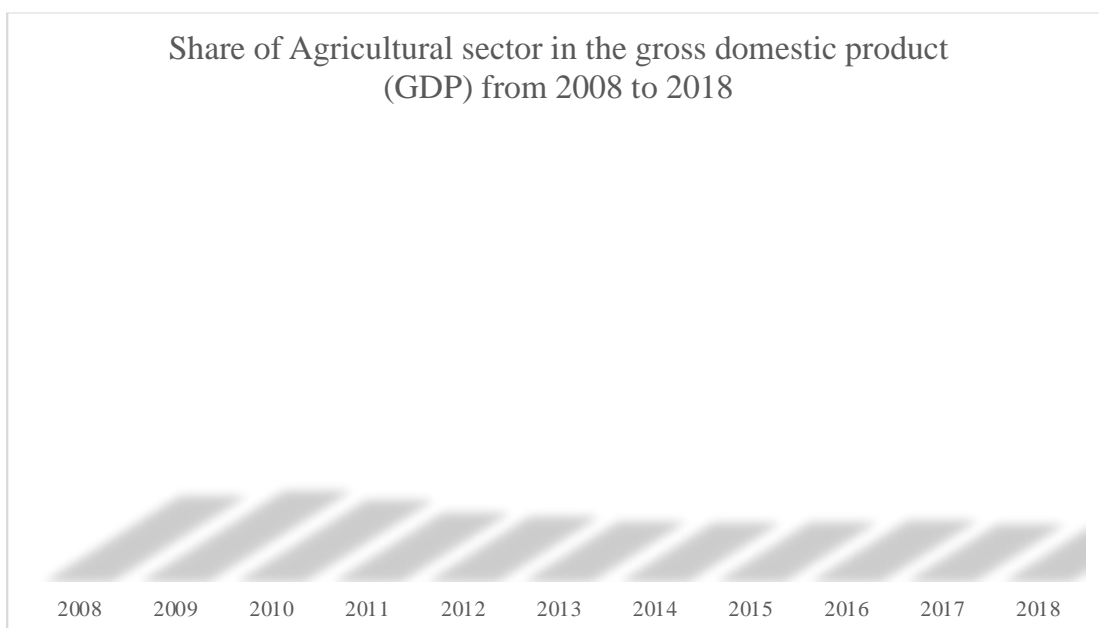
- i. Improved transparency and liquidity of markets as a result of centralizing them.
- ii. Price discovery is improved with commodity exchanges
- iii. By providing a transparent, secure, and regulated exchange, commodity financing is easier to assess.
- iv. Warehouse receipts can be used as collateral for a loan.
- v. The exchange ensures that products are graded and standardized; therefore, buyers can be sure of a quality product.
- vi. Finally, exchanges help buyers to ensure traceability.

A review of some of commodity exchange markets in the literature provides a better insight into how commodity exchange markets can function to the benefit of market participants. According to the United Nations Conference on Trade and Development (UNCTAD, 2007), just around the time that the Industrial Revolution was attaining its peak in England, a group of metal traders came together and founded the London Metal Exchange in London in the year 1877. They did this because they faced uncertainty on the price at which their metals would sell after they were shipped over a long distance and arrived in London. To manage their 'price' risk, the metal traders negotiated forwards contracts so that they would be able to protect themselves against sudden and unexpected price volatilities (United Nations, 2009). Forward contracts helped the traders to hedge a selected price so that, before the metals arrived in London, they were more certain of the price at which their metals would sell.

The Chicago Board of Trade (CBOT), set up in 1848, is another example of a commodity exchange set up to reduce some of the uncertainties brought about by commodity trading. This time, the commodity involved was grain; the then grain merchants of the time faced the problem of not being able to find buyers for their produce. They faced high transportation costs in transporting the grains to Chicago and incurred huge losses when they were not able to find suitable buyers. As a result of this, CBOT initiated futures contracts in the year 1865. Futures contracts offered more financial leverage, flexibility and financial integrity (United Nations, 2009).

## 1.2 Problem Statement

The share of agriculture in the total GDP for Ghana in 2018 was 18.3% (MoFA, 2018). This figure is however, significantly lower than what it was ten (10) years ago. This *figure* below illustrates this.



*Figure 1.* Percentage Share of Agricultural Sector GDP from 2008 - 2018

Source: (World Bank, 2019)

The agricultural sector in Ghana also contributes 33.5% to total employment in the country (MoFA, 2019). However, the majority of agriculture activities in Ghana are undertaken on a predominantly small-scale basis, with a large percent of Ghanaian farmers owning farms that are less than 2 hectares (MoFA, 2019). The Ministry of Food and Agriculture has stated that its primary purpose is to promote sustainable agriculture to improve the livelihood of producers, processors, and traders. The Planting for Food and Jobs Program is an example of initiatives the government has put in place to promote sustainable agriculture. The Planting for Food and Jobs



Program aims to create employment for the youth while increasing food production (Mabe, et al., 2018). Other key commitments of the ministry include increased investment in agriculture, reduction in post-harvest losses, and boosting intra-African trade (MoFA, 2014).

However, much of Ghana's agricultural productivity is in the form of subsistence farming (MoFA, 2014). Subsistence farming is when a farmer grows just enough to feed himself or herself and his or her family. There is little surplus after the family has been fed (African Development Promise, 2014). This type of farming is characterized by low productivity and therefore, will not be able to attain the accelerated sustainable development that the Ministry of Food and Agriculture is aiming to achieve. For example, the estimated average of cereal yields in the economy is 1.7 kilograms per hectare (t/ha). This figure is less than the regional African average of 2.0t/ha; thus, reflecting the low productivity the sector faces a result of small-scale farming. The estimated yields figure is even smaller when compared to the potential yields figure which is over 5.0t/ha (MoFA, 2014).

Table 1: Actual and Potential Crop Yields in Ghana (mt/ha)

<b>Commodity</b>	<b>Potential</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>Actual as % of Potential</b>
Maize	5.0	1.7	1.7	1.9	1.7	1.4	1.7	1.7	35.0
Rice (paddy)	6.0	2.3	2.4	2.7	2.4	2.5	2.6	2.7	45.0
Cassava	48.7	13.5	13.8	15.4	15.8	16.7	18.3	18.6	38.0
Yam	49.0	14.2	15.3	15.5	14.5	15.6	16.8	16.6	34.0

Sorghum	2.0	1.2	1.3	13.0	1.2	1.2	1.1	1.1	57.0
Cowpea	3.0	1.2	1.7	1.8	1.6	1.8	1.2	1.2	41.0

Source: MoFA (2014). Agriculture in Ghana – Facts and Figures

As a result of this low productivity, Ghana continues to increase its import bill for food and agricultural related products. In 2015, food imports alone amounted to 16.8 % of import merchandise and were estimated at US\$ 13.3 billion. For example, in 2017, Ghana imported rice worth \$370 million (OEC, 2017). Unless local productivity increases substantially, this figure is only expected to increase significantly over the next few years (World Bank, 2015).

It is, therefore, necessary to modernize and transform the agricultural sector so that it will be able to achieve food security and create more jobs for the benefit of the relevant stakeholders. The development strategy by the Food and Agricultural Ministry is focused on improving effectiveness through the commodity value chain, enhanced application of environmentally sustainable science and technology, and increased collaboration with the private sector to facilitate implementation (World Bank, 2017).

The market liberalization of the 1980s is evidence that, African governments have pondered on solutions to improve agricultural sector productivity. The liberalization of the agricultural sector in the 1980's put an emphasis on private sector intervention and presented a crucial opportunity for governments to improve agricultural operations. (Onumah, 2010).

However, the market liberalization of the 1980's has not been able to fully realize its goals of creating an efficient agricultural market system and as a result,

agricultural markets in Africa remain mostly inefficient and underdeveloped. The main reason responsible for the failure to meet its objectives hinges on two major problems which were never dealt with sufficiently. The first problem is weak infrastructure, and the second is the absence of an orderly and organized institution with reputable market credibility (Abdurezack, 2010).

Weaknesses in infrastructural development affect the performance of the market because it results in problems such as poor transport networks which result in high transportation costs and an increase in physical marketing costs. A study by Gabre-Madhin and Goggin (2005) indicated that marketing costs comprise 40% - 60% of the final price of a commodity and 70% of this cost is attributable to transportation costs. The absence of an orderly and organized market institution also contributes significantly to market failures such as increased transaction cost and the inability to centralize market operations. (World Bank, 2001).

Policy makers in developing countries such as Ghana have recognized the urgent need to establish an efficient market institution. In 2008, the Ghanaian government through the Ministry of Food and Agriculture received funding from the World Bank and began to conduct investigations into the establishment of a commodity exchange in Ghana. The studies concluded that a Ghanaian commodity exchange was both necessary and plausible. The exchange would offer spot trading facilities and repurchase agreements backed by warehouse receipts. A futures market would be developed afterwards. The GCX was then designed in conjunction with the local demand expectations of commodity trade financing requirements and the financial investment market yield (Osman & Ngmenipuo, 2014).

Following the recommendations gained from the extensive research by the Ministry of Food and Agriculture, the Ghana commodity exchange was established. Standardized rules of contract enforcement, specific grades, procedures, and regulations were drawn out and the following commodities began to be traded on the exchange: maize, sorghum, soya bean, paddy rice, and sesame (GCX, 2019). The exchange currently has six (6) warehouse delivery centers located at Wenchi, Kumasi, Sandema, Tamale and Ejura to commence its operations with a capacity of about 4,000 MT (GCX, 2019).

The various recommendations from the extensive research conducted before the Ghana Commodity Exchange was established have concluded invariably that, the market reform the GCX will provide has to go beyond the mere establishment of the institution and focus more on the effectiveness of its operations. If the exchange is not efficient and able to live up to expectations, it will fail to achieve benefits such as ensuring that stakeholders get access to market prices and thus, reducing transaction costs involved in buying and selling commodities. An efficient commodity exchange will also serve as a transparent and competitive price discovery instrument (a method for determining commodity prices) with reduced transaction and marketing costs (Onumah, 2010). Aside from the technical question of the efficiency of the GCX which may be impossible to assess due to data accessibility difficulty another relevant question that emerges is are the relevant stakeholders benefitting in any palpable way from the establishment of the GCX?

The direct benefits commodity exchanges confer are not established. Furthermore, there are some claims regarding the role impact of commodity exchanges in developing countries, majority of which are not verified. Some popular claims include: commodity exchanges increase exports, and commodity exchanges

increase prices for farmers (Rashid, 2015). This paper will attempt to determine in a practical context of a developing country (Ghana) how the role and operations of the GCX is benefiting smallholder farmers in Ghana.

### 1.3 Research Questions

The study sought to find answers to the following questions:

- How have farmers benefitted from the operations of the Ghana Commodity Exchange?
- What are the challenges faced by the GCX in their operations?

### 1.4 Research Objectives

The study was guided by the following objectives:

- To determine how farmers have benefited from the Ghana Commodity Exchange.
- To determine the challenges the GCX is facing in its bid to achieve general agricultural sector performance.

### 1.5 Significance of Study

Many noteworthy studies point to the fact that the absence of a competent market institution is causing a bottleneck to the advancement of agricultural sector productivity (UNCTAD, 2009). Policymakers have gone beyond acknowledging this policy recommendation and have inaugurated institutions like the Ghana Commodity Exchange. The policymakers' intention is to establish an institution which is useful in

the performance of its duties. Therefore, this paper provides contributions to policymakers which will help them to evaluate the GCX against the country's' need and take the necessary corrective action steps where appropriate. This study can also be used by management of the GCX as an indication of the progress they have been able to attain in pursuit of their objectives. This thesis is also significant in provoking further research by scholars on other aspects of the GCX, such as its efficiency in price risk management, the role of warehouse receipts, and other relevant elements.

### 1.6 Methodology

This research is exploratory in scope. It adopted a qualitative approach involving the analyses of data collected via in-depth interviews, as well as from available documents from relevant state and international organizations. Mainly non-probabilistic sampling methods were used. Sampling methods such as purposive and snowballing were preferred because the research relied on the expert consultation of participants chosen. Their expert knowledge added to existing information and made the study more credible. The research was conducted in the Greater Accra Region because of the vast concentration of experts in the region who were able to provide key insights to the study.

### 1.7 Scope of Study

This thesis aims to assess the role of the Ghana commodity exchange in improving general agricultural sector performance in Ghana. The benefits of the GCX on smallholder farmers is of particular interest. The study will assess aspects of the

GCX such as the benefits they received, challenges they face in their operations, and strategies to deal with those challenges.

### 1.8 Limitations of the Study

Most of the limitations faced during the research are related to the newness and uniqueness of the operation of GCX. First, the GCX is an infant institution and therefore, academic resources relating to this study are few. In addition to this, the very short time experience of the institution would affect this thesis from capturing possible development that may rise due to learning by analyzing trends. The time available for the research was limited and therefore only a few participants were engaged to glean their views.

### 1.9 Organization of the Paper

The research paper was organized into five chapters. The first chapter provided a background, statement of the problem, the research objectives, and the significance of the study. The second chapter dealt with the review of literature necessary to give context to the research. The third chapter covered the research methodology including the research design, data collection instruments and data analysis. The fourth chapter portrays the significant findings of the research. Finally, the conclusion and priorities ahead were presented in chapter five.

## CHAPTER 2: LITERATURE REVIEW

### 2.1 Overview

This chapter describes commodity exchanges, and in addition to this, the experiences of commodity exchanges in other parts of Africa are discussed. The literature review is intended to give the reader better insight into the subject matter and present a notable perspective and place this current research in context.

### 2.2 Commodity Exchange Markets

A commodity exchange is a platform that brings together several buyers and sellers to trade commodities that are standardized by the rules and regulations of the exchange (Nordier, 2013). According to the United Nations Conference on Trade and Development (2009), commodity exchanges have a number of functions which are explained below.

**Price Discovery:** One of the most important functions of a commodity exchange is price discovery. Price discovery is the process of determining market prices through an exchange (USAID, 2017). The transparent conditions of the exchange contribute to the accurate determination of the value of the commodity over time (Rashid, 2015). Market prices on the commodity exchange reflect the underlying supply and demand of commodities (UNCTAD, 2009). As a result, market participants such as farmers are able to make informed decisions on which crop to cultivate, and when to deliver the crop to the market to obtain the highest return.

**Price Risk Management:** Commodity exchange markets allow market actors, including framers and traders, to protect against future price hikes or dips by locking in prices now (USAID, 2017). One problem that farmers typically face is their inability to know whether the price they would receive for their produce will be able



to cover the costs of production. Usually, forwards, futures, and options are the most common instruments used by commodity exchanges for price risk management (Nordier, 2013). By using any of these risk management tools, the farmer can lock a selected price so that he or she will know how much they would receive before planting the selected crop. This is to guarantee that returns will exceed input costs, and the farmer can generate a positive return.

Forward contracts enable buyers and sellers to agree on prices before delivery. Forward contracts bound the seller to deliver a specified amount of the physical commodity for a specific price at an agreed date. Futures contracts, on the other hand, are standardized forward contracts which are traded on exchanges. Futures are standardized in the sense that there is a pre-determined volume of trade on the exchange (Amadeo, 2019). For example, every soya bean futures contract traded on the Chicago Board of Trade (CBOT) is for 5,000 bushels (Kang & Nayana, 2006). The buyer and seller of a futures contract agree to purchase or sell a definite amount of a commodity on a set future date. However, unlike forward contracts, there does not have to be trade occurring on a pre-determined time. Options contracts also provide the seller of a commodity with the assurance of receiving a minimum selling price and the buyer of paying a maximum purchase price.

There is, however, a problem of smallholder farmers typically being unable to trade directly in the more sophisticated contracts such as futures, options, and forwards. This is due to problems such as inability to meet the contract required volume, insufficient education and the inability of smallholder farmers to meet quality standards (Mezui, et al., 2013). South Africa on the other hand has to a large extent overcome this challenge by ensuring proper regulation and enhanced supervisory capacity (Adelegan, 2009).

**Efficiency and Upgrading of Physical Trade:** Commodity exchanges improve efficiency by lowering transaction costs (Nordier, 2013). They are able to reduce transaction costs by providing licensed warehousing avenues which store commodities and as a result, reduce risk of loss (USAID, 2017). Commodity exchanges also reduce transaction costs by offering services at lower costs than is available in the marketplace (USADID, 2017). Finding a suitable buyer or seller, inspecting product quality, and negotiating contract terms are among the services a commodity exchange provides at a lower cost than is found in the marketplace. In addition to this, commodity exchanges specify the quantity and quality of the commodity to be delivered, thus allowing for anonymous transactions and providing a basis for dispute resolution (USAID, 2017). This goes a long way to increase the standard and quality of the physical product in the market.

**Market Transparency:** Commodity exchanges facilitate greater transparency in the market. Smallholder farmers are usually not aware of the volumes of trade on the market and the prevailing market prices (Chhajed, & Mehta, 2013). Commodity exchanges address this problem by widely publicizing market information on bid and asking prices and volumes so that all market actors, including smallholder farmers, can have access to them and be able to make their own decisions.

**Access to Finance:** Warehouse receipts should support a commodity exchange. The primary purpose of warehouse receipts is that it is a system of financing. Farmers can use the warehouse receipts that are issued as collateral for loans and can finance their operations without selling their produce (USAID, 2010). In order for there to be a credible and efficient financing system based on warehouse receipts, several conditions have to be in place. First of all, there has to be a network of certified and insured warehouses which are capable of ensuring the quantity and

quality of a commodity as indicated in the transferable receipt (Indaba Agricultural Policy Research Institute, 2014). In addition to this, a robust legal and regulatory framework for warehouse receipts has to be developed. The legal framework must confer clear rights related to property ownership, use, possession, and transfer (USAID, 2010). Lastly, the banking sector must be willing to provide credit to market players, secured by commodity-backed collateral.

These functions of a commodity exchange essentially serve as the benefits members of the exchange enjoy as a result of transacting on it. These benefits will be assessed by interviewing farmers in Ghana to find out if, based on their experience, they have been able to enjoy the promised benefits of the exchange while they were trading on it.

### 2.3 Theoretical Approaches of Measuring Impact of Commodity Exchanges

Claims about the impact of commodity exchanges in developing countries need to be evaluated systematically and validly in order to be relevant and benefit the overall economy (Rashid, 2015). This section provides insight into studies on the impact of commodity exchanges in developing countries. The first source of literature comes from time series econometric studies on the impact of commodity exchanges on market variables, primarily in India, China, and Brazil. The second is from the United Nations Conference on Trade and Agriculture Development (UNCTAD, 2009) research on the developmental impact of commodity exchanges in developing countries based on subjective rankings. The third is the qualitative assessment of African commodity exchange experiences.

### *2.3.1 Time Series Econometric Analysis*

Studies which involve evaluating the operations of commodity exchanges mainly use time series econometric models. The relevance of this method is to use price data and trade volume data to investigate the extent to which a commodity exchange is improving price discovery and market integration (Rashid, 2015). Accurate price discovery is reflected when buyers and sellers have access to wide market information and are operating in a transparent environment (Rashid, 2015). For smallholder farmers, this means that they have an upper hand during price negotiations and cannot be cheated by other actors in the value chain. Better market integration implies that information is easily transmitted across all the stages of the agricultural market chain. This means that the benefits of price increases or decreases cannot be derived from any player in the market due to superior information (Rashid, 2015). In other words, differences in prices in two market areas will only exist due to transaction costs. This includes costs such as transportation, storage, and other costs of trading.

Some of the most commonly used methods under time series are the vector error correction (VEC), co-integration, and the Granger Causality tests (Rashid, 2015). With these tests, there are three broad viewpoints used in analyzing. The first focus of analysis assesses the relationship between spot and futures prices to determine if prices are truly a reflection of demand and supply factors (Rashid, 2015). This is to test whether or not the exchange is performing its function as a price discovery mechanism. If prices reflect demand and supply factors, sizable deviations should not exist between spot and expected future prices. The second area of focus is concerned with whether or not future prices are influenced by current prices or whether current prices are influenced by future prices (Rashid, 2015). This can be

determined by conducting Granger causality tests. The third leg of focus is between trade volume and price volatility. During the 2007-2008 food crisis, it was argued that excessive trading resulted in high price volatility which affected world agricultural markets (von Braun et al., 2009).

Eswaran and Ramasundara (2008) studied the impact of a futures market in price discovery using data from the Multi Commodity Exchange (MCX) found in India. They assessed whether the MCX was performing its function as a price discovery mechanism by analyzing data from the exchange on four commodities (cotton, castor, pepper, and soy). The researchers employed econometric analysis, specifically the restricted ordinary least squares (OLS) regression to test for price discovery. The price discovery hypothesis is tested by determining whether or not spot and future prices deviate significantly. The findings from the study noted that there were no improved price discovery benefits for the commodities trading on the MCX.

Granger Causality tests and vector error tests were also used by Chhajed and Mehta (2013) to analyze the prices of nine different commodities to determine if there was price discovery. The results of the finding for the nine different commodities showed that, price discovery mechanism differed depending on the type of product (Chhajed & Mehta, 2013). Some commodities showed a significant relationship between spot and future prices while other commodities did not show significant relationship between spot and future prices. However, results from Granger causality tests can be biased by explanatory variables and as a result, the conclusions from the study are not reliable (Rashid, 2015).

*2.3.2 Developmental Impact Analysis by the United Nations Conference on Trade and Development (UNCTAD)*

The UNCTAD in 2009 conducted a study investigating the developmental impacts of commodity exchanges in developing countries. The study focused on smallholder farmers in the agricultural sector of developing countries. The aim of the study was to, “identify, analyze and assess the impacts made by commodity exchanges in developing countries on economic growth, development, and poverty reduction, with a particular focus on the agricultural sector and farmers” (UNCTAD, 2009). The study focused on futures commodity exchanges because they believed that futures commodities exchange markets had the broadest array of impact.

From the review of literature, six potential benefits were identified. Out of these six, three were considered core functions. These three include price discovery, hedging and an avenue for investment. The other three, which include facilitation of physical trade, financing, and market development, were considered secondary benefits.

The methodology involved, developing a set of hypotheses about the benefits accruing to each core function. After this, they developed a range of impact hypotheses derived from each benefit hypothesis (UNCTAD, 2009). Therefore, eighty- one (81) impact hypotheses were developed of which, thirty-seven (37) directly concerned farmers. In addition to this, the research brought together qualitative and quantitative information from surveys gathered from secondary sources. They were, therefore, able to demonstrate the impact of an exchange on farmers and on other relevant stakeholders. This is because the methods of assessment used were mainly descriptive and not rigorous (Rashid, 2015). Therefore, one drawback about the study is that it is unable to establish causality. For example, the

research is not able to determine whether the presence of a commodity exchange reflected in income increments or better price discovery for farmers. The study was, however, useful in exposing gaps in the data and providing a context and perspective for a more rigorously designed research (Rashid, 2015).

### *2.3.3 Experiences of commodity exchanges in other parts of Africa*

Commodity exchanges in Africa have been plagued with numerous challenges. However, with exceptions like the Ethiopian Commodity Exchange (ECX) and the South African Futures Exchange (SAFEX), it has become necessary to understand these success stories and make efforts to replicate them in other African countries. Thus said, commodity exchanges in Africa which are not so successful also have relevant lessons which can be gleaned from their experiences. The literature review will investigate the experiences of some commodity exchanges in other parts of Africa in order to draw glean from their experiences some of the benefits of a commodity exchange. The experiences of the Kenyan Commodity Exchange, the Zambian Commodity Exchange, and Ethiopian Commodity Exchange are reviewed below.

Kenya was chosen because, just like Ghana, it is recognized as one of the fastest growing countries in its region with a large middle-class population (Mutiga, 2016). Ethiopia was the fastest growing economy in the year 2019 and has one the most successful agricultural commodity exchange markets in Africa (Kisika, 2019). The Zambian Commodity Exchange (ZAMACE) was chosen because of its unique history which involves an initial poor performance and suspension of trade on the exchange in 2012. Since the suspension of trade, the ZAMACE has been able to

restructure its operations in ways that have addressed their challenges (Jayne et al., 2014).

### *2.3.3.1 The Kenyan Commodity Exchange*

Kenya has three commodity exchanges, namely: the Nairobi Coffee Exchange, which trades in coffee, the Tea Auction located in Mombasa, and the Kenya Agriculture commodity exchange, which trades mainly in maize and beans. The Kenyan Agricultural Commodity Exchange (KACE) is a private sector firm which has been in operation in Kenya since 1994. The KACE has been beneficial to smallholder farmers by connecting sellers and buyers of agricultural products and allowing easy access to market information to relevant stakeholders such as producers, traders, and processors of agricultural produce within the sector (Mukhebi, 2004).

The KACE, however, faces several challenges which hinder their efforts. One of the most significant challenges is the fact that the produce of farmers is of low quality and a lot of smallholder farmers can produce and supply their goods in bulk which is necessary for an exchange. Secondly, inefficiency, mismanagement, and cumbersome internal bureaucracies plague commodity boards in Kenya (Mukhebi, 2004).

A solution to address their challenges involved KACE encouraging smallholder farmers to join and form marketing associations. Through the marketing associations, they can combine their produce of marketable quality and offer them for sale on the exchange. They are also able to acquire farming equipment in bulk and at



a cheaper price. KACE also set up an electronic market information system known as the Regional Commodity Trade and Information System (RECOTIS). Through this, a more extensive range of market participants can access market information, thus promoting regional trade.

Generally, due to the problems the KACE faces, such as lack of infrastructure, fragmented markets, and government intervention, the KACE has not been able to achieve the volume and frequency of trade they targeted. So, they have decided to focus on information dissemination and act as a provider of market information for a fee.

By a conjoined effort of the National Cereals Produce Board (NCPB), the Kenya Agricultural Commodity Exchange (KACE), the Eastern African Grain Council (EAGC), and the Nairobi Stock Exchange, a platform where futures can be traded has been set up. The market trades in three major grains produced in East Africa, including maize, rice, and wheat. This has been met by criticism as some scholars argue that, Kenya has not established the fundamentals for a viable futures commodity exchange market. They say that there is a need for a sound legal and regulatory framework as well as improvements in road networks to connect farmers to the exchange facilities. There must also be improvements in warehousing facilities to enable products to be stored for a more extended period (Omondi, 2010).

#### *2.3.3.2 The Zambian Commodity Exchange*

The Zambian agricultural commodities exchange (ZAMCE) was launched in 2007. It trades mainly in wheat, maize, and soya beans. Most of the exchange deals are conducted under 'registered trades' rather than trade across the floor. The

registered trade option is considered by some scholars to defeat the entire purpose of the exchange. This is because, parties to registered deals get the assistance of the exchange's contract and arbitration services, but do not have to disclose the prices or terms of the contract immediately (Robbins, 2011).

The ZAMCE was initially owned by 15 'brokers' including three large trading companies and has closed membership to other companies. The exchange was not able to make the 400,000 tons a year of trade needed to break even and was only able to make 60,000 tons a month. Sitko and Jayne (2012) identified five factors contributing to the low trade on the Zambian commodity exchange. First of all, the exchange was not able to attract financial institutions who were willing to commit to commodity exchanges. This is because of the frequent and unpredictable government intervention in the grain markets. Secondly, there was the fear by market participants that there would be non-compliance and other opportunistic behaviours would be displayed by participants. This made commodity exchanges appear overly risky and thus not attractive. The third reason is that there was the possibility of conflict of interest as some brokers were also traders. The fourth reason is that there is no system in place to prevent brokers from speculating or hoarding food products. Finally, the fifth point is that membership fees for participants were excessively high.

In 2012, the ZAMCE suspended operations to deal with some of the challenges raised earlier. Since their suspension, the ZAMCE shareholders have made efforts to restructure its ownership hierarchy (Sitko & Jayne, 2012). To deal with the conflict of interest that may arise as a result of management and ownership being together, the ZAMCE separated the management from the trading interests of the owners. This resulted in a restructuring which greatly reduced the stake the

current ownership had in the company. Before the demutualization (separation of ownership from management) process in 2012, the Zambian National Farmers Union (ZNFU) was hesitant to encourage its members to utilize the services of the commodity exchange. This was because they did not trust that the existing brokers would act in the best interest of farmers. The demutualization has changed all these negative sentiments, and now the ZNFU has stronger confidence in the ZAMCE.

The exchange still has some issues that require resolving for the ZAMCE to resume operations smoothly. The government frequently imposes export bans on short notice and this has prevented financial institution commitments; there is also the absence of a warehousing authority. The reason for the government's unwillingness to set up a warehousing authority is unclear. It is purported that some individuals benefit from the current market system and would not want price discovery mechanisms created by the warehouse receipts which will benefit more people. (Robbin, 2011).

#### *2.3.3.3 The Ethiopian Commodity Exchange*

The Ethiopian Commodity Exchange (ECX) was launched in 2007, and soon after its launch, maize, wheat, and beans were the main traded commodities (Gabre-Madhin, 2011). However, during that same period, Ethiopia experienced a food price crises, and grain prices spiked without control. There were also speculations that exchange trading would cause further hikes (Jayne, et al, 2014). The crises in food grain prices pushed the ECX to introduce new commodities which had greater price stability and market liquidity. The exchange resorted to coffee and sesame seed trading, which are both important export commodities in Ethiopia. In July 2008, a law was passed to ensure that Ethiopian coffee was not directly exported by farmers, but

that would be traded on the Ethiopian Commodity Exchange. In 2010, the ECX resumed trading in grains after it signed an agreement with the World Food Program (WFP) to buy maize through the exchange. The WFP is a major food purchaser in Africa and as a result, dictated the terms of purchases. In 2010, it made an encouraging start with 6,000 tons of maize purchases (Jayne et al., 2014).

The ECX is not without its challenges and they are as follows. A study by Whitehead (2013) argues that the ECX is inaccessible to smallholder farmers and that the current ECX model prevents effective traceability. Traceability is a system in which agricultural produce can be traced from the field to the buyer by grouping the produce into distinct portions and assigning them unique codes (Cornell University, 2019). Monmouth, a premier coffee company in London, raised a concern about Ethiopia's coffee export. The company stated that the coffee traded on the ECX was limited in traceability. It was difficult to trace the journey of the coffee beans from the producer to the final consumer. Purchasers of the coffee from the ECX are interested in knowing what they are buying and where they are buying it from and therefore are dissatisfied with the lack of traceability of the ECX's coffee.

There are also arguments that farmers' share of international coffee prices have not risen compared to farmers share prices before the ECX was launched (Jayne, 2014). For example, data from the International Coffee Organization (2012) have indicated that farmers took home 51.6% of the export price of their produce in 2012. This is a reduction in the 57.1% of the export price they obtained in 2007, which was before the exchange was established.

#### 2.4 Insights drawn from the experience of commodity exchanges in other parts of Africa.

A trend that has been noticed from the three commodity exchanges is the role of the government. If the government is not in support of the commodity exchange, the private sector faces intense difficulties when trying to execute their exchange plans. For commodity exchange initiatives which are privately held, their success is much dependent on the government's willingness to allow it to operate. National initiatives are not without their fair share of problems as they have to deal with 'too much' government interest. This occurs where government interventions disrupt the operations of the exchange (Mezui, C. et al., 2013).

The role of the government should be limited to ensure that they do not have a controlling stake but are able to perform their required functions such as licensing the exchange and ensuring that requirements are met for the establishment of the exchange. The government can also work side by side with the various stakeholders to help ensure the exchanges' success (Mezui, C. et al., 2013).

The Ethiopian Commodity Exchange has been able to attain many positive developments such as raising warehouse receipts for all commodities traded on the ECX, creating a transparent market and providing market information. (Rashid, 2015). It is purported to be one of the most successful commodity exchanges in Africa. The ECX demonstrates how effective government intervention can provide positive outcomes. Therefore, greater attention must be given to it to ensure that the maximum benefits of positive government intervention are achieved (Rashid, 2015).

Another notable trend that can be gleaned from the various country experiences is the inability to obtain the support of large traders. It appears as though large traders in agricultural produce are not interested in utilizing the commodity exchange. They believe that because of their size, they can attract large margins and therefore do not need to utilize the services of agricultural commodity exchanges. Because of this, the volume of trade on some exchanges in Africa as seen in the cases of Kenya and Zambia are usually low. It is, therefore, important that the commodity exchanges of the various countries stress benefits of commodity exchanges such as the creation of a centralized market, possibility of reducing transaction costs and the possibility of entering into forward and futures contracts (Mezui, C. et al., 2013).

There must be sufficient volume of trade to cover the fixed costs of operating a commodity exchange, considering that for the majority of African countries which have commodity exchanges, the volume of trade is low. Therefore, African commodity exchanges can consider inter-regional trade in order to make commodity exchanges more viable. As a matter of fact, in Africa, the Pan- African Commodities and Derivatives Exchange (PACDEX) has initiated the establishment of national exchanges in some countries including Ethiopia, Nigeria, Kenya, and Uganda as part of their aim to establish a pan-African commodity exchange (Mezui et al., 2013).

## 2.5 Gap in Literature

The above literature presents a case for assessing the role of the GCX in improving agricultural sector productivity in Ghana. Ghana is interested in promoting development of its agricultural sector, and this is seen in the primary mandate of the Ministry of Food and Agriculture which is to promote sustainable agriculture to improve the livelihood of producers, processors, and traders. Therefore, the role of the

GCX in improving agricultural sector productivity needs to be explored and analyzed as a tool for development and growth as well. Hence, this thesis will investigate the benefits of the GCX on smallholder farmers to determine its progress, prospects and challenges.

## CHAPTER 3: METHODOLOGY

### 3.1 Introduction

This chapter focuses on explaining the method by which the research was conducted. The research sought to assess the benefits of the operations of the GCX on smallholder farmers and explore the challenges that the exchange faces. To adequately achieve these objectives both primary and secondary data were collected. The chapter explains the research design, tools and methods employed in the data collection, process, sampling techniques and analysis. This chapter also highlights limitations in the data collection and ethical considerations.

### 3.2 Research Design

This research was conducted using qualitative approaches. The qualitative approach involved exploratory analysis. Exploratory analysis was employed because, it provided systematic yet flexible guidelines for collecting and analyzing data for constructing theory (Charmaz, 2014). Exploratory research design was chosen to gain background information and to define the terms of the research problem (van Wyk, 2012). This form of research concentrates on smaller and focused samples rather than large samples. The research is concerned with gaining an in-depth understanding of the research topic from the perspective of the research participants.

### 3.3 Research Method

Structured interviews with officials of the concerned functional heads of the GCX were conducted. The head of settlement and financial services and the head of risk and central depository were asked to elaborate on the difficulties, accomplishments, and prospects of the exchange and to provide their expert and



individual views which they believed would be beneficial to the GCX.

The focus of the study is on small holder farmers, therefore potential participants (smallholder farmers who had ever used the services of the GCX) were identified and contacted. They were interviewed in order to gain a better understanding of the impact the operations of the GCX is having on their livelihoods. The information was recorded by taking notes. These sessions were done on a face-to-face basis. However, telephone interviews were where the participant was not available for a physical meeting.

In addition to this, other relevant members trading on the Ghana Commodity Exchange were interviewed since their participation was essential to the success of exchange. There are 73 listed members trading on the Ghana Commodity Exchange (according to the exchange's website) and out of this, eight (8) participants with a direct or indirect relationship with smallholder farmers were identified and interviewed. Both primary and secondary data were collected and analyzed. Primary data was collected in the form of semi-structured interviews. Secondary data were gathered from peer reviewed scholarly articles including UNCTAD papers and internet articles. The interviews were used to foreground the benefits of commodity exchanges to smallholder farmers.

In total, two functional heads of the GCX were interviewed, as well as one institutional member of the GCX, three aggregators (who aggregate commodities on behalf of smallholder farmers), three smallholder farmers including one who represented a farmers' association, and finally one buyer on the exchange. It must be noted here that some of the aggregators interviewed also bought commodities on the exchange.

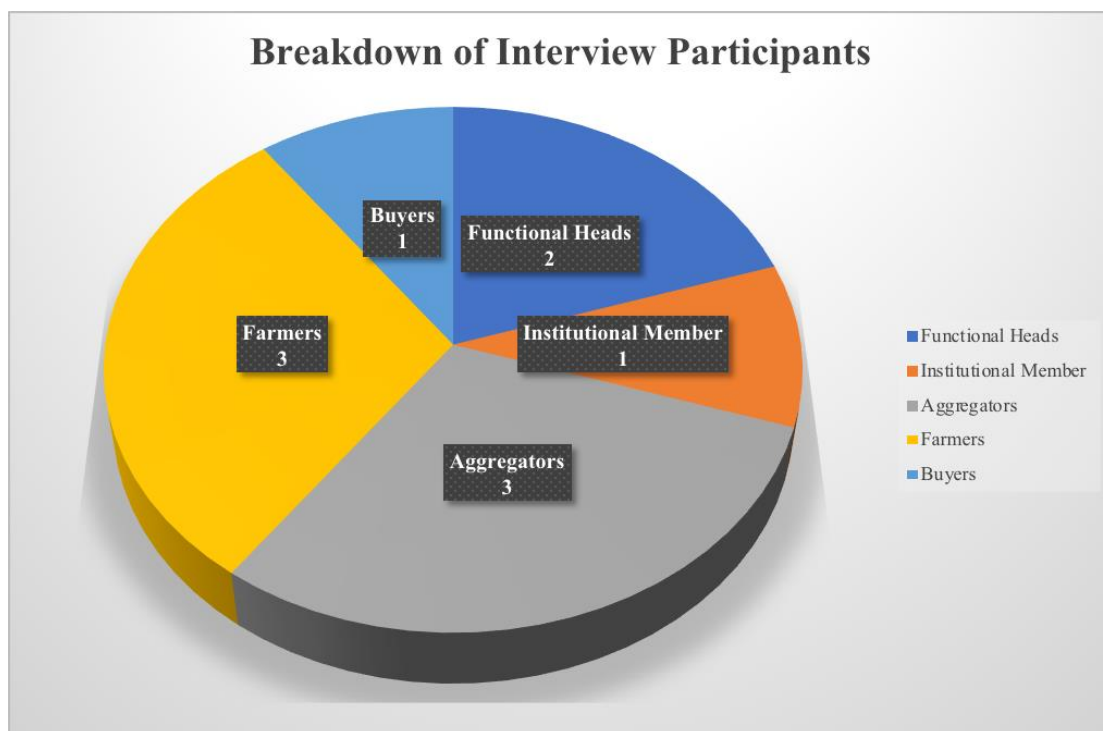


Figure 2. Breakdown of Interview Participants

### 3.4 Area of Study

The research was conducted in the Greater Accra Region where the head office of some relevant institutions is situated. The head office of the Ghana Commodity Exchange is located in the Greater Accra Region. Participants trading on the exchange who were residing in the Greater Accra Region were also contacted to partake in the study. Some participants who are farmers resided in the Greater Accra Region; however, their farms were located outside the region.

### 3.5 Sampling Strategy

To recruit participants, purposive sampling was employed. Purposive sampling is used to recruit participants who have important knowledge necessary to conduct the research (Tongco, 2007). This sampling strategy was mainly used to recruit the expert informants of the research. To get in contact with farmers the

snowballing technique was used. Initially, a few farmers were found and snowball sampling was used to locate and find the rest. Snowballing was used so that participants with target characteristics could easily be found (Naderifar, et. al, 2017).

### 3.6 Analysis of Data

Thematic coding was used in this study to analyze the data collected. Thematic coding analysis is a tool some researchers use to categorize data into common themes and therefore it enables the researcher to establish a framework of thematic ideas about it. (Gibbs, 2007). After themes have been derived, thematic analysis, which is a tool that some researchers use to identify, analyze and interpret patterns of meaning within qualitative data, (Braun & Clarke, 2016) will be employed.

### 3.7 Limitations of the study

Most of the limitations faced during the research are related to the newness and uniqueness of the operations of the GCX. First of all, the GCX is an infant institution and therefore, academic resources helpful to conduct research on the organization are limited. In addition to this, the very short time experience of the institution would affect this thesis from capturing possible development that may rise due to learning by analyzing trends.

The absence of data caused by the newness of the exchange is reason for the which none of the theoretical methods of assessing impact in developing countries was implemented. Instead, a qualitative approach was deemed appropriate in order to capture in depth the experiences of participants. In addition to this, the time available was limited so not many other participants were interviewed to glean their

experiences and views.

### 3.8 Reliability and Validity

Reliability is a concept used to evaluate quality in qualitative research with respect to credibility, neutrality, consistency and applicability or transferability (Lincoln & Guba, 1985). A reliable study is one in which the results can be replicated under similar conditions. Validity serves as a means for researchers to apply a qualifying check or measure for their research (Cresswell & Miller, 2000). To ensure that the research is reliable and valid, the results of the study were shown to participants to get feedback and to ensure alignment. This was done to avoid personal biases influencing the results. Also, meticulous record keeping was observed during the record keeping process to ensure that interpretations of data are consistent and transparent (Noble, & Smith, 2015).

### 3.9 Ethical Considerations

This paper acknowledges the fact that it must minimize risk to its participants while attempting to maximize the quality of information produced (Gillespie, & Glisson, 1992). The research therefore observed the principles of ethics and ensured that the confidentiality of participants was maintained. In addition to this, approval was sought from participants who were interviewed and, interview participation only occurred after the participant had understood the purpose of the research and filled a consent form. The highest level of integrity and ethical standards of academia were observed in this research and external sources of data were referenced. No attempt was made to fabricate or destroy the data collected during the research.

## CHAPTER 4: FINDINGS & DISCUSSION OF RESULTS

In this chapter, detailed discussions and analysis of the study findings are presented. The research questions and objectives are reiterated here to easily follow the discussion of the results. The two research questions are:

- (i) How have farmers benefitted from the operations of the Ghana Commodity Exchange?
- (ii) What are the challenges faced by the GCX in their operations?

The corresponding objectives are:

- (i) To determine how farmers have benefitted from the Ghana Commodity Exchange.
- (ii) To determine the challenges the GCX is facing in its bid to achieve general agricultural sector performance.

### 4.1 Respondents' Background

To answer the research questions and achieve the research objectives, ten interviews were conducted, and the participants were selected using purposive and snowball sampling techniques. Two functional heads from the GCX were interviewed; they were, the head of settlement and financial services, and the head of risk and central depository. Other participants included members of the GCX including an institutional member (a representative from the National Buffer Stock Program), three aggregators (who buy produce from farmers and trade on the exchange), three smallholder farmers (known as associate members on the exchange), and a buyer.

All of the participants had been members of the exchange since its inception in December 2018. One of the smallholder farmers interviewed belonged to a farmers' association and each of the aggregators aggregated produce from at least one hundred

(100) smallholder farmers. The buyer interviewed bought grain mainly to supply chicken feed to her poultry farm. One of the aggregators interviewed also indicated that his organization had also made some purchases from the exchange.

#### 4.2 Benefits farmers obtain from the operations of the GCX

The following questions were asked with respect to benefits and challenges small holder farmers face with respect to the GCX. The benefits of the commodity exchange were based on Kynetix's (2016) six benefits of trading physical commodities on an exchange. They are listed below:

- i. Improved transparency and liquidity of markets as a result of centralizing them.
- ii. Price discovery is improved with commodity exchanges
- iii. By providing a transparent, secure, and regulated exchange, commodity financing is easier to assess.
- iv. Warehouse receipts can be used as collateral for a loan.
- v. The exchange ensures that products are graded and standardized; therefore, buyers can be sure of a quality product.
- vi. Finally, exchanges help buyers ensure traceability.

##### *4.2.1 Price Discovery*

Members of the GCX were asked how the exchange has improved price discovery; that is, the accurate determination of the value of the commodity over time. The summary of the findings based on this question was that, the exchange had indeed improved the accurate determination of the value of the commodity. Specifically, one aggregator indicated that, "*prices quoted on the exchange are fairly*

*stable and reflect the real value of the commodity as the exchange has ensured the highest quality standards of the product”.*

The exchange facilitated this by factoring in ask and bid prices in the determination of its prices. This means that the exchange prices reflected both supply and demand in a particular time and this was an accurate determination of the price. One participant spoke of the use of world market prices as a basis of establishing ask-and-bid prices. This information which was not typically available to some small-scale farmers is now available; hence, the GCX has been able to create a greater spread of market information which helps to improve price discovery. The participant said, *“The exchange uses world market prices to price and also send us these prices on our mobile phone and this is fair for us farmers”.*

With greater market information spread and real time ask-and-bid prices being factored into the price, participants were of the unilateral view that the exchange has improved greater price discovery. The use of an electronic trading platform also makes it easy to access real time prices with a mobile device. One participant said that he received prices on his phone even though he is not close to the exchange and this helps him to make better decisions. Another said that, *“the prices are an accurate representation of maize prices all over Ghana”.* Thus, making a profit on the exchange was easier; according to a participant, he was able to make profit on the exchange because prices were stable and were an accurate determination of the value of the commodity.

#### *4.2.2 Price risk management*

The second question was aimed at collecting information on the benefits of the GCX for small-scale farmers. The question is, ‘has the exchange been beneficial in

terms of price risk management, that is, protecting you against future price hikes or dips? Price risk refers to the uncertainty regarding future commodity prices.

Instruments to hedge commodity risk price consist of futures, forward contracts, options and swaps. These instruments have, however, not started operating on the GCX. Discussions with functional heads of the GCX revealed that in the near future, futures contracts would be traded. The functional heads agreed that, once the currently operating spot market is well-established and there is sufficient volume of trade, as well as a greater confidence in the exchange, futures contracts will be traded. All of the participants were in agreement with the prospect of a futures contract; however, none of them had traded on the exchange by using such a financial hedging contract. This is because, the exchange had not yet started issuing futures contracts.

However, a participant stated that, even with the spot contracts, when a price was determined for a particular transaction, one was certain that these prices were ‘locked’ and were not subject to sudden and unpredicted changes which were likely to occur in the open market. He stated that, *“the exchange prices offer stability that the open market does not have.”* He continued and said, *“it is not subject to change and you can be sure that the price will not be this today and that tomorrow. It helps us determine our profits and plan beforehand.”*

#### *4.2.3 Reduction of Transaction Costs*

The third question was, how has the GCX been efficient in reducing transaction costs?’ This answer got mixed responses from the participants. All of the participants agreed that the transaction costs of finding an appropriate buyer or seller had been reduced significantly. However, there were other areas such as transportation costs which had more mixed reactions. Participants who were situated



close to warehouses seemed to enjoy the benefits of reduced transportation costs than those who were further away.

One participant reported that the nearest warehouse was 18 miles from his farm site and this was causing him great difficulty to transport the goods to the warehouse. She stated during the interview that, *“The distance from where I am to the warehouse is far and it is difficult to bring the goods there.”* Another participant reported that the warehouses were understaffed and the worker at a particular warehouse took up to two weeks to collect the goods and place them in the warehouse. The participant stated that, *“There is only one person at the warehouse and he only comes around for my goods every two weeks and this disturbs me.”*

Some participants described the membership fees as ‘high’ and thus discouraged more industry players such as farmers and aggregators from trading on the exchange. One of the participants said, *“The high membership fees discourages others from trading on the exchange and this will go against the GCX in the long run”*. He continued by saying that, *“they should reduce their membership fees so that a lot of people can be a part of it and they can have a high volume of trade.”*

Transaction costs involved in finding the correct quality and grade for commodities are also reduced for buyers. The participants who had bought from the exchange attested to the fact that they were assured of the quality and quantity of their goods and did not have to spend more money performing their own quality control checks or cleaning the products themselves. The representative from the institutional body stated that: *“aggregators who buy produce from small-scale farmers seem to be better equipped to manage the demands of the commodity exchange and other management issues. They are better off because they have better connections and*

*because of their size, are able to meet better the demands of the Ghana Commodity Exchange.*” He explained demands as membership fees, fulfilling quality standard procedures, and filing paper-work.

His point was demonstrated during my interview with a small-scale trader who purchased on the exchange. She spoke of the condition on the exchange whereby, in order to purchase, it is required to deposit an amount of money. This was not ideal as a small-scale purchaser who did not have enough funds to deposit for a number of days before a transaction could be locked. She stated, *“I do not have enough money to leave idle for three days while waiting for a seller to accept my ask price.”* The representative of the institutional member of the exchange believed that, aggregators, institutional members and other ‘large members’ were in a better position to be involved in trade on the exchange.

The aggregators I interviewed did not have an issue with the arrangement explained above because they had access to a larger pool of financing. The aggregators had access to trucks to transport the commodities easily and enjoyed economies of scale as a result of their larger size than small-scale farmers. One aggregator indicated that, *“I can rent out my tractors and use them to raise additional funds when I run into challenges.”*

All the participants I interviewed who had purchased on the exchange spoke of the assured quality and standard the exchange offers, a guaranteed standard that no one else offers. In her own words, one buyer said, *“maize usually has some chemicals which are harmful for production found in them. But the exchange ensures that the chemical found in the maize is reduced and this ensures quality.”*

#### 4.2.4 Transparent Market Environment

The fourth question was, do you think that trading on the GCX creates a more transparent market environment? All of the participants felt that so far, the exchange's way of developing prices was fair and transparent. They believed that international market prices, ask-and-bid prices as well as the membership fees and other premiums make the exchange pricing generally fair. Some of the participants reported that there were no hidden fees and hidden charges. Her exact words were, "*The costs which make up the prices on the exchange are clearly stated and there is minimal adjustment to these prices after they are set.*" All the participants I interviewed had a general trust of the exchange and their operations and would recommend it to others without hesitation. Participants made mention of the fact that the process of price quotation is transparent. One participant who is an aggregator said, "*I prefer the exchange a lot and recommended it to all my clients.*"

#### 4.2.5 Warehouse receipts to secure financing

The fifth question was, have warehouse receipts been beneficial in securing finance? A few of the interviewed participants had warehouse receipts; however, none of those who had it had ever used it to obtain financing. One of them reported that, she did not need a bank loan and thus was not interested in the warehouse receipt financing. Her words were, "*I don't need money so, I will never go for a loan to run my business.*" Others stated that the warehouse receipt financing was only available in certain areas and not in theirs hence, their inability to use their warehouse receipts to access financing. A direct quote from the individual indicated that, "*I have heard about the warehouse receipts, but it has not come to my area so far; I have heard it's in the Brong Ahafo Region.*"

One participant made mention of the current system of warehouse management employed by the GCX. He stated that the GCX operates its own warehouses instead of operating with warehouses they had certified. He further mentioned that, he did not think this was in their best interest. He stated that managing their own warehouses could take them away from their core obligation and not enable them to focus. He rather advises that the exchange leaves operating warehouses to external third parties and they can only certify warehouses when they meet their standards; this will leave them with more time to focus on other pressing areas. His direct words were, *“I don’t think the GCX should manage its own warehouses; that’s not the mandate of the exchange. They should leave that to others and only certify them when they meet the standards.”*

Another participant believes that it will take a while for warehouse receipts to be a fully functional, but with the work the exchange is doing in the near future, warehouse receipt financing will be more common among farmers. A participant who mainly purchases crop on the exchange brought up a concern that there was no financing available for members who were not commodity sellers. It therefore made it difficult for them to trade as they did not have commodities to access financing. The participant pointed out that if financing was made available for buyers as well it will also benefit them. The participant stated that, *“As a buyer on the exchange, I also need a loan system to enable me access quick financing.”*

#### 4.2.6 Traceability

Traceability is becoming a growing requirement for a commodity exchange because it makes the commodity more trustworthy and credible (Leung,

2014). International buyers especially want to be able to trace the source of the goods they are purchasing all the way to the farmer who produced them.

One of the functional heads of the GCX explained the role of traceability this way. He started that, *“The exchange is fairly new and so we admit that traceability efforts are not as advanced as they ought to be.”* He however continued to say that the exchange standardizes and certifies all commodities, and this offers buyers some certainty of quality assurance. Their traceability efforts were not where they need to be yet but they were headed in the right direction.

### 4.3 Discussion of Findings

From the findings documented above, the study has reached the following conclusions about the benefits that the Ghana Commodity Exchange offers to its members.

The exchange had been successful in improving price discovery which is the accurate determination of the value of the commodity over time. Even with just spot contracts, the producers of the commodities deemed the bid-ask system of pricing commodities as appropriate and able to capture the actual value of the commodity.

One of the most important functions of a commodity exchange is price discovery according to (Mezui et al., 2013). With this, farmers become well informed and are better able to improve their bargaining position. This occurred in India where because of the Indian Commodity Exchange (ICEX), smallholder farmers were able to improve their bargaining position with the price information they were now getting (Mezui et al., 2013).

Price risk management can be achieved through hedging and trading in contracts such as forwards, futures, swaps, and options. The GCX plans on trading in

futures contracts in the near future and this prospect has settled well among both current and prospective participants. There is trust in the exchange to facilitate these types of contracts and enable farmers and producers to manage their price risk over the long term. This shows that the GCX has been able to represent an accurate representation of the prevailing supply and demand conditions for commodities in the Ghanaian economy. This is encouraging for farmers as they would like to produce crops for which the level of demand is reflected in the prices. Even though Ghana is a latecomer to the commodity and derivatives market, there is massive potential for it to spearhead development in both international and local trade (Umeano, 2017).

When it came to the reduction of transaction costs, there were mixed results from participants. Participants who were situated closer to warehouses were better off than those situated further away. This is because, for participants who were further away a higher transportation cost was incurred to convey the goods from their farms to the GCX certified warehouses. The transaction costs involved in finding an appropriate buyer or seller at a minimal cost was also reduced for the majority of the participants interviewed. For those who did not find this cost minimal, high membership fees, and cumbersome procedures such as paying a deposit to ensure a sale were to blame for the increased transaction costs. What can, however, be established is that market participants have some form of transaction costs reduction when they use the exchange. The cost involved in finding a buyer or seller for a negotiated price is reduced when trading on the exchange (Mezui et al., 2013).

Unfortunately, none of the research participants had used warehouse receipts to obtain financing. However, most of the farmers were enthusiastic about the prospect and could not wait for a nationwide roll out of the warehouse receipts. They believed that the Ghana Commodity Exchange with its good reputation and organized

structure would enable them obtain financing as they were being promised. Even without the warehouse receipts for financing, the presence of storage facilities has enabled farmers who could not easily access warehousing find a storage space for their produce. This is going a long way to reduce post-harvest losses and protect the income of farmers.

To allow efficient running of the warehouse receipt system the government should back the GCX with improved warehouse laws and regulations to facilitate the smooth operations. The Central Bank can also discount loans which have warehouse receipts as their collateral (Kurdyla, n.d.).

What stood out the most concerning the transparent market environment was the electronic dissemination of prices to members of the exchange. Participants who would not have had access to such information as international market prices and local prices now have the information. This has empowered them to make better choices and decisions. Farmers are now well-informed about movements in the markets because they can access these prices easily via their mobile phones. This way, they can sell at a time they believe is favorable for them so as to obtain the best price. With the increased transparency comes competition and this may be a problem for existing large traders who have often benefited from an opaque market environment as they were able to extract large margins. Now smallholder markets can also hold a competitive edge in the market (Mezui et al., 2013).

#### 4.4 Challenges the GCX is experiencing

##### *4.4.1 Infrastructure Development:*

The interviews with functional heads of the GCX revealed that the exchange is lacking in infrastructural development. The exchange is only a bit over a year old and

this could be a reason for the unavailability of widespread infrastructure for the exchange to operate. A commodity exchange needs a reliable system for transportation so that commodities can be delivered easily to the respective warehouses. In addition to this, there are not many warehouses and as a result, more warehouses have to be built. This will reduce transaction costs and enable traders to make higher margins on the exchange.

Infrastructural challenges also include the lack of a proper transportation network due to bad roads, inefficient transaction system, and the inability to access an ICT platform. In the case of inefficient transaction system, one participant stated that, *“it takes up to two weeks for the warehouse personnel to come and take a sample of my goods and another two weeks for the results to come. It wastes too much time and I need money as soon as possible. I do not have that kind of time”*. Another participant explained that, *“The exchange is very good, but it takes some days after I have paid a deposit for a sale to occur”*. Another participant also explained that, payment after a sale is delayed and this affects other aspects of his business. The lack of ICT was not a direct challenge mentioned by any of the farmers but rather by an aggregator who believes that the GCX is making an assumption that all farmers, even those in very remote areas have access to phones or even electricity to charge those phones. Without a phone, it is difficult to receive price updates to make informed decisions.

The poor road network is only accentuated by the distance from some farmers to the warehouses. A report by the African Development Fund (2003) indicates that, *“Ghana’s full potential to contribute to the regional economic integration is currently constrained because of its poor roads state that imposes difficulties and heavy costs in the movement of both national and international goods and passengers as well as in the delivery of social services.”*



This was confirmed by some of the farmers I spoke to who did not have personal vehicles to convey them from their location to the warehouse. In addition to the bad roads the transportation was expensive, and this discouraged them from trading further on the exchange. This was the reason why some participants believed that the exchange should channel more of its resources to develop aggregators who will aggregate produce from the smallholder farmers so that this burden can be lifted off smallholder farmers.

#### *4.4.2 Legal and regulatory infrastructure*

One of the challenges of the Ghana Commodity Exchange is that the participants do not have a full trust of the system and are yet to make it their sole method of trade. Contract enforcement in Ghana according to IMANI Center for Policy and Education is still not very stable and hinders entrepreneurial ventures (IMANI, 2019). The lack of trust stems from the weak legal enforcement and regulatory systems. The exchange currently operates only spot contracts but this issue of lack of a strong legal and regulatory infrastructure would affect participants' willingness to participate in such financial hedging contracts such as futures, forwards, options, and swaps. One participant stated that court cases take a while to be solved and are expensive and therefore, they do not want to be involved in contracts that rely on the future performance of another party.

In addition to this the functional heads from the GCX admitted that there was more work needed to be done to educate farmers and explain the role of the GCX in their livelihoods. This lack of communication affects farmers' perceptions and discourages them from trusting the exchange and in effect trading on it. One of the functional heads indicated that, the challenge may be from the fact that farmers in

Ghana are generally not well educated and thus, their inability to understand the dealings of the exchange. The GCX puts in a lot of effort to communicate with its members; some of the participants who were interviewed indicated that they felt they were not heard. One had issues concerning the high membership fees, and delayed payment, among other concerns.

## CHAPTER 5: CONCLUSION &amp; RECOMMENDATION

## 5.1 Summary

The GCX was established to, “link Ghanaian smallholder farmers to agricultural and financial markets across the West Africa Region to ensure Ghana farmers secure competitive prices for their commodities as well as supply good quality commodities which meet the nutritional needs of the Ghanaian people.” (GCX, 2020) Kynetix (2016), highlights some benefits that a commodity exchange offers to its participants. They include;

- i. An improved market transparency
- ii. Improved price discovery easily accessible to stakeholders
- iii. Opportunity for stakeholder’s particularly farmers to receive financing
- iv. Warehouse receipts which can be used as collateral for a loan.
- v. Products are also graded and standardized; therefore, buyers can be sure of a quality product.
- vi. Also, better traceability

Evidence on the effects of commodity exchanges in a country are very poorly understood in Ghana and even in the international context. Also, there are many unverified purported benefits of commodity exchanges in developing countries and this paper sought to qualitatively assess the benefits of the GCX provides for the stakeholders.

## 5.2 Conclusion

This paper, therefore, aimed to explore the role of the Ghana Commodity Exchange in improving the performance of key agricultural sector players such as farmers and expand on the benefits of the exchange in improving the livelihood of

farmers. The literature review mainly pointed out the experiences of commodity exchanges highlighting their successes and failures. In addition to this, impact assessment models by various authors were analyzed to give context to the need to assess developmental impacts and benefits of a commodity exchange. The method this paper chose to answer its research questions was a qualitative approach in-depth interviews were conducted to glean both the professional expertise of some commodity exchange personnel and the experiences of members of the Ghana Commodity Exchange including farmers, buyers, and institutional members.

The findings from this research revealed that price discovery had been achieved and that, farmers were in a better position to bargain because they now had access to price information which they did not have before and this has put them in a better position. In addition to this, the GCX has been able to efficiently trade in spot contracts over the past few years that it has been operating. It has been able to gain the trust of some of its members who plan to trade in futures contracts when the exchange begins to trade in them. This will be beneficial for farmers who want to manage their price risk by enabling them to protect themselves against future price dips.

The majority of the participants interviewed agreed that the transactions costs involved in finding a suitable buyer or seller at a suitable price was reduced by means of the exchange. Thus, the centralization of the market created a more efficient way of trading. However, there were challenges in the operations of the exchange that did not contribute to reduced transaction costs. One of these was the fact that warehouses were not situated close to some members of the exchange and, the bad roads in Ghana made it difficult for them to transport their goods to the warehouses. Other logistic

challenges such as delays in settlement and long cumbersome processes proved challenging for some participants and thus, contributed to increased transaction costs.

None of the participants interviewed during this research had used warehouse receipts to obtain financing and because of this, this paper is unable to make conclusive statements about the role of warehouse receipt in financing. However, some of the participants had accessed warehouse receipts and were confident that because of the credibility of the Ghana Commodity Exchange, they could readily access financing when the need arises. Some participants also spoke of the quality standard assurance they could guarantee when they were purchasing from the exchange. This was one of the major benefits for buyers on the exchange. This was because, the warehousing and storage service of the GCX enabled farmers to grade and store their commodities while maintaining accepted quality standards.

Transparent market environment was another of the benefits the exchange was able to provide through their electronic price dissemination platform. The transparent market environment has the ability to improve competition in the market since it's no longer opaque. Although the GCX is admittedly a long way of in its traceability efforts, the transparent market environment provided by the exchange puts it in the right direction. The assurance of quality and openness in pricing and terms of trade are steps in the right direction to improve traceability in the agricultural commodity market.

The paper also revealed some challenges the GCX is facing and these include a poorly developed infrastructure. There are not enough warehouses yet to meet the needs of farmers especially those in distant areas. Secondly, the road networks in Ghana especially in the rural areas are poor and this causes difficulty with

transportation. Another challenge is in the form of the legal and regulatory infrastructure and this challenge is from a bit of mistrust in the Ghana Commodity Exchange. The lack of trust stems from the weak legal enforcement and regulatory systems. The exchange currently operates only spot contracts but this issue of lack of a strong legal and regulatory infrastructure would affect participants willingness to participate in such financial hedging contracts such as futures contracts.

### 5.3 Recommendations

To create a more efficient Ghana Commodity exchange, below are some recommendations:

First, the Ghanaian government should play an intentional role in developing elements of physical infrastructure that support commodity exchange; physical infrastructure such as, warehouses, roads, and including information and communications technology. The government can also increase their efforts in facilitating the integration of the GCX and financial institutions. So far, only Memorandums of Understanding between the GCX and financial institutions have been reached. More drastic efforts including the passing of laws and bylaws can be included in their effort in their bid to support the exchange members financially.

The government's use of the exchange as a means of trading commodities itself can instill more trust in the exchange by using the GCX for their own food security measures and making this known to the public. The government's use of the exchange as a means of trading commodities itself will promote more confidence and trust in the exchange and encourage better participation.

For the GCX, increased partnership with entities such as aggregators, could be beneficial. Aggregators should be supported to aggregate produce from small-scale farmers located far away from the exchange; so that, the exchange can meet its

required volume of trade and also, indirectly, extend its benefits to smallholder farmers whom they may not have been otherwise been able to reach.

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## APPENDIX

## Appendix 1: Interview guide for farmers and members of the GCX

1. What do you know about the Ghana Commodity Exchange?
2. How long have you used the services of the Ghana Commodity Exchange?
3. Has using the exchange improved price discovery (the accurate determination of the value of the commodity over time)?
4. Has the exchange been beneficial in terms of price risk management (that is, protecting you against future price hikes or dips)?
5. How has the GCX been efficient in reducing transaction costs?
6. Do you think that trading on the GCX creates a more transparent market environment?
7. Have warehouse receipts been beneficial in securing finance?
8. What are some of the challenges involved in using the exchange?
9. What are some of the things the exchange could improve upon to create a more efficient system.
10. Are you involved with any cooperatives or farmers' organizations? Why or why not?
11. If yes, what does your organization think of the GCX?

## Appendix 2: Interview guide for personnel of the GCX

1. How many people do you have trading on the GCX? How many smallholder farmers have traded the exchange
2. Of this, how many are smallholder farmers?
3. Apart from farmers who else use the exchange? How do they use the exchange?
4. What special benefits do smallholder farmers enjoy while trading on the exchange?
4. Is the current infrastructure development enough to support the operations of a commodity exchange like the GCX?
5. What were the major problems GCX encountered in its first year of operation?
- 6 What is the outlook of the GCX?
- 7 What is the GCX doing to reach more farmers and users?
- 8 Do you think the GCX is doing enough in terms of communicating its mission, marketing itself and advertisement?
- 9 Do you feel there is a cultural inertial on the part of farmers from using the GCX?
10. Do you think the GCX should be educating farmers and users about how to take advantages of the services provided by the GCX?