VALUE CHAIN ANALYSIS OF DRY CHILI PEPPER IN THE ADA WEST DISTRICT OF GHANA

BY

FRANCIS ETORNAM ATAKLI

(10379039)

THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF PHILOSOPHY (HONOURS) DEGREE IN AGRIBUSINESS

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DECLARATION

I, Francis Etornam Atakli, the author of this thesis, "VALUE CHAIN ANALYSIS OF DRY CHILI PEPPER IN THE ADA WEST DISTRICT OF GHANA" do hereby declare that but for the references, which have cited been duly, the work presented in this thesis was done entirely by me. This work has never been presented either in whole or in part for any other degree of this University or elsewhere.

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Francis Etornam Atakli Date

(Student)

This thesis has been presented for examination with our approval as supervisors.

…………………………………….. ………………………………

Mr D. P.K Amegashie Date

(Major Supervisor)

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Dr John Baptist D. Jatoe Date

(Co-Supervisor)

DEDICATION

I would first like to dedicate this thesis to God Almighty for His endless guidance and protection. This work is also dedicated to my lovely parents, Mr and Mrs Atakli, my siblings, Gladys Atakli and Emelia Emefa Atakli, my grandmother, Susana Coffie and finally my beloved Miss. Rejoice Akotia.

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ABSTRACT

Chili is a highly profitable vegetable crop cultivated by majority of rural farm household and it contributes more than half of the income of the farmers. The study considered the value chain analysis of dry chili pepper and its related activities in the Ada West District of Ghana. Primary data was collected using well-structured and pre-tested questionnaires administered to 182 respondents. The respondents included 105 chili pepper farmers, 42 dry chili pepper wholesalers and 35 dry chili pepper processors. The first objective of the study identified the various actors involved in the dry chili pepper value chain, their respective roles, and existing linkages. The actors identified are chili pepper farmers, wholesalers, retailers, processors of dry chili pepper with female participants dominating all stages of the value chain except the farming stage. Also, support institutions such as financial institutions, government institutions and NGOs were identified. Farmers cultivate chili pepper, process into dry form, sell to wholesalers who then sell to processors and/or retailers; processors process the dry chili pepper into the chili pepper powder then sell to retailers. Support agencies provide services such as transport, finance and technical assistance across all stages of the chain. The second objective assessed the value added and gross margin per cedi of operating cost at main actor stages of the value chain. Farmer's added value of GHS18.49, wholesalers added a value of GHS11.27 and processors added a value of GHS13.73. Gross margin per cedi of operating cost was GHS0.94, GHS0.52, and GHS0.25 for farmers, wholesalers, and processors respectively. The power relation that existed within the chain was analysed as the third objective. Wholesalers and processors were scored the highest and lowest, respectively in terms of bargaining power, profit, and protection from competition and information concentration. The value chain is perceived to be dominated by wholesalers, who dictate the quality, quantity, and price of dry chili pepper, due to their access to information and high bargaining strength. Farmers ranked "high incidence of pests and diseases" and "high cost of input", as the two most important constraints and "poor agronomic practices" as the least pressing constraint. Wholesalers and processors ranked "lack of working capital and seasonality" of dry chili pepper as the two most pressing constraints and "non-governmental support" as the least pressing constraint. There are several challenges that actors along the chili pepper value chain face. The study recommended that all stakeholders both governmental and non-governmental agencies along the chain should take all actors along the chain into consideration during policy interventions. Farmers and processors should be encouraged to form associations/organizations at respective stages of the chain to increase their participation, improve information flow and bargaining power as well as financial institutions should aid in addressing these challenges.

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LIST OF ACRONYMS

AVRDC	Asian Vegetable Research and Development Center
CPP	Chili Pepper Paste
DCP	Dry Chili Pepper
EDBSA	Economic Development Board of South Australia
FASDEP	Food and Agricultural Sector Development Policy
FCP	Fresh chili pepper
FDA	Food and Drugs Authority
GHS	Ghana Cedi
GDP	Gross Domestic Product
GIDA	Ghana Irrigation Development Authority
IFAD	International Fund for Agricultural Development
M4P	Market for the Poor
MFI	Microfinance Institution
MiDA	Millennium Development Authority
MoFA	Ministry of Food and Agriculture
NGO	Non- Governmental Organization
PCP	Powdered chili pepper
SCM	Supply Chain Management
SFVC	Sustainable Food Value Chain Development
UNIDO	United Nations Industrial Development Organization

CHAPTER ONE

INTRODUCTION

1.1 Background

Vegetable production and its consumption have long been part of the agricultural economy of Ghana. Vegetable production is a significant part of the agricultural sector as it contributes significantly to employment provision, food security and has a greater impact on poverty reduction (MoFA, 2009). Cultivation of vegetables is an important agricultural and economic endeavour of both rural and urban vegetable farmers in Ghana (Darkey, Dzoemku, Okorley, Gyimah, & Bluwey, 2014). Also, vegetable farmers tend to receive much higher incomes compared to stable food crop farmers per hectare of production in Ghana (AVRDC, 2006). This may be so due to the cultivation of vegetables all by these vegetable farmers, year round, thereby leading to the higher income received.

In Ghana, chili pepper (*Capsicum sp*.) is a vegetable crop of high value and is considered as a cash crop by vegetable farmers. It is produced by vegetable farmers in both urban and rural areas, not only as a vegetable but also as a spice for both domestic consumption and the export market. (Kumar & Rai, 2005). It is a widely cultivated crop and its production is carried out in almost all agricultural ecological zones in Ghana. Chili pepper is called "Green Gold" by a lot of farmers due to its economic value, chili contributes about 70 per cent of farmers' income (DAI, 2014).

Chili pepper is the most cultivated vegetable in Ghana. According to Ghana statistical services, (2014) about a milion households are involved in chili pepper cultivation in Ghana. The varieties of chili pepper produced in Ghana particularly the ‘‘Legon 18’’ variety which has become famous for its great taste and longer shelf-life, has a good reputation in the European markets compared to chili peppers from other chili pepper producing countries (MiDA, 2009). Several studies indicate that there is growing demand for chili pepper locally coupled with export demand, which makes the vegetable a potential crop for improving the livelihood of the majority of rural farmers through the potential income gain from both local and export markets (DAI, 2014). Chili pepper is utilized in almost all Ghanaian dishes and households either fresh as a vegetable, or in various processed forms especially the dry forms (Nkansah, Ofusu-Budu & Ayarna, 2011).

An agricultural value chain can be defined as the “system of production, processing and marketing that brings individual and collective actors together to participate in coordinated activities that add value to a particular good or service, from its production until it reaches the final consumer” (Garcia-winder et al. 2009). A value chain entails all the activities and services which are needed to bring a product or service from the initial stage of product conception through several production stages until its distribution to final consumers and even beyond to product disposal and recycling (Pietrobelli & Saliola, 2008).

Nonetheless, value chain explains how a customers’ value is accumulated along a supply chain as well as the various activities that lead to the delivery of the product or service that is demanded by these customers (Cherukuri & Reddy, 2014).

The chili pepper value chain, therefore, looks at the various activities that are carried out to convey chili pepper and its products from initial production stage, through processing and its onward delivery to the final consumer both locally and internationally and even to recycling. The various actors along the chili pepper chain carry out various activities that add value to the good in transit up until it reaches the final consumer. Figure 1.1 shows a typical value chain and its main actor stages from the input suppliers through the various value addition stages to the final consumer. A value chain is a consumer demand driven supply chain, which aims at delivering the consumer-desired product.

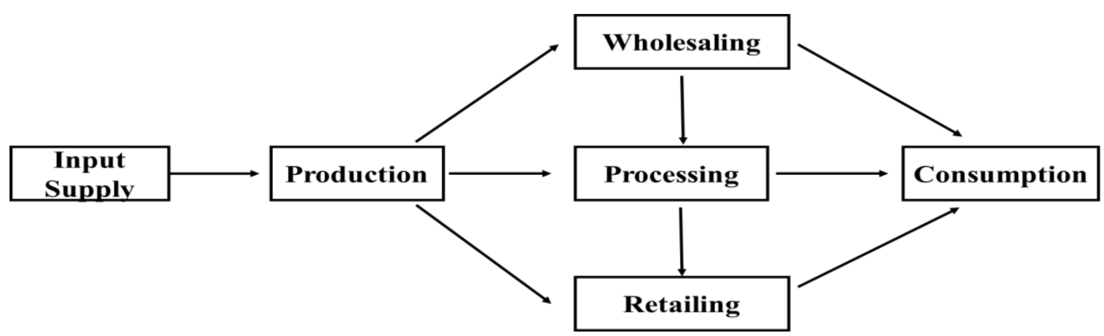

Figure 1 1: Typical value Chain Map with Main Stages

Source: Author’s Own Design

The value chain actors are linked by both horizontal and vertical relationships, which ensure the delivery and disposal of product demanded by prospective consumers through an effective and efficient product flow regime. Hence, value chain development, optimized productivity, profit maximization and the better positioning of both products and value chain stakeholders in the market at large allows for the attainment of fair competition (Ngugen, 2010).

Furthermore, the different stages of a value chain can be grouped into production, processing, distribution and disposal stages, based on roles played by the actors, with each stage adding a different value to the product (Ngugen, 2010). According to Rich, Baker, Negassa, & Ross (2009), there are four main categorical areas of value chain analysis which are of key importance. These areas include mapping, governance, distribution and chain upgrading.

- **Mapping:** has to do with the systematic outlining of the value chain actors and their various linkages along the value chain, respectively.
- **Governance:** deals with understanding the way and manner in which the existing relationship and coordination mechanisms among actors are achieved.
- **Distribution:** has to do with how the benefits accrued along the value chain are shared among actors within and along the value chain (Rich et al., 2009).
- **Upgrading:** looks at the ways by which issues such as uninterrupted product quality and design improvement, access to new markets, actors' innovation capacity assessments as well as diversification are achieved by the various actors within and along the value chain.

Therefore, this value chain approach seeks to look at how the dry chili value chain is conducted by its stakeholders and the performance of the value chain as a whole.

1.2 Problem Statement

Agriculture as an engine for pro-poor growth remains the mainstay of policymakers as the principal means to achieve economic growth and development. However, several factors that bedevil agriculture development; these factors include high transactional cost, lack of technology, and inadequate access to credit, market imperfection, and perishability of products and the prevalence of limited trading of staple food (World Bank, 2008).

Value chain analysis in the agricultural sector generally focuses on the international perspective, and little or no consideration paid to the local commodity value chain and the chili pepper sector is no exception. However, the local market provides a higher opportunity for better intergeneration and increases the involvement of smallholder farmers in the value addition to a commodity, thereby increasing actors' share of the final output value (Witzke, 2006).

In spite of the country's potential for chili pepper production nationwide, coupled with the ever-increasing demand for chili pepper both locally and internationally, the sector has failed to reach its potential concerning the production, processing, marketing and more importantly improvement in the living standard of the actors along the chili pepper value chain (DAI, 2014).

The second objective of FASDEP II was to coordinate and link up institutions and actors in the market (MoFA, 2007). Notwithstanding this objective of FASDEP II, a problem that particularly affects the producers and other market players of the value chain, which is the inability of the FASDEP II implementation to ensure market participation of all stakeholders effectively, link up in the market chain to perform their initiated roles, activities and functions.

Value chain can be integrated vertically or horizontally to meeting constraints of actors in the value chain (Kit et al., 2006). Therefore, if the actors are integrated vertically and horizontally, the value chain analysis of dry chili pepper will allow for the identification of weak value chain stages in order to improve upon these stages for better performance of the chain (Schmitz 2005). According to a report by Vermeulen et al., (2008), both vertical and horizontal integration require capacity and capability, which are the resources poor farmers and chain actors' lack, hence making it impossible to be integrated without support.

Nonetheless, it is generally unclear whether the integration of smallholder farmers into agricultural market systems leads to the economic growth and poverty reduction among these farmers. However, there is the opportunity for smallholder farmers to benefit from value chain integration if the challenges of the value chain are identified and analysed with critical attention paid to how these smallholder farmers can benefit from being integrated, thereby leasing value addition to raw materials produce.

Moreover, the linkages among agricultural value chain actors tend to be non-existent or not clearly established (UNIDO, 2009 & Aina, 2007). The actors along a particular value chain mostly do not have the basis for improving upon their products, which leads to the poor nature of the value chain structure and the relationships among actors along the value chain.

There is, therefore, the need to identify who the participants of a particular value chain are and assess how these participants benefit from better integrated into value chains.

According to findings of Liang, et al. (2010) on the value added and governance structure of the pear industry of China, there are imbalances regarding the distribution of benefits and risk sharing between sellers and buyers. The investigation found that farmers hardly receive a reasonable share of profits compared to the risk they bear and this is because of their weak bargaining position. In addition, because of the poor nature of value chain structures, smallholder farmers tend to obtain fewer benefits and excluded from the markets. It is, therefore, important to ensure that effective participation of various stakeholders of the value chain is developed, to allow for fair distribution of incomes and not polarized (Kaplinsky &, Morris, 2000).

The growing interest of policymakers in the development of agriculture as a means of increasing economic growth and reducing poverty among smallholder farmers cannot be overemphasized. Many global policies encourage linking farmers to markets as a means of reducing poverty among farmers. This has led to both government and non-government agencies such as GIDA and GIZ to design programmes that are geared towards the promotion of cheap supply of agro-inputs and supporting farmers to sell through the value chain approach. However, according to Schmitz (2005), gains along value chains are distributed unevenly, making value addition along chains not clearly established.

Also, actors along value chains tend to obtain unfair returns for their contribution towards the ultimate product of the chain (Megasa, 2015). Agricultural value chains offer a vital means of linking suppliers to consumer demanded agro-products, thereby creating a mutual means of obtaining fare returns and markets for these products. Research conducted by IFAD in 2006 on the livestock supply chain indicated that farmers get the least benefits from their product among the value chain actors (IFAD, 2006).

The lack of market information such product prices coupled with the weak bargaining power of farmers, which may be as a result of low social status, iliteracy and poverty among farmers has led to this phenomenon (Megasa, 2015). There is therefore the need to ascertain whether the situation aforementioned is prevalent in the dry chili value chain, as there is no evidence of research conducted about the dry chili value chain.

In addition, the report of IFAD (2006) shows that poor information sharing and unfair distribution of ultimate product value is a characteristic of the livestock value chain, this implies a poor governance structure of the chain. To understand the power relation that is prevalent along the value chain of dry chili pepper it is imperative to ascertain how the chain is governed and by which actors in the study area.

According to the findings of ACDI/VOCA, (2014), there are several bottlenecks bedeviling the development of agricultural value chains in Ghana. In addition, Masters et al., (2013) indicate that there are several constraints to the production, marketing and the distribution phases of value chains and these are characteristic of developing agricultural value chains. However, the dry chili value chain as any other agricultural value chain will face similar challenges, hence the need to analyse the constraints of the value chain.

It is against this background that the study seeks to answer the following questions.

1. Who are the actors, and what are their functions and linkages along the dry chili pepper value chain in the Ada West district?
2. What value is added by each of the actors along the dry chili pepper value chain in the study area?
3. What power relations exist along the dry chili pepper value chain in the study area?
4. What are the constraints faced by main actors along the chain in the study area?

1.3 Objectives of the Study

The main objective of the study is to analyse the value chain of dry chili pepper in the Ada West district of the Greater Accra Region of Ghana. Specifically, the study seeks to:

1. Identify and map the various actors, their functions and existing linkages in the dry chili pepper chain in the Ada West district.
2. Determine the value added by each actor along the dry chili pepper value chain in the Ada West District.
3. Examine the power relationship along the dry chili pepper value chain in the study.

4. Identify and rank the constraints faced by actors along the dry chili pepper value chain in the study area.

1.4 Relevance of the Study

The impact of chili pepper value chain is broad and spans from poverty reduction, employment generation, nutrition enhancement and health benefit. Chili pepper is the most produced type spice and the second most important vegetable cultivated and consumed across the globe after tomatoes. Actor identification, ascertaining their roles and linkages in the dry chili pepper value chain, will allow actors to collaborate and understand core functions and how these affects other actors along the chain. The overall performance and growth of the chili pepper sector of the district will be achieved through teamwork and support of all actors along the value chain. Also, this will ensure the competitiveness of the chili pepper value chain, thereby presenting the chili pepper value chain actors as a means to economic growth and poverty reduction.

However, analysis of the cost and margins as well as the value addition within the value chain will inspire policymakers to put measures in place for upgrading the chain and sector as a whole to benefit the actors along the value chain. In addition, the determination of actors who benefits from participating in the value chain and ascertaining actors who need support along the value chain will allow for the needed support to be identified and relevant support provided to these actors to improve their performance and thereby increasing their gains as well as the overall value chain performance.

Power relation analysis of the dry chili pepper value chain is important in that it allows for actors along the chain to obtain relevant information needed to formulate strategies that will enhance their operational activities.

Also, donor agencies, as well as policymakers, are provided with relevant information on how best to provide support and technical assistance to strengthen actor position within the chain. This will result in a more equitable distribution of gains along the chain and will prevent stranger actors from cheating the chain actors. Knowledge of constraints at all stages of the value chain will ensure that actors develop a shared will to develop strategies to curb the constraints.

1.5 Limitation of the Study

The chili pepper value chain is complex with numerous interconnecting chili pepper product chains the fresh, dry and powdered chili pepper among others. However, the study looks at the analysis of dry chili pepper value chain with the ultimate product as chili pepper powder. The study considered a farmer in the value chain as a dry chili pepper producer, thus the farmer processes fresh chili pepper into dry chili pepper before its onward supplies to subsequent buyers.

Conversely, the majority of actors in the study area do not keep records of their operations and hence data obtained from them for the study were mainly estimates. In addition, the study considered processors as retail processors; chili processors who mill dry chili pepper into powder and trade the powdered forms. The marginal costing approach using process-costing technique was used in the analysis of the dry chili pepper value chain.

1.6 Organization of the Report

The study is organized into five main chapters. Chapter One presents the introduction of the subject matter of the study. Chapter Two reviews the literature relevant to the study. Chapter Three presents the methodology of the study. It focuses on the methods of analysis, data collection and the analytical tools used to achieve the stated objectives of the study. Chapter Four presents the results and discussions of the study. The final chapter, Chapter Five, gives a summary of the major findings, conclusions and recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of relevant literature on the concept of the value chain, approaches, value chain analysis, value chain mapping, cost and margins analysis, power relation, and finally, the empirical research related to the study.

2.2 Concept of Value Chain

The chain of activities that lead to the transformation of inputs materials into finished goods that can be bought and utilized by final users is mostly known as a value chain (Dekker, 2003). This definition turns out to be limiting about the scope of the definition. Conversely, a value chain is made up of a series of value-creating activities, which add value to the ultimate product. Nonetheless, Pietrobelli and Saliola (2008) argued that value chain entails all the activities and services that are essential to take a product or service from the idea development stage through all stages of production until sales, use, and even beyond to recycling.

Reddy et al., (2010) also defined value chain as all value addition activities carried out at every supply chain stage to add value to a product or service that aim to improve upon the total value of the product or service until its usage and or disposal and recycling. Typically, “value chain” describes the full range of value-adding activities required to bring a product or service through the different phases of production, including procurement of raw materials and other inputs, assembling, physical transformation, acquisition of required services such as transport and ultimately in response to consumer demand (Kaplinsky and Morris 2002). As such, value chains include all of the vertically linked, interdependent processes that generate value for the consumer, as well as horizontal linkages to other value chains that provide intermediate goods and services.

Value chains focus on value creation usually by means of innovation in products or processes, as well as marketing, and on the allocation of the incremental value. A value chain also, "disaggregates a firm into its strategically relevant activities in order to understand the behaviour of costs and the existing and potential sources of differentiation".

2.3 Value Chain Analysis Approaches

Several schools of thought have expressed their views about various approaches to assess value chains in the bid to understand a product value chain. Nonetheless, key among these researchers include Porter, Durufle, Kaplinsky and Morris. Porter (2008) proposed a framework (Porters Framework) which allows firms to assess their position in markets and the relationships that exist with suppliers, buyers and competitors thereby ascertaining its competitive advantage. The framework provides an analytical tool, which allows a firm to determine its competitive advantage source based on its cost structure and pricing strategies.

The framework also looks at the physical transformation of a product with emphasis on the product design, input procurement, logistics, marketing and sales, strategic human resource planning and management as well as research. This implies that a value chain analysis is assessed strictly on business terms.

On the other hand, value chain analysis according to the Filiere's approach looks at how production systems of an agricultural sector are linked to downstream industries such as the processing, trade and export as well as final consumption. This approach used originally as an analysis tool to assess the contractual farming arrangement between entities and the vertical integration of agricultural systems of France in the 1960s. The Filiere's and Porter's approaches share some similarities but also differ in relation to the physical and quantitative relationships. Thus, Filiere's approach focuses on income generation and how it is distributed along a value chain, separating income between the local and export components and then analysing the contribution made to national GDP by spillovers of the value chain.

More recently, Kaplinsky & Morris (2001) have looked at value chain analysis from a broader and holistic approach, tackling value chain analysis from the global perspective. Globalization is seen as an integral aspect of value chain analysis in which several firms and entities and or countries interact and thereby assessed holistically. There is also a perception of increased gaps existing in the incomes between and within the countries because of globalization. There is the need for value chain analysis to understand the entire chain process to increase its performance. Value chain maps serve as a tool for splitting the total value chain gains of the different entities of a chain and indicate how these entities are linked to each other and up to the global economy level. From the global economy level perspectives, international relations are considered a part of the network of producers, exporters, importers and retailers allowing for easy access to market and suppliers due to relations and knowledge developed.

The foreign investment advisory service (FIAS) (2007) defined value chain analysis as the process of accounting and presenting the value that is added to a product or service as the product is being converted into a customer-desired product desired by customers from its raw material state. Value chain analysis, according to FIAS (2007), comprises of market segments analysis, mapping of the value chain, measuring the performances and benchmark establishment and carrying out an analysis of the performance gaps of a specific value chain.

These areas indicated by FIAS (2007) share some similarities with Kaplinsky and Morris (2000). However, the latter approach differs from the former with respect to both the upgrade and governance of the value chains during the analysis. The proposed methodology by FIAS (2007) has core production linkages as a way of mapping value chains while that proposed by Kaplinsky and Morris (2001) is applied in the identification of the critical success factors of the dry chili pepper value chain.

2.4 Value Chain Mapping

The process of linking all the key activities undertaken in the creation of a product is known as the value chain mapping. The map allows for illustrating all activities, actors and their relationships among segments of the chain and the interactions with their intermediaries. According to the Economic Development Board of South Australia (EDBSA), (2015), value chain maps offer simplified means of understanding the various pathways and processes for the production of a product or service. Therefore, value chain maps illustrate the complexities of a value chain of an industry sector in the simplest form.

Value chains are most often illustrated in linear form thus horizontal and vertical, but value chains are ordinarily complex and “web-like” in real-world circumstances, with many linear chains feeding into core supply chain (Brown et al. 2000). Tamasse (2009) stated that in the bid to understand the relationship that exists among actors in value chains, it is vital to note the various actors as well as their activities direct and indirect influence on the chain activities.

2.4.1 Dimensions of Value Chain

The dimensions of a value chain include the input-output structure, the governance structure, the territorial structure and technical structure and actors. Analysing these dimensions provide insight into issues such as what are the different stages of the chain, who are the participants at each chain stages, what are their linkages and which participants run the production process and who benefits more among actors along the dry chili pepper value chain. There is the need to ascertain the important intervention points of the value chain to allow for the better integration of poor chain actors.

2.4.2 Technical structure and actors

Generally, this dimension consists of input material supply, primary goods production, processing of intermediate goods, marketing and trade, and the disposal of finished goods. These five stages make up the technical production process. Nonetheless, each stage of the production process consists of one to several actors performing different roles and functions.

Input supply: this is the initial stage of most value chains. The stage comprises the provision of all production input materials that are required for the initial step of the production process of the desired product. Input materials such as seed, machinery through to technical equipment are made available for production purposes at this stage of the chain by both small to large-scale enterprises.

Primary Production: All activities including seed sowing, fertilizing, harvesting, etc. needed to produce raw material like grain or vegetables are carried out at this stage. Actors at this stage range from the individual firms, small-scale firms to middle or big sized enterprises that operate out-grower schemes or production plants.

Processing: Products that serve as intermediary goods move into a processing stage, which is the subsequent step of the chain. Raw materials and or intermediary goods are converted to processed products such as dry chili pepper or powdered chili pepper among others. However, product transformation is becoming increasingly crucial as users tend to have rapidly changing taste and preference for a high variety of products and desire already prepared food, which is readily consumable.

Activities such as product classification and packaging, form part of the product transformation. These are becoming increasingly vital due to the ever-changing consumer requirements of a product design and make in both developing and the industrialized countries. Several actors found at the processing stage with differentiated products, depending on the quantity and quality of goods produced, the product's complexity and production process required.

Marketing and trade succeed the processing stage in most chains. The processed products have to be moved to the places of demand and distributed for onward sales to consumers. Marketing may be carried out either directly by the producers or processors, or by logistics companies, however, marketing requirements tend to be high with higher traded product requirements such as quantity and quality.

Consumption: the final stage is the product usage. Consumers neither contribute directly to the production process nor add value to the product, they form the most vital part of the chain. In that, the consumers are the driving force of the whole process, thus the whole chain is because of what they demand. The determining factor for product quantity and quality is the demand of the consumer

The technical structure described above is conventional, but not fixed. In some cases, additional stages tend to appear. For instance, for the fresh fruit production and consumption sector, there is the stage of aggregations. Activities such as sorting, grading and cleaning are carried out at the production or the marketing stage but mostly left out in the fruit chain description. However, this dimension is applicable to the chili pepper production, which is the focus of the study.

2.4.3 Territorial structure

The territorial structure, according to Stamm (2004), is “understood as the geographic concentration or dispersion of production and marketing” This structure provides an overview of the specific stage of a value chain. The value chains, as well as the activities within the chains of countries, have all chain stages and activities localised, however, for international chains both the chain stages and activities may be extensive globally.

An example can be seen in the processing of fresh chili-to-chili paste. A Poland fresh chili pepper processor may buy raw materials (fresh chili) from Ghana. However, the chili pepper paste produced in Poland can then be sold domestically or exported to other parts of the world.

Knowledge of the terrestrial structure is imperative for assessing the profits of individual countries integrated into the chain. Conversely, it allows for the analysis of what makes some countries better integrated and others poorly integrated. Comparing the integrated to non-integrated countries, the country's frameworks conditions allows for the identification of possible entry barriers that need to be addressed for a better integration of countries into the global trade (Donaldson, 2015).

2.4.4 Input-output structure and profit distribution

The input-output structure is closely related to the technical structure. It can be defined as the "tangible (raw materials, intermediate goods) and intangible (knowledge) flows linked together in the process of value creation" (Stamm, 2004). The input-output structure gives mainly an overview of four aspects: the amount and quality of a good that is needed from one stage of the chain to fulfil the requirements of the following stage, the value that is created at each stage, the profit distribution in a chain and the information flow between the single stages of a chain.

According to FIAS (2007), three (3) main elements can be associated with each activity stage in the value chain. They describe the production links in the value chain. These elements are source, make and deliver.

"**To Source**" implies the processes involved in the acquisition of the main inputs (raw materials) or goods/services for the main production process of a product. The product of this stage is either utilized by succeeding production stage as an intermediary input or sold as finished goods/ services to consumers.

"**To make**" has to do with the processes, which are undertaken in the primary transformation of the main raw material or intermediate goods from the preceding stage into finished goods and services. The products at this stage are also either sold off as finished goods or used as intermediate goods for subsequent stages.

"**To deliver**" looks at the distribution of the finished goods and services from previous stages to final consumers or succeeding production stages. Mostly, characteristic activities of this stage include haulage, loading and offloading and the like. Nonetheless, both governmental policies and infrastructure allow for the smooth operations of value chains thereby affecting the chain performance and effectiveness.

Conversely, the EDBSA (2015) also identified five key segments of value chain maps, which are described as the production links in the value chain. These stages include:

Value chain stages: this step looks at an outline of the general linear chain of product production process. At this stage, the value chain is seen as an economic system organized around a specific product. The step allows for the creation of a linear chart of the vital stages in the value chain and forms the basis for the development of the value chain map, which is from the raw material or product design phase to the product's sale or usage by the ultimate users.

Identification of main actors: this is the step in which the most important participants at each stage level of the chain of a specific goods or services are identified. Identification of the major participants involved in the key transactions of the chain and their links allow for a graphical representation of the value chain and its stages. These participants may be private businesses and governmental entities. It important to note that some of these actors are existent across the whole value chain thus being vertically integrated. Also, other actors may be involved only in distinct stages.

The product produced and services provided: this step looks at the outcomes and services that are provided at each stage of the production chain. The goods and services that are produced at specific chain stages, as well as value-adding activities, are quantified at this stage. It is imperative to identify precisely where the value is being added, or where extra value addition is carried out. It is worth noting that some products may be exported for further processing or distribution before its onward sales to consumers.

Activities and Processes undertook: this refers to the main processes and activities necessary to produce the goods or services of the chain. There is an assessment of the processes and activities undertaken along the chain collectively, and individually, which is carried out either to provide knowledge and information on the value chain. Identification of these processes and activities, their inter-relationships, alongside other elements of the chain map, is key to identifying how value is transferred along the chain.

The chain Support services: these are activities needed across all stages of the value chain but are not created as a direct result of the chain. These activities are vital for the smooth and effective operation of the chain. They are mostly not tied to one stage and are frequently used across various stages. These activities go beyond the straightforward domestic value chain to a larger extent such as export value chain.

2.5 Costs and Margins Analysis

The profitability of a venture tends to be the motivation of most businesspersons and hence forms the basis for the decision-making in venturing into a specific business endeavour. Profits are very vital issues considered by people who are usually less resourced and cannot afford to be in a market where profits are hard to come by (van den Berg et al. 2008). Therefore, there is the need to analyse the revenue, costs and margins of the value chain. Dekkar (2003) also indicated that cost and revenue analysis allows for the control of cost drivers by a firm better than its competitors do. In addition, cost and margins analysis enables researchers to ascertain the "pro-poor" nature of a specific value chain (M4P, 2008).

An actor's cost is, therefore, the money the actor contributes to the value of a product while the revenue is the money (selling price) received for the products for sale. The margin of actors has to do with the money received from their cost less revenue. Historic costs and margins deal with ascertaining the financial trends of value chains and whether the value chains have the potential for growth.

However, actual costs and margins assist in estimating whether the value chain serve as a better income source for the poor as well as discovering how accessible these incomes are to the poor in the rural areas participating in the chain. Analysis of costs and margins of the value chain will be useful if producers (farmers) are seen as micro-enterprises thus profit-seeking entities with limited resources rather than as subsistence actors.

However, it is important to recognize the difference between the cost as used by the economist and the accountant. The economist considers the opportunity cost as cost incurred because of the use or production resources (labour, land and capital) by actors to maximize profit whilst the accountant looks at cost from the financial perspective. Liang et al.'s (2010) study on the value added and governance structure of the pear industry defined cost to be the added expenses incurred from activities such as inputs purchasing through to output sale.

2.6 Power relation of the Value chain

A value chain analysis is unique in the sense that it does not only emphasize the dynamics of the user markets of products but furthermore looks at the changes in shifts in relationships. The power relation (governance) of value chains can be defined as the relationships among buyers, sellers and all stakeholders (service providers and regulatory institutions) who function within and between the chain and can influence the range of activities needed to bring a product or service from its idea phase to a customer desired product.

According to Gereffi's Global Commodity Chain approach, "a governance structure is the authority and power relationships which determine how financial, material and human resources are distributed within a chain" (Gereffi & Fernandez-Stark, (2011). Per this definition, the governance structure organises a value chain and concretely defines what is to be produced, how to produce it, when to produce it, and how much it should be sold for. This indicates that the power relation is predominantly between suppliers and purchasers and not so much between input suppliers and producers or purchasers and final consumers. Generally, it is assumed that these linkages are market coordinated.

Different kinds of governance structures exist; therefore, it is important to ascertain under what circumstances do these governance structures arise and what are the advantages each structure offers (Humphrey and Schmitz, 2002). According to Gereffi et al. (2005), the determining aspects of a value chain, governance structure has to do with the transactions complexity, the possibility of codification and the competence level of suppliers.

Transaction Complexity: is "the complexity of information and knowledge transfer required to sustain a particular transaction, particularly with respect to product and process specifications" (Gereffi et al. 2005). It can be assumed that the more distinct the final product, the more complex is the required information and knowledge transfer. It is understood as the sum of specifications needed from the diverse stages of a value chain to produce a certain good.

Possibility of codification: looks at “the extent to which the information and knowledge necessary for the transactions can be codified and, therefore, transmitted efficiently and without transaction-specific investment between the parties to the transaction” (Gereffi et al. 2005). Competence level of the suppliers: has to do with “the capabilities of actual and potential suppliers in relation to the requirements of the transaction” (Gereffi et al. 2005).

The interaction between these aspects determines the governance structure of the chain. The different governance structures offer different gains for the producers. The best form is a relational governance structure as it offers producers the highest level of independence connected with a powerful position in which they can influence the co-ordination of the chain to their own benefits.

McCormick and Onjala (2007) also defined governance in the chain as the pattern of indirect and direct control. In value chain analysis it is important to ascertain the type of power relationship that exists among the actors, as it aids significantly in the selection of interventions to improve the competitiveness of the whole chain. Governance allows for the interaction between chain actors to be organized rather than it simply being random (Kaplinsky and Morris, 2000).

Gereffi and Fernandez - Stark (2011) also indicated that the analysis of value chain governance provides an understanding of how the chain is controlled and coordinated when certain actors wield more power than the other actors in the chain do. A study on the analysis of the groundnut value chain in Ghana by Owusu-Agyei (2010) identified the distributors in the chain to be the dominant actor. These distributors set prices and determine quantities of groundnuts as wells control the flow of information.

However, Irawatiet et al. (2009) noted that the absence of governance in the value chain leads to uneven distribution of gains among actors and an unfair distribution of value addition. This implies that issues of the chain governance are unearthed when value chain analysis is carried out. According to Gereffi and Fernandez – Stark (2011) there are five governance structure types; these are the market, modular, structure, relational, captive and hierarchy structures.

2.7 Institutional and Policy Framework Analysis

Chili has not received major attention by policy makers and agricultural institutions. Lack of government investment in public institutions for agriculture (research, extension, irrigation) is acute for chili as not considered priority crop. Fertiliser subsidy policy could be better targeted which would make more fertiliser available for high value crops such as chili. Research and extension institutions are ineffective in commercialising new technologies, as they lack connections with the private sector.

Policies: Whilst policy makers at the national and regional level are well aware of the potential that chili offers, they have yet to develop specific policies to promote the crop. SADA too is aware of the crop's potential but it has also yet to develop a coherent policy for the crop. Chili therefore benefits from the general policies that are pursued to promote agriculture, such as fertiliser subsidy, but no attempt has been made to assess where market failures are causing production bottlenecks or reducing value addition in the value chain.

As a result, broad based policies for agriculture miss the mark for chili. For instance, seed subsidy is not directed towards seeds for chili and fertiliser subsidy only benefits the rainy season crop. Better targeting would reduce abuses, such as traders from neighbouring countries smuggling fertiliser across the border, thus making more chemical fertiliser available for dry season farmers (DAI, 2014).

Besides, the focus on chemical fertiliser rather misses the mark for chili as what the North, with its soils depleted of organic matter, really needs is promotion of the use of organic fertiliser, which is particularly important for growing chili. Allied to lack of a crop specific policy is poorly developed public institutions that make it difficult to implement all agricultural policy. As noted earlier, research and extension institutions are underfunded. That applies also to the Ghana Irrigation Development Authority (GIDA), which is responsible for dams and dugouts.

As important as funding is governance over these institutions. In general, their management is not held to account for delivering results and nor has it been tasked to develop strategies to work with the private sector or civil society to leverage their capabilities and networks. Facilitating the involvement of the private sector in research and development and extension education will enable the dissemination and commercialisation of research findings and extension information to target beneficiaries. Gebremedhin et al. (2006)

Public sector organisations, such as the Ghana Export Promotion Authority, Ghana Standards Authority and Food and Drugs Authority, provide export trade support by facilitating the promotion and development on non-traditional export goods (including chili), the development and enforcement of standardisation and food quality control, including the enforcement of international quality standards. The activities of these service-providing institutions appear to be most useful for export commodities, as quality awareness on the domestic markets is very low.

Donor Programmes: what government has done is to hand over the task of developing the chili potential of the North to donor-funded programmes that it is undertaking. As part of the Government of Ghana's policy to commercialise vegetable cultivation in the Savannah belt, the Northern Rural Growth Programme (NRGP) has named chili as one of the vegetables to promote. However, specific policies and interventions are yet to materialise. The vegetable window has not been contracted out to a technical service provider to facilitate its value chain arrangements (DAI, 2014).

The Market Oriented Agriculture Programme (MoAP) implemented by GIZ has been analysing and intervening in the chili value chain for many years. IFDC and GIZ have also promoted some interventions geared at integrating smallholder farmers into the domestic and international markets that enable farmers to increase the supply of raw materials and participate in adding value activities to strengthen their position in the chain.

However, the coverage of all these useful innovations/interventions is limited in scale in Northern Ghana. It is however now scaling down its involvement. The chili initiative in Northern Ghana is now limited to only 300 chili producers. GIZ and ADRA have also done some work on chili production and productivity, but these initiatives are limited to few communities in Northern Ghana.

These interventions need to be rethought if they are to be scaled-up. The involvement of capable players in the chili value chain and the establishment of supply chains from southern exporters and major buyers in the Savannah belt are crucial for success.

2.8 Empirical Research on Related Literature

In Malawi, a value chain approach was used by Makota, et al. (2010) to ascertain the main players in paprika and bird's eye chilies sub-sectors, the power relation of the respective value chains, the vertical and horizontal linkages along the value chains and prospects for value chain upgrading. In their study, smallholder farmers were assigned relatively less land (18 per cent) to paprika production in 2009/2010 season, compared to 40 per cent of the land to birds' eye chilies.

They realized that even though small-scale farmers dominate production, a number of commercial producers are also involved, such as Africa Invest Malawi. Some of the commercial producers are also engaged in out-grower schemes with the smallholder farmers. It was also observed that a large proportion of the farmers of both paprika and chilies access their seed through market-based sources.

Among the major constraints, facing the smallholder farmers is access to market information, especially as it relates to prices. Gross margins for bird's eye chilies were found to be significantly higher (MK79, 057/Ha) than that of paprika in the study areas (MK11, 553/Ha). It was evident that the bird's eye chili value chain also had few players. The producers are generally smallholder farmers, who sell their dry chilies to large-scale traders (Nali Ltd, Africa Invest Malawi, Cheetah Malawi Ltd and Ducati Produce, among others).

Large-scale traders export the commodity generally to brokers in South Africa and to end-users in Europe, the United Kingdom and others parts of the developed world. In this buyer-driven chain, the final consumers dictate prices. The study recommended that in order to improve the paprika and bird's eye chilies sector in Malawi, there was an urgent need to increase the production levels and the productivity of the two crops substantially. This specifically means improving farmer's agronomic practices through the provision of quality agricultural extension services and improving the organization of farmers into groups (Makota et al., 2010).

Dijk and Treinekens (2012) assessed red chili production in Pakistan and found out that only 2.66 percent of total Red Chili production of the country is exported in spite of an established market demand for the Dandicut variety in several existing markets and potential in other promising markets due to its intrinsic product attribute of high pungency and colour. Their study identified that the chili value chain competitive position is weak. These is due to several supply-side constraints and weaknesses, which includes:

1. Low yields due to limited genetic potential of chili varieties and poor farm management practices,
2. Primitive drying process results in inconsistent product quality with high afflation and undesired dark colour
3. Weak direct linkages among growers and exporters result in uncertainty, high price fluctuations and low trust levels in the chain.

Dessie, et al. (2017) conducted their study at Abshige Woreda, South Ethiopia to analyse the value chain of chili pepper and the factors that determine the supply of red pepper to the market. The study has duly focused on the market channel, market participants and performance of chili pepper markets. The data was generated by structured questionnaire, focus group discussions, key informant interviews and field observation focus. Their study realized that traders took 61.3% out of the total profit margin.

Chili pepper producers added 38.7% of the total value of Chili pepper in the Woreda. The Total Gross Marketing Margins was highest in Farmers-Processors-Consumers channel (62.1%) followed by Farmers-Retailers-Processors-Consumers channel (55.4%). Results of the econometric model showed the relative influence of determinants of different variables on the marketable surplus of chili pepper in the study area. Out of nine variables, seven variables of the determinants of marketable supply of chili pepper were significant

Accordingly, the age of the household head, education level of the household head, average output price has a positive and significant influence on the marketable supply of chili pepper. Similarly, distance from market, average input price, diseases and drought have influence marketable supply negatively and significantly with the volume of red pepper marketed. They concluded in their study that the development of red pepper producers' bargaining power through cooperatives is the best measure that should target at increasing the share of producers and increasing chili pepper production in the Woreda red pepper markets (Dessie et al., 2017).

Nkansah et al., (2011) investigated the overall economic efficiency of chili pepper producers in the Volta region of Ghana. The study used farm-level data to examine the productivity of selected agricultural inputs, technical, allocative and economic efficiency levels and the determinants of the efficiency of chili pepper production. The modified Trans log stochastic frontier production and cost function models were adopted for the study using the maximum likelihood estimation procedure and a sample of 200 chili pepper producers through a multi-stage sampling technique. The results indicated that on average, chili pepper farms were only 65.76% economically efficient, whilst mean technical and allocative efficiencies were estimated to be 70.97% and 92.65%, respectively.

The results also revealed that chili pepper farms in the study were characterized by decreasing returns to scale. Nkansah, et al. (2011) concluded that chili pepper farms in the study area are economically less efficient and recommended policies and programs that aim at appealing to the teaming youth into chili pepper cultivation to be pursued by giving them incentive packages. They also recommended that policy makers should also focus on policies that will facilitate chili farmers' access to alternative sources of low-interest bank loans in the form of inputs.

Baan, 2014 analysed the chili pepper value chain of smallholder farmers producing under Irrigation at Kpando -Torkor in the Volta region of Ghana. The study was carried out in Torkor using desk research and case study. The result of the study indicated that there were two chili value chains the export market-based chain and the local market-based chain. The export market-based chain revealed a functioning market institution and relationship but the local market-based chain was, weak in market institutions. Both chains were however, not fully developed.

He pointed out that the chains were short and lean and smallholder farmers as an actor were performing only the function of producing. In addition, there were prospects to upgrade for improved market access and integration into the chain. The high demand for chili pepper domestically is an opportunity for maximizing profits leading to sustainability of the chain. On the other hand, the smallholder farmers are facing challenges of small landholdings, high costs of production, lack of capital for investment, the absence of storage facilities and poor infrastructural development.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

In this chapter, the methodology of the study is presented. Sections 3.2 and 3.3 of this chapter presents the conceptual framework and the theoretical framework of the study. The method of analysis, sampling procedure and method of data collection and description of the study area are presented in subsequent sections of this chapter.

3.2 Conceptual Framework of the Study

The conceptual framework of the study is presented in a flow chart shown in Figure 3.1. The activities undertaken start from input supply, production and marketing, among others, to consumption with their respective linkages. The actors of the chili pepper value chain include the input providers, chili pepper farmers, traders and processors of both fresh and dry chili pepper and the consumers of chili pepper products. Chili pepper production essentially begins the value chain, with farmers buying input materials such as seeds, fertilizers, agro-chemicals and the like from the input dealerships for production purposes. Farmers obtain seeds from input dealerships and nurse them after the first rains for the chili-farming season. Seedlings are then transplanted onto ploughed fields to grow to maturity for approximately four months after which it is ready for harvesting. At harvest season, farmers mostly sell off their harvest as either fresh or dry chili pepper.

The farmers may decide to sell their harvest either directly to traders (wholesalers and retailers) in the market, processors or to final consumers. Local wholesalers upon purchasing chili pepper, then sell to processors and/or retailers as well as final consumers. On the contrary, processors further process chili pepper into forms that are in demand in the market and subsequently sell to final consumers. Some retail processors buy from wholesalers who also purchase from colleague wholesalers and sell in the main markets. For purposes of this research, the dry chili value chain is considered for analysis.

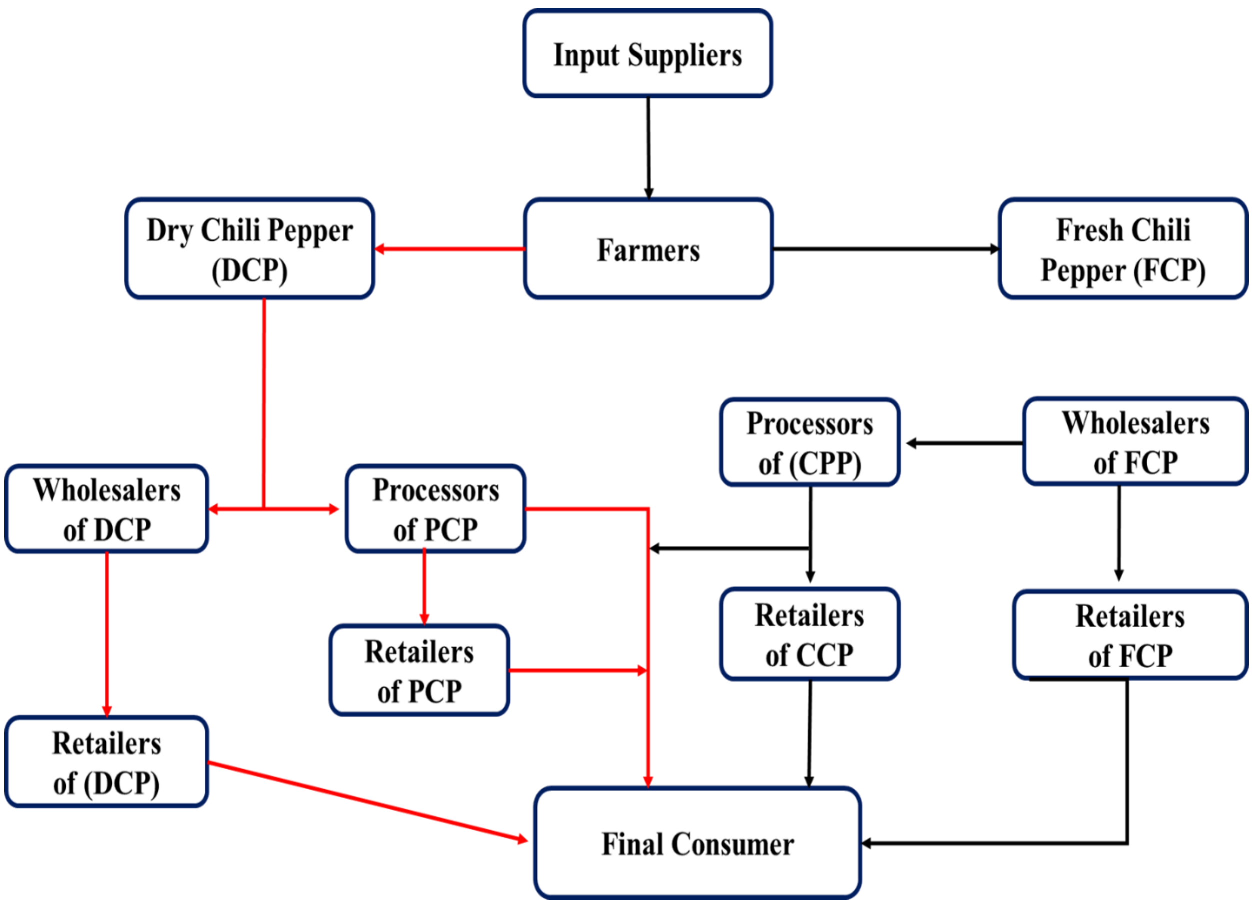

Figure 3 1: Conceptual Framework of the Study

Source: Author’s Design

3.3 Theoretical Framework of the Study

The analysis of the dry chili value chain is carried out with references to the framework of the New Institutions of Economics. The framework looks at the roles of organisations or firms in participating in economic activities as being both vertical and horizontal relationship between these entities or firms. It also analysis the role of the various market participants at their respective stages of the supply process (Zoss, 2014). The study analyzed the dry chili pepper value chain from the principal-agent and the transactional theories perspectives.

The principals of a value chain nominate agents to perform tasks such as production, procurement, distribution of raw materials as well as processing of products such as dry chili pepper among others. In the performance of value-added activities in the value chain in the Ada West district, the principal may hide or provide partial information in order to take advantage of market situations before the transaction takes place. These roles of agents and principals in the dry chili value chain are in line with the principles of the New Institution of Economics. Conversely, in the performance of value addition activities in the dry chili value chain in the Ada West District of Ghana, actors incur a cost, which is associated with transactions carried out to add value to raw materials.

The transactional cost incurred by these chain actors is in line with transaction cost theory. There is both direct and indirect cost to the processes involved in the value addition activities along with a value chain (Butter, Graaf, Nijesen (2009).

This transactional cost is measurable and includes materials, labour and overhead costs such as levies and tariffs. Butter, et al., (2009) indicated that indirect transactional cost is difficult to estimate and includes contract enforcement, communication among others. The transaction cost of the various arrangements in the value chain is within the scope of the New Institution of Economics framework. However, the value chain considers value addition along the dry chili pepper value chain in the nature of processing in which inputs are being added to raw materials continuously to the production processes, thereby losing their identity, and achieving a continuous output of production.

3.4 Method of Data Analysis

Appropriate economic models such as the cardinal scoring approach, marginal costing and the Kendell's coefficient of concordance were adopted for addressing the objectives of the study. Descriptive statistics were used to analyse the socio-economic characteristics of the respondents, describe the relationship between the value chain actors and to analyse the scores of the indicators for governance structure.

3.4.1 Identification and mapping of actors along the value chain

The value chain mapping process is both a quantitative and a qualitative means of creating and visualizing a complex industrial sector. The map, therefore, provides an easily digestible means of understanding the pathways and processes to a product production through to its consumption in the simplest form possible (UNIDO, 2009). Value chain maps allow for easy identification of key interrelationships and points of coordination of a product's value chain as the product moves from the initial point of production through to consumption when presented visually (Lubungu et al. 2013).

The methodology proposed by FIAS (2007) was applied in mapping the core production and linkages, which is similar to EDBSA (2015) approach to mapping value chain. The study adopted both approaches in drawing a flow diagram to establish the` various operational stages of the dry chili pepper value chain, from the farm to the consumption.

The main actors along the dry chili pepper value chain were mapped up by drawing up a flow chart to identify the main stages of the value chain from the initial operational stage to the other. Thus, from input dealership to primary production through to the consumer stage of the product (dry chili pepper) of the value chain. At every operational stage, a link is drawn between each stage of operation with respect to the key transactional activities that identify the actor at each value chain stage in the chart. Thus, the source of a major input product of a proceeding actor with regard to the preceding actor who is the main consumer of the input product.

The good and service, as well as the processes and activities, undertaken along the chain, were used to draw out a flow chart that illustrates the chili pepper value chain and how the product is distributed from one stage to another. Supports services that are necessary for the proper functioning of the value chain that was received by actors were identified and indicated appropriately on the map. In addition, the nature of contracts as well as the input-output relationships among actors was analysed to assess the existing relationships among actors along the value chain.

3.4.2 Estimation of value added by each actor along the value chain

Value-added per unit of product is defined as the price obtained by an actor (selling price) in the value chain less the price received by the actor for the inputs used as well expenses incurred (variable cost) by the actor in the value chain. Therefore, the value added is how much contribution or value is added to a product at each stage of production and supply along the value chain (Kuwornu et al. 2013, & GTZ 2007).

The revenue and costs of the dry chili value chain were estimated to determine the value added respectively by the various actors along the value chain. The cost of an output from a preceding process becomes a cost of input to the next stage. The cost incurred by a business entity includes both the variable and investment cost to the business entity (Kuwornu et al. 2013). The value chain for this study starts with the input dealership and ends with at local consumer level. However, the estimation of value addition was carried out with regards to the chili pepper farmers, the wholesalers and processors.

The value-added estimation was carried out for a kilogram of chili pepper at the respective stage of the value chain. Value-added considers all the variable or cooperating costs, which include direct material, direct labour and direct expenses. The gross margin, net margin, selling price and the gross margin per cedi of operating cost per kilogram of each actor stage was employed in the estimation of value added by respective main stage actors.

The cost variables estimated at each stage include:

1. The Purchasing Price per kilogram of main primary input of each actor.
2. The Operating/ variable Cost other than primary input cost per kilogram of each actor.
3. The Selling Price (Price Received) per kilogram of each actor.

Value-added was computed as the unit Selling Price (SP) per kilogram less unit variable cost (VC) incurred per kilogram of the output of the respective stage actor. This is expressed mathematically as:

Value Added (VA) = Selling Price (SP) – Variable Cost (VC) (3.1)

$$\text{Mean VA} = \frac{\sum_{j=i}^{N} VA_j}{N} \qquad (3.2)$$

Where: Mean VA = Mean Value added

N = number of actors at a given stage of the chain

Gross Margin computed as the value added less the operating cost per unit kilogram of product produced at each respective stage of the chain. This is expressed mathematically as:

Gross Margin (GM) = VA - OC (3.3)

Where: GM = Gross margin

VA = Value added

OC = other operating costs per unit

$$\text{Mean GM} = \frac{\sum_{j=i}^{N} GM_j}{N} \tag{3.4}$$

Where: Mean GM = Mean Gross Margin

N = number of actors at a given stage of the chain

The Net Margin computed as the Gross Margin less the Marketing Cost per kilogram of product. Mathematically, expressed as:

$$NM = GM - MC \tag{3.5}$$

Where:

NM = Net margin

GM = Gross margin

MC = unit marketing cost

$$\text{Mean NM} = \frac{\sum_{j=i}^{N} NM_j}{N} \tag{3.6}$$

Where: Mean NM = Mean Net Margin

N = number of actors at a given stage of the chain

Gross margin per cedi of operating cost is computed as the gross margin divided by the sum of the main input cost and other operating costs of the actor. Mathematically, it is expressed as:

$$\text{GMP} = \text{GM} / (\text{COP}) \tag{3.7}$$

$$\text{Mean GMP} = \frac{\sum_{j=i}^{N} \text{GM} / (\text{COP})_j}{N} \tag{3.8}$$

Where: GMP = Gross margin per cedi of operating cost

GM = Gross margin

COP = other operating costs per unit plus unit Cost of main input

The period of analysis is critical so for this study, the operating cost period for production was considered as from the time of land preparation to the time of selling of dry chili pepper for farmers. Wholesalers, on the other hand, one operating period considered as the time he/she bought dry chili pepper after “harvest season” to the time he/she sold dry chili pepper before the next “planting season”. The processor’s cycle considered as from the time he/she purchased dry chili pepper to the time he/she sold as a processed dry chili pepper.

Referring to Table 3.1, to estimate the value added at each stage, the main input material cost at each stage was computed. In the case of the farmers, the main input (A) cost was the average price of seed.

The main input (D) cost for the wholesalers was the average price of the dry chili pepper and for the processors; the main input (G) was the average price of either dry pepper from the farmer or the wholesaler. The total operating cost (B) for the farmer computed as the summation of all direct labour and direct expenses cost. The marketing cost (C) computed as the sum of all production overheads such as market tolls and levy, communication and marketing. Computation of estimates made per kilogram of product for easy comparison along the chain.

Table 3 1: Value Addition Estimation per Kilogram of Dry Pepper

	Actors		
Cost Items	**Farmers**	**Wholesalers**	**Processors**
Cost of Main Input	A	D	G
Other Operating Costs	B	E	H
Marketing Cost	C	F	I
Selling Price	D	G	J
Value Added	D - A	G - D	J - G
Gross Margin (GM)	(D-A) – B	(G-D) - B	(J-G) - H
Net Margin	(D-A-B) - C	(G-D-B) - F	(J-B-H) – I
GM/ cedi of Operating Cost	(D-A-B) / (A + B)	(G-D-B) / (D + E)	(J-B-H) / (G + H)

Source: Author’s Computation

Test of statistical differences in means of net margins

Based on the sample size of the actors, differences in means were tested for farmers-processors, farmer- wholesaler, processor- wholesaler. That is, whether the sample size is less than 30 or greater than 30, the t-test or Z-test, conducted respectively. The t-test or Z-test is estimated as:

$$\text{Z or t} = \frac{\overline{X}_1 - \overline{X}_2}{S_{\overline{X_1} - \overline{X}_2}} \tag{3.9}$$

Where:

$\overline{X}_1$ refers to the mean of the farmer

$\overline{X}_2$ refers to the mean of the processor

$S_{\overline{X_1} - \overline{X}_2}$ is the standard error of the difference between the two means

it is estimated as:

$$S_{\overline{X_1} - \overline{X}_2} = \sqrt{\frac{S_1^2}{n_1} - \frac{S_1^2}{n_2}} \tag{3.10}$$

where:

S_1^2 is the unbiased estimate of the variance of the farmer

S_1^2 is the unbiased estimate of the variance of the processor

n_1 and n_2 are the sample sizes for the farmer and processor respectively

Statement of hypothesis:

The null hypothesis (H_0) was tested against the alternative hypothesis (H_1) as follows: H_0 is: there is no significant differences between the means of actors and the H_1 is: there is a significant difference between the means of actors. The t–statistic was used to test the differences between means of values on the parameters estimated, the significance of the t – statistic was at 5% significant level. The decision rule: where the calculated t – statistic is greater than the tabulated t – statistic then the null hypothesis is rejected in favour of the alternate. That is there is no significant difference between the estimated means values of the actors.

3.4.3 Description of Governance Structure of the value chain

Descriptive statistics such as the percentage was employed in the analysis of the data obtained on the form of contractual agreement, terms of nature of contractual engagement between actors of the chain either verbal or written agreement. The nature of contracts elements included the provision of finance or credits, purchasing of products, provision of storage space and materials, provision of transports.

Also, the terms of contracts included whether there was a clear specification of the product under consideration, statement of the time of product delivery, the specification of parties involved responsibilities, payment terms and other financial issues were clearly specified and whether provisions were made for the changes in prices due to product differentiation with respect to quality and quantity. The concept of power is complex in nature and a highly controversial issue in the majority of value chain literature.

On the contrary, the study adopts the approach of CATRO (2006) and Gerrefi et al. (2005) in the analysis of the governance structure of the dry chili value chain. Power is defined as the level of ‘‘importance and influences’’ an actor in a chain exerts within the chain with respect to selected governance indicators. These indicators include profit, bargaining power, protection from competition and the concentration of information in a value chain (Gereffi et al. 2005 & CASTRO, 2006).

The means scores of the selected indicated were on the level of “importance and influence” which actor tend to have or exert in the value chain was analysed with the cardinal scoring approach. A 100 per cent was awarded as the strength each indicator for all actors along the value chain. Means scores computed from data on the score awarded by actors were analysed, thus higher means score implied a higher level of influence and power. So, in that sense, the actor with the highest mean scores percentage with regards to a particular indicator in the value chain is the dominant actor in the chain and actors with lower mean scores are the dominated actors with the least score being the most dominated in the study area.

3.4.4 Identification and Ranking of Constraints of the Actors.

In literature, the Garrett method of constraints ranking and Kendall’s coefficient of concordance are methods used predominantly in the analysis of constraints in empirical studies. The study adopted Kendall’s coefficient of concordance (W) in the analysis of the constraints of actors along the dry chili value chain in the study area. The Kendall’s coefficient of concordance is a measure of the agreement between several (p) judges (or respondents) who are given a set of (n) objects.

Respondents were asked to assign ranks to constraints presented to them in descending order of severity; that is from the most pressing constraint to the least pressing constraint. The Kendall's Coefficient of Concordance (W) is an appropriate estimator, as it attempts to examine the degree to which a group of variables provide a common ranking for a set of objects (Legendre, 2005), The "W" value ranges between 0 and 1, where 0 and 1 represent perfect disagreement and perfect agreement, respectively among rankings.

However, Kendall's coefficient of concordance has a limitation to its use. The coefficient does not consider the heterogeneity in the constraints faced by the population at the individual level. Nonetheless, Kendall's coefficient of concordance was used as the study deals with a homogenous population. The constraints faced by actors along the chili pepper value chain in the study area were identified from the literature, validated during pre-testing of the questionnaire, and presented for assessment.

The formula is expressed mathematically as:

$$W = \frac{12\left[\sum T^2 - \frac{(\sum T)^2}{n}\right]}{nm^2(n^2-1)} \tag{3.5}$$

Where;

T	=	sum of ranks for each constraint being ranked
m	=	number of respondents
n	=	number of factors being ranked

Hypothesis Testing: The null hypothesis (H_0) was tested against the alternative hypothesis (H_1) as follows: H_0 is, there is no agreement between rankings of respondents and the H_1 is there is an agreement between rankings of respondents.

The chi-square statistic (X^2) will be used to determine the significance of Kendall's coefficient of concordance (W) at 1%, 5% or 10% significant levels.

The decision rule is that: If the calculated X^2 is greater than the tabulated $X^{2,}$ then the null hypothesis is rejected in favour of the alternate. That is there is no agreement between rankings of respondents.

3.5 Method of Data Collection

3.5.1 The Ada West District

The study was conducted in the Ada West district of the Greater Accra region of Ghana. The district was established in 2012 out of the former Dangbe East District of the Greater Accra Region with Sege as the district capital. The district is bounded to the North by the North Tongu district and on the south by the Gulf of Guinea, which stretches, from Akplabanya to Goi towns of the district, shares boundaries with Ada East and Ningo-Prampram to the East and West, respectively. The district is about 80 kilometres from Accra.

The economy of the district is predominantly an agricultural one making farming a major economic activity. Agriculture serves as the major source of livelihood of the citizenry who are engaged either directly or indirectly in farming and its related activities.

The district is well known for the cultivation of vegetables and fruits with some level of agro-processing activities. Crops produced are mainly pepper, tomato, okra, maize, cassava, pineapple, watermelon, mango and cashew.

The district vegetation is predominantly a coastal savannah type with short savannah grass and interspersed with shrubs and short trees. The general drainage pattern of the Ada West District can be described as dendritic with some of the streams taking their sources from the Volta River. Water bodies such as Anyamam, Akplabanya and Sege, among others, spring up with increased and decreased capacities in the wet and dry seasons, respectively (Ghana Statistical Service, 2014).

3.5.2 Types and sources of data

The study used both primary and secondary data. The primary data used was mainly cross-sectional and covered actors in production, wholesaling, processing, and retailing in the Ada West District. Data were collected from respondents through the administration of structured questionnaires, which were pre-tested, and feedback from respondents incorporated in the final questionnaire design. Secondary data was obtained from research reports, journals, and institutions such as MoFA among others.

3.5.3 Sample size and sampling technique

The study employed a two-stage random sampling technique in the selection of respondents for purposes of this study. The initial stage, the Ada West district of the Greater Accra region was purposively selected for the study due to the significant contribution of the district to the region's vegetable production especially chili pepper production. In addition, contact was made with the district MoFA office to obtain most chili producing communities within the district. With the help of the district extension officers, three communities: Addokope, Sege and Matsekope in the district were considered as zonal communities purposively for the selection of potential respondents.

Finally, the snowball sampling technique was used for selection of respondents along all stages of the chain, since there was no formal list for potential respondents. The snowball sampling technique involved the initial selection of a respondent randomly, using the table of random numbers, and the subsequent selection of the next respondent with the help of the preceding respondent. One hundred and five (105) respondents were selected and interviewed for the producer stage of the chain. At the processor and wholesaler stages of the chain, 42 and 35 respondents were selected and interviewed, respectively. The overall size of respondents for the study was one hundred and eighty-two (182) respondents.

Table 3 2: Distribution of Sample Size in the Study Area

Towns	**Producers**	**Wholesalers**	**Processors**
Addokope Area	49	17	14
Sege Area	38	13	10
Matsekope Area	35	12	11
Total	105	42	35

Source: Field Data, 2018.

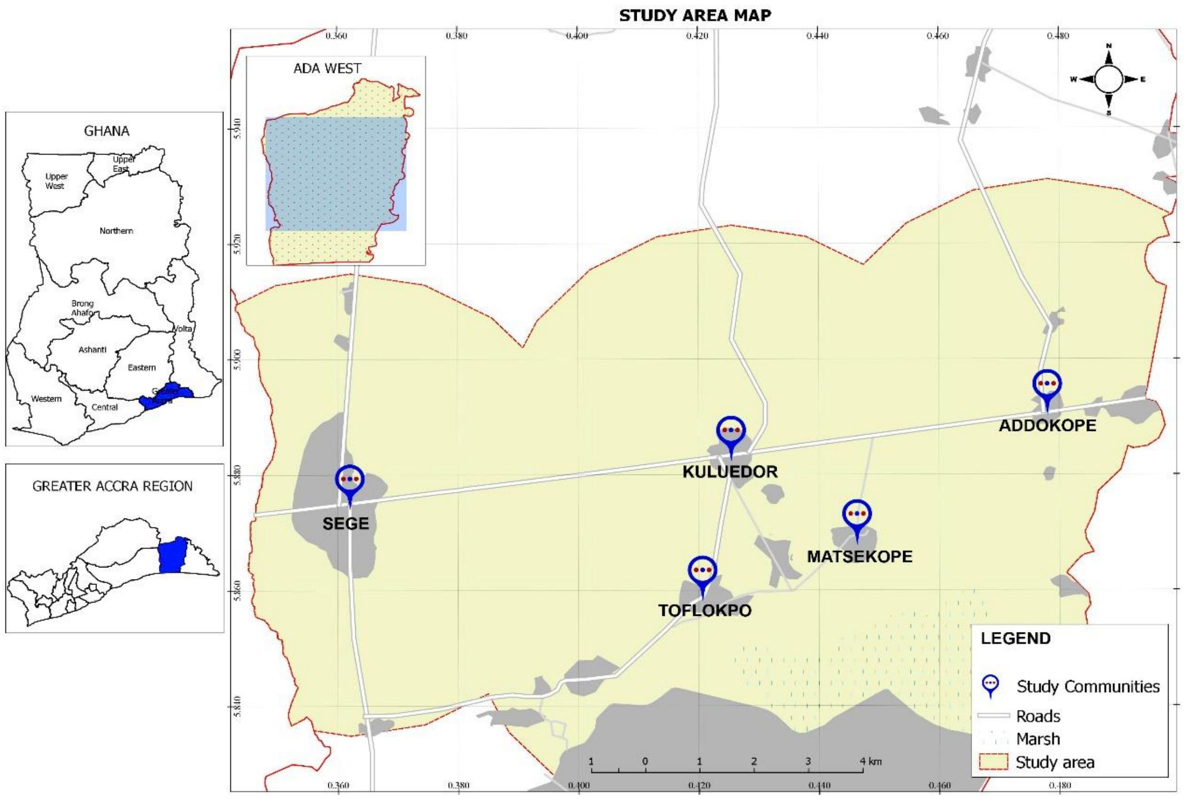

Figure 3 2: Map of the Ada West District

Source: Author's Own Construction

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents the results and discussions of the study. The chapter is divided into five sections. The first section presents information on the socio-economic characteristics of the actors of the dry chili value chain, which is the producers, processors, wholesalers and retailers in the Ada West district in the Greater Accra of Ghana. The value chain map of the main actors of the chili pepper value chain, their goods and services provided respective processes and activities undertaken and support services across the value chain are presented in the next section.

Furthermore, the results on the value addition estimation and gross margin per cedi of operating cost as well as the margins along the dry chili pepper value chain is presented. The governance structure that exists along the chain is discussed in the subsequent section. The final section presents and discusses the results on the constraints faced by the dry chili pepper value chain actors in the study area.

4.2 Socio-Economic Characteristic of Respondents

The results of the socio-economic characteristics of respondents are summarised and presented in Table 4.1.

Gender: The results show that males dominated the farmer stage of the value chain and represent 76% of the total 105 farmers interviewed.

Table 4 1: Socio-Economic Characteristics of Respondents of the Study

Characteristics	Farmers (N=105)		Processors (N = 35)		Wholesalers (N= 42)	
	Freq	Percent	Freq	Percent	Freq	Percent
Gender						
Male	25	24	4	11	7	17
Female	80	76	31	89	35	83
Age Group						
Youth (15 to 35 yrs.)	18	17	9	26	14	33
Adults (36 to 60 yrs.)	56	53	20	57	26	62
Elderly (> 61 yrs.)	31	30	6	17	2	5
Mean		40		37.6		42
Minimum		23		18		22
Maximum		74		64		78
Std Deviation		13.26		12.09		14.45
Household Size						
1 to 5	52	50	16	46	21	50
6 to 10	38	36	11	31	18	43
11 to 15	9	9	5	14	3	7
≥ 16	6	6	3	9	0	0
Mean		6.8		5.21		5.58
Minimum		1		1		1
Maximum		18		11		21
Std Deviation		3.65		1.90		3.36
Std Deviation		10.67		9.22		8.79

Source: Field Data, 2018.

This result is in conformity with finding by Adul- Rahman & Donkeh (2015) on the maize value chain in the northern region wherein their study findings shows that 68.3% of the respondents were male and 31.7% were female. The dominance of males may be because males are seen to be more involved with the production stage of a farming enterprise (chili pepper farming) than their female counterparts are.

However, the females were dominant at both processing and wholesaling stages of the value chain representing, 89% and 83% of the number of interviewed respectively. This may be because females mostly participate in the trading and marketing domain of the farming enterprises. In addition, as indicated, chili pepper business is mostly dominated by females either that the farmers due to the high capital requirement typical activities of small-scale processors do not require as much financial capacity in compared to the production stage of the value chain. Processors usually purchase smaller quantities of dry chili pepper for processing and it's onwards sale.

Age: Majority 83% of farmers interviewed were elderly 36 years and above. The remaining 17% were below age 36. The majority 57% of the processors were adults, 2% were elderly and the remaining 41% were youth. The greater number of the wholesalers were adults 62% and 5% were elderly. The youth accounted for 33% of the number of traders. The average age of the farmers, processors and wholesalers were approximately 40 years, with standard deviation of 13.4 years, 38 years with standard deviation of 12.1 years and 43 years with standard deviation of 14.5 years respectively.

From Table 4.2 show that the youth and adults dominate all stages along the value chain, hence the indicating that majority are still young, are of the active working age class, and can positively influence the productivity and efficiency of the value chain.

The results also, reveal a relatively comparable age for all actors along the chain. However, the average age of processors compared to the other actors indicates that, the processors were relatively the most youthful group of actors along the value chain. It could be inferred that, younger actors, may not be financially empowered enough to undertake farming or wholesaling and hence concentrate on the processing stage of the chain in other to generated income with less expenditure.

Household Size: From Table 4.1 the pooled results estimate show that the minimum household size is one (1) for all actors and the maximum is 18, 11, and 21 members for farmers, wholesalers and Processors respectively. The household sizes comprise of the number of the person that the actors look after and hence not only their biological children but also the non –biological children of the actors.

Referring to Table 4.1, the majority of the actors have an average household size that ranges from one (1) to five (5) people. That is the 50 % for both farmers and wholesalers and 46% for the processors. The average household size indicate that the actors are characterised by large family sizes. It can be inferred that larger household size are kept as a means of obtaining labour (household labour) which tends to be a cheaper source of labour for most rural businesses.

Marital Status: Majority of the respondents 73% of farmers, 85% of processors, 51% of traders were married. Thus, implying their business can be kept in perpetuity by the spouse and children even in events of their absence. In addition, the majority of the households of both farmers and wholesalers had a household size of five (5) members and below

This could imply that the majority of the respondent may have household social and economic obligation to cater for. Hence, there is the need for these respondents to take up the production and marketing aspects of the business seriously to ensure raise in income in order to meet their obligations.

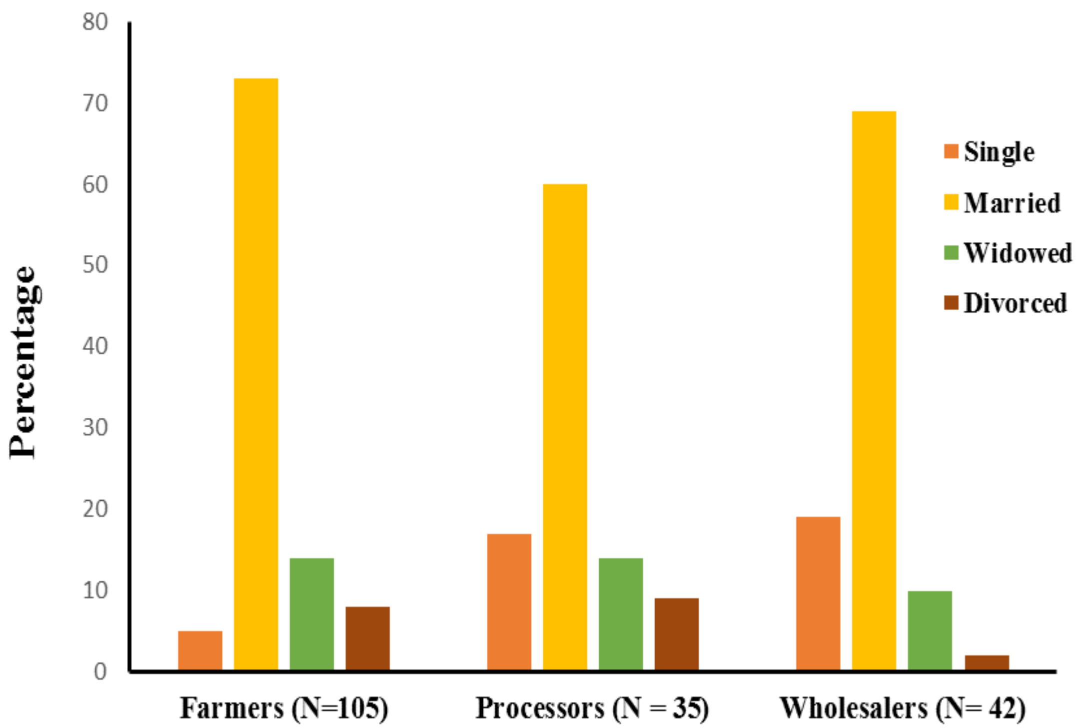

Figure 4 1: Marital Status of Respondents

Source: Field Data, 2018.

Education: Majority of the populace consider formal education to confer a wide range of opportunity and advantage for success in life as compared to iliteracy. Hence, formal education is perceived as a tool to liberate an individual from poverty and harmful practices (Oseni, 2011).

Majority 56% of the farmers 75% of the processors and 67% of wholesalers had at least primary education. This implies the actors along the value chain are capable of adopting technologies transferred in the English language and require mathematical analysis. This is a desirable development as training on any interventions can be made available to the actors by any stakeholder may be easier. The performance of the entire value chain is enhanced when actors can read and write and obtain information by themselves cannot be overemphasised (Mafimisedi et al, 2012).

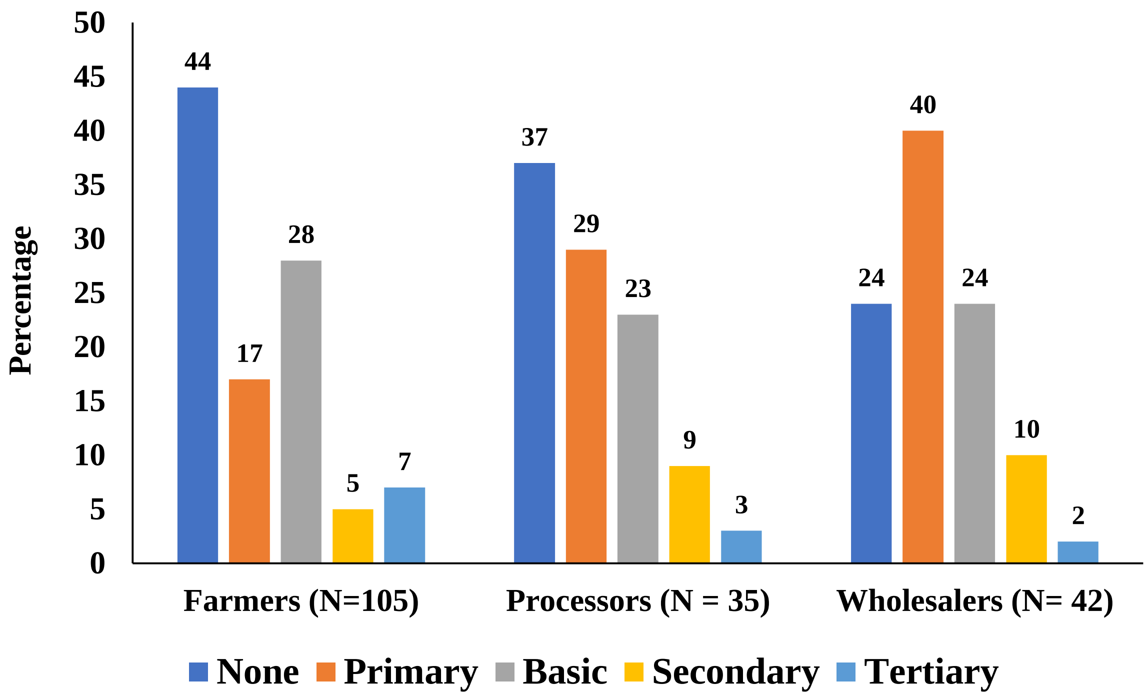

Figure 4 2: Educational Status of Respondents

Source: Field Data, 2018.

Major occupation: Out of the 105 farmers interviewed, 85 farmers representing 81% indicated crop production as their major occupation while 11% were involved in animal production as the major occupation. On the other hand, eight farmers representing 8% were involved in non-farming activities such as teaching as their major occupation. At the wholesaler stage of the value chain, trading of dry chili pepper was the major occupation for 29 respondents representing 69% while the remaining respondents (31%) engaged in the marketing of other commodities as their major occupation.

However, 77% of the processors indicated that processing of dry chili pepper into chili pepper powder and the remaining, 23% of the processors indicated that they were engaged in other trading activities such as selling fruits as their major occupation. The result for the distribution of major occupation of the respondents in the value chain is presented in Figure 4.3.

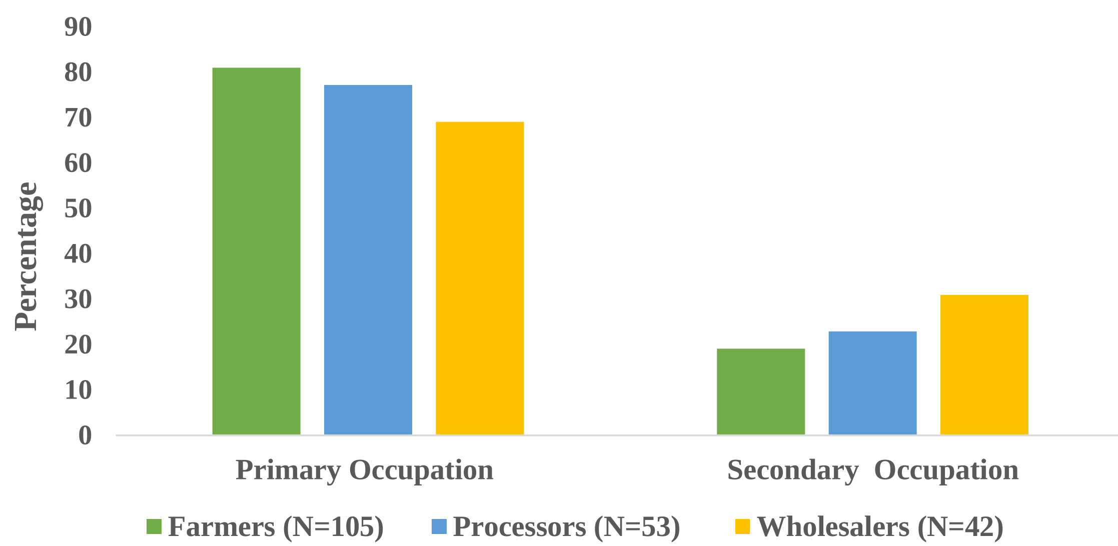

Figure 4 3: Occupation of Respondents

Source: Field Data, 2018.

Respondents Membership of Association: It was found that majority (81%) of the farmers did not belong to any Farmer Based Organisation (FBO) while the rest (19%) were members of FBO. However, the majority of the processors and wholesalers belong to organisations or groups that are 74% and 85% respectively. Actors who are members of groups/ FBO were found to benefit from information and idea sharing, good practices. This is believed to enhance the use of improved technology, the ease of acquisition and utilization of inputs.

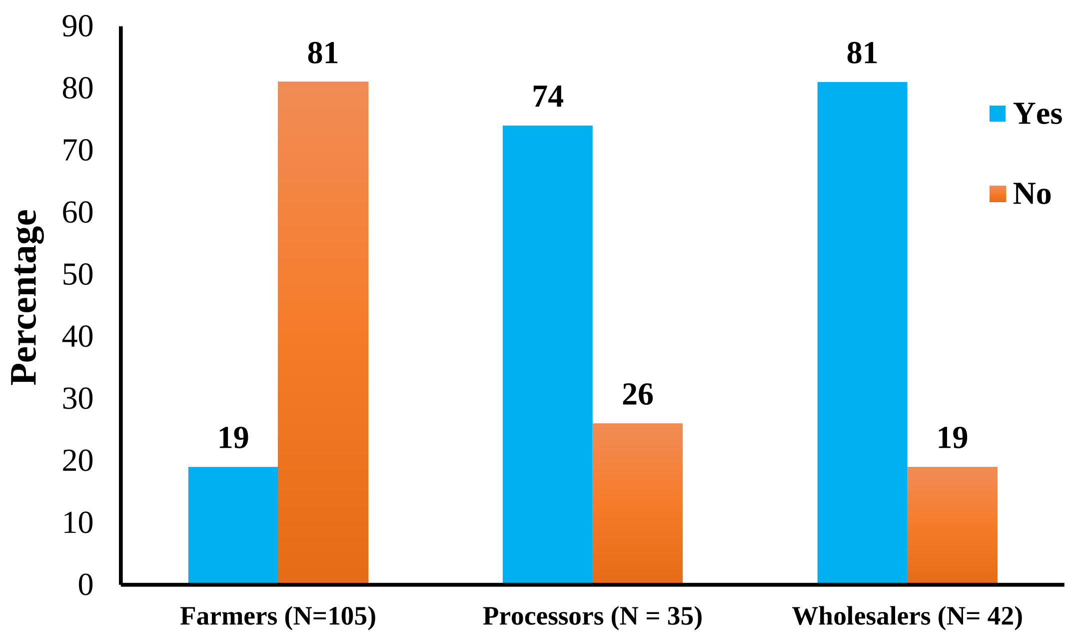

Figure 4 4: Respondents Membership Association

Source: Field Data, 2018.

4.3 Identification of Actors, their Functions and Relationships

4.3.1 Actors and their Functions

An overview of the dry chili pepper value chain is presented in Figure 4.5. The figure shows the flow of dry chili pepper and its products from the input dealer stage through to the consumer's stage. It also depicts the intermediaries and the links among the various actors operating along the value chain. The study found the involvement of diverse actors in the dry chili pepper value chain through both direct and indirect participation. According to KIT and IIRR, 2006, input supplies, farmers, traders and consumers make the direct actors as they are involved in the commercial activities in the chain, whereas actors such as financial and non – financial institutions; NGO’s form the extension agents, make the indirect actors of the chain. Actors identified along the chain include the input dealerships farmers, wholesalers, retailer, processors and consumers of dry chili pepper.

Input suppliers: Input suppliers were mostly small dealerships, who supply agricultural inputs such as seeds (both local and improved varieties), agro chemicals such as fertilizers, and weedicides among others to mostly farmers. In addition, farming tools and equipment such as the knapsack sprayers, cutlasses etc. were supplied by the input providers to assist in farming activities. Extension agent of the district MoFA office play a vital role in the provision of relevant farming information as well as training farmers on good cultural and agronomic practices to enhance production and performance.

Farmers: Farmers were the largest group of stakeholders involved in the value chain. Farmers carry out various activities including nursery establishment and management, transplanting through to harvesting. However, the farmers after harvesting undertake primary processing of harvested chili pepper. Farmers carry out curing, drying, grading and or sorting and bagging of dried chili pepper for storage. Most of the farmers, sold majority 81% of their product (dry chili pepper) to wholesalers and about 11.28% are sold to processors, 6.20% sold to retailers and the remaining 1.52% sold to consumers directly.

Wholesalers: Wholesalers are traders in the chain who are involved in the buying of dry chili pepper from mostly farmers with the sole purpose of reselling in the district markets. Wholesalers use their financial resources and knowledge of local market dynamics to buy chili pepper from remote village in the district. Wholesalers predominantly perform activities such as assembling/ collecting, grading or sorting and storage of dry chili pepper and facilitating activities such as funding to loyal suppliers. The wholesalers also, serve as brokers and intermediaries in the value chain were the largest group after farmers. Furthermore, about 62.24% of their product are sold to retailers mostly outside of the district and about, 19.32% was sold to processors and the remaining were sold to and 17.54% sold to consumers.

Processors: these are mostly individuals involved in the buying of dry chilies from mostly wholesalers and farmers and processing (milling) of dry chili pepper into powdered chili pepper. Processors market their products, which is mostly powdered chili pepper to mostly retailers and final consumers. Processors sold about three quarters 75.04% of their product to retailers and the remaining quarter 24.96% to consumers.

Retailers: Retailers perform direct market activities through selling to the ultimate end user (consumer) in the value chain. Various market functions such as buying, sorting, grading, destalking, storage and other functions related to marketing of their product to consumers.

Service institutions: These are supporting actors who provide service to support actors along the value chain from production through to the final consumer. Supporting institutions identified along the dry chili pepper value chain in the district include both governmental and non-governmental organisations; these include MoFA extension agents, credit institutions, transport service providers and the like. Access to information and finance determines the state of success of value chain actors (Kotler & Armstrong, 2003).

Extension service officers of the Ministry of Food and Agriculture (MoFA) and other non-governmental institutions like The Hunger Project-Ghana helped farmers with technical advice on the best agronomic practices to adopt on their farms. Services from the Food and Drugs Authority with regard to food safety are available to stakeholders especially the processors through the district assemblies, in order to help ensure quality standards of products.

There are a few formal financial institutions, specifically rural banks and microfinance institutions, providing financial assistance in the form of loans to actors especially to wholesalers in the district. This is because the wholesalers make enough returns on regular basis to meet the payment schedule. However, there are a couple of NGOs and informal financial institutions such as The Hunger Project-Ghana and Susu companies assisting farmers with a credit facility for farmers in the district.

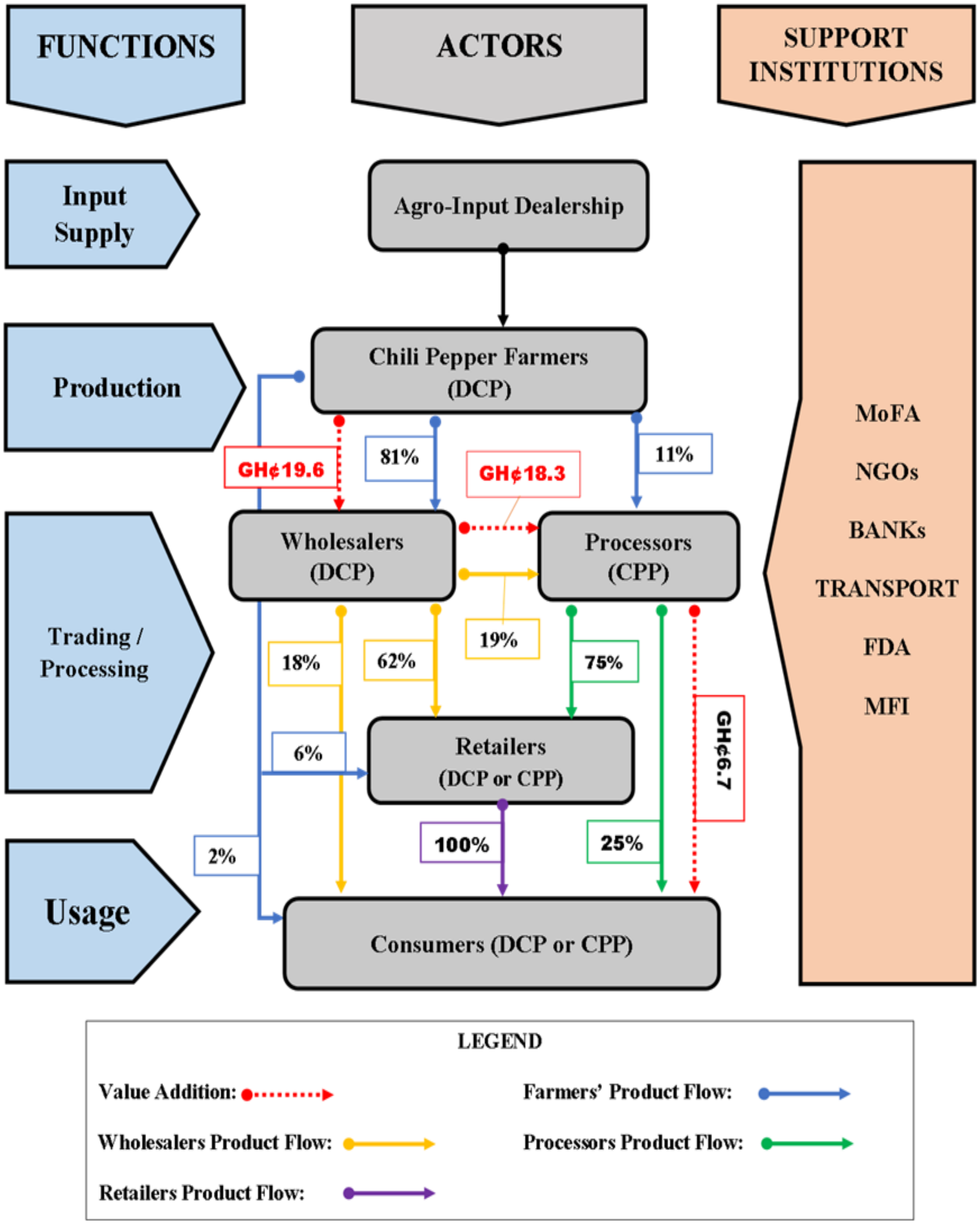

Figure 4 5: Map of Linkage among Actors of the Dry Chili Pepper Value Chain

Source: Author's Design

4.3.2 Relationships between actors in the dry chili pepper value chain

Contractual agreements between actors were uncommon along the dry chili pepper value chain. Table 4.2 provides the existence and type of contract that exists among actors along the value chain.

Relationship between farmers and the other actors: Majority of the farmers 79% had no form of contractual agreements with all other actors within the value chain. However, the farmers who had a contract agreement 21% had only a verbal form of a contract agreement with 16 wholesalers and 6 processors. This implies that some farmers have a regular source of market for their produce, as these wholesalers and processor agree to purchase their produce.

Relationship between the wholesalers and the other actors: Almost half 40% of the wholesalers, on the other hand, had contractual agreements with other actors within the value chain. The contract agreements were mostly with farmers and processors, but these contracts were verbal with no written contracts. This suggests that wholesalers seem to understand the importance of contracts and the need to have a guarantee of product supply from these actors to stay in business and for the smooth functioning of the chain.

Relationship between processors and the other actors: Few 46% of the processors also had no form of contracts with other actors within the value chain. Majority 54% of processors, however, had a contract agreement with the farmers and wholesalers within the value chain, and the contractual agreements were verbal with no written contracts.

Table 4 2: Existence and Types of Contract among Actors along the Value Chain

Actors	Farmers		Wholesalers		Processors	
	Freq	**Percent**	**Freq**	**Percent**	**Freq**	**Percent**
Existence of Contract						
Yes	22	21	17	40	16	46
No	83	79	25	60	19	54
Total	**105**	**100**	**42**	**100**	**35**	**100**
Type of Contract						
Verbal	22	100	17	100	16	100
Written	0	0	0	0	0	0
Contracts with other Actor						
Farmer	0	0	5	29	6	38
Wholesalers	16	73	12	71	10	63
Processors	6	27	0	0	0	0
Total	**22**	**100**	**17**	**100**	**16**	**100**

Source: Field Data, 2018.

Their contracts were mostly with the wholesalers; that is about 10 out of 17 had a verbal contract with the wholesalers. This implied that the processors are well aware of how vital it is to have a constant supply of raw material to ensure smooth operations of their business.

Similarly, results from Table 4.3 shows that all the farmers 100% who had contractual agreements, had "purchasing of product" as the term of the verbal contract with the wholesalers and the processors. Also, about 74% of the farmers with contracts, had ‘‘credit provision relationship’’ which allowed the contract partners to provide credit to the farmers for their farming purpose. This could be the reason why the farmers are inclined to sell their product to the other party either than the contractor even where the prices are lower than market prices.

Few farmers 27.3% of the farmers had ‘‘input-provision relationship’’ with contract partners thereby these farmers input such as fertilizers as well as packaging materials for their business purposes. Only 13.6% of the farmers had transport provision agreement with the other contract partners.

All the wholesalers who had ‘‘input-provision relationship’’ contract agreement with other actors within the chain. Additionally, the majority of the processors 71% had a contract agreement with both farmers and processors, with ‘‘product purchasing relationship’’ as the term of the verbal contract existing between the two parties. All wholesalers had ‘‘credit provision relationship’’ with mostly the processors.

Table 4 3: Verbal Contract Terms among Actors of the Dry Chili Pepper in the Ada West District

Verbal Contract Term	**Farmers**		**Wholesalers**		**Processors**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**
Provision of Input	6 (27%)	16 (73%)	17 (100%)	0.0 0.0	4 (25%)	12 (75%)
Provision of Credit	14 (74%)	8 (26%)	0.0 0.0	17 (100%)	11 (69%)	5 (31%)
Purchasing of Product	22 (100%)	0.0 0.0	12 (71%)	5 (29%)	16 (100%)	0.0 0.0
Provision of Transport	3 (14%)	19 (86%)	0.0 0.0	17 (100%)	14 (75%)	2 (25%)

Source: Field Data, 2018.

Credits in the form of loans and credit sales of dry chili pepper to these processors by wholesalers and farmers were predominant within the value chain. Transport services were available to almost all the processors. These terms of agreement help the processors to receive the needed products to stay in business.

On the contrary, about 25% of the processors with contractual agreement had an input provision relationship as the term of the contract, which is existent among them and their contractors. Also, about 69% and 75% of processors had a ‘‘credit provision relationship and transport provision’’ as the terms of the agreement with their contract parties. Also, all processors interviewed had ‘‘product purchasing relationship’’ with processors were in contracts with both farmers and wholesalers.

4.4 Governance Structure among Actors along the Dry Chili Pepper Value Chain

The results of the governance structure showed that farmers perceived wholesalers to be the dominant actor group within the value chain, having the highest influence with regards to share of profit (32%), bargaining power (32%), 29% for protection from competition and 35% in terms of information concentration. The wholesalers also perceived themselves to be the dominant group of actors within the value chain allocating 34%, 33%, 33% and 32% to share of profit, bargaining power, protection from competition and information concentration, respectively.

Table 4 4: Actors' perception of Percentage Share of Power along the Dry Chili Pepper Value Chain in the Ada West District

Indicators	Share of Profit	Bargaining Power	Barriers to Entry	Information concentration
Farmers' Perception				
Farmers	34	35	34	33
Processors	23	23	21	24
Wholesalers	42	42	44	42
Total	**100**	**100**	**100**	**100**
Processors' Perception				
Farmers	38	39	39	34
Processors	23	27	29	29
Wholesalers	39	34	32	37
Total	**100**	**100**	**100**	**100**
Wholesalers' Perception				
Farmers	31	33	31	28
Processors	23	27	28	32
Wholesalers	46	40	41	40
Total	**100**	**100**	**100**	**100**
Overall Perception				
Farmers	37	39	34	34
Processors	22	21	30	28
Wholesalers	41	41	36	38
Total	**100**	**100**	**100**	**100**

Source: Field Survey Data, 2018.

Conversely, processors perceived farmers to be the dominant group of actors within the value chain with regards to share of profit (28%), bargaining power (29%), protection from competition (29%) and information concentration (28%).

Results from the analysis of the combined effects of the perceptions of all actors indicate that the wholesalers are the dominant group of actors with 32% allocation to share of profit, 31% to bargaining power, 30.0% to protection from competition and 32% to information concentration. These results conform to results of Owusu-Adjei (2017) and Fitzpatrick (2011) as their work indicated that the cashew value chain in Africa is buyer-driven and they tend to dominate the value chain by setting rules for other chain actors.

4.5 Value Addition along the Dry Chili Pepper Value Chain

The result of the value added by key value chain stage actors (farmers, wholesalers and processors) along the dry chili pepper value chain is presented in Table 4.5. The results indicate that farmers added the highest value per kilogram of dry chili pepper produced with GHS18.49 value added. Processors followed with GHS13.73 value added per kilogram of dry chili pepper. Wholesalers added the least value with GHS11.27 value added per kilogram of dry chili pepper processed to chili pepper powder.

Conversely, the farmers were found to obtain the highest net margin GHS 15.17 with gross margin per cedi of operating cost of 0.94. This implies farmers made returns of GHS 0.94 for every GHS1.00 spent in their operation. Wholesalers had a net margin of GHS10.76 with gross margin per cedi of operating cost of GHS0.52. Wholesalers, therefore, received GHS0.52 for every GHS1.00 spent in the trading business.

Processors, on the other hand, had a net margin of GHS8.94 with gross margin per cedi of operating cost of GHS0.25. Processors were the group of actors who made the least return from their business operation with GHS0.25 return on every GHS1.00 spent in their operations. The farmers tend to make more as they double up as ‘‘farmer processors’’, that is the farmers process fresh chili pepper harvested into dry forms before it onward supplies. Processors value addition involves packaging of dry chili pepper and milling of dry chili pepper into chili pepper powder for sale and hence the least return on the investment made.

Table 4 5: Value Added and Margins per Kilogram of Dry Chili Pepper at Key Actor Stage in Ghana Cedi

Cost Items	Farmers GHS	Wholesalers GHS	Processor GHS
Cost of Main Input	1.84	20.33	31.60
Other Operating costs	15.81	0.44	4.64
Marketing Cost	1.19	0.06	0.15
Selling Price	20.33	31.60	45.33
Value Added	18.49	11.27	13.73
Gross Margin (GM)	16.66	10.83	9.09
Net Margin	15.47	10.76	8.94
G M / Cedi of OC	0.94	0.52	0.25

Source: Appendix 4

Test of differences between means results indicated that there are significant differences between the means of parameters. Therefore, since the t-calculated value for farmer–processors, farmer–wholesaler, processor–wholesaler per kilogram of chili are GHS13.4219, GHS18.9273, GHS 5.2795, respectively, these are greater than t-critical value of 1.96 at 95% confidence interval, so we reject the null hypothesis.

Table 4 6: Difference in means of Net margins for the various actors

Actor	Mean	Std. Deviation	T – Cal	T – Crit	Decision Rule
Farmer	15.47	8.2569	13.4219	1.96	Reject null hypothesis
Wholesaler	10.76	8.226			
Farmer	15.47	8.2569	18.9273	1.96	Reject null hypothesis
Processor	8.94	7.761			
Wholesaler	10.76	8.226	5.2795	1.96	Reject null hypothesis
Processor	8.94	7.761			
t-critical is 1.960 at 95% confidence interval					

Source: Field Survey (2018)

4.6 Constraints Faced by Actors along the Dry Chili Pepper Value Chain.

4.6.1 Constraints to Farmers of Chili Pepper

The study identified and ranked constraints facing chili pepper farmers in the Ada West district of the Greater Accra region of Ghana. Each farmer was asked to rank constraints according to how each constraint hinder their performances in a hierarchy of most pressing to the least pressing. Table 4.7 indicates the results for farmer stage constraints of the dry chili pepper value chain.

Pests and diseases: The result showed that high incidence of pests and diseases was the most important constraint of chili pepper farmers in the Ada West district. The farmers explained that there is a high incidence of pests and diseases. Rodents are animal pests, which cause damage at both the maturity and fruiting stages of the crop. The activities of these pests such as eating of seedlings at both nursery and on fields, feeding on pepper fruits at fruiting cause high losses in yield and quality of chili pepper harvested. The control of pests has been difficult for farmers, as prevailing measures such as the setting of traps, poisoning among others have not yielded any result. However, control measures may be more effective with intervention from pest control companies.

The high cost of input: the cost of input Materials such as fungicides, weedicides, pesticides and the like that help control insect pests, weeds and diseases range between GHS 35 per litre and GHS150 per litre does not allow for the ease of use in the control of pests and diseases problems. Most of the farmers were of the view that if they could obtain the inputs needed at a much lower cost, then they would be able to control this pest as well as the disease-causing organisms and ensure maximum yield attainment.

Poor agronomic practice: a greater number of farmers had good knowledge of good agronomic practices and hence ranked poor agronomic practices as the least important constraint. Majority of the farmers engaged in good agronomic practices such as nursing and transplanting of seedlings, optimum land preparation, regular weeding among others in their effort to obtain better returns from their farming business.

However, these constraints directly contribute to the low productivity seen at the farm level of the sector. This, therefore, affect the entire production system and directly or indirectly influences the entire value chain. Farmer's inability to produce at optimum or increased yield levels leads to the inadequate supply of chili pepper. These results reflect the narrative of constraints to crop production in Ghana and African as a whole. Studies conducted in Senegal and Uganda on the similar constraints confirms how these constraints affect crop production (Mbene, 2005; Emerging Market Group, 2008).

Table 4 7: Ranked Constraints Faced by Farmers

Constraints	Mean Rank	Rank
High incidence of pests and diseases	1.00	1st
High cost of inputs	2.67	2nd
Inadequate tractor services	3.83	3rd
High interest rate on credit/ credit facilities	3.92	4th
Low level of crop productivity	4.83	5th
Limited access to improved seeds	6.17	6th
Weak extension services	7.00	7th
Inadequate access to credit	7.25	8th
Weak farmer association	8.33	9th
Poor agronomic practices	10.00	10th
N = 99 W = 0.73 Chi-Square = 50.80 df = 8 Asymp. Sig. =.000		

Source: Field Data, 2018.

4.6.2 Constraints of Wholesalers

The results for constraints ranking of wholesalers is presented in Table 4.8 below.

Lack of Working Capital: Constraints ranking by wholesalers showed that lack of working capital was their most important constraint. Majority of the wholesalers supported the claim that there were very few credit institutions both the formal and informal providing financial support to their business. Hence, their inability to obtain enough money or credit for trading. The wholesalers also, argued that money for the running of their business operation all year round would help with the purchase seasonal surplus of dry chili pepper for shortage periods.

Seasonality of dry chili pepper: The seasonality of dry chili pepper was also a vital bottleneck of the wholesalers. A good number of the wholesalers explained that dry chili pepper not being available throughout the year makes trading difficult. Hence, these wholesalers visit farming villages in search of dry chili pepper to purchase in order to stay in business thereby increasing operating cost.

Government Support: Wholesalers, on the contrary, considered the lack of governmental support to be the least important constraint to their business operations. However, they argued that with government support there could be a substantial expansion of the sector. For instance, development of processing factories to process fresh chili pepper into dry chili pepper in the district during harvest seasons.

Table 4 8: Ranked Constraints faced by Wholesalers

Constraints	Mean Rank	Rank
Lack of working capital	1.50	1st
Seasonality of dry chili pepper	3.46	2nd
Lack of ready market for dry chili pepper	3.67	3rd
Low price of processed chili pepper	3.88	4th
High cost of labour	5.42	5th
Inadequate supply of dry chili pepper	6.04	6th
High cost of input materials	6.46	7th
Non -governmental support	7.00	8th
N = 42 df = 7 Wa = .63	**Chi-Square = 50.80**	**Asymp. Sig =.000**

Source: Field Data, 2018.

4.6.3 Constraints of Processors

Constraint ranking in the value chain by processors is presented in Table 4.9 below.

Lack of Working Capital: The processors of dry chili pepper in the Ada West District ranked lack of working capital as the top most important bottleneck to their operations in the district. The processors explained that the financial institutions in the district do not provide them with loans for their business. These processors argued that the financial institutions are hesitant in providing financial support to them, due to the inability to organise themselves into groups.

Hence, few of these processors are optimistic that if they should be organised into groups, the bank will be ready to supports them financially.

Table 4 9: Ranked Constraints Faced by Processors

Constraints	Mean Rank	Rank
Lack of working capital	1.07	1st
Low price of processed chili pepper	2.29	2nd
Seasonality of dry chili pepper	3.34	3rd
Lack of ready market for dry chili pepper	4.64	4th
High cost of input materials	5.57	5th
Non -governmental support	5.86	6th
N = 7 Wa = 0.93 Chi-Square = 52.28 df= 8 Asymp. Sig.= 0.000		

Source: Field Data, 2018.

Low Price of Product: The low price of the product (powdered pepper) of the processors is also pressing constraint of the processor. Majority of the processor tend to side with the narrative of product prices being low. The low price of powdered chili pepper is due to the homogeneity of the product and the need for product diversification. There is no product differentiation by the majority of the processors hence the low prices obtained by these actors.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study, the conclusions drawn from the major findings of the study and the policy recommendations based on the findings of the study. The summary is presented in Section 5.2, followed by the conclusions in Section 5.3 and the policy recommendations in the last section (Section 5.4).

5.2 Summary

The study was conducted to analyse the value chain of dry chili pepper in the Ada West District of Ghana. One hundred and eighty-two 182, (105 farmers, 42 wholesalers and 35 processors) respondents were sampled for the study. The study investigated issues, which include the relationship existing among dry chili pepper value chain actors, the value added by each actor at the key stages of the value chain the power relationships among actors along the value chain and the major constraints faced by actors along the value chain.

The existing relationship between the value chain actors and the flow of products from the farmer level to the consumers was described with a flow chart. The major actors identified along the dry chili pepper value chain were the farmers, wholesalers, processors and retailers. Governmental and non – governmental institutions, as well as financial intuitions, played key roles to influence the activities of the value chain.

Adult female participants at both wholesaler and processor stages of the value chain dominated the dry chili pepper value chain in the Ada West District, however, the males were the dominant group at the farmer stage. Majority of the actors were between the age ranges of 36 years to 60 years with the majority having 6years to 10 years of experience in their respective fields

Also, more than half of the actors had at least primary level of education. FBO memberships along the chain were common among wholesalers and processors with 81% and 74% belonging to an association; nonetheless, a greater number of the farmer did not belong to an association. More than three-thirds of the farmers, wholesalers and processors had farming, trading dry chili pepper and processing of dry chili pepper into powder pepper respectively. Farmland holdings of the majority of the farmers were below 1.2 hectares of land and these mostly inherited.

Value-added, gross margin, net margin and gross margin per cedi of operating cost were estimated at the farmers, wholesalers and processors levels of the value chain to ascertain which actor added more value and obtain a higher return on the amount invested. The results of the analysis show that farmers added the highest value per kilogram of chili pepper amounting to GHS18.27. Wholesalers followed with GHS19.60 value added per kilogram of dry chili pepper and processors added the least value of GHS16.73 per kilogram of dry chili pepper. The dominant group of actors along the dry chili pepper value chain were the wholesalers with regards to the governance indicators, while the processors were the most dominated group of actors along the value chain.

The power relations between the actors was examined and the cardinal scoring approach used to discuss the four indicators of the governance structure of the value chain. The indicators discussed include; the share of profit, barriers to entry, information concentration and bargaining power of actors along the chain. The pooled results of the scoring exercise showed that both farmers and processors are the dominant actor group in the dry chili pepper value chain scoring 41% for both shares of profit and bargaining power and 36 % and 38% about protection from competition and information concentration perceived the wholesalers.

Finally, Kendall's coefficient of concordance and the chi-square statistic (X^2) were used test for the agreement between the rankings of constraints by the respondents. In order of ranks for the farmer level constraints, high incidence of pests and diseases was ranked as the most important constraint followed by the high cost of input materials with poor agronomic practices being the least ranked. For both processor and wholesaler stages, the most significant constraints were lack of working capital, followed by seasonality of dry chili pepper with non-governmental support being the least ranked constraint.

5.3 Conclusions

The actors along the dry chili pepper value chain were predominantly females. There are five primary actors identified along the dry chili pepper value chain performing distinct roles. Farmers along the value chain carried out activities such as land and nursery management, agronomic management practices such as weeds, pests and disease control, and harvesting among others.

The wholesalers were involved in the collection of dry chili pepper from farmers in villages in the district. Sorting and or grading, packaging, transporting to wholesale market and trading were also carried out by the wholesalers. Processors also carried out sorting and grading of dry chili pepper, miling, and packaging among others. Retailers, on the other hand, were involved in the packaging and trading of dry chili pepper and powdered chili pepper. Consumers were at the receiving end of the chain. There are secondary actors, support institutions providing various forms of assistance at each chain stage.

Conversely, the majority of the actors had at least basic education, which implies their ability to adopt technological interventions, which may be provided by both governmental institutions as well as non- governmental institutions, to enhance the value chain performance and ensure upgrade of the dry chili pepper value chain. The value chain was less competitive as very few of the chain actors were linked to each other with the verbal form of contractual agreements.

However, all actors along the value chain added some level of value to the inputs used, showing a positive trend of value addition as well as gross margin per cedi of operating cost along the chain. Farmers added more value of GHS18.27 to a kilogram of fresh chili pepper as compared to GHS19.70 for the wholesalers and the processors adding GHS 6.7 of value to a kilogram of dry chili pepper. These show that there is inequality in the distribution of margins along the chain.

The dry chili pepper value chain is perceived to be dominated by wholesalers. The wholesalers have a higher share of profit, bargaining power, protection from competition and information concentration. These wholesalers tend to dictate the quality and price of dry chili pepper, due to their access to information and high bargaining strength. There are several challenges that actors along the chili pepper value chain face. High incidence of pests and diseases, the lack of working capital and low product price are the most important constraint to farmers, wholesalers and processors respectively.

5.4 Recommendations

The study provides the following recommendations for improvements in the dry chili pepper value chain in the study area: All stakeholders along the chain, especially MoFA, should take all actors along the dry chili pepper value chain into consideration during policy interventions for upgrading purposes. Moreover, processors should be encouraged to process diverse dry chili pepper products to help obtain a higher return on their investments.

In addition, farmers and processors should be encouraged by both NGOs and MoFA to form Farmer Based organisations at respective stages of the chain to increase their participation and improve information flow and their bargaining strength. The study also recommends that both governmental and non-governmental agencies, as well as financial institutions, should aid in addressing the challenges that mitigate against the performance of the chili pepper value chain. Both governmental and non-governmental agencies, as well as financial institutions, should aid in addressing these challenges.

Thus, financial institutions in the study should be supported by government to increase their capacity to support chain actors especially wholesalers and processors through both formal or informal credit schemes, to allow for these actors to obtain credit for their operation and improve upon their operation and make the most returns on their investments.

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APPENDICES

Appendix 3.1: Questionnaire for Producers

University of Ghana

Department of Agricultural Economics and Agribusiness, Legon.

This study is a Value Chain Analysis of Chili Pepper in the Ada West District in partial fulfilment of the award of Master of Philosophy in Agricultural Economics. All information gathered will be treated with much confidentiality and would solely be for academic purposes. Your support and contribution would be very much appreciated. For further enquiries, Please contact the researcher on ataklif@yahoo.com or call 0267644864

A. Enumerator Only		
A1	Questionnaire ID	
A2	Date of Survey (DD/MM/YY)	
A3	Enumerators' Name	
A6	Name of community	
B. Household Characteristics		
B1	Respondents' name:	
B2	Respondents' age	
B3	Gender	1= Male 2= Female
B4	Marital status	1= Never 2= Married 3= Widowed 4= Divorced
B5	Household size	
B6	Highest level of education	
B7	Religious affiliation	1=Christian 2=Muslim 3=Traditionalist
B8	What is farming your major occupation?	
B9	What is your motivation for cultivating chili pepper?	
B10	Have you received any form of training in chili pepper cultivation?	1= Yes 2= No
B11	If yes, who were the facilitators?	1= Extension Officers 2=NGO 3= FBO 4= Other (specify)
B12	Do you belong to any farmer-based association (FBO)?	1= Yes 2= No
B13	If yes, what is the purpose of the association? Multiple choice	1=Provision of Seeds/Seedlings 2= Provision of Other Inputs (Fertilizer) 3= Marketing of Chili Pepper 4= Agronomic practices 5= Others (specify)

B14	If no, why?	1= There is no farmers association in the community 2= I am not interested in the association 3 = I am not qualified to be member 4 = Other (specify)
C. PRODUCTION		
C1	How many acres of land did you cultivate during the last 12 months?	
C2	How many acres of chili pepper did you cultivate during the last 12 months?	
C3	How did you acquire the land?	1= Own/inherited 2= Purchased 3= Rent 4= Lease 5=Sharecropping 6= Family land 7= Other (specify)
C4	If plot is rented in, how much is the rent paid?	
C5	What variety of chili pepper do you produce?	1= Legon 18 2= local variety 3= Others (specify)
C6	How long have you been in chili pepper farming? Indicate the years	
C7	What is the average farm yield per acre of chili pepper?	
C8	Where do you obtain planting materials?	1= Purchase 2= Own farm 3= Other farmers 4= Other (specify)
D. MARKETING		
D1	In what form do you sell the chili pepper produced? Multiple choice	1= Fresh Green/ Ripped 2= Dried Chili Pepper 3= Powered 4= Others (Specify)
D2	What quantity of chili pepper was harvested in the last 12 months per acre?	
D3	Have you sold any of the harvested chili pepper fresh?	1=Yes 2= No
D4	If yes, what quantity (mini bag) did you sell?	
D5	Have you sold any of the chili pepper dry?	1=Yes 2= No
D6	If yes, What is the price per quantity (mini bags) sold?	
D7	Who are your customers? Multiple choice	1=Wholesalers 2= Traders 3= Exporters 4=Households 5= Other (specify)
D8	Whom do you mostly sell to?	1=Wholesalers 2= Traders 3= Exporters 4=Households 5= Other (specify)
D9	What proportion of quantity was sold to customers? (Total 100%)	

D9	1=Wholesalers	2= Retailers	3= Processors	4=consumers	5= Others (Specify)

D10	Do you transport chili pepper to your customers?	1= Yes 2= No
D11	If yes, who bears the cost of transportation?	1= Producer 2= Customer 3= Both
D12	If you (producer) bear the cost how much did it cost and for what quantity (mini bag)?	
E. SERVICE		
E1	Have you acquired any form credit in the last 12 months?	1= Yes 2= No

E2	If yes, from which source?	1= MFI 2= 3= Rural Bank 4= FBO 5= Relatives 6= Other (specify)		
E3	What Collateral was required?	1= None 2= Land Title 3= Self-Help Group 4= Livestock 5= Savings 6= Other (specify)		
E4	If no, why was credit not acquired?	1= Not Required 2= Not Available 3= Credit Term 4= No collateral 5=Other (specify)		
E5	Did you receive any market information related to chili pepper in last 12 months?	1= Yes 2=No		
E6	If yes, what aspect of the information did you receive and what were the resources?			
Source Code 1=Print / Mass media (newspaper, radio, TV) 2= Mobile phone/internet 3= NGO's 4= Other (specify)		Market Information Type	1=Yes 2= No	SOURCE
		Dry chili pepper prices		
		Market prices of input		
		Location of input providers		
		Location of traders		
E7	Did you receive any extension services related to chili pepper in the last 12 months?	1=Yes 2=No		
E8	If yes, what was the source of information received?			
Source Code 1=Print / Mass media (newspaper, radio, TV) 2= Mobile phone/internet 3= NGO's 4= MoFA 4= Other (specify)		Market Information Type	1=Yes 2= No	SOURCE
		Agronomic practices		
		Chili pepper processing		
		Chili pepper marketing		
		Technical training		
		Other (specify)		
F. RELATIONSHIP BETWEEN FARMER AND OTHER ACTORS				
F1	Do you have any contract with your buyer?	1= Yes 2=No		
F2	If yes, what is the type of contract?	1= Verbal 2= Written 3= Both 4 Other (specify)		
F3	Nature of contract	1= Yes 2= No	Terms of the Contract. Multiple choice	Actor with whom you have the contract
	Provision of inputs			
	Provision of			

	technical assistance			
	Provision of finance			
	Purchasing of product			
	Provision of transports			

Code
1= Clearly specifies the product under consideration 2= Clearly established prices, payment obligation and other financial issues 3= Clearly specifies prices adjustment for variation in the product quality and quantity 4= States the time of product delivery 5= Specifies the responsibilities of both parties
6= Provision finance / credit

G. Governance Structure

G1	Who determines the variety of chili pepper to produce?	1= Buyers 2= Sellers (you) 3= Other (specify)
G2	Who determines the price of the chili pepper?	1= Buyers 2= Sellers (you) 3= Other (specify)
G3	How is the price of chili pepper determined?	1= Cost of production 2= Market selling price 3= Profit margin 4= Delay in payment
G4	What is your level of satisfaction for the prices you receive for the chili pepper?	1= High 2= Medium 3= Low
G5	What major factor do you think determines the prices you receive for the chili pepper?	1= Seasonality or availability of chili pepper 2= Bargaining/ negotiation strengths of buyer 3= Lack of market information 4= Lack of transport means 5= Other (specify)
G6	What is the level of your "importance" and 'influence" in the chili pepper value chain with regards to the following indicators? *Note each actor to be scored 25% for each indicator. (Total score = 100%)	

Indicators	Producers	Wholesalers	Processors	Retailers
Profit				
Bargaining power				
Protection from competition				
Information concentration				
Total	100	100	100	100

H. Value Addition

What activities (value capturing) do you perform on the produce before selling to the buyer? What is the cost of the value addition activities performed?

Activities	1= Yes 2= No	Unit Cost
Curing (Steaming / Boiling)		
Sorting/ grading		
Drying		
Destalking		

Bagging / Packaging		
Storage		
Transportation		
Labelling		
Weighing		
Other (specify)		

I. Constraints

I1. List the constraints that affect your performance in the production of chili pepper and the coping strategy.

Constraints	Rank (1 to N)	Coping strategies
Low level of crop productivity		
Inadequate tractor services		
High incidence of pest and diseases		
Poor agronomic practices		
Limited access to improved seeds		
Weak extension services		
High cost of input	`	
Weak farmer association		
Seasonal dried chili pepper price fluctuations		
High interest rate on credit/ credit facilities		
Access to Credit		
Low price for produce		
Theft		
Other (specify)		

*Note 1 being the most pressing constraint factor and n the least pressing

J. PRODUCTION COST

J1. Cost of Variable Inputs

Inputs	Quantity	Frequency	Average Unit cost
Weedicides/herbicides			
Pesticides			
Fertilizer			
Organic manure (last 3years)			
Ploughing (tractor service)			
Others (specify)			

J2. Cost of Fixed Inputs

Inputs	Quantity	Unit Cost	Useful life
Hoes			
Cutlass			
Knapsack sprayer			
Watering can			
Basket			
Wellington boots			
Sacks			

J3. Labour Cost							
What form of labour do you employ?			1= Hired Labour 2= Household Labour				
Labour Cost Item	Mostly carried out by M/F	Freq	Male	Female	Children	No Of days	Wage
Seedling transport							
Transplanting / acre							
Fertilizer\application / acre							
Weeding/ acre							
Harvesting (GMG bag)							
Harvest transport / (GMG bag)							
Others (specify)							

I. MAPPING VALUE CHAIN	
Actors	1= wholesalers 2= Processors 3= Retailers
Main Goods and/or Services Provided	
Activities Undertaken	
Support Services Received	
Customers	
Most Vital / Major Customer	

Appendix 3.2: Questionnaire for Traders

A. ENUMERATOR ONLY		
A1	Questionnaire ID	
A2	Date of Survey (DD/MM/YY)	
A3	Enumerators' Name	
A4	Respondent Type	1=Wholesaler 2= Retailer
A5	Name of Community	
B. HOUSEHOLD CHARACTERISTICS		
B1	Respondents' Name:	
B2	Respondents' Age	
B3	Gender	1= Male 2= Female
B4	Marital status	1= Never 2= Married 3= Widowed 4= Divorced 5= Other (specify)
B5	Household Size	
B6	Highest Level of Education	
B7	What is your primary occupation?	
B8	What is your motivation for retailing chili pepper?	
B9	Have you received any form of training in chili pepper trade business?	1= Yes 2= No
B10	If yes, who were the facilitators?	1= MoFA 2=NGO 3= Trader Groups 4= Other (specify)
B11	Do you belong to any traders association?	1= Yes 2= No
B12	If no, why?	1= I do not know of any association 2=There is no association in my community 3= I am not interested in their activities 4= I am not qualified to belong to an association 5=Other (specify)
B13	If yes, what is the purpose of the association?	1= Marketing of chili products 2= Links to suppliers 3= Links to customers 4= Help access credit 5=Other (specify)
C. MARKETING AND DISTRIBUTION		
C1	How long have you been retailing chili pepper? (Years)	
C2	What variety (type) of chili Pepper do you trade? Multiple response	1= Legon 18 2= local variety 3= Other (specify)
C3	What forms of chili pepper do you mostly trade? Multiple response	1= Fresh green /ripe 2= Dried 3=Paste 4= Powdery 5= Other (specify)
C4	What is the quantity of chili pepper you purchased the last 12 months for retailing? (mini bags)	
C5	What is the price per quantity bought at the point of sale? (GHS/ mini bags)	

C6	Have sold any chili pepper in the last 12 months?			1=Yes 2= No	
C7	If yes, what quantity and price of each form was sold in the last 12 months?(mini bags)				
Form		PASTE	POWDER	DRIED	FRESH
Quantity					
Price					
C8	What form of chili pepper do buyers prefer most?			1= Fresh green /ripe 2=Dried 3= Paste 4=Powdery 5=Other (specify)	
C9	Where / whom do you obtain your chili pepper from? Multiple response			1= Farmers 2= Own farm 3= Processor 4= wholesalers 5= Others (specify)	
C11	What proportion of quantity was sold to each customer?				
	1= wholesalers	2= Processors	3= Exporters	4= Households	5= Others (Specify)
C12	Do you transport chili pepper to your customers?			1= Yes 2= No	
C13	If yes, who bears the cost of transportation?			1= Supplier 2= Customer 3= Both 4= Other (specify)	
C14	If you bear the cost how much did it cost and for what quantity?			QUANTITY	COST
C15	Do you have a permanent supplier?			1= Yes 2= No	
C16	If yes, do you provide premium prices?			1= Yes 2= No	
C17	Do you have any special arrangement with your supplier?			1= Yes 2= No	
C18	If yes, what is the arrangement?				
C19	Do you have a preferred quality of chili pepper?			1= Yes 2= No	
C20	What quality parameter(s) do you consider when buying chili pepper for retail?				
C21	At what season of the market do you get good quality chili pepper at competitive price to purchase?				
C22	In which month does the demand for chili pepper increases or decrease?			DECREASE	INCREASE
C23	What are the reasons for changes in the increases and decreases in the supply?				
D. SERVICE					
D1	Have you acquired any form of credit in the last 12 months?			1= Yes 2= No if no, skip to E4	
D2	If yes, from which source?			1= MFI 2= MoFA 3= Rural Bank 4= FBO 5= Relatives 6= Other (specify)	
D3	What Collateral was required?			1= None 2= Land Title 3= Self-Help Group 4= Livestock 5= Savings 6= Other (specify)	

D4	If no, why was credit not acquired?	1= Not Required 2= Not Available 3= Credit Term 4= Other (specify)
D5	Have you received any market information related to retailing of chili pepper in last 12 months?	1= Yes 2= No
D6	If yes, what aspect of the information did you receive and what were the sources?	

Source Code	Market information type	1 = Yes 2= No	Source
1= Media	Retail prices of chili pepper		
2= Relations	Market price of input		
3= NGO's	Location of input providers		
5= Other (specify)	Location of traders/customers		

F. RELATIONSHIP BETWEEN TRADER AND OTHER ACTORS

F1	Do you have any contract with your buyers?	1= Yes 2= No
F2	If yes, what is the type of contract?	1= Verbal 2= Written 3= Both 4 Other (specify)

F3	Nature of Contract	1=YES 2=NO	Terms of the Contract Multiple response	Actor with whom you have the contract
	Provision of trading inputs			
	Provision of technical assistance			
	Provision of drying facility (Processing)			
	Provision of storage space and materials			
	Provision of transports			
	Provision finance / credit			

Code (Terms of the Contract)
1= Clearly specifies the product under consideration 2= States the time of product delivery
3= Specifies the responsibilities of both parties 4= Clearly established prices, payment obligation and other financial issues 5= Clearly specifies prices adjustment for variation in the product quality and quantity 6= Other (specify)

E. GOVERNANCE STRUCTURE

E1	Who determines the variety of chili pepper to retail?	1= Buyers 2= Sellers (you) 3= Other (specify)
E2	Who determines the retail price of chili pepper?	1= Buyers 2= Sellers (you) 3= Other (specify)
E3	How is the retail price of chili pepper determined?	1= Cost of trading 2= Market selling price 3= Profit margin 4= Delay in payment
E4	What is your level of satisfaction for the prices you receive for the chili pepper?	1= High 2= Medium 3= Low
E5	What major factor do you think determines the retail prices you receive for the chili pepper?	1= Seasonality or availability of chili pepper 2= Bargaining/ negotiation strengths of buyer

		3= Lack of market information 4= Transport cost 5= Other (specify)
E6	What is the level of your "importance" and 'influence" in the chili pepper value chain with regards to the following indicators? *Note each actor to be scored 25% for each indicator. (Total score = 100%)	

INDICATORS	INPUT SUPPLIES	PRODUCERS	TRADERS	PROCESSORS
Profit				
Bargaining power				
Protection from competition				
Information concentration				

F. VALUE ADDITION

What activities (value capturing) do you perform on the produce before selling to the buyer? What is the cost of the value addition activities performed?

ACTIVITIES	1= Yes 2= No	UNIT COST
Cleaning		
Washing		
Sorting		
Grading		
Drying		
Destalking		
Storage		
Packaging / Bagging		
Other (specify)		

G. CONSTRAINT AND OPPORTUNITY

G1	List the constraints that affect your performance in the production of chili pepper and the coping strategy.

CONSTRAINTS	RANK (1 - N)	COPING STRATEGIES
Lack of ready market for chili pepper		
High cost of labour		
Inadequate supply of raw material (chili pepper)		
Seasonality of fresh chili pepper		
Seasonality of dried chili pepper		
Non -Governmental support		
High cost of input materials		
Low price of processed chili pepper		
Lack of working capital		
Other (specify)		

G2	To what extent do you Agree or Disagree with the following as opportunities of production of chili pepper

Opportunities	Agree (1)	neither Agree	Disagree (3)

		nor Disagree (2)	
Government support for standards			
Government support for infrastructure development			
Growing demand for chili pepper product form paste			
Availability of suitable land for cultivation of chili pepper			
Support from donor agencies			
Other (specify)			

H. OPERATING COST

H1. COST OF VARIABLE INPUTS

INPUTS	QUANTITY	FREQUENCY	AVERAGE UNIT COST
Rent			
Ingredient charges			
Packaging (rubber)			
Market levy			
Market tolls			
Other (specify)			

H2. COST OF FIXED INPUTS

INPUTS	QUANTITY	UNIT COST	USEFUL LIFE
Basins (plastic/metal)			
Tarpaulin			
Dryer			
Tables			
Other (specify)			

H3. LABOUR COST

What form of labour do you employ? 1= Hired Labour 2= Household Labour

Labour Item	Mostly carried out by (M / F)	Frequency	Male	Female	Children	No. of days	Wage
Transportation							
Sorting							
Cleaning							
Grading							
Drying							
Bagging							
Selling							
Others (Specify							

I. MAPPING VALUE CHAIN

K. MAPPING VALUE CHAIN

Actors	1= Producers 2= wholesalers 3=Retailers 4= Processors
Main Goods and/or Services Provided	
Activities Undertaken	

Support Services Received	
Customers	
Most Vital / Major Customer	

Appendix 3.1: Questionnaire for Processors

A. ENUMERATOR ONLY		
A1	Questionnaire ID	
A2	Date of Survey (DD/MM/YY)	
A3	Enumerators' Name	
A4	Name of community	
B. HOUSEHOLD CHARACTERISTICS		
B1	Respondents' name:	
B2	Respondents' age	
B3	Gender	1= Male 2= Female
B4	Household size	
B5	Highest level of education	
B6	Marital status	1= Never 2= Married 3= Widowed 4= Divorced 5= Other (specify)
B7	What is your main occupation?	
B8	What is your motivation for processing chili pepper?	
B9	Have you received any form of training in chili pepper processing?	1= Yes 2= No
B10	If yes, who were the facilitators?	1=MoFA 2=NGO 3=FDA 4= Other (specify)
B11	Do you belong to any processors association?	1=Yes 2=No
B12	If yes, what is the purpose of the association?	1=Provision of Raw Material (Pepper) 2=Marketing of Chili Pepper 3=Welfare 4= Marketing of marketing of chili products 5= Others (specify)
B13	If No, why?	1=There is no processors association in the community 2=I am not interested in the association 3=I am not qualified to be member 4=Other (specify)
C. PROCESSING		
C1	Where did you get information from to start processing chili pepper?	1=Other Processors 2=Relations 3=MoFA 4= NGO 5= Media 6= Other (specify)
C2	How long have you been processing chili pepper? (indicate the years)	
C3	What variety (type) of chili Pepper do you process? (Multiple response)	1=Legon 18 2=local Variety 3=Other (Specify)
C4	What forms of chili pepper do you mostly process? (Multiple response)	1= Fresh Green 2= Fresh Ripe 3=Paste 4=Powder 5=Dried

C5	What form of processed chili pepper do buyers prefer most?	1= Fresh green 2= Freshly Ripped 3=Paste 4=Powder 5=Dried			
C6	Where / whom do you obtain your raw materials (chili pepper) for processing from? (Multiple response)	1=Farmers 2=Own farm 3=Wholesalers 4=Other (Specify)			
C7	What is the average quantity of chili pepper you purchased this current season for processing? (mini bags)				
C8	What is the price per quantity bought at the point of sale? (GHS/mini bags)				
C10	Do you have a permanent supplier?	1= Yes 2= No			
C11	If yes, do you provide premium prices?	1= Yes 2= No			
C12	Do you have any special arrangement for your supplier?	1= Yes 2= No			
C13	If yes, what is the requirement?				
C14	Do you have a preferred quality of chili pepper?	1= Yes 2= No			
C15	What quality parameter(s) do you consider when buying chili pepper for processing? (please indicate)				
C16	Do you provide any form of support/service to your suppliers?	1= Yes 2= No			
C17	If yes, what service do you provide?				
C18	At what season of the market do you get good quality chili pepper at competitive price to purchase?				
C19	In which month does the demand for processed chili pepper increases or decrease?	Increase	Decrease		
C20	What are the reasons for changes in the increases and decreases in the supply?				
C21	How do you store processed chili pepper?	1= Polypropylene bags 2= Sacks specify size 3= Others specify			
D.	MARKETING				
D1	What form of processed chili pepper do you sell?	1= Paste 2= Dried 3= Powdered 4=Others (specify)			
D2	Have you sold any of the processed chili pepper?	1=Yes 2= No			
D3	If yes, what quantity of each form of processed chili pepper was sold in the last 12 months?	Paste	Dried	Powdered	Others
D4	What is the price per quantity sold? (mini bags)				
D5	Who are your customers? Multiple response	1=Wholesalers 2= Traders 3=Exporters 4=Households 5= Other (specify)			
D6	Which of the customers do you mostly sell to?	1=Wholesalers 2= Traders 3= Exporters 4=Households 5= Other (specify)			
D7	What proportion of quantity was sold to each customers? please indicate below				

1= Wholesalers	2= Retailers	3= Exporters	4=	5=Households	6= Other (specify)

D8	Do you transport processed chili pepper to your customers?	1= Yes 2= No
D9	If yes, who bears the cost of transportation?	1= Supplier 2= Customer 3= Both 4= Other (specify)
D10	If you bear the cost how much did it cost and for what quantity?	
E.	SERVICE	
E1	What is the source of your working capital	1= MFI 2= MOFA 3= Rural Bank 4= FBO 5= Relatives 6= Other (specify)
E2	What Collateral was required?	1= None 2= Land Title 3= Self-Help Group 4= Livestock 5= Savings 6= Other (specify)
E3	If No, why was credit not acquired?	1= Not Required 2= Not Available 3= Credit Term 4= Other (specify)
E4	Have you received any market information related to processing of chili pepper in last 12 months?	1= Yes 2=No
E5	If yes, what aspect of the information did you receive and what were the resources?	

Source Code 1=Print media (newspapers/price bulletins) 2= Mass media (radio/TV) 3= FDA 4= NGO's 5= Other (specify)	Market information type	1 = Yes 2= No	Source
	Processed chili pepper prices		
	Market prices processing input		
	Location of input providers		
	Location of traders/customers		

F.	RELATIONSHIP BETWEEN PROCESSOR AND OTHER ACTORS	
F1	Do you have any contract with your buyers?	1= Yes 2=No
F2	If yes, what is the type of contract?	1= Verbal 2= Written 3= Both 4 Other (specify)
F3	Do you have any contract with your suppliers?	1= Yes 2=No
F4	If yes, what is the type of contract?	1= Verbal 2= Written 3= Both 4 Other (specify)

F5	Nature of Contract	1=Yes 2=No	Terms of the contract Multiple response	Actor with whom you have the contract
	Provision of processing inputs			

	Provision of technical assistance			
	Provision of drying facility(processing)			
	Provision of storage space and materials			
	Provision of transports			
	Provision finance / credit			

Code (Terms of the contract)
1= Clearly specifies the product under consideration 2= States the time of product delivery 3= Specifies the responsibilities of both parties 4= Clearly established prices, payment obligation and other financial issues 5= Clearly specifies prices adjustment for variation in the product quality and quantity 6= Other (specify)

G. GOVERNANCE STRUCTURE

G1	Who determines the variety of chili pepper to process?	1= Buyers 2= Sellers (you) 3= Other (specify)
G2	Who determines the price of the processed chili pepper?	1= Buyers 2= Sellers(you) 3= Other (specify)
G3	How is the price of processed chili pepper determined?	1= Cost of processing 2= Market selling price 3= Profit margin 4= Delay in payment
G4	What is your level of satisfaction for the prices you receive for the processed chili pepper?	1= High 2= Medium 3= Low
G5	What major factor do you think determines the prices you receive for the processed chili pepper?	1= Seasonality or availability of chili pepper 2= Bargaining/ negotiation strengths of buyer 3= Lack of market information 4= Lack of transport means 5= Other (specify)
G6	What is the level of your "importance" and 'influence" in the chili pepper value chain with regards to the following indicators? *Note each actor to be scored 25% for each indicator. (Total score = 100%)	

Indicators	Input dealers	Famers	Wholesaler	Processors
Profit				
Bargaining Power				
Protection from Competition				
Information Concentration				

H. VALUE ADDITION

What activities (value capturing) do you perform on the produce before selling to the buyer? And what is the cost of the value addition activities performed?

Activities	1= Yes 2= No	Unit Cost (mini bag)

Cleaning		
Washing		
Curing(Steaming/Boiling)		
Sorting		
Grading		
Drying		
Destalking		
Bagging		
Storage		
Transportation		
Packaging		
Labelling		
Weighing		
Other (specify)		

I. CONSTRAINT AND OPPORTUNITY

I1. List the constraints that affect your performance in the production of chili pepper and the coping strategy.

Constraints	Rank (1 - N)	Coping strategies
Lack of ready market		
High cost of labour		
Inadequate supply of raw material (chili pepper)		
Seasonality of fresh chili pepper		
Seasonality of dried chili pepper		
Non -Governmental support		
High cost of input		
Low price of processed chili pepper		
Lack of credit		
Other (specify)		

*Note 1 being the most pressing constraint factor and n the least pressing

I2. To what extent do you Agree or Disagree with the following as opportunities of production of chili pepper

Opportunities	Agree (1)	neither Agree nor Disagree (2)	Disagree (3)
Government support for processing standards			
Government support for infrastructure development			
Growing demand for chili pepper paste			
Growing demand for dried chili pepper			
Availability of suitable land for cultivation of chili pepper			
Support from donor agencies			
Other (specify)			

J. OPERATING COST

J1. Cost of Variable Inputs

Inputs	Quantity	Frequency	Average unit cost
Rent			
Ingredients(water)			
Electrical charges			
Packaging			
Miling			
Fire Wood			
Other (specify)			

J2. COST OF FIXED INPUTS

Inputs	Quantity	Unit Cost	Useful life
Cook Stove or Gas stove			
Basins (plastic /metal)			
Tarpaulin			
Dryer			
Other (specify)			

J3. LABOUR COST

What form of labour do you employ? 1= Hired Labour 2= Household Labour

Labour Cost	Mostly carried out by M/F	Freq	Male	Female	Children	No. of days	Wage
Sorting							
Grading							
Packaging							
Marketing							
Other (specify)							

K. MAPPING VALUE CHAIN

Actors: 1= Producers 2=Wholesalers 3= Retailers 4= Processors

Main Goods and/or Services Provided	
Activities Undertaken	
Support Services Received	
Customers	
Most Vital / Major Customer	

Appendix 4.1: Cost Structure of Farmers

Farmer Cost Items					
Cost Category	**Unit**	**Qty**	**Unit Price**	**Total Cost**	**Cost / Kg of Output**
Main Inputs Cost					
Seed	Grams	150.00	0.15	22.50	
Fertilizer (NPK)	Kg	50.00	1.30	65.00	
Ammonia	Kg	25.00	1.20	30.00	
Sub total				**117.50**	**1.84**
Other Operating Costs					
Land Rent	Acre	1.00	80.00	80.00	
Ploughing (2x)	Tractor unit	1.50	80.00	120.00	
Pesticides	Litres	0.50	45.62	22.81	
Fungicides	Litres	0.50	43.04	21.52	
Manuring	Effective tractor trailer load	0.33	150.00	49.50	
Nursery Management	Man-Hours	12.00	2.00	24.00	
Transplanting	Man-Days	4.00	20.00	80.00	
Fertilizer Application	Man-Days	1.00	35.00	35.00	
Weeding (3x)	Man-Days	12.00	20.00	240.00	
Harvesting (8x)	Man-Days	8.00	25.00	200.00	
Curing / Drying	Kg-Hours	240.00	0.25	60.00	
Destalking	Man-Hours	8.00	7.50	60.00	
Transportation (Farm to Home)	Man- Hours	8.00	2.40	19.20	
Sub total				**1012.03**	**15.81**
Marketing Cost					
Sorting/Grading	Man-Hours	6.00	7.50	45.00	
Bagging/Packaging	Man-Hours	2.00	7.50	15.00	
Transportation (Home to Market)	Trips	8.00	2.00	16.00	
Sub total				**76.00**	**1.19**

Source: Source Field Data, 2018.

Appendix 4.2 Cost Structure of Wholesalers

Wholesaler Cost Items					
Cost Category	**Unit**	**Qty**	**Unit Price**	**total cost**	**cost /kg of output**
Main Inputs Cost					
Dry Chili Pepper	Kg	1904.70	23.33	44436.65	23.33
Sub total				**0.00**	**23.33**
Other Operating Costs					
Sorting /Grading	Man-hour	101.64	2.00	203.28	0.11
Sacks	number	127.00	2.50	317.50	0.17
Rubber Bags	number	127.00	1.80	228.60	0.12
Storage	week	48.00	2.00	96.00	0.05
Sub total				**845.38**	**0.44**
Marketing Cost					
Transportation to Market	Kg-metre	127.00	0.33	41.91	0.02
Bagging and Packaging	number	127.00	0.13	16.51	0.01
Market Levy/ Toll	number	127.00	0.50	63.50	0.03
Sub total				**121.92**	**0.06**

Source: Source Field Data, 2018.

Appendix 4.3 Cost Structure of Processors

Processors Cost Items					
Cost Category	**Unit**	**Qty**	**Unit Price**	**Total Cost**	**Cost / Output**
Main Inputs					
Dry Chili Pepper	kg	160	23.75	3800	**23.75**
sub total					**23.75**
Other Operating Costs					
Transportation (To Mill)	Kg-Metre	160	0.2	32	**0.2**
Miling	bag	10	30	300	**1.875**
Storage	Week	12	2	24	**0.15**
Sacks	Number	10	2.5	25	**0.15625**
Rubber Bags	Number	10	1.2	12	**0.075**
Packaging Bags	Number	10	35	350	**2.1875**
Sub total					**4.64375**
Marketing Cost					
Packaging	man-day	1	0	0	**0**
Market Levy/ Toll	Day	48	0.5	24	**0.15**
Sub total				**24**	**0.15**

Source: Source Field Data, 2018.

APPENDIX 5: PLAGIARISM REPORT

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ORIGINALITY REPORT

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