AN ASSESSMNET OF FRUIT SUPPLY CHAIN IN GHANA. THE CASE OF CASHEW NUTS.

By

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A Thesis submitted to the Department of Information Systems and Decision Sciences, Kwame Nkrumah University of Science and Technology in partial fulfilment of the requirements for the degree

of

MASTER OF BUSINESS ADMINISTRATION

(Logistics and Supply Chain Management)

KNUST School of Business, College of Art and Social Sciences

August, 2009

DECLARATION

I hereby declare that this submission is my own work towards the MBA and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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DEDICATION

I dedicated this work to my lovely wife, Florence Adu-Gyamfi, for her understanding, support, love and care.

ACKNOWLEDGEMENTS

My first and foremost thanks go to the almighty God whose love, grace and protection saw me through this course.

I am highly indebted to my supervisor, Dr. S. K. Amponsah, Head of Mathematics Department and Mr. Jonathan Annan, Head of Department of Information Systems and Decision Sciences, for their support, encouragement, constructive comments and also for shaping this work through to its end. The contributions of Mr. David Asamoah during the initial stages of the work is also very much appreciated.

I am also very grateful to my mother, Mad. Hannah Clement, my late grandmother, Mad. Comfort Quainoo, all my aunts and sisters, not forgetting their husbands and indeed all the members of my family for their love, support and encouragement.

My heartfelt thanks also go to all the respondents I interviewed especially the Chief Executive Officer of Mim Cashew and Agricultural Products Limited, Mr. Lars Wallevik, Mr. Kyeremeh, a member of the Kenten Cashew Farmers' Association and all the commissioned agents. Without you this work would not have been a success.

I also appreciate the support and relationship I have had with Miss Theresa Owusu-Ansah and Mr & Mrs Manu and all my lecturers, course mates and group members especially Miss Dorcas Nuertey, Messrs Theophilus Kofi Anyanful, Emmanuel Samuelson Annang and John Mensah. I can never forget you people and may the almighty God richly bless you.

ABSTRACT

Cashew is one of the most important non-traditional export crops in Ghana. It has many uses but unlike the other export crops, its value chain has unfortunately been neglected. The development and effective management of cashew supply chain, it is anticipated, can help reduce the waste associated with it while at the same time helping those involved in the cultivation and sale of cashew increase their profit margins. The research sought to identify the main actors, the flow process and the risks and challenges associated with the value chain. This was done through the use of three different sets of questionnaires to the main actors of the chain. These were a cashew processing company (Mim Cashew and Agricultural Products Limited), farmers who supply raw nuts to the company and suppliers of cashew seeds to farmers. The research identified that the main actors in the cashew supply chain are the processing companies, farmers, the suppliers of cashew seeds to farmers and the commissioned agents, who buy from the farmers on behalf of the processing companies and their foreign partners, as well as those involved in the marketing of the final product till it gets to the end user. It came out that cashew supply chain is fraught with many risks and challenges which were mainly attributed to the fact that the government and its supervising agencies who are deemed to be actors, and are supposed to monitor the activities of those involved in cashew production are not playing the role expected of them. Some of the problems faced by the actors include theft, payment of low producer prices to farmers, destruction of farms by bush fires, grazing animals, and diseases and pests' infestation as well as the high cost of labour, equipment and capital in the country. To overcome these problems the government should take cashew production seriously as it can be the country's second cocoa. A Cashew Marketing Board should be established as a matter of urgency to help regulate the prices as has been done for cocoa. People should be educated on the importance that can be realised from cultivating and consuming cashew. Farmers should also be assisted in spraying their farms, laws and regulations on bush fires should be enforced as well as constantly educating people on the effects of bush fires so as to reduce its negative impact on the activities of farmers.

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1.	ADRA	Adventist Development and Relief Agency
2.	CAPEAG	Cashew Processors and Exporters Association of Ghana
3.	CDP	Cashew Development Project
4.	CNSL	Cashew Nut Shell Liquid
5.	CRIG	Crop Research Institute of Ghana
6.	CRM	Customer Relationship Management
7.	CSCMP	Council of Supply Chain Management Professionals
8.	CSM	Customer Service Management
9.	EDI	Electronic Data Interchange
10.	FDB	Food and Drugs Board
11.	GDP	Gross Domestic Product
12.	IT	Information Technology
13.	LWP	Large White Pieces
14.	MOFA	Ministry of Food and Agriculture
15.	MT	Metric Tonnes
16.	SCM	Supply Chain Management
17.	SCRM	Supply Chain Risk Management
18.	SPSS	Statistical Package for the Social Science
19.	SWP	Small White Pieces
20.	TIPCEE	Trade and Investment Programme for a Competitive Export Economy
21.	US	United States
22.	USAID	United States Agency for International Development
23.	WW	Whole Whites

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Cashew, which is one of the most important non-traditional export crops in Ghana, contributes significantly to the people living in the northern savannah, forest savannah, and to some extent the coastal savannah zones of the country thereby contributing to the country's Gross Domestic Product (GDP). This is because majority of the people living in these areas get income through the cultivation of cashew both for export and as raw material for some local industries. The country also gets foreign exchange through the sale of cashew. However, the cultivation of cashew is predominantly undertaken by illiterate, small holders operating on subsistence basis. Thus the contribution of large scale commercial farmers is very low. Also the production of cashew in the country is almost entirely dependent on the volume and distribution of rainfall. Yields are also very low as a result of the generally low level of technology and high cost of inputs.

Cashew produces kernels, which are used in the confectionary industry, apples which are processed into alcoholic and non-alcoholic beverages, jams or marmalade, animal feed, vinegar and cashew nut shell liquid (CNSL) which, are used in the manufacture of paints, insecticides, and brake fluid liquid (Cashew Production Guide, 2006). However, the value chain of cashew as noted by Boahen (2007) is largely undeveloped compared with other export crops like cocoa, fruits and vegetables such as pineapple and okra. Dwomoh *et al.* (2008) however state that recent surveys in Ghana have shown that several old cashew plantations exist and that the Government

of Ghana, through the Ministry of Food and Agriculture (MOFA) in collaboration with Cocoa Research Institute of Ghana (CRIG), has embarked on massive rehabilitation of the existing plantations, as well as establishing new ones, through the provision of technical support and farming incentives to farmers. The primary objectives are to increase cashew production and to export processed nuts.

The process of getting goods and services to the end user or the final consumer, in recent times, has become very complex unlike the olden days where it was very simple. As argued by Stock and Lambert (2001), it is very essential to transport goods from the place they are produced to the place they are consumed whether in an industrialised or non-industrialised society. They further argued that this exchange process is the cornerstone of every economic activity except in very primitive societies where every family produces to meet its own household needs. Also, there is every basis for exchange when one or more individuals or businesses have surplus of goods that are needed by other people within the society. Supply chain, demand chain or value chain is therefore described as when many exchanges take place between producers and consumers, and the alignment of firms that bring products or services to the market (Stock and Lambert, 2001). Supply chain encompasses all the activities associated with the flow and transformation of goods from the raw materials stage (extraction), through to the end user as well as the associated information flows (Handfield and Nicholas, 1999). This implies that supply chain entails all the activities right from the acquisition of raw materials, its conversion to finished products right to the time the product reaches the end user or consumer. According to Rao *et al.* (2009) supply chain is an incorporated process involving a number of diverse business units (i.e., suppliers, manufacturers, distributors, and

retailers) working collectively to obtain raw materials, transform these raw materials into specified final products, and distribute these final products to retailers.

Beamon (1998), also defines supply chain as an integrated process where a number of various business entities i.e., suppliers, manufacturers, distributors, and retailers; work together in an effort to acquire raw materials, convert these raw materials into specified final products, and deliver these final products to retailers. From another perspective, Chopra and Meindl (2007) indicate that supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request and that it includes not only the manufacturer and suppliers, but also transporters, warehouses, retailers, and even customers themselves. Supply chain activities are also seen to transform natural resources, raw materials and components into a finished product that is delivered to the end customer. In sophisticated supply chain systems, used products may re-enter the supply chain at any point where residual value is recyclable.

Supply chain can also be thought of as a system characterised by a forward flow of materials and a backward flow of information. Many researchers and practitioners have primarily investigated the various processes of supply chain individually. Recently, however, there has been increasing attention placed on the performance, design, and analysis of the supply chain as a whole. From a practical standpoint, the supply chain concept is thought to have arisen from a number of changes in the manufacturing environment, including the rising costs of manufacturing, the shrinking resources of manufacturing bases, shortened product life cycles, the

levelling of the playing field within manufacturing, and the globalisation of market economies. The current interest has therefore sought to extend the traditional supply chain to include reverse logistics, to product recovery for the purposes of recycling, re-manufacturing and re-use (Beamon, 1998).

According to Chang and Makatsoris (2001) the objective of supply chain management is basically to meet customer demand for guaranteed delivery of high quality and low cost goods with minimal lead time. To achieve this objective, companies require a better visibility into the entire supply chain i.e., that of their own as well as those of their suppliers and customers. Companies therefore need to be agile enough to adjust and rebuild plans in real time, to take care of unexpected events in the supply chain. Efficient supply chain management can be achieved through careful consideration of capacity and material information. Companies today want to reduce inefficiencies in their business processes and to redesign their business processes in order to achieve world-class business performances. Some of the inefficiencies can be found from the company, some of them are caused by their suppliers and some of them are caused by both the company and its suppliers. Proper management of the chain can help companies become more aware of their supply chain dynamics and efficiency. It is therefore imperative to have a good understanding of the overall supply chain. Good understanding of the business characteristics (e.g. performance measures, make-to-stock or make-to-order) is also essential since every industry has different business characteristics and supply chain management processes.

Sabbath and Frentzel (1997) argued that corporate downsizing and reengineering over the years have helped the United States (US) and other multinational companies to re-establish their global competitiveness. During this period, the most popular route to increased profitability has been to cut costs rather than increase revenues. Logistics and supply chain professionals are therefore playing a vital role in improving the cost competitiveness of their operations across the supply chain by adopting new strategies, closing warehouses, reducing inventories, outsourcing non-essential services, and installing powerful forecasting and material-control systems. Cost cutting across all parts of an organisation, however, can be taken to the extreme. It can lead to a vicious cycle of plant closings, layoffs, and expense reductions ultimately leading to a gutted, weak corporation that is unable to sustain profitability for very long.

Sabbath and Frentzel (1997) further argued that with lean and healthy operations as their foundation, progressive companies are focusing intensely on growing revenues, thereby eliminating the problems associated with corporate downsizing. Thus instead of merely striving to meet annual cost-reduction targets, managers at these leading companies are repositioning the supply chain as an enabler of growth. They are speeding the flow of new products; accessing new markets across the globe; developing new channels of distribution; customizing services to micro customer segments; and forging new value-added relationships with suppliers and customers.

1.2 CASHEW SUPPLY CHAIN

The proper and effective management of supply chain plays a major role in the production of cashew including the improved delivery performance for instance from the farmer through to the end user, nuts consumption or export, overall increased productivity, lower supply chain costs, improved capacity realisation, improved flexibility, improved reliability and improved responsiveness and awareness of cashew farmers and the consumers safety and welfare. The cashew tree which is native to Brazil was first introduced to Mozambique and then India in the sixteenth century by the Portuguese, as one of the means of controlling coastal erosion. It was spread within these countries with the aid of elephants that ate the bright cashew fruit along with the attached nut. The nut which was too hard to digest was later expelled with the droppings. It was not until the nineteenth century that plantations were developed and the tree then spread to a number of other countries in Africa, Asia and Latin America (Azam-Ali and Judge, 2001).

Cashew is one of the most important tree-nut crops, ranking third in the international trade after hard nuts (29%) and almonds (21%). World production of cashew is estimated at seven hundred and fifty thousand (750,000) metric tonnes. Major cashew-producing countries are India, Indonesia, Mozambique, Brazil and Tanzania. There is a great variability in the cashew production and productivity in Africa mainly due to insects, diseases, poor nutrition, and poor management, as well as poor variety performance. Production in Africa has fallen significantly during the last ten (10) years while the world consumption of cashew has been increasing at an average annual rate of 10.9%. The principal producers of cashew in Africa are Mozambique, Tanzania, Kenya, Guinea Bissau, Madagascar, Senegal, Côte d'Ivoire, Benin,

Nigeria, Burkina Faso, Cameroon, Mali, Malawi, Zambia, Angola, and Cape Verde (Cashew Development Project Appraisal Report, 2000). Also even though cashew production is not as widespread as the other export crops it contributes significantly to the country's economy.

1.3 STATEMENT OF THE PROBLEM

Many organisations are losing a great chunk of their customer base as a result of the inefficiencies associated with their operations and/or their refusal to attach importance to customer and supplier relationship management. Also even though cashew has great economic potential to producing countries, it usually receives inadequate attention from economic planners in most countries due to lack of awareness of its economic and biological potentials. Proper management of cashew supply chain can be used as a means to smoothen out the inefficiencies in the operations of organisations while at the same time helping them to achieve their targets. It is therefore envisaged that the successful management of supply chain as a tool for cost reduction through proper inventory management, proper utilisation of transportation channels in sending goods from the point of production to the end user, producing to meet customer expectations, improvement in production systems, and the elimination of waste can help to increase a company's revenue. In today's business environment the success of every company is measured on its ability to increase its shareholders value. This can be achieved by putting things in place to manage its supply chain effectively by reducing all the waste associated with its operations.

1.4 OBJECTIVES OF THE STUDY

The objectives of the study are

- To identify all the actors within the cashew supply chain
- To investigate the flow process of activities in the cashew supply chain
- To find the risks and challenges associated with cashew supply chain
- To make recommendations to improve the state of the cashew industry in Ghana.

1.5 JUSTIFICATION OF THE STUDY

Cashew is one of the most important non-traditional export crops in the country and has many beneficial uses. However, its supply chain is largely undeveloped. This research therefore seeks to look out for how the key actors in the cashew supply chain can be properly connected as well as how to improve the flow process. This is as a result of the fact that with the recent and rapid evolution of quality programmes, firms are undoubtedly at different stages in their progression of programmes to implement so as to increase their bottom line. While some farmers are undoubtedly on the right path, others may be using supply chain systems which are not consistent with the industry's quality initiative standards. With increased competition both domestic and worldwide, firms must be aware of every aspect within their business and be looking for ways to improve them. This research therefore seeks to establish how cashew supply chain specifically, how the flow process and the relationship between actors in the chain can be improved as well as ways of reducing some of the risks and challenges associated with cashew supply chain. This therefore would be

valuable to farmers and all the other actors in the cashew industry and would thus allow them to compare their performance and development with farmers in the fruit industry as a whole. In addition, it would provide progressive organisations with the opportunity to achieve a competitive advantage over rival firms with respect to the proper management of the supply chain by implementing best practices not being used by the other firms or farmers in the industry.

1.6 SCOPE OF THE STUDY

This research was undertaken in the Brong Ahafo Region of Ghana. It sought to look at the state of the cashew supply chain in Ghana and ways that can be used to improve the inefficiencies associated with it by specifically looking at the actors, the flow process and the risks and challenges associated with it and come out with the appropriate recommendations that can be used to improve the operations of cashew farmers in Ghana.

1.7 ORGANISATION OF THE STUDY

This thesis is given in five chapters. Chapter one takes care of the general introduction where the background of the study, statement of the problem, objectives and relevance of the study are discussed. Chapter two on the other hand reviews the relevant literature to this study where the supply chain concept, actors and the flow process and the associated risks and challenges associated with supply chain are discussed. Chapter three looks at the methodology and organisational profile of Mim Cashew and Agricultural Products Limited, while chapter four discusses and

analyses the findings of the research. A summary of the findings, conclusions and recommendations of the research is presented in chapter five.

1.8 LIMITATIONS OF THE STUDY

The main limitation of this study is finance and time constraints as the researcher had to travel far and near in gathering information for the study while at the same time having to work within the stipulated time set by the University. Also, some of the interviewees were unwilling to disclose some information creating the impression that everything was well with their operations until they were impressed upon by other farmers to give a true picture of their activities.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

The review of supply chain, supply chain management and cashew production literature will be discussed under this section. The history and concept of supply chain and supply chain management (SCM), issues relating to cashew supply chain, actors and the flow process, risks and networking among others are discussed. This review of literature is done using several authorities in the field of SCM and cashew production as captured in books, journals, articles, and research and conference papers.

2.2 THE CONCEPT OF SUPPLY CHAIN

According to Croker (2003), supply chain is the total flow of materials, information and cash through a business network, all the way from the suppliers' suppliers to the customers' customers. Thus materials have to flow from suppliers through a company, where the materials are transformed into other materials (products). These are then distributed to the company's customers and finally to their customers' customers. In the same vein, funds also flow from customers through a company's operations through to its suppliers. It should however be noted that some of the funds are used to offset the company's expenses and to increase value. Information flows both ways through the system to make it efficient. Van Roekel *et al.* (2002) also argue that supply chains are not developed by itself but require a lot of efforts and competencies of those involved and that before a supply chain is developed, certain steps have to be taken in order to formulate the right chain organisation. Special care

is also required for the formation of cross-border supply chains as differences in business and social culture can have for instance large influences in the performance of the chain collaboration. Chia-Chen *et al.* (2009) also think supply chain is generally conceptualised as a network of companies from suppliers to end-users, which have with the intention of integrating supply and demand through coordinated company efforts.

2.3 THE ACTORS AND FLOW OF SUPPLY CHAIN

Van Roekel *et al.* (2002) see supply chain as the coming together of different actors to achieve a more effective and consumer-oriented flow of products. Supply chains may include growers, packers, processors, storage and transport facilitators, marketers, exporters, importers, distributors, wholesalers, and retailers. The development of supply chain, therefore, can benefit a broad spectrum of society, including people living in both rural and urban areas, in developing countries. Supply chains not only benefit the companies directly involved, but also stimulate social, economic and sustainable development within a country. Development of cross-border supply chain can also stimulate the development of local agro-industries, employment generation, local food production, value addition to products, introduction of new technologies, decreasing product losses, increased export earnings, and improved food safety and nutrition by connecting chain partners and their activities.

Scheer *et al.* (2002) argue that the relationships in a supply chain consist of two or more legal entities as separate actors being linked by goods, information and

financial flows. Within a supply chain, the actors face each other in different processes and activities in order to provide the succeeding actor with the products and services required. The relations of exchange between the customer and the supplier run upstream on one side that is, the supplier provides the customer with digital and physical products as well as with services. For initiation and execution of the exchange, information flows downstream among the actors who realise the transaction. The supplier then receives monetary compensation through payment transactions from the customer. According to Trienekens *et al.* (2003) in order to achieve economic growth, producers have to learn how to deal and process the information and demands they receive and subsequently how to manage their farms and businesses accordingly. This implies much more than just focusing on crops, it implies a timely and opportune response to market demand and learning to interpret urban and international trends rather than local ones.

Crandall (2002) argues that there are three major flows in a supply chain, namely, the physical flow of goods and services, information, and funds and that all are necessary if a supply chain is to function and flourish. Roberts (2002) defines the physical supply chain as the actual movements and flows within and between firms, transportation, service mobilisation, delivery, movement, storage, and inventories. Crandall (2002) further indicates that in manufactured products, they originate in the extraction (mining) industries and farms, and flow toward the consumer through fabricators, assemblers, distributors, and retailers. Although not yet perfect, this flow is improving rapidly. For the most part, it receives major management attention and resource commitment. The flow of information according to Crandall (2002) is also receiving a great deal of attention. A supply chain requires only a minimal amount of

required information, such as customer purchase orders, shipping notices, and invoices, to keep it operating. Most companies provide this information willingly and promptly. This minimal information is necessary to create the flow of funds along the supply chain. Additional information flows on a voluntary basis among supply chain participants. This includes sales results, demand forecasts, and plans for special events, such as sales or product promotions. This additional information makes it possible for goods and services to flow faster and more smoothly. It also helps funds to flow more smoothly. Information flows in both directions – toward the consumer and from the consumer up the supply chain toward the suppliers. New technologies, and advances in collaboration among supply chain participants, is making information flow better, although it still encounters some problems in most supply chains. Last but not the least is the flow of funds, or the flow of money according to Crandall (2002). Funds flow is very essential to the growth and proper operation of supply chain. The money flows from the consumer upstream in a supply chain until all suppliers have received payment for the goods and services they provided. While the flow of funds is mandatory if a supply chain is to exist, it is still an uncoordinated and sub-optimised flow in most supply chains.

2.4 THE HISTORY AND CONCEPT OF SUPPLY CHAIN MANAGEMENT

The origins of supply chain management, according to Cartlidge (2004), are believed to lie in the shipyards of Japan and that it was actually used in the early 1950s. This technique was later believed to have been used in the car manufacturing industry by Toyota. It is the belief of most people that it is the peculiarities and uniqueness of the culture of the people of Japan that permitted not only the widespread adoption of SCM in the Japanese manufacturing sector but also restricts its application and

transfer outside of Japan (Cartlidge, 2004). Stock and Lambert (2001) also state that SCM is a term that has grown significantly in use and popularity since the late 1980s. SCM involves getting a smooth and efficient flow of goods, services and information from the raw materials state through to finished goods in the hands of the final consumer (Ellram, 1990, Jones and Riley, 1985). It thus replaces the traditional supply-push, inventory-driven system with one which is driven by constantly improving the level of customer service and pulled by consumer demand. Gibson *et al.* (2005) on the other hand see SCM as a discipline in the early stages of evolution. SCM gives a concrete form to the idea of business ecosystem and also provides a framework of processes for firms to engage in co-existence rather than competition. Thus there is therefore a mutual collaboration and cooperation and companies work together to make the whole supply chain competitive (Bechtel and Jayaram, 1997). Cooper *et al.* (1997) argue that consultants proposed the term and educators proposed the structure and theory for executing SCM. SCM is also thought to have first appeared in 1982, and around 1990 it is believed, academics first described SCM from a theoretical point of view to clarify the difference from more traditional approaches and names (such as logistics), to managing material flow and the associated information flow.

SCM has varied definitions as different scholars try to explain or define the concept from their own perspectives. This fact is supported by Stock and Lambert (2001) who argue that there is a considerable confusion as to the exact meaning of SCM as several authors have defined supply chain management. According to Christopher (2005) supply chain management is the management of upstream and downstream relationships such as suppliers and customers to deliver superior customer value at

less cost to the supply chain as a whole. Thus supply chain management seeks to manage relationships so as to achieve a more profitable outcome for all parties in the chain. Russell and Taylor (2002) also define SCM as the managing of the flow of goods and services and information through the supply chain in order to attain the level of synchronisation that will make it more responsive to customer needs while lowering total cost. This implies that all members in the supply chain combine their capabilities, not just the capabilities of the producing or manufacturing company alone, and are so managed to channel their efforts towards the achievement of a maximum competitive advantage. Also in order for this synchronisation to be effective, there should be close coordination, cooperation, and communication, plus timing among the supply chain members. Russell and Taylor (2002) further argue that today's supply chain is characterised by the rapid flow of information among customers, suppliers, distributors and producers.

The Council of Supply Chain Management Professionals (CSCMP) (2004), postulates that SCM encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities, including coordination and collaboration with suppliers, intermediaries, third-party service providers and customers. This implies that supply chain entails all activities involved in the production and delivery of products and/or services, from the supplier's supplier to the customer's customer. The Council of Supply Chain Management Professionals again emphasises that SCM include the management of supply and demand, sourcing of raw materials and parts, manufacturing and assembly, warehousing and inventory tracking, order entry and order management, and distribution and delivery to the customer. Chopra and Meindl (2007) define SCM

as the management of supply chain assets and product, information, and fund flows to maximise total supply chain profitability. They thus see SCM as the effective management of assets and information by an organisation so as to increase its profit margin and be in a position to undertake the necessary expansion programmes. Lambert *et al.* (1998) also look at SCM as the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders. SCM is also seen as a network of facilities that produce raw materials, transform them into intermediate goods and then final products, and deliver the products to customers through a distribution system. It entails the procurement of goods and services at the right price, quality and quantity and at the right time; manufacturing and distribution of an organisation's products to its wholesalers through to the final consumers and in the form they desire (Lee and Billington, 1995).

According to Mentzer (2001) the significant importance of SCM includes the systematic, strategic coordination of the traditional business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long term performance of the individual companies and the supply chain as a whole. Chang and Makatsoris (2001) also describe SCM as a process of integrating or utilising suppliers, manufacturers, warehouses, and retailers, so that goods are produced and delivered at the right quantities, and at the right time, while minimising costs as well as satisfying customer requirements. They look at it from the perspective of supplying goods and services at least cost to members of the supply chain at the right quantities, at the right time, and at the right place. Lummus and Vokurka (1999) summarise SCM as "all the activities involved in delivering a

product from raw material through to the customer, including sourcing raw materials and parts, manufacturing and assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, delivery to the customer, and the information systems necessary to monitor all of these activities".

According to Tan *et al.* (1998) the concept of SCM has been studied from two perspectives, namely purchasing (i.e. supply management) and logistics (i.e. transportation, distribution, warehousing, and inventory management). According to the purchasing perspective, SCM is synonymous with supplier integration and is thought to have evolved from traditional purchasing and materials functions. From the logistics management perspective, SCM is synonymous with distribution, logistics, inventory management, and customer relationships. These two perspectives have however evolved into one single philosophy of SCM with integrated systems, processes, and practices between trading partners. Lee (2002) noted that SCM has emerged as one of the major areas for companies to gain competitive advantage. But managing supply chain effectively is seen as a complex and competitive task as a result of current business trends of expanding product variety, short product life cycle, increasing outsourcing, globalisation of businesses and continuous advances in information technology.

In today's highly competitive market, manufacturers face the challenge of reducing manufacturing cycle time, delivery lead-time and inventory reduction. However, every organisation has its own objectives and its own way of decision-making processes. As a result of the conflicting objectives of each organisation and non-

integrated decision making processes, there arose the need for a new mechanism which help to resolve those conflictions and to integrate processes. It is in light of this that in the early 1990s, the phrase "supply chain management" came into use. SCM consists of a number of organisations – beginning with suppliers, who provide raw materials to manufacturers, which manufacture products and keep those manufactured goods in the warehouses. Then they send them to wholesales or distribution centres from where the goods are shipped to retailers and finally to end users. Different industries however have slightly different structures of the supply chain networks (Chang and Makatsoris, 2001).

2.5 SUPPLY CHAIN RISK MANAGEMENT

Liu and Wang (2008) define risk as the possibility of suffering harm or loss and born of uncertainty. Supply chain risk on the other hand refers to uncertainty or unpredictable event affecting one or more of the parties within the supply chain or its business setting, which can influence the achievement of business objectives. Juttner (2005) contends that although much discussion on risk awareness, risk management, business continuity planning and disruption handling have been done, the basis of most of these work have been on single organisations. As a result of this, applying the knowledge gained from a single company perspective to a supply chain context must be limited because it does not reflect a supply chain orientation. This is because supply chain at its simplest degree of complexity comprises three entities, namely, a company, a supplier and a customer, directly involved in the upstream and downstream flow of products, services, finances and information. Any approach to managing risks from a supply chain perspective must therefore have a broader scope

than that of a single organisation and provide insights regarding how the key processes have to be performed across at least three organisations.

According to Vanany *et al.* (2009) risk and uncertainty have always been an important issue in supply chain management. Earlier literature considered risks in relation to supply lead time reliability, price uncertainty, and demand volatility which lead to the need for safety stock, inventory pooling strategy, order split to suppliers, and various contract and hedging strategies. Although supply chain management has always had a strong emphasis on risk, the notion of supply chain risk management has gained an increasing popularity in recent years due to increasing supply chain complexity, including the use of global contract manufacturers and suppliers. Effective supply chain risk management (SCRM) has also become a need for companies nowadays.

Juttner (2005) again describes supply chain risk sources as any variables which cannot be predicted with certainty and from which disruptions can emerge. He identifies five sources of supply chain risk, from an inter-organisational supply chain understanding. These include environmental risk sources, demand, and supply risk sources, process risk sources and control risk sources. However, we distinguish between environmental, demand and supply risk sources on the one hand, and processes and control mechanisms as a risk amplifier or absorber on the other. Finch (2004) on the other hand identifies supply chain risks as natural disasters examples of which are floods, storms/lightning and disease/epidemic; accidents which may be as a result of human error or fires; deliberate acts (physical actions) which may also be

as a result of sabotage, theft and vandalism; management issues; competitor's actions and/or weak or ineffective control of suppliers or customers. According to Chopra and Sodhi (2004), the supply chain risks could be in the form of delays of materials from suppliers, large forecast errors, system breakdowns, capacity issues, inventory problems, and disruptions. Tang (2006) also classifies supply chain risks into operations and disruptions risks. The operations risks are associated with uncertainties inherent in a supply chain, which include demand, supply, and cost uncertainties while disruption risks are those caused by major natural and man-made disasters such as flood, earthquake, fires, and major economic crisis. Chopra and Sodhi (2004) classify supply chain risks into disruptions, delays, systems, forecast, intellectual property, procurement, receivables, inventory and capacity.

Sinha *et al.* (2004) also classified four areas of risks in the aerospace industry, which include standards, supplier, technology, and practices. In each of these four areas, there are a number of supply chain risks that could happen. Most companies are facing day-to-day operational accidents, but the frequency of those risks happening depends on how good they manage supply chain risks. Operational catastrophes are risks associated with rare and difficult to predict events, but once occurred; they have severe impacts on the company. Such risks as natural disaster, socio-political instability, economic disruptions, and terrorist attacks are examples of operational catastrophes. Finally, the strategic uncertainties are the type of risks that are generally difficult to address and affect the company not at the operational level, but strategically. The strategic uncertainty could be in the form volatile demand, supplier default/bankruptcy, increasing competition, market constraint, and technology change. Vanany *et al.* (2009) contend that risk management involves the course of

actions to consider in order to reduce the risks. This can be done by reducing the probability of occurrence, the severity of impacts, or both. Generally, risk management involves such options as transferring it to or sharing it with other parties, accepting it as it is, or avoiding the risks. Transferring risk to other parties is one of the common supply chain management practices nowadays. An example would be the outsourcing/subcontracting practices where some types of supply chain risks are transferred to the parties providing the products or services. Some global players outsource the whole production processes to outside parties which automatically mean that such a company does not need to deal with labour and production facility problems.

2.6 SUPPLY CHAIN MANAGEMENT NETWORKING

According to Jain (2004), supply chain can be visualised as a large network. Chia-Chen *et al.* (2009) further contends that the concept of supply chain management is getting more and more attention and that many relationships among organisations have evolved from arm-length buy-sell relationships into tightly coupled supply chain collaborations. Organisations have now realised the importance of network management i.e. the effectiveness of one element in the network does not assure the effectiveness of the whole system. Also, in order to reduce uncertainties of supplies, vertical integration has become a major solution. However, the inflexible and inefficient structure of large enterprises forces organisations to pursue a more efficient way to operate. The advancement of inter-organisational information technology and global logistics is the main force to realise the collaboration between organisations. However, prior researches about information technology (IT)-enabled integration have typically been focused on the viewpoint of business customers or

network leaders, with small amounts of attentions given to the benefits accrued to focal firms. It is therefore important to understand the determinants of focal firms' intention to share information as well as their relationships with their customers, especially customers that have maintained relationships for a period of time (Chia-Chen, *et al.*, 2009).

2.7 ESSENTIAL SUPPLY CHAIN MANAGEMENT PROCESSES

Stock and Lambert (2001) argue that SCM entails the management of eight key business processes, namely, customer relationship management, customer service management, demand management, order fulfilment, manufacturing flow management, procurement, product development and commercialisation and returns.

2.7.1 CUSTOMER RELATIONSHIP MANAGEMENT

Chopra and Meindl (2007) state that customer relationship management (CRM) consists of all processes that focuses on the interface between the firm and the customers that work to generate, receive, and track customer orders. It includes processes such as marketing, pricing, sales, order management, and call centre management. Key to the integration of SCM is to identify key customers that are critical to an organisation's objectives. Customer service teams therefore develop and implement partnering programmes with key customers. Organisations should also establish product and service agreements specifying the levels of performance with key business customers. Stock and Lambert (2001) point out that new customer interfaces lead to improved communications and better predictions of customer demand which in turn lead to improved service for customers.

2.7.2 CUSTOMER SERVICE MANAGEMENT

Customer service management (CSM) according to Stock and Lambert (2001) seeks to provide a single source of information about customers. It thus becomes a key point of contact for administering the product and service agreement and also provides customers with real-time information on shipment dates and product availability through linking with a firm's production and distribution operations. Effective management of customer service in a SCM environment requires an on-line, real-time system so as to provide customers with product and pricing information as and when needed.

2.7.3 DEMAND MANAGEMENT

The demand management process is seen as a key success factor for every organisation in today's business environment. Demand management process is therefore used to balance customers' requirement with a firm's supply capabilities so as to prevent the unnecessary building up of inventory (Stock and Lambert, 2001). They further reiterate that it is important to determine what customers will purchase and when through the use of point of sale and relevant customer data to reduce the uncertainty and provide efficient flows throughout the supply chain.

2.7.4 CUSTOMER ORDER FULFILMENT

Customer order fulfilment is another key effective SCM in meeting or even exceeding customer needs date. There is therefore the need to provide a seamless process so as to achieve a high order fill rates on either a line-item or an order basis. This can be done effectively by integrating the organisation's manufacturing,

distribution, and transportation plans. There is also the need to have good relationships with key supply chain members and carriers to meet customer requirements and reduce total delivery cost to the customer (Stock and Lambert, 2001).

2.7.5 MANUFACTURING FLOW MANAGEMENT

Stock and Lambert (2001) describe the manufacturing process in made-to-stock organisations as where goods are produced and supplied to customers based on historical records or forecasts. Thus products are pushed through the plant to the market which often resulted in the production of wrong mix of products thereby building up unnecessary inventory and its associated cost as a result of keeping huge inventory. With SCM, however, demand is matched with production capabilities with flexible manufacturing processes so as to respond to changing market situations. Stock and Lambert (2001) again argued that manufacturing flow management lead to shorter cycle time and improved responsiveness to customers.

2.7.6 PROCUREMENT

Russell and Taylor (2002) describe procurement as the purchase of goods and services from suppliers. This plays a very important role in SCM as companies want materials, parts and services necessary to produce high quality products which are of a relatively low cost and deliver them on time. This therefore calls for a strategic relationship with suppliers so as to get raw materials from their suppliers at all times and of the right quality and quantity, and at competitive prices. It is in the light of this that Stock and Lambert (2001) argued that developing strategic plans with

suppliers supports the manufacturing flow management process and the development of new products. This is basically done by strategically grouping suppliers according to their contribution and importance to the organisation.

2.7.7 PRODUCT DEVELOPMENT AND COMMERCIALISATION

According to Stock and Lambert (2001) customers and suppliers must be integrated into the product development process in order to reduce time to the market. This is because if new products are the lifeblood of a company, then product development is the lifeblood of an organisation's new products. Also as product life cycle shorten, the right products must be developed and successfully launched in shorter time frames in order for an organisation to be competitive. It is therefore imperative for managers of product development and commercialisation process to select materials and suppliers in conjunction with their procurement and marketing units to come out with products needed by customers.

2.7.8 RETURNS

According to Clendein (1997), managing the returns channel as a business process offers organisations the same opportunity to achieve a sustainable competitive advantage as properly managing the supply chain from an outbound perspective. Effective process management of the returns channel, therefore, enables identification of productivity improvement opportunities and break-through projects. Returns can be managed in four categories, namely, equipment, parts, supplies, and competitive trade-ins.

2.8 THE ROLE OF INFORMATION TECHNOLOGY (IT) IN SCM

Chopra and Meindl (2007) describe information as a key supply chain driver as it serves as the glue that allows the supply chain drivers to work together with the goal of creating an integrated, coordinated supply chain. They see information as crucial to supply chain performance as it provides the foundation on which supply chain processes execute transactions and managers make decisions. It is therefore imperative for managers to understand how information is gathered and analysed as it is information that makes supply chain visible to managers and through that know what customers want, how much inventory is in stock, and when more products should be produced or shipped. This, according to Chopra and Meindl (2007), is where IT comes to play. IT thus serves as the eyes and ears (and sometimes a portion of the brain) of management in a supply chain, capturing and analysing the information necessary to make a good decision.

Lok *et al.* (2005) define IT as a facilitator of integration of business functions at all levels in an organisation by making corporate-wide information more readily accessible. Thus, they see IT as a determinant of organisational integration. The major advantage of IT is improving process improvements such as operating efficiency. Information sharing is also seen as the most important factor of IT alignment. IT is an important characteristic of modern firms. This fact is affirmed by Lee (2002) who argues that the Internet has contributed to both the increasing needs and opportunities for improved SCM. The Internet helps companies in the supply chain to be connected in real time with information and knowledge sharing, new products and services can also be designed to fit special market segments, and the development of new supply chain structures to serve customers in a more direct

manner. Many firms acknowledge the potential benefits of integrated IT system such as Internet (email) and electronic data interchange (EDI). Email and EDI have become extremely important communication tools.

According to Karimi *et al.* (1996), IT integration is a major issue because the traditional management strategy for IT is a bottom-up approach. Functional areas have been automated on an application-by-implication basis. This problem will even be greater for inter-firm relations because the variety of applications will even be greater. As a result, application systems will be incompatible, incomprehensible and redundant. Firms that have integrated their IT systems are the ones that establish standards of performance. The purchasing function especially develops rapid communication mechanisms such as EDI and Internet links to quickly transfer requirements. These therefore provide a means to reduce time and money spent on the transaction portion of the purchase (Stock and Lambert, 2001). Chia-Chen *et al.* (2009) argue that information transparency reduces the phenomenon of information distortion. This in effect helps organisations have better order fulfilments, shorter response time, and become more competitive. Such a way for inter-organisational cooperation can benefit not only one organisation but also the whole system. Organisations that link their customers and suppliers in a tightly integrated network would be the most competitive. This is because they face high pressures from customers, and must as a result integrate with dozens of suppliers to lower cost and reduce order fulfilment lead-time. It is also imperative to maintain long-term relationships with customers and increase information visibility. IT-based supply chain management system and relationship management are closely related with an

organisation's success. They are squeezed from both business customers and suppliers to add more value in the value chain.

2.9 THE HISTORY OF CASHEW PRODUCTION

Hammed *et al.* (2008) indicate that the cashew of commerce is a small to medium-sized tree believed to have originated from a short-growing ecotype *Anacardium occidentale,* L. that occurs among the low vegetation of the *restinga* in coastal north-eastern Brazil. A tall-growing ecotype is found in the *Ilanos* of Colombia, Venezuela, *Caatinga* (dry thorn forest) and the *cerrado* vegetation of the savannas of the Amazon basin. Therefore, cashew is well adapted to seasonally wet and dry tropical climates and has the capacity to grow and yield satisfactorily on well-drained, light textured soils with minimum inputs. This indicates that, cashew has a very good adaptability to wide ecological differences. Aliyu and Akintaro (2007) also noted that cashew (*Anacardium occidentale* L.) is native to South America with centre of origin in Central Brazil. The crop was introduced into Africa and India by Portuguese adventurers in the 16th century. Cashew is an important tropical nut tree crop that is widely cultivated in Asia, Africa and South America. Improvement works in this important crop are limited despite its numerous uses.

In the 1970s, Africa was the largest producer of raw cashew nuts accounting for 67.5% of world production. This subsequently declined to 35.6% by 2000, with Nigeria, Tanzania and Mozambique being largest producers. The production in Asia during the same periods increased from 26.8% to 49.5% with the major producers being India, Indonesia and Vietnam. Similarly, the production in South and Central

America also rose from 4.5% in 1970 to 14.5% in 2000 with Brazil and El Salvador being the leading producers (Hammed, *et al.*, 2008).

2.9.1 GLOBAL CASHEW PRODUCTION

According to Azam-Ali and Judge (2001) in the early 1970s, the majority of global cashew production (68 percent of total) took place in African countries, in particular, Mozambique and Tanzania. Over the following thirty years, production trends shifted, with Asian countries emerging as the world leaders in cashew production. Today, India commands about 40 percent of the international market in cashew production. Other Asian countries, particularly Vietnam and Indonesia, are beginning to expand their production capacities. Currently, the four main cashew producing countries are India, Brazil, Nigeria and Tanzania. They further noted that the world production of cashew nuts grew rapidly during the 1950s and 1960s, reaching a peak of six hundred and twenty-four thousand (624,000) tonnes of raw nuts in 1973. Countries such as India, Mozambique and Tanzania accounted for the majority of this production, while smaller industries had developed in Brazil, Kenya and several other African countries.

The years 1975 and 1976 witnessed a sharp decline in world production, which continued into the 1980s. According to Jaffee and Morton (1995) as cited by Azam-Ali and Judge (2001) this decline in production was largely due to decreased production in Mozambique and Tanzania, since production in India during the period remained static. During the late 1980s and continuing into the 1990s, production picked up and continued to increase gradually. In the year 2000, world cashew

production exceeded 1.2 million tonnes. Asian and African countries produced 0.6 million and 0.4 million tonnes respectively. As noted by Mitchell (2004) cashews are a highly profitable crop. Cashew trees are drought-tolerant and thus provide a hedge against annual crop failure. They have been called the poor man's crop and the rich man's food. These attributes have contributed to the rapid growth of global cashew supplies, including a recovery of production in Africa and expansion in Asia. India and Brazil are the largest producers and exporters of cashew kernels, but Vietnam has emerged in the last decade to become a major producer and exporter.

2.9.2 CASHEW PRODUCTION IN AFRICA

Overall cashew production in Africa steadily increased during the 1950s and 1960s, until the mid-1970s when the continent was the prime producer of cashew nuts. The year 1975 was the start of a fifteen year period of decline in production throughout the continent due to a combination of biological, agronomic and socio-political factors. The decline in prices at the end of the 1970s, combined with lower levels of production, also to a large extent dissuaded many farmers from improving cultivation techniques and replanting their cashew plantations. Since the early 1990s however, production has recovered and has continued to increase steadily over the last decade. Today, Africa accounts for about 36 percent of world cashew production. Historically, Mozambique and Tanzania were the main cashew-producing countries in Africa, with smaller amounts produced in a number of other countries. The last five to ten years however has seen the emergence of Nigeria as a leading producer of cashew nuts in Africa (Azam-Ali and Judge, 2001).

According to Mitchell (2004) the cashew tree's tolerance of drought conditions provides a hedge against crop failure. Its ability to grow on poor soils and to be intercropped with food crops such as cassava makes it an ideal product for small farmers. Production responds to fertilisation, but the cashew tree produces some nuts even without the application of purchased inputs. Cashew nuts are consumed as food as well as marketed for export. Cashews have a favourable position among the world's agricultural commodities, with more rapid growth in world import demand, higher relative prices during the past decade, and lower price volatility than most other commodities. Mitchell (2004) further noted that cashews are a premium nut in high-income countries. They contain ten to twenty (10-20) percent less fat than other nuts, most of it unsaturated, which is preferred by health conscious consumers. Imports of cashew kernels by developed countries have grown 7.1 percent a year during the last decade. During the 1990s imports of cashew kernels grew by 12 percent in the European Union, 5.6 percent in the United States, and 2.6 percent in Japan. The large differential in per capita consumption of Japan and most European countries compared with the United States suggests considerable opportunity for increasing demand in Japan and Europe. Production in Sub-Saharan Africa has increased rapidly during the 1990s. Most African producers export raw cashews to India for processing, with only Mozambique processing significant quantities of cashews domestically.

2.9.3 CASHEW PRODUCTION IN GHANA

Cashew is gaining momentum with the recent creation of the African Cashew Alliance. However, the Ghanaian cashew output is still only one-tenth of the Cote d'Ivoire production. Nevertheless, the production base could grow significantly

through the support of such programmes as the Cashew Development Project (CDP) being managed by the Ministry of Food and Agriculture (MOFA), as well as a clear interest in the crop on the part of professional traders active throughout the sub-region (Ghana Food Safety Action Plan, 2008).

According to Dedzoe *et al.* (2001) cashew is ranked among the most important edible nuts in global commerce and the confectionary industry. Apart from the nuts, the tree as a whole has a variety of uses. The bark and leaves of the tree are used in the treatment of gastro-intestinal disorders such as dysentery and diarrhoea. It is also noted that resin obtained from the tree are of commercial value in the book industry due to their adhesive properties. The cashew nut is also known to reduce blood cholesterol and related problems while the tree can be incorporated in farming systems, especially in agro-forestry programmes. They further noted that there has been a renewed interest in cashew production in Ghana as a result of the prominence given to the crop in the non-traditional export sector.

Cashew is grown as a cash crop in the coastal belt i.e., Central, Greater Accra, and Volta Regions; the transitional belt north of Ashanti, Brong Ahafo, and guinea savannah belt, parts of Northern, Upper West and East regions. The ideal rainfall regime is between 750mm – 1300mm. Cashew is a hard crop which grows well on marginal land and it is therefore seen as an ideal crop for soil conservation and afforestation, especially in savannah areas of the country (Cashew Development Project, 2008). Cashew cultivation in Ghana is largely a small holder activity with majority of farmers having an average farm size of between 0.8 – 2.5ha. More than

60,000 small holder farmers are engaged in cashew cultivation in the country with yield per unit area increasing from an average of 200kg/ha in 2000 to 450kg/ha in 2006 (Boahen, 2007).

In recent years the interest for the crop has grown and this is evidenced by the growth of demand for cashew seed nut for planting which has increased from about 1MT in 1994 annually to about 10MT in 2007 annually. As at 2006, estimated area under cultivation was about 59,000 hectares with annual production of about 16,000MT of raw cashew nuts. An estimated 3.24 million hectares of suitable land is available for cashew cultivation in the country. Cashew takes two to three (2-3) years to produce economic crop. Area under cultivation is projected at 65,000 hectares by the year 2020 with a projected domestic production of 47,000MT (Cashew Development Project, 2008).

When it comes to research, it is the Crop Research Institute of Ghana (CRIG) which is mandated to undertake cashew research. Under the Cashew Development Project, CRIG has been supported to strengthen its cashew adaptive research programme and cashew by-product development research through the provision of equipment and logistics. A laboratory for cashew research has also been constructed and equipped for CRIG at its sub-station at Bole in the Northern Region of Ghana by CDP. The research activities undertaken by CRIG mainly focus on evaluating the existing germplasm, soil fertility improvement studies, intercropping studies, vegetative propagation techniques, development of strategies for canopy substitution, development of control packages for pest, disease and weeds, quality assessment of

raw nuts through cashew nut profile studies. Apart from the above, CRIG is also carrying out research trials on industrial utilisation of the cashew apple into various products including animal feed, jams, alcoholic and non-alcoholic beverages among others. Gum extracts are also being used to produce chocolate pebbles. In spite of funds provided to CRIG under the Cashew Development Project, the cashew research programme is still under-funded, in terms of finance and manpower resources. Marketing of cashew nuts also contributes significantly to the country's economy. Annual export of raw nuts for instance reached 47,000MT in 2006, contributing approximately US$ 23 million in foreign exchange earnings. This figure is considered very small when compared with world excess demand of 430,000MT of raw nuts, valued at US$270 million, and growing at a rate of 5-8% per annum. Also, less than 50% of Ghana's cashew export is derived from domestic sources with cross boarder trading accounting for the rest of the exports (Cashew Development Project, 2008).

Quality of nuts at farm gate is a key issue that largely influences nut prices. Proper post-production handling by farmers especially drying, packaging material used and the method of storage have a direct influence on the nut quality. To enhance the efficiency of cashew marketing in Ghana, Cashew Processors and Exporters Association (CAPEAG) has been formed and registered. Several producer associations also exist countrywide. Under the Cashew Development Project, district producer associations have been formed and registered, in close collaboration with Department of Cooperatives. The producer associations and processors/exporters associations are currently being trained on quality standards developed by the industry through appropriation of grades and standards, spearheaded by the United

States Agency for International Development (USAID) – Trade and Investment Programme for a Competitive Export Economy (TIPCEE) project with support from the MOFA-CDP and other stakeholders (Cashew Development Project, 2008).

Some of the major raw cashew nut processing companies in operation are Nasaka group of processors, Winker Agro Processing, and Shop Best, among others, with a total installed capacity of about 377MT annually. However, about 50% of this capacity is utilised. Working capital requirements to purchase and stock raw nut all year round has been a major cause of this. The private sector has taken up the challenge of roasting kernels and as a result, more than eleven cashew roasters have also been in operation since 2003 to roast cashew kernels for the domestic market. Local demand for cashew kernels is currently estimated at over 40MT/annum while production is only about 33MT. With recent cheap imports of roasted kernels, often with improved and attractive packaging materials, the local kernel production is likely to suffer stiff competition in the next two to three (2-3) years. Processing of raw cashew nuts into kernels will create considerable employment especially for women who form about seventy percent (70%) of the work force in the existing cashew processing facilities. In April 2007, these key stakeholders collaborated and organised the first international cashew workshop in Ghana that highlighted the potential and benefits of cashew. Over 200 stakeholders participated in this event. This enabled them to share experience and best practices along the value chain; from research to processing and packaging (Cashew Development Project, 2008).

CHAPTER THREE

METHODOLOGY AND ORGANISATIONAL PROFILE

3.1 INTRODUCTION

This chapter looks at the methodology that is used for this research. It basically comprises of the research design, the population of the study, sampling procedures, instrument for data collection, data administration method, and data analysis procedures as well as the profile of the case study organisation.

3.2 RESEARCH DESIGN

Research design according to Saunders *et al.* (2007) is the general plan of how to go about answering research questions. It contains clearly defined objectives, sources from which data will be collected and the constraints thereof (for example access to data, time, location and money) as well as ethical issues associated with research. Descriptive research, which according to Robson (2002) portrays an accurate profile of persons, events or situations, is the design that is employed for this research. It is seen as an extension, or a forerunner to a piece of exploratory research or a piece of explanatory research. Three different sets of questionnaires were used for this study (refer to Appendices A, B and C for samples). This is as a result of the fact that three categories of respondents were interviewed. These are a cashew processing company (Mim Cashew and Agricultural Products Limited, MCAP, Ltd), cashew farmers and suppliers of cashew seeds. Informal interviews were also conducted for some commissioned agents of the processing company.

3.3 POPULATION OF THE STUDY

The population for the study were varied, diverse and scattered across the Brong Ahafo Region of Ghana. They included the case study organisation, one hundred and eighteen (118) cashew farmers selected from farmers in Techiman, Tuobodom, Wenchi, and Tano Obuasi, who supply cashew nuts to the processing company, and six (6) suppliers of cashew seeds. All these people, including the Manager of the case study organisation, the Mim Cashew and Agricultural Products Limited, were interviewed through the use of questionnaires.

3.4 SAMPLING PROCEDURES

Data for the research were gathered from a wide variety of actors involved in the cashew supply chain. The risks and challenges associated with it were explored through interviews with the case study organisation, farmers and suppliers of cashew seeds using questionnaires. Respondents were selected for this research using purposive sampling. The goal in purposive sampling is not to achieve a representative sample of the general population, but rather to select participants based on particular characteristics of interest in the study. Information can then be gathered from a range of people within the study area from which a rich picture of the local situation can be generated. Purposive sampling has two principal aims the first of which is to ensure that the main groups of actors of relevance to the study are represented, and secondly to ensure that a diversity of actors within each of the main groups is selected to allow for an exploration of the influence of the key characteristic on these various actors (Saunders, *et al.*, 2007). The main characteristic of the farmers selected for this research was cashew farmers in the Brong Ahafo Region who supply cashew to the Mim Cashew and Agricultural Products Limited.

The researcher selected farmers that fit the required characteristics using key contact people (cashew farmers and commissioned agents in charge of depots).

3.5 INSTRUMENT FOR DATA COLLECTION

Both primary and secondary sources of data were used for this research. Primary data were gathered by the researcher from the Mim Cashew and Agricultural Products Limited, commissioned agents who are in charge of depots, cashew farmers and the suppliers of the farmers in the Brong Ahafo Region using questionnaires and informal interviews. The informal interview was conducted because it was a means of soliciting additional information from the respondents most of whom were illiterates. Secondary data, which is seen by Saunders *et al.* (2007), as the data that have already been collected for some other purpose were also used for this research. These were mainly from books, journals, articles, and conference and research papers.

3.6 MAIN DATA ADMINISTRATION

Questionnaires were designed to interview all stakeholders in the value chain of cashew including a manufacturing company (MCAP, Ltd), farmers, and the suppliers of farmers. For each of them, it was to explore their main suppliers, customers and the relationship between them as well as the risks and challenges associated with their operations. The interviewees are persons who are directly involved in the production and sale of cashew nuts. The respondents were the case study organisation, some one hundred and eighteen (118) cashew farmers and six (6) organisations that supply farmers with cashew seeds/seedlings for planting.

3.7 DATA ANALYSIS PROCEDURES

Once the raw data has been collected they must be organised and analysed if any conclusions are to be drawn from them. The data collected for this research were therefore collated and properly arranged after which they were coded, keyed and analysed using the Statistical Package for the Social Sciences (SPSS) version 16.0. This was done by inputting the questions into the variable view after which the coded responses from the respondents were inputted into the data view of the SPSS. The data were then analysed using tables, pie charts, bar charts and percentages (descriptive statistics) and this has been presented in Chapter four.

3.8 BACKGROUND OF MIM CASHEW AND AGRICULTURAL PRODUCTS LIMITED

Mim Cashew and Agricultural Products Limited (MCAP, Ltd) is located just outside Mim town in the Asunafo North District of the Brong Ahafo Region Ghana. According to the census conducted in the year 2000, the population of Mim consists of roughly 22,000 people. The company employs a little over four hundred and fifty (450) people. MCAP, Ltd which was established in March 2008 produces high quality cashew nut kernels and cashew brandy, grown and processed at Mim, in the Brong Ahafo Region of Ghana. The project derives its strength from Paul Wallevik's wish to give something back to the people of Ghana. Wallevik lived in Ghana from 1957 to 1974, where he founded his career in the furniture business. He established a furniture company, Scanstyle Mim in the late 1960s producing furniture components for export. Even though Paul Wallevik had to leave Ghana under some controversial circumstances during one of the country's turbulent political periods, he still has a soft heart for the people and the rich culture of Ghana. It is in pursuit of this that in

July 2007 Wallevik's oldest son Lars Wallevik and his partner Kristine Munk made their first trip to Ghana to investigate how they could help establish a project in Ghana. This was to fulfil Wallevik's intention of creating a long term income sources and good employment for Ghanaians. The project is intended to be a business project with a holistic and humanitarian approach. When Lars and Kristine discovered that the neighbouring property to Scanstyle Mim, the Mim Agro and Industrial Project, was for sale, they quickly realised that this property would serve as the perfect platform for the project Wallevik had in mind. Mim Cashew and Agricultural Products Limited has its own cashew plantation and processing facilities.

3.8 1 THE MANAGEMENT OF THE COMPANY

The main directors of the company are Lars Wallevik and Hermann Bani. Wallevik holds a Master's degree in Business Administration and has a background in growing organic avocados in California and working with the procurement unit of a big pharmaceutical company. Bani, who is the second in command, has lived and worked in Mim for more than thirty (30) years. He has been working as an engineer for all the big companies in Mim, and has designed, planned and constructed the cashew processing factory. Bani also worked alongside Desmond Charmant, the founder of the property the company operates on, for many years. Aside the two directors, they have three people working in the administration, namely Kristine Munk who is in charge of Public Affairs, David K. Manu the accountant, and Jemima Hansen the data entry clerk. The company also has highly qualified people in charge of their factory. Baba Atta Nsor heads the factory as the factory manager and is assisted by Daniel Nsiah (Factory Supervisor) and Frank Badu (Cashew Supervisor). They also have forty-five (45) people working in the shelling section,

and ninety-three (93) people working in the pre-treatment, sorting, peeling and packaging sections and it is anticipated that the numbers will go up as the factory expands its capacity. The company also has its own cashew plantation, which is administered by a Farm Manager in the person of Asante Adusei, who has about fifty (50) people working with him in the plantation. The workshop is managed by a Mechanical Engineer, S.O. Mensah. David Dodoh is in charge of all the carpentry work at the factory site.

3.8.2 THE PRODUCTION OF CASHEW BY MIM CASHEW AND AGRICULTURAL PRODUCTS LIMITED

Mim Cashew and Agricultural Products Limited produces cashew nut kernels from its own plantation and outgrowers in and around the Brong Ahafo region, in a factory that has a capacity to process up to two thousand (2,000) tonnes of raw nuts per year. There are over three hundred (300) people who are working full time in processing. The cashew kernels are vacuum packed and a large percentage are exported to European and North American retailers. A smaller portion of the cashew nuts and cashew brandy are sold locally. The company processes cashew nut kernels of different sizes and qualities. The whole cashew nut kernels are divided into five (5) different sizes and qualities. These are Whole Whites (WW) four hundred and fifty (450), three hundred and twenty (320), two hundred and forty (240), two hundred and ten (210), one hundred and eighty (180), the latter being the biggest. The most common sizes are the WW 320 and the WW 240. The broken kernels are divided into butts, splits, chips, large white pieces (LWP) and small white pieces (SWP). The process starts with sorting. The raw nuts are sorted in a specially designed machine. After that the raw nuts are steamed and dried in an open area for a minimum of

twenty-four (24) hours and a maximum of forty-eight (48) hours, depending on atmospheric humidity. The raw nuts are then shelled in accordance with the different nut sizes. After shelling, the cashew kernels are peeled, and then graded again according to the different sizes. Finally, they are vacuum packed in bags of 22.68 kg (50 lbs) each.

CHAPTER FOUR

PRESENTATION OF FINDINGS AND ANALYSIS

4.1 INTRODUCTION

This chapter looks at the presentation of findings and analysis of data collected from the Mim Cashew and Agricultural Products Limited, their suppliers (farmers) and the suppliers of the farmers obtained through the use of questionnaires. The research sought to investigate cashew supply chain taking into consideration the actors, the flow process and the risks and challenges associated with it. The research also enquired about the main products produced by the company, their sources of raw materials (cashew nuts) and the main sources of their suppliers, the risks and challenges associated with the flow process and suggest means to smoothen the inefficiencies associated with the supply chain.

4.2 THE ACTORS AND FLOW OF CASHEW SUPPLY CHAIN

The research established that the main actors of the cashew supply chain are the processing companies, their commissioned agents, farmers and the farmers' suppliers. It is also through some of these bodies that processed cashew passes through till it gets to consumers. The company also sell its products mostly to supermarkets abroad by shipping them directly to them. However, on the local scene they sell to supermarkets through local agents. It was noted that, they very much cherish the relationship they have with their customers who they have been dealing with since they began operations.

4.2.1 THE BACKGROUND OF THE ORGANISATION

Mim Cashew and Agricultural Products Limited which is the focused company, was established in March, 2008. It is located at Mim in the Asunafo North District of the Brong Ahafo Region of Ghana. It produces cashew nuts and cashew brandy for both the domestic and international markets. It has its own cashew plantation but also purchases nuts from farmers in the Brong Ahafo Region, specifically from Techiman, Wenchi, Tuobodom, Tano Obuasi among others through commissioned agents. They deal with both individual farmers and farmers' associations who are mostly illiterates or have very low level of education. It also came out from the research that the company has a very strong relationship with the agents who purchase the cashew nuts from the farmers.

4.2.2 THE BACKGROUND OF THE FARMERS

It came out from the research that cashew production, just like the cultivation of the other food crops, is dominated by males, the aged, illiterates and/or people with very low educational background. Males tend to be the bread winners in most families and it is through engaging in farming activities that some of them get income to support themselves and their families and this account for their dominance in cashew production. It also came out that most of the people especially the aged are leaving cashew production to engage in the production of other food crops as a result of the fact that they get virtually nothing from cashew as compared to what other farmers get from the cultivation of cocoa and the other food crops. The youth especially those below thirty five (35) years, it was explained were not taking to farming because it takes too long a time for them to realise the needed returns.

NUMBER OF YEARS INVOLVED IN CASHEW PRODUCTION

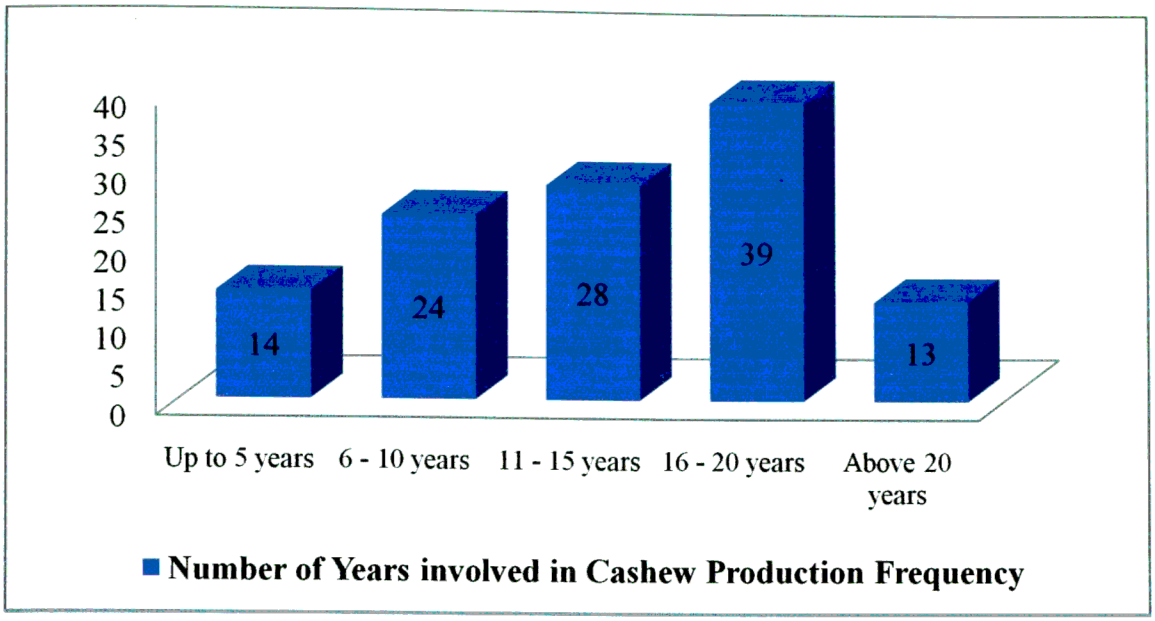


Figure 4.1

As illustrated in Figure 4.1, fourteen (14) farmers representing 11. 9% of the respondents have been cultivating cashew for between one (1) and five (5) years, twenty-four (24) farmers representing 20.3% of the respondents for between six (6) and ten (10) years, twenty-eight (28) farmers representing 23.7% of the respondents for between eleven (11) and fifteen (15) years, thirty-nine (39) farmers representing 33.1% of the respondents for between sixteen (16) and twenty (20) years and thirteen (13) farmers representing 11% of the respondents have been involved in cashew production for well over 20 years. This was attributed to the fact that cashew thrives very well in the study area and so people take into its cultivation to earn some income though according to the farmers what they get from it is relatively low as a result of the fact that it is the buyers who fix the price they pay for the cashew nuts. Most of these people are into cashew production because they do not have any productive skills to help them gain employment in the other sectors of the economy.

4.2.2.1 SOURCES OF CASHEW SEEDS FOR CULTIVATION

The research revealed that majority of the farmers obtain cashew seeds for cultivation from their own farms and do not even remember the original source of the seeds they used to establish their farms as they have been involved in cashew production for many years. While some said they started cultivation with seeds from some foreigners who lived in their localities, others said they purchased their nuts from some staff of the Ministry of Food and Agriculture. It was also noted that some of the farmers obtain seeds for cultivation from certified seed dealers and farmers' associations respectively. Those who buy from farmers' associations whose members have cultivated cashew for over ten years believe those seeds survive and bear good fruits/nuts than plants which are less than ten years old. These farmers' associations were found out to be recognised seed growers as their members are well vexed with the skills of selecting and cultivating quality cashew seeds/seedlings.

4.2.2.2 LENGTH OF RELATIONSHIP WITH SUPPLIERS

The study also sought to enquire about the length of relationship and how they rate the relationship with their suppliers. It came out that after purchasing the initial seeds for cultivation they do not go back to the suppliers as they use seeds from their own farms thereafter. They could therefore not talk about the length of relationship they have had with their suppliers. Also majority of the farmers could not describe the relationship they have had with their suppliers as they can not even remember those they purchased the nuts they used to establish their farms from. Most of them for the same reason above could not talk about the sort of relationship that exists between them and those suppliers but just described them as former business partners.

However, those who buy from farmers' associations described the relationship between them as very strong as some of them are even members of the same association they purchase seeds from. Some described those they purchase seeds from as friends while others described them as business partners. Most of the respondents also indicated that they sell their cashew nuts to the Mim Cashew and Agricultural Products Limited through commissioned agents who buy and store them in their warehouses (depots). These agents in turn sell to the processing company and their other business partners (mostly foreigners).

TABLE 4.1 LENGTH OF RELATIONSHIP WITH CUSTOMERS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Up to 5 years	14	11.9	11.9	11.9
	6 – 10 years	23	19.5	19.5	31.4
	11 – 15 years	28	23.7	23.7	55.1
	16 – 20 years	40	33.9	33.9	89.0
	Above 20 years	13	11.0	11.0	100.0
	Total	**118**	**100.0**	**100.0**	

Source: Field survey (2009)

As depicted in Table 4.1, it came out from the study that 11.9% of the respondents have had up to five (5) years of business relationship with the commissioned agents who purchase the cashew nuts from them, 19.5% of the farmers have had between six (6) and ten (10) years of relationship with their customers, 23.7% of the respondents have had between eleven (11) and fifteen (15) years of business relationship with their customers, 33.9% for between sixteen (16) and twenty (20) years of business relationship with their customers, with the remaining 11% having had more that twenty (20) years of business relationship with their customers. This

therefore gives the farmers the assurance that their produce will be bought though they themselves do not have any influence on the price as they are determined by the customers. It is this assurance that is motivating them in the business even though they are not entirely happy with what they get. Some of the farmers in order to survive have resulted to diversification where they grow other crops including cash crops like cocoa and other food crops to supplement their income.

ASSESSMENT OF BUSINESS RELATIONSHIP WITH CUSTOMERS

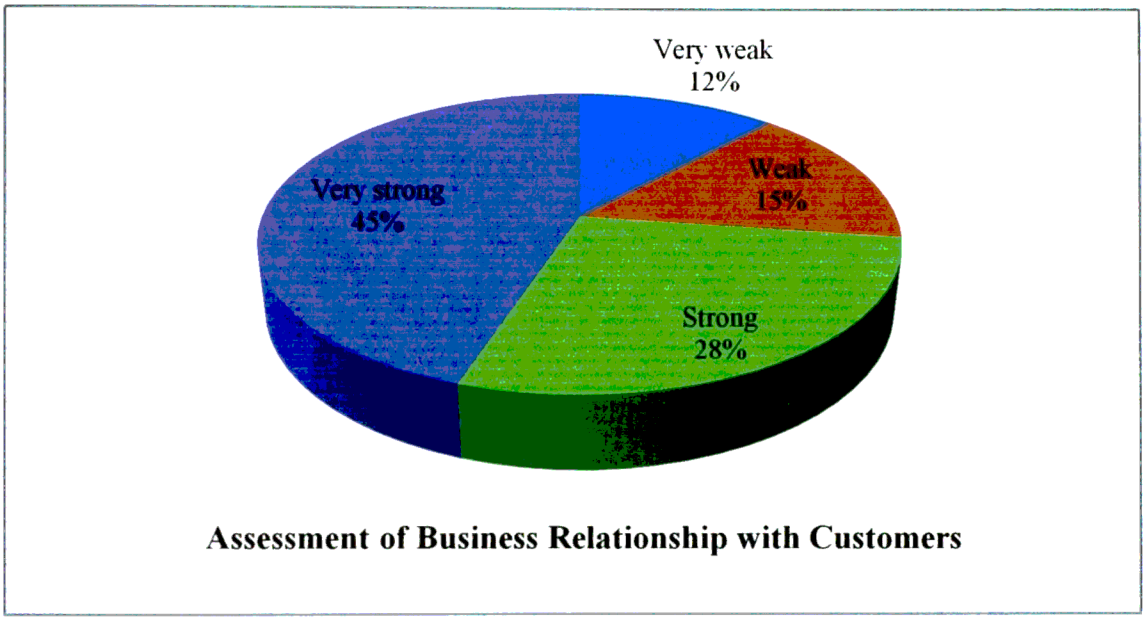


Figure 4.2

As shown in Figure 4.2, it can be observed that fourteen (14) farmers representing 11.9% of the respondents have a very weak relationship with their customers. This is as a result of the fact that the agents (customers) do not deal with them directly, as a result of the fact that they have not been in the cashew business for long, but rather through the leaders of their association. Eighteen (18) farmers representing 15.3% of the respondents also indicated that the relationship they have with their customer is weak, thirty-three (33) farmers forming 28% of the respondents indicated that the

relationship they have with their customers is strong with the remaining fifty-three (53) farmers representing 44.9% of the respondents indicating they have very strong relationship with their customers. These were attributed to the fact that they have been in the business for a very long time and have thus been leaders or are leaders of the association and so have direct contact with the customers. This therefore enables them to bargain with the customers on behalf of the members of the association.

4.2.3 THE BACKGROUND OF THE SUPPLIERS

The research also enquired about the activities of those who supply seeds and/or seedlings to farmers. In all six (6) suppliers of cashew seeds were identified and interviewed. These are the Mim Cashew and Agricultural Products Limited, the leaders of four farmers' associations in Kenten near Techiman, Tuobodom, Tano Obuasi and Wenchi (who at the same time serve as recognised seed growers) and a certified seed dealer in Techiman. It came out that these organisations have been in operation for a considerable number of years ranging from between five (5) and twenty (20) years. While the manager of the Mim Cashew and Agricultural Products Limited indicated that they use seeds from their previous harvest for planting, the farmers (certified seed growers) indicated that they sell seeds and seedlings to farmers in and around their locality mainly from their current season's improved seeds as such seeds are deemed more viable. This fact is attested to by the Cashew Production Guide (2006).

4.2.3.1 TYPE OF FARMERS THEY ARE DEALING WITH

The recognised seed growers and the certified seed dealer indicated that they deal with both individual farmers and farmers' associations some of whom are even members of their association. The farmers they are dealing with are mostly illiterates confirming the fact that it is mostly illiterates and people with very low level of education who engage in farming activities. They however could not indicate the number of farmers they are dealing with but indicated they consist of both males and females. They were also not able to give an exact account of the sources of the seeds they used to establish their farms. While the Mim Cashew and Agricultural Products Limited indicated they inherited their cashew plantation from the Mim Agro and Industrial Project, the recognised seed growers claimed variably that they received their initial seeds for cultivation from some foreigners, some agricultural based organisations such as the Adventist Development and Relief Agency (ADRA)-Ghana and from agricultural extension offices of the Ministry of Food and Agriculture. The certified seed dealer also indicated that its seeds are obtained mainly from recognised seed growers. The certified seed dealer has had over five (5) years of relationship with its business partners (suppliers). The relationship with customers could not be rated as they deal with different customers at different times.

4.3 THE RISKS AND CHALLENGES ASSOCIATED WITH CASHEW SUPPLY CHAIN

4.3.1 THE ORGANISATION'S PERSPECTIVE

The research revealed that Mim Cashew and Agricultural Products Limited had issues with some of the cashew nuts that are supplied by the farmers. This is as a

result of the fact that some of the nuts supplied to them do not meet quality standards though generally most of them were good. This is demonstrated by the fact that some of the nuts were slightly damaged, infested and/or unattractive. They also had issues with the cost and the quantity supplied by the farmers. The research also came out that the company generally does not have many issues with their customers as there is ready market for their products. Other significant risks and challenges faced by the company include finance, theft, lack of technical support, high cost of labour and equipment, and inadequate infrastructure among others. The company is restricted in its expansion programmes by the difficult nature in accessing funds and the high interest rate in the country. There is also the issue of stealing of products at the warehouse and especially during production. The company also complained about the cost of training programmes it organises for its employees to raise their knowledge in their production activities, the rate of demand in the increase of wages by their workers and the high cost of equipment needed for their operation some of which are not available locally and have to be imported with its associated costs.

The research revealed that the company overcome these challenges through sourcing for credit from financial institutions, keeping of up to date records and effective supervision to help check stealing of products by the employees. There is also regular inspection of facilities and enforcement of safety rules and regulations to ensure the safety of workers and visitors to the facility as well as ensuring that quality standards are strictly adhered to.

4.3.2 THE FARMERS' PERSPECTIVE

TABLE 4.2 THE EFFECTS OF THE DELAY IN SUPPLYING SEEDS ON THE ACTIVITIES OF FARMERS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not so important	34	28.8	28.8	28.8
	Fairly important	25	21.2	21.2	50.0
	Important	15	12.7	12.7	62.7
	Very important	15	12.7	12.7	75.4
	Not applicable	29	24.6	24.6	100.0
	Total	**118**	**100.0**	**100.0**	

Source: Field survey (2009)

As shown in Table 4.2, thirty-four (34) of the respondents representing 28.8% indicated that the delay in supplying seeds is not so important to their operations because their farms are well established and that even if they want to expand their farms they will use seeds from their own farms. 21.2% of the respondents forming twenty-five (25) farmers said the delay in supplying seeds by suppliers is fairly important with fifteen (15) farmers representing 12.7% of the respondents indicating that it is important as it affects the time they plant their crops which is usually at the onset of the raining season. Also 12.7% of the respondents forming fifteen (15) farmers indicated that the delay in supplying seeds by suppliers affects their operations significantly as it determines the time they plant their crops. On the other hand twenty-nine (29) farmers representing 24.6% indicated that the delay in supplying seeds by their suppliers do not affect their activities as their farms are well established and also as result of the fact that they have no immediate plans of expanding their farms as the business is no more lucrative. The delay in the supply of seeds affects the activities of majority of the farmers seriously as they have to plant

their crops at the beginning of the raining season. The plants do not do well and may wilt and die when they are not planted at the right time.

THE EFFECTS OF THE SUPPLY OF UNVIABLE SEEDS ON THE ACTIVITIES OF FARMERS

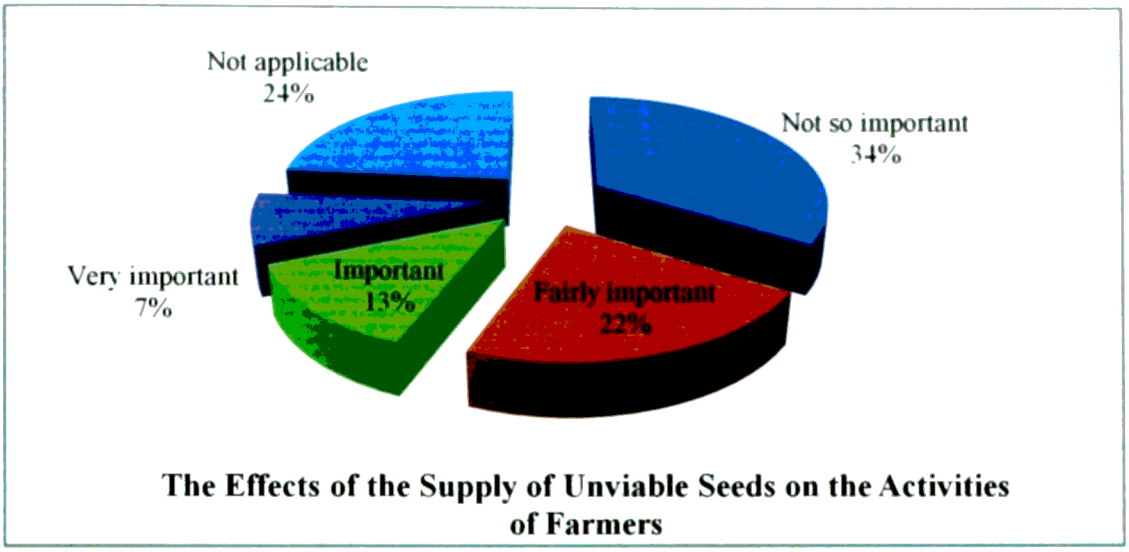


Figure 4.3

As illustrated in Figure 4.3, the research came out that the supply of unviable seeds i.e. seeds that have a very low germination percentage is not so important to the operations of forty (40) farmers forming 33.9% of the respondents as they buy from the right source. They are therefore insulated from this problem as they get specially selected viable seeds from their suppliers. 22% of the respondents forming twenty-six (26) farmers indicated that it is fairly important thus, it does not affect them so much also as a result of the fact that they buy from the right source. It can be said that there may still be some problems with seeds bought from the right source as they may be mixed up during packaging though of a negligible percentage. 12.7% of respondents representing fifteen (15) farmers indicated that it is important as it

affects their operations. 7.6% forming nine (9) farmers indicated that it is very important as it affects them and have to replant to fill in the places of those that fail to germinate. 23.7% of the respondents forming twenty-eight (28) farmers indicated that it does not affect them as they either select good nuts from their own farms or are not interested in expanding their farms. Unviable seeds are seeds that either do not germinate or have a very low germination percentage. Cultivating unviable seeds therefore implies putting into the soil seeds that have a very low germination percentage.

TABLE 4.3 THE EFFECTS OF THE SUPPLY OF DAMAGED SEEDS ON THE ACTIVITIES OF FARMERS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not so important	21	17.8	17.8	17.8
	Fairly important	22	18.6	18.6	36.4
	Important	19	16.1	16.1	52.5
	Very important	12	10.2	10.2	62.7
	Not applicable	44	37.3	37.3	100.0
	Total	**118**	**100.0**	**100.0**	

Source: Field survey (2009)

The research also enquired about the effects of the supply of damaged seeds on the activities of the farmers. As shown in Table 4.3, it came out that, the supply of damaged seeds by suppliers is not so important to the activities of twenty-one (21) farmers as they buy seeds from trusted sources and that they also inspect the seeds before they pay for them. Twenty-two (22) of the respondents also indicated that it is fairly important though they are careful when it comes to selecting seeds for

cultivation. The research also revealed that nineteen (19) of the respondents are affected by the supply of damaged seeds. This even applies to those who have been in the business for considerable period of time. This is because the people they employ to harvest the nuts in farms they themselves can not easily access, do not select quality nuts for them. Twelve (12) farmers also stated that they are significantly affected by the supply of damaged seeds as they get mixed with the quality ones and therefore becomes difficult to detect especially when buying large quantities. Forty-four (44) farmers indicated that they are not affected by the supply of damaged seeds as their farms are well established and are not keen on expanding their farms as they get virtually nothing from their farming activities.

As shown in Figure 4.4, the research sought to enquire about how the supply of disease infested seeds affect their farming operations. It came out that twenty-eight (28) farmers representing 23.7% of the respondents are not so much affected by this as they buy seeds from trusted sources and/or from their own farms. Twenty-six (26) farmers representing 22.0% of the respondents are some how affected as some infested seeds may be mixed accidentally during harvesting and sorting of seeds for sale. Seventeen (17) farmers representing 14.4% of the respondents said they are affected by the supply of infested seeds. Eleven (11) farmers representing 9.3% of the respondents said their activities are seriously affected by the supply of infested seeds which do not germinate and have to replant with quality seeds which comes with additional costs in terms of capital, energy and time. Also twenty-eight (28) farmers representing 23.7% of the respondents said they are not affected by this problem as they get seeds for planting from their own farms. They therefore carefully select healthy seeds from disease-free plants. Eight (8) representing 6.8% of the

respondents indicated that they face other risks which affect their operations negatively. These include the possibility of being supplied with seeds that are too small and have very low germination percentage, the supply of late maturing nuts, the supply from trees that produce very big but empty fruits and the difficulty in getting seeds at times.

THE EFFECTS OF THE SUPPLY OF DISEASE INFESTED SEEDS ON THE ACTIVITIES OF FARMERS

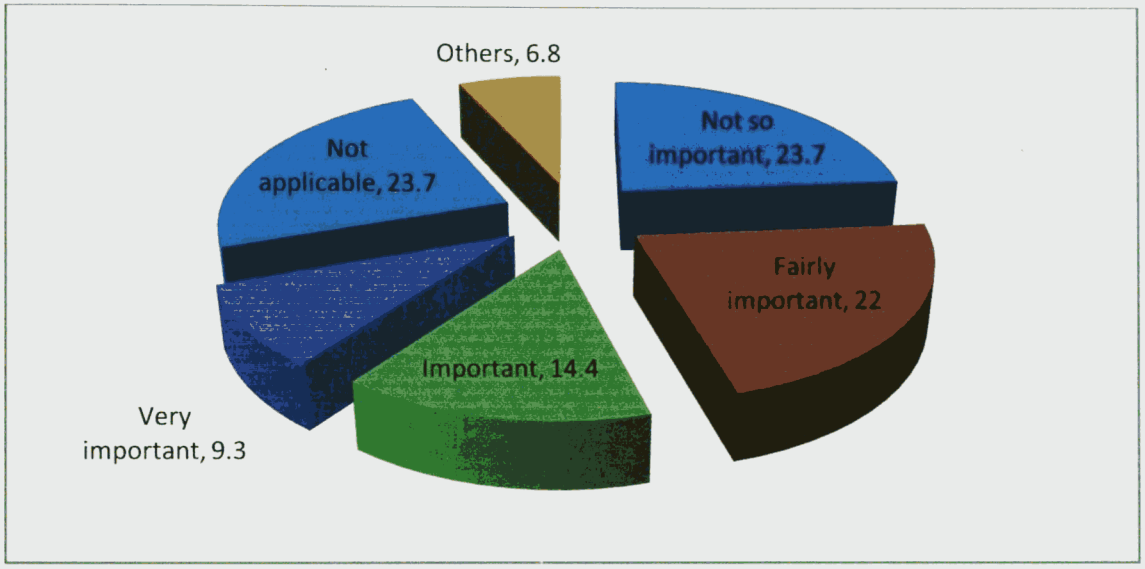


Figure 4.4

The research also enquired about the possibility of the farmers not getting buyers for their produce. And as shown in Table 4.4, 9.3% of the respondents indicated that the problem of not getting buyers is not so important to their operations as their plants have just started bearing fruits/nuts. 12.7% of the respondents also indicated that they are not so much affected by this problem as their farm sizes are very small and as a result do not produce that much. 26.3% of the farmers also indicated that they are affected by the problem of not getting buyers especially for the apples as there are

not enough processing companies that can use them to manufacture products such as jam or marmalade, drinks among others. 51.7% of the farmers also complained that they do not get buyers at times and this even account for the low producer price they are offered as they have no option but to accept them. Some of the agents who purchase the nuts from the farmers also complained that after buying the nuts from the farmers they at times have to virtually beg some of their foreign partners (mostly Indians) to come and buy them. These business partners however decide the price they pay for the nuts.

TABLE 4.4 THE EFFECTS OF NOT GETTING BUYERS ON THE ACTIVITIES OF FARMERS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not so important	11	9.3	9.3	9.3
	Fairly important	15	12.7	12.7	22.0
	Important	31	26.3	26.3	48.3
	Very important	61	51.7	51.7	100.0
	Total	**118**	**100.0**	**100.0**	

Source: Field survey (2009)

The research also enquired about the effects of customers demanding far less than what the farmers produce on their activities. As illustrated in Figure 4.5, eleven (11) farmers representing 9.3% of the respondents indicated that the problem of customers demanding far less than what they supply is not so important to their operations. This was attributed to the fact that their plants have just started bearing fruits and that whatever they produce are purchased. Twenty-three (23) farmers representing 19.5% of the respondents said they are not so much affected by this

problem as they are pre-financed by agents (customers) who they are obliged to sell to after harvest. Thirty-eight (38) farmers also representing 32.2% of the respondents also indicated that the problem of buyers demanding far less than what they produce affects their operations and this has even caused some of them to cut down some of their plants so as to cultivate other food crops. Forty-six (46) farmers representing 39% of the respondents indicated that they are seriously affected by this problem especially when they refuse the low price offered by customers as they have no economic use for the nuts and so have to virtually plead with the agents (buyers) to come for them at whatever price they can offer.

THE PROBLEM OF CUSTOMERS DEMANDING FAR LESS THAN SUPPLY

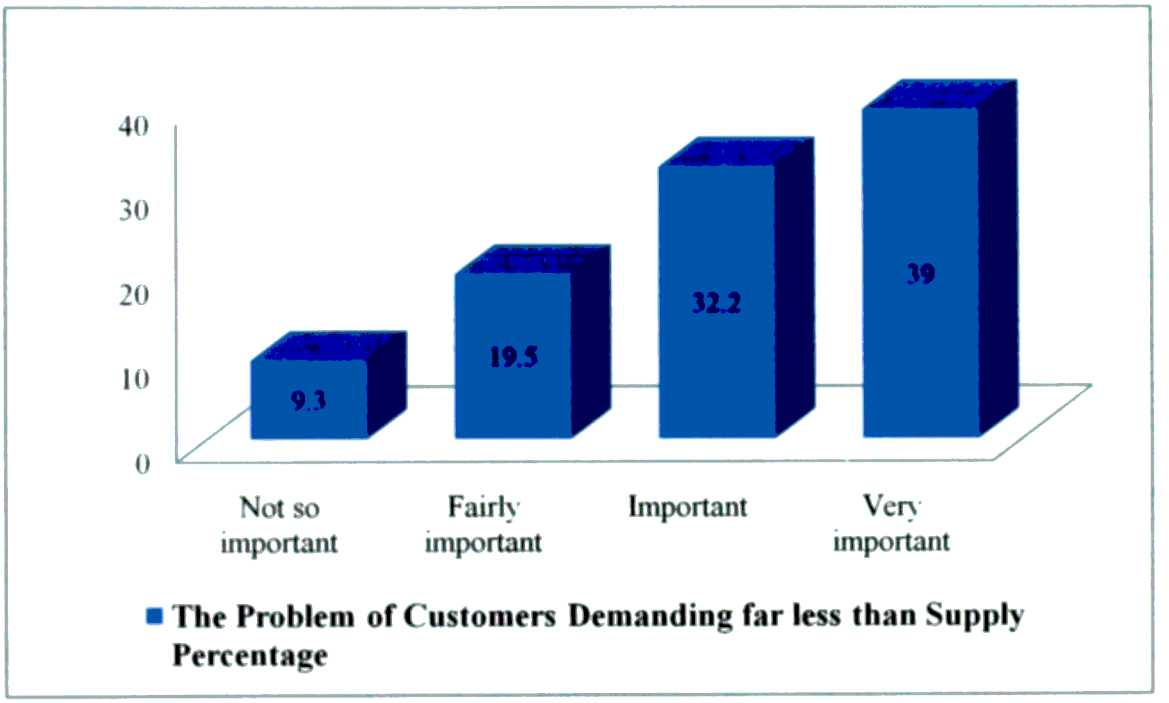


Figure 4.5

TABLE 4.5 THE EFFECTS OF LOW PRODUCER PRICE ON THE ACTIVITIES OF FARMERS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Important	18	15.3	15.3	15.3
	Very important	100	84.7	84.7	100.0
	Total	**118**	**100.0**	**100.0**	

Source: Field survey (2009)

It also came out from the research that one other significant challenge facing cashew farmers is the payment of low producer price as the government does not fix prices for cashew as is done for cocoa. This therefore leaves the buyers to determine the price they pay for the nuts/apples. As illustrated in Table 4.5, eighteen (18) of the respondents indicated that they are affected by this problem. These people, it was observed have very small farm sizes and are also not much into the cultivation of cashew but are using it as a diversification strategy. One hundred (100) farmers indicated that it is one of the major problems they are grappling with. They thus obtain virtually nothing at the end of the day. This therefore does not motivate people to get into cashew production. The study also revealed that the commissioned agents pay different prices per kilogram depending on the area they are located. For instance farmers in Sampa are paid higher producer prices than those in Kenten near Techiman all in the Brong Ahafo Region of Ghana. This is as a result of the fact that the prices are fixed by the commissioned agents based on what they are also offered by the processing companies and exporters. This problem arises as a result of the fact that there is no marketing board for cashew to fix the producer price as is done for cocoa.

THE PROBLEM OF CUSTOMERS NOT BUYING FROM FARMERS AT TIMES

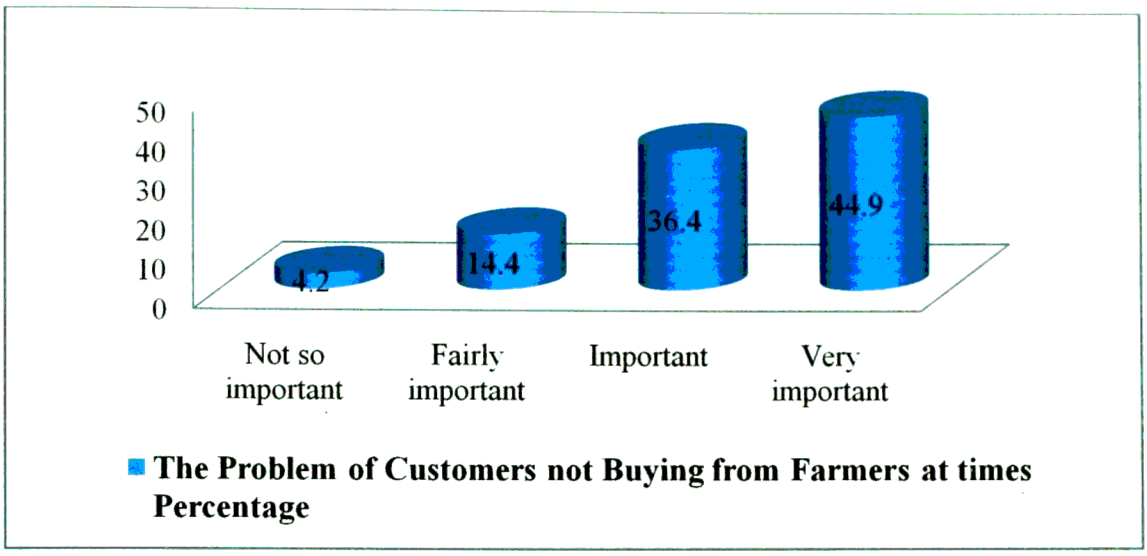


Figure 4.6

The study further enquired about the problem of customers not buying from farmers at times. As shown in Figure 4.6, it came out that five (5) farmers representing 4.2% of the respondents were not facing this problem as their produce were always purchased as a result of being pre-financed by the agents (buyers) and the mutual agreements they have with them. Seventeen (17) farmers forming 14.4% of the respondents also indicated that they are not affected by the problem that much. Forty-three (43) farmers representing 36.4% and fifty-three (53) farmers representing 44.9% of the respondents indicated that they are very much affected by this problem especially when they argued with agents on the price offered by them and/or when agents themselves are not sure of getting buyers using the problems they encountered in the immediate past season as a guide.

From Table 4.6, it can be observed that fourteen (14) farmers representing 11.9% of the respondents face financial problems while one hundred and four (104) farmers representing 88.1% indicated that their activities are seriously hampered by inadequate capital. This confirms the assertion that farmers in the country face financial problems in terms of money to acquire farming inputs, expand their farms and hire labour for the various cultural practices and maintaining their farms as well as the hiring of extra hands during harvesting. This is also as a result of the fact that the farmers are left in the hands of agents (buyers) who determine the price they pay for the nuts.

TABLE 4.6 THE EFFECTS OF FINANCIAL PROBLEMS ON THE ACTIVITIES OF THE FARMERS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Important	14	11.9	11.9	11.9
	Very important	104	88.1	88.1	100.0
	Total	**118**	**100.0**	**100.0**	

Source: Field survey (2009)

As depicted in Figure 4.7, it came out from the research that 16.1% of the respondents representing nineteen (19) farmers are not affected that much by theft as their farms are manageable and that they harvest their produce either by themselves and/or with the assistance of their family members. Thirty-eight (38) farmers representing 32.2% of the respondents indicated that they are affected by theft on the part of those they employ to help them during harvesting. Sixty-one (61) farmers forming 51.7% of the respondents said their activities are seriously hampered by stealing of nuts by those they hire to harvest their produce thereby decreasing their

already meagre income. Some of the commissioned agents also complained that the people they employ to cart the nuts from farms to their warehouses steal some of them and sell to other agents. It was established that stealing of their produce mainly take place during harvesting and especially by some of the people they employ to help them in harvesting their fruits/nuts.

THE EFFECTS OF THEFT ON THE ACTIVITIES OF THE FARMERS

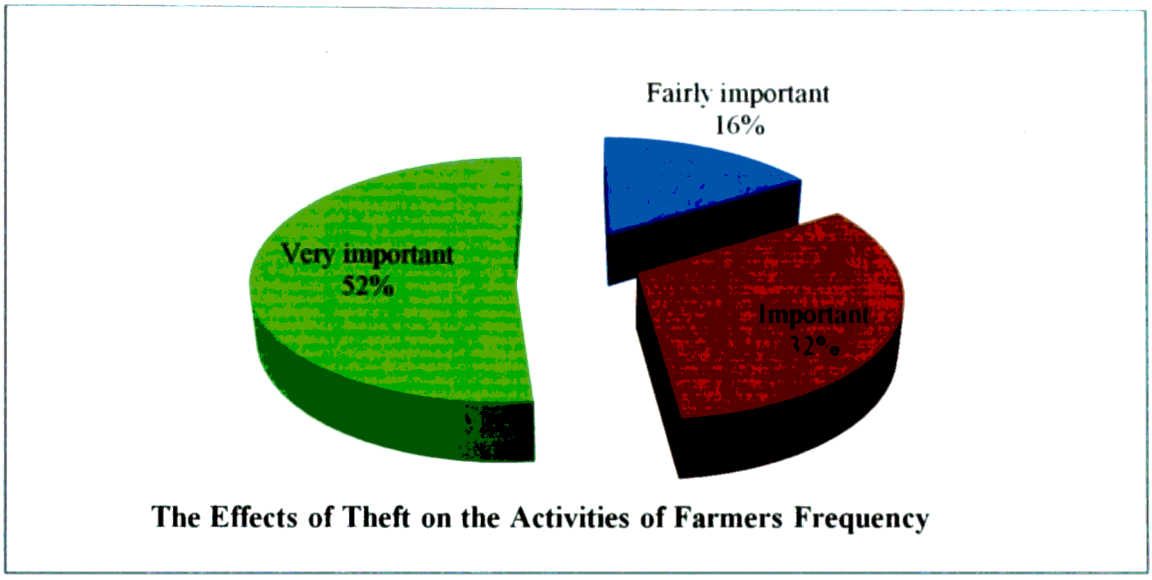


Figure 4.7

As shown in Table 4.7, twenty-four (24) farmers said they are not affected that much by bush fires as they weed their farms regularly and make fire belts around them thereby preventing to some extent bush fires from extending into their farms. Forty-one (41) farmers indicated that bush fires affect their operations and this tends to destroy their farms. Fifty-three (53) of the farmers said they are very much affected by bush fires. Fires may be caused by people accidentally, during hunting for small mammals, because of grudges, to increase new grass for cattle and as a result of removing weeds for land preparation. This confirms the assertion by Topper (2002)

that bush fires are one of the major causes of lost cashew production, and are frequently reported by farmers as one of their major problems. Fires do not only reduce yields in the year of the fire, but also cause reduction of yield in the subsequent years, deform the trees and, in some cases, kill trees outright.

TABLE 4.7 THE DESTRUCTION OF FARMS BY BUSH FIRES

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fairly important	24	20.3	20.3	20.3
	Important	41	34.7	34.7	55.1
	Very important	53	44.9	44.9	100.0
	Total	**118**	**100.0**	**100.0**	

Source: Field survey (2009)

As illustrated in Figure 4.8, the research also sought to find out whether grazing animals destroy the farms of the respondents. Twenty (20) farmers representing 16.9% of the respondents indicated that destruction by grazing animals is highly insignificant as their plants are matured. Twenty-one (21) farmers representing 17.8% indicated that some insignificant percentage of their plants is destroyed by grazing animals. Eighteen (18) farmers representing 15.3% of the respondents indicated that their farms get destroyed by grazing animals, while twenty-one (21) farmers who represent 17.8% of the farmers indicated that destruction of their farms by grazing animals is highly significant as either their plants have not matured or they have just embarked on expansion programmes. Thirty-eight (38) farmers representing 32.2% of the respondents said they are not affected by the destruction of grazing animals as their farms are well established and also as a result of the fact that

they are not keen on expanding their farms. It was noted that grazing animals and rodents only attack seedlings and immature cashew plants. They do not attack matured plants and the fruits/nuts of cashew and this account for the high percentage of farmers who indicated that their farms do not get destroyed by grazing animals as their plants are well matured.

THE DESTRUCTION OF FARMS BY GRAZING ANIMALS

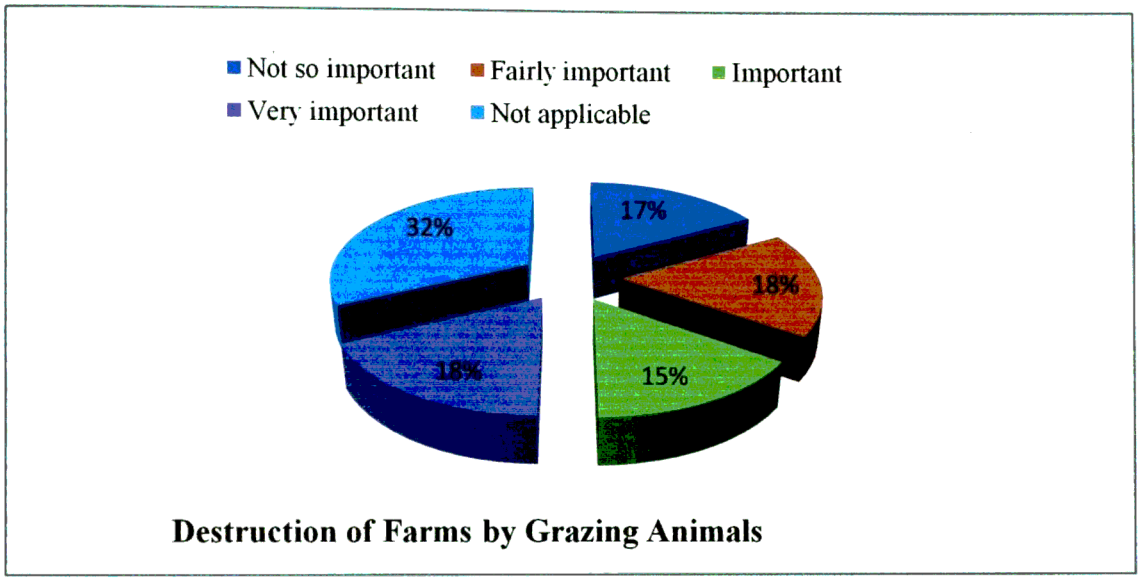


Figure 4.8

As illustrated in Figure 4.9, the research also came out that twenty (23) farmers who represent 19.5% of the respondents are not so much affected by rainfall as well established cashew plants do not need so much rainfall to survive. Thirteen (13) farmers forming 11.0% of the respondents indicated that their farms are not much affected by rainfall. Twenty-five (25) farmers representing 21.2% of the respondents indicated that their operations are affected by rainfall especially during the planting season as late onset of rains delay planting and also affect newly planted plants. Fifty-seven (57) farmers representing 48.3% of the respondents indicated that rainfall seriously affects their operations as it destroys matured fruits and nuts that have

fallen from trees as the value of water soaked fruits and nuts are far less than the normal ones.

THE EFFECTS OF THE RAINFALL PATTERN ON THE ACTIVITIES OF THE FARMERS

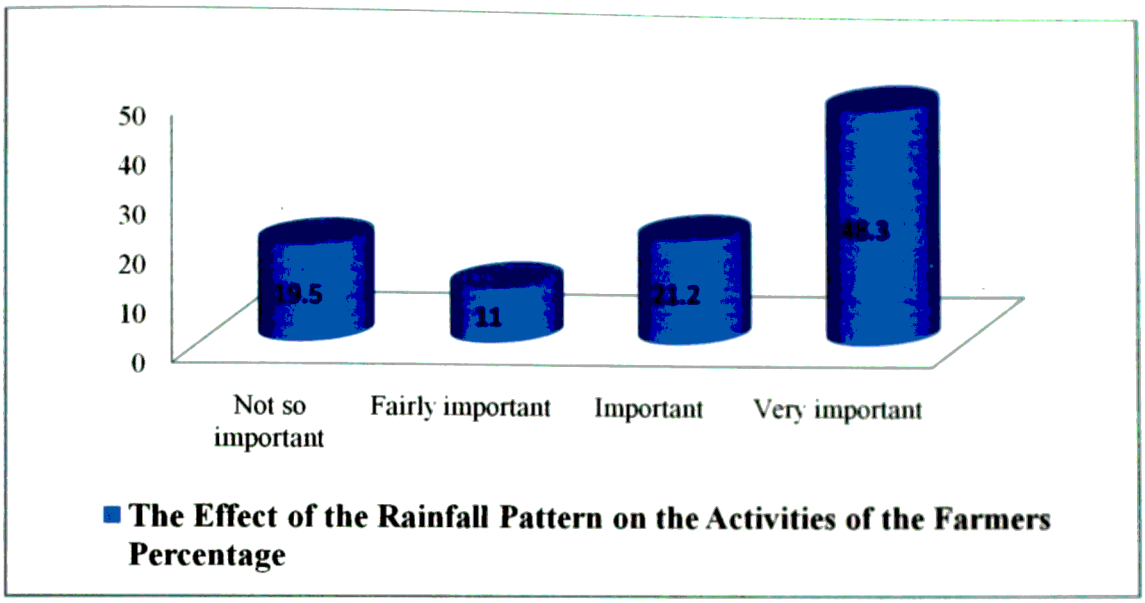


Figure 4.9

As shown in Table 4.8, the research also sought the opinion of the farmers on the impact of the high cost of labour on their activities. It came out that thirty-six (36) of the respondents representing 30.5% are affected by the cost of labour they employ to work on their farms. Eighty-two (82) farmers representing 69.5% of the respondents indicated that they are seriously affected by the high cost of labour which they see as a big drain on their already meagre income. Generally the cost of labour people employ to help them in their farming activities is relatively high compared with the returns the farmers get from the sale of their produce. It was interesting to note that

while the farmers were complaining about the high cost of labour the people they employ also complain about low remunerations given to them by the farmers.

TABLE 4.8 THE EFFECTS OF THE HIGH COST OF LABOUR ON THE ACTIVITIES OF FARMERS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Important	36	30.5	30.5	30.5
	Very important	82	69.5	69.5	100.0
	Total	**118**	**100.0**	**100.0**	

Source: Field survey (2009)

From Table 4.9, it can be observed that thirty-four (34) farmers representing 28.8% of the respondents are affected by the high cost of equipment in the country and this thwart their efforts to expand their farms. Eighty-one (84) farmers representing 71.2% of the respondents said it affects them significantly thereby reducing their income. It frustrates their efforts at buying spraying machines and chemicals to control diseases and pests and other farming inputs. The high cost of equipment also increases their cost of production thereby reducing their returns in the long run.

TABLE 4.9 THE EFFECTS OF THE HIGH COST OF EQUIPMENT ON THE ACTIVITIES OF FARMERS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Important	34	28.8	28.8	28.8
	Very important	84	71.2	71.2	100.0
	Total	**118**	**100.0**	**100.0**	

As indicated in Table 4.10, the study also enquired about the effects of disease and pest attack on their farming activities. Thirty-five (35) farmers who represent 29.7% of the respondents indicated that disease and pest attack their plants. Eighty-three (83) farmers representing 70.3% of the farmers also indicated that it is one of the major problems they face. It contributes significantly to the reduction in the yield of the cashew plants, and increases their cost of production as they themselves have to buy chemicals to control diseases and pests unlike the government's mass spraying exercise that cocoa farmers enjoy.

TABLE 4.10 THE EFFECTS OF DISEASE AND PEST ATTACK ON CASHEW PLANTS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Important	35	29.7	29.7	29.7
	Very important	83	70.3	70.3	100.0
	Total	**118**	**100.0**	**100.0**	

Source: Field survey (2009)

Seventeen (17) farmers representing 14.4% of the respondents indicated that sourcing of credit is not on their mind at the moment as their trees have just started bearing fruits and are not sure of what the future holds for them. As Figure 4.10 illustrates, twenty (20) of the farmers who represent 16.9% of the respondents take credit to support their operations especially when it comes to maintaining their farms and hiring people to assist them during harvesting. Fifty-two (52) of the farmers representing 44.1% of the respondents indicated that the taking of credit to support their farming activities is very important as they take advance payments (i.e. interest

free loans), from the commissioned agents who purchase their nuts, at the beginning of the season to hire people to assist them in their farms. These loans are deducted from the total amount due them at the end of the season.

THE SOURCING OF CREDIT FACILITIES BY FARMERS TO OVERCOME CHALLENGES

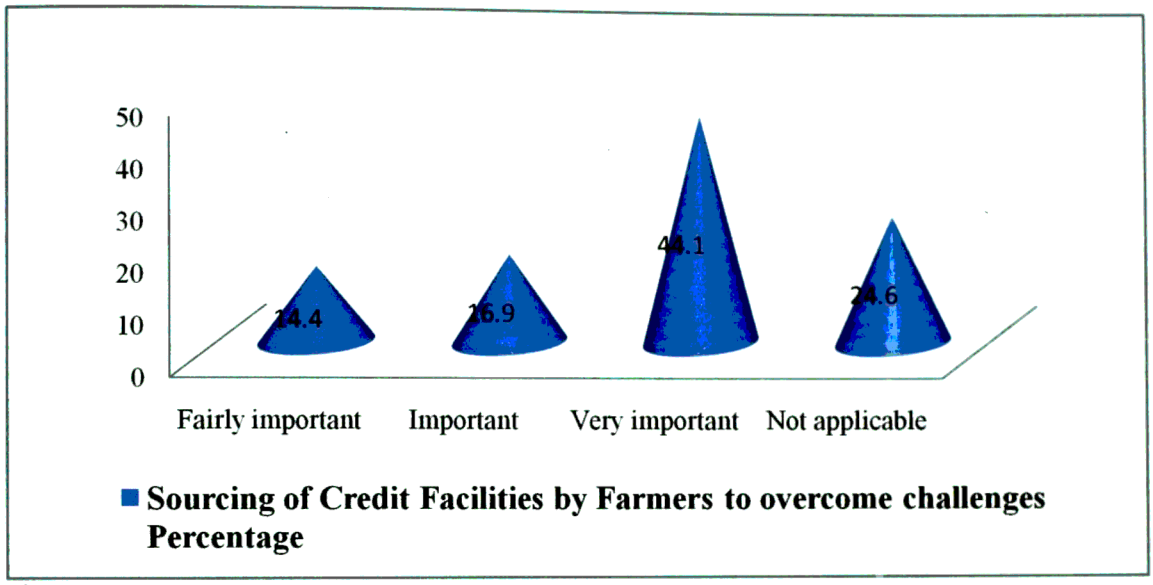


Figure 4.10

As illustrated in Table 4.11, twenty-seven (27) farmers representing 22.9% of the respondents indicated they have been introduced to the biological control of pests (the use of weaver ants) by agricultural extension officers and so they control pest infestation by using other pests. The relevance of biological control has been buttressed by Peng *et al.* (1995). They confirm that *Oecophylla smaragdine* has been identified as a good candidate as a biological control agent in cashew, controlling most of the important pests of cashew. Forty-one (41) of the farmers representing 34.7% of the respondents indicated that the use of chemicals to control disease and pest attack is very significant even though they also employ integrated pest management at times. Fifty (50) farmers representing 42.4% of the respondents also

indicated that they spray their plants with chemicals to control diseases and pests. These were attributed to the fact that their plants are prone to disease and pest attack and therefore have to spray with chemicals to control them. It was however noted that in their attempt to control diseases and pests through the use of chemicals they devalue the fruits/nuts as they spray directly on the matured fruits/nuts thereby poisoning them.

TABLE 4.11 THE APPLICATION OF CHEMICALS TO CONTROL DISEASE AND PEST ATTACK

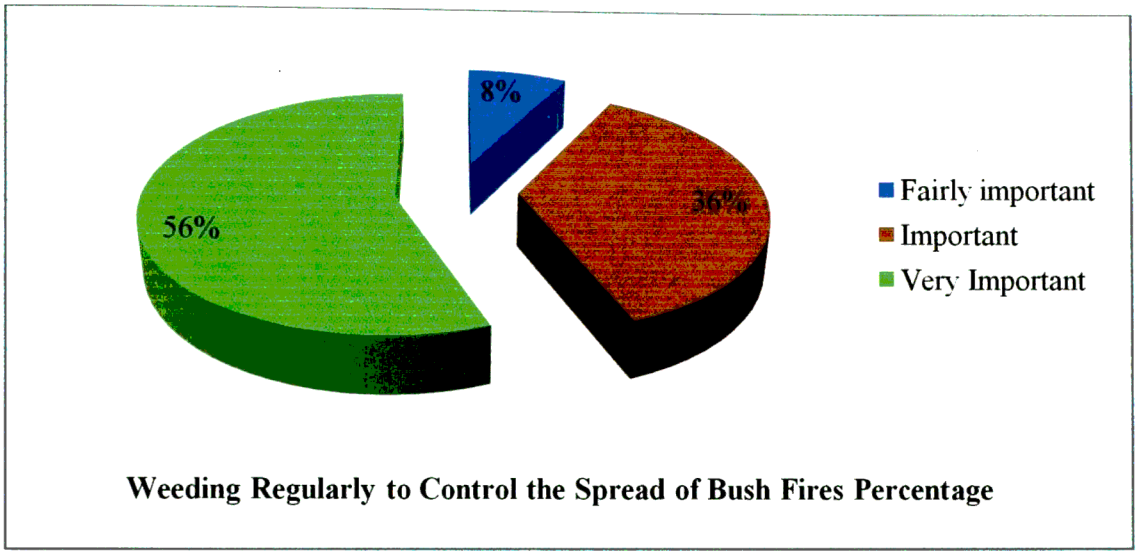
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fairly important	27	22.9	22.9	22.9
	Important	41	34.7	34.7	57.6
	Very important	50	42.4	42.4	100.0
	Total	**118**	**100.0**	**100.0**	

Source: Field survey (2009)

The research enquired whether the farmers weed regularly to control the spread of bush fires which is very rampart in the Brong Ahafo Region of Ghana. As shown in Figure 4.11, it came out that nine (9) farmers who represent 7.6% of the respondents weed their farms regularly not with the intention of controlling bush fires but to help prevent weeds from competing with the plants for nutrients. Forty-three (43) farmers representing 36.4% of the respondents indicated that weed control is very important in their effort at preventing bush fires as well as being a maintenance strategy. Majority of the farmers i.e. sixty-six (66) representing 55.9% of the respondents also indicated that regular weeding of their farms contributes significantly in reducing the

spread of bush fires to their farms. This is because bush fire is thought to be the number one threat of cashew especially as the crop is very fire sensitive and are easily killed by fire. When weeds are allowed to overgrow in the farms they contribute to the easy spread of fires aside competing with the plants for the available nutrients. This in effect contributes to reduction in yield.

THE USE OF REGULAR WEEDING IN CONTROLLING BUSH FIRES



Weeding Regularly to Control the Spread of Bush Fires Percentage

Figure 4.11

4.3.3 THE SUPPLIERS' PERSPECTIVE

The research also enquired about some of the risks and challenges faced by the suppliers of cashew seeds. Specifically the study looked at whether the suppliers face the problem of delay in supplying seeds; being supplied with unviable seeds, damaged seeds, and infested seeds and the possibility of being supplied with far less than what they demand from their suppliers. It came out that most of the suppliers do not face these problems as they produce the seeds from their own farms. However the certified seed dealer indicated that occasionally shortages do occur during the

planting season and it is during such periods that some of these problems are experienced. It was again noted that most of these problems are not experienced because the seeds are carefully selected. It was however noted that some unviable, damaged and/or disease infested seeds, which practically have very low germination percentages do occasionally mix with the viable ones when inexperienced people are employed to do the sorting.

The research also sought the opinions of the suppliers of cashew seeds about some of the significant challenges they face in their dealings with their customers. Specifically the study enquired from the suppliers whether their customers pay in time. It came out that they do not face this problem as the seeds are paid for upon delivery. It was also noted that they get buyers at all times as farmers tend to buy seeds from trusted sources. Also with the problem of demand being far less than supply, as a result of not knowing the exact quantity needed by customers and the problem of their customers not buying from them at times, the research revealed that though they experience some of these problems at times they do not have so much effect on their operations as they are the well known suppliers in their localities. Some of the other significant risks and challenges faced by the suppliers include inadequate capital, theft, bush fires, irregular rainfall patterns and the high cost of labour. It came out that like all other business activities, the suppliers also face financial difficulties. This therefore hampers their quest to improve upon and expand their operations. They also complained about stealing of the seeds especially by caretakers and those they employ to help them during harvesting. Bush fires affect their operations as they destroy their farms. This, it was noted are prevented through regular weeding, pruning, and creating of fire belts around their farms. Irregular

rainfall patterns also affect the operations of the recognised seed growers as it leads to the wilting of seedlings and immature plants. They further complained about high cost of labour. It was however observed that while the farmers are complaining about the high cost of labour, the labourers are also noted to be complaining about low wages that are paid for their services.

The research finally sought the views of the suppliers on how they overcome the problems they enumerated. It came out that most of the suppliers being farmers usually take soft loans from the agents who purchase their nuts. These monies are taken at the beginning of the season for their farming activities. The agents then deduct the loans from what are due the farmers after purchasing their nuts. This arrangement according to the farmers is very crucial to their activities as they prefer this to taking bank loans with its associated high interest rate and the demand for collateral which they find difficult to come by. The study also revealed that they apply chemicals to help control diseases and pests. Aside this they also use weevil ants to control some of the insects and pests that attack the cashew plants. The recognised seed growers again indicated that to avoid the spread of diseases from one plant to another, they usually destroy diseased plants so as to break the chain. The farms are also properly maintained to avoid the harbouring of disease causing organisms in weeds, and other left over fruits/nuts from previous harvests. They also weed their farms regularly to avoid the spread of bush fires into their farms as it is very rampant in the locality. Fire belts are also set around the farms to prevent the spread of bush fires. The recognised seed growers also weed their farms not only to control bush fires but also to prevent the weeds from competing with the plants for soil moisture and nutrients.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter looks at the summary of the findings of the study, conclusions based on the findings and finally end with some recommendations aimed at improving the supply chain of cashew.

5.2 SUMMARY OF FINDINGS

5.2.1 THE ACTORS OF CASHEW SUPPLY CHAIN

The research sought to enquire about the supply chain of cashew by specifically looking at the main actors, the flow process and the risks and challenges associated with it. This is very relevant in the sense that goods and services produced must reach the final consumer in the form, quality and quantity that will be appreciated by them and at a price that will be beneficial to both the producer and the final consumer. The research identified that the main actors of cashew supply chain are the processing companies, farmers, the suppliers of cashew seeds to farmers and the commissioned agents, who buy from the farmers on behalf of the processing companies and their foreign partners, as well as those involved in the marketing of the final product till it gets to the end user.

5.2.2 THE FLOW PROCESS OF ACTIVITIES IN THE SUPPLY CHAIN

The research also established that it is through the main actors that cashew passes through till it gets to the end user. It starts with the acquisition of seeds by farmers from suppliers. The farmers in turn sell their produce mainly cashew nuts to the processing companies through their commissioned agents. A greater percentage of the apples are left to rot as there are not enough processing companies which can put them to productive use in the country. These agents either buy from farmers' associations or virtually move from farm to farm with trucks to purchase nuts from farmers. The agents see to it that the nuts are properly dried after which they keep them in their warehouses. It is from there that the processing companies or their foreign partners who are mostly Indians, some of whom are resident in Ghana, buy from. It was observed that some of the companies and/or the foreign partners at times bypass the agents and buy directly from the farmers. The companies process the cashew into drinks and cashew nut kernels and sell to consumers either by themselves or through agents. The foreign partners most of whom as indicated earlier come down from India during the harvesting season, export the raw nuts to India using Ghanaian companies as conduits.

5.2.3 THE RISKS AND CHALLENGES ASSOCIATED WITH CASHEW SUPPLY CHAIN

The research revealed that cashew supply chain is fraught with many risks and challenges which were mainly attributed to the fact that the government and its supervising agencies who are deemed to be actors, and are supposed to monitor the activities of those involved in cashew production are not playing the role expected of them. It also came out that, some of the cashew processing companies listed in

literature are either no more in existence or are no more dealing in cashew. A typical example is the case of the Ghana Nuts Company Limited, which is no more dealing in cashew as a result of a terrible lost it suffered when its shipment of cashew nuts to India was rejected on the grounds of reduction in quality as a result of the consignment being delayed unnecessarily.

The research also revealed that cashew production is no more attractive as the government does not fix prices for the nuts and apples as is done for cocoa. The farmers are therefore left in the hands of their customers (agents) who determine the price based on what they are also paid by the processing companies and their other foreign partners. The cashew apple which has a very high vitamin C content, low in cholesterol and can be used in the production of both alcoholic and non-alcoholic beverages, are left to go waste as there are not enough processing companies in the country. The focused company (Mim Cashew and Agricultural Products Limited) has its own cashew plantation and therefore does not buy apples from farmers. It only buys cashew nuts from farmers to supplement what it gets from its plantation.

It came out from the research that Mim Cashew and Agricultural Products Limited, is a cashew processing company located at Mim in the Asunafo North District of the Brong Ahafo Region. The company has its own cashew plantation, though it purchases cashew nuts from other farmers located in and around the Brong Ahafo Region. The company produces cashew brandy and cashew nuts kernel using cashew apples and nuts respectively. The company faces some challenges which hamper the smooth running of its operations. Among these are the low quality of nuts supplied

by some of the farmers, theft of products by employees, and the high cost of labour, equipment and capital in the country.

It was also observed that cashew production just like the cultivation of the other food crops is dominated by illiterates and middle aged men. The farmers face many challenges in their operations among which are the stealing of nuts by some of the people they hire during harvesting, destruction of farms by bush fires especially when they are not properly maintained. Other problems faced by farmers and especially the recognised seed growers include the high cost of labour, equipment and capital in the country, disease and pest infestation and the destruction of seedlings and young plants by grazing animals. Grasscutter and some other rodents cause considerable damage to seedlings and young plants by grazing on the stems.

5.3 CONCLUSIONS

The research revealed that even though cashew is one of the most economic and important non-traditional export crops in the country, its supply chain is fraught with many risks and challenges. If the production of cashew is taken seriously it can become the country's second cocoa. Farmers should therefore be educated on best practices so as to help improve their operations and derive the maximum benefit from engaging in the production of cashew. It must also be emphasised that for an organisation to derive maximum benefits from its operations, the management of its supply chain should not be underestimated. This is because the proper management of the chain such as the proper management of customer relations, procurement, the

optimum quantity of inventory to keep, can help remove most of the inefficiencies associated with its operations and help increase its bottom line.

5.4 RECOMMENDATIONS

The government and its supervising agencies such as the Ministry of Food and Agriculture (Agricultural Extension Officers) and the Food and Drugs Board (FDB) should take keen interest in cashew production in the country by assisting farmers in the use of right practices so as to increase their yield and produce high quality apples and nuts. The government should therefore take proactive measures and also resource the supervising agencies so as to carry out their programmes effectively. They should constantly educate farmers on best farming practices and on how to overcome some of their challenges. FDB and Agricultural Extension Officers should educate farmers about the harm they cause when they spray the apples with chemicals in their attempt to control diseases and pests.

The prices paid to farmers keep declining as the agents and cashew buyers determine the price they pay for the nuts. This therefore goes a long way in discouraging farmers from expanding their farms. Different prices are also paid to farmers in different production centres and districts. To help arrest this problem, the government should as a matter of urgency establish a Cashew Marketing Board similar to the Cocoa Marketing Board to regulate prices for cashew products so as to boost cashew production in the country. This will help to either eliminate or reduce the situation where buyers (agents) set prices. The board can also help establish warehouses and engage purchasing clerks to buy from farmers and store in their

warehouses from where they can be sold to customers both locally and outside the country. This will also prevent the situation where some foreigners go directly to farmers to purchase cashew nuts and use Ghanaian companies as conduits in exporting the nuts thereby depriving some Ghanaians (agents) of their work and the government tax revenue which might have been derived from the foreigners exporting goods to other countries.

The government should also help create conducive environment and if possible assist private businesses to establish more processing factories to process cashew apples so as to put the apples to good use thereby increasing the revenue of farmers. The government itself will get revenue through the tax these companies will pay. As it is now, most of the apples go waste i.e. rot on farmlands. The government can also organise educational and training programmes to help sensitise people on the benefits that can be derived from eating the apples and cashew products in general. Cashew can be used to produce many products, some of which have been enumerated earlier, and it is about time people are educated on this to demystify some of the myth associated with it.

Young and educated people should also be encouraged to take to cashew production. This is because cashew being the second most important nut of commercial importance can help raise hard currency for the country if its production is taken seriously. The crop has many uses some of which are that the kernels obtained from the nuts are very nutritious with low cholesterol levels and can be used in the food industry in chocolates, ice-creams, sweets and biscuits. Cashew shell nut liquid

(CSNL) have industrial and medicinal uses and the tree can be used for reforestation, serve as shade and source of fuel among many other uses. Therefore when young, educated and energetic people are encouraged to cultivate cashew, production levels will increase considerably, especially when the farmers are paid well.

The government should also extend the cocoa mass spraying exercise to cashew farms so as to help prevent the destruction of farms by diseases and pests as most farmers are not in a position to spray their farms with chemicals and as a result leave their farms at the mercy of diseases and pests. This will in the long run benefit the government as increase in yield will bring revenue to government through export duties. Farmers should also be assisted with credit facilities to help them increase their production. District assemblies should also enforce the laws and regulations on bush fires and also constantly educate people on the effect of bush fires so as to reduce its negative impact on the activities of farmers.

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APPENDIX A

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BUSINESS

QUESTIONNAIRE ADMINISTERED TO A PROCESSING COMPANY ON AN ASSESSMENT OF FRUIT SUPPLY CHAIN IN GHANA. THE CASE OF CASHEW NUTS.

PART 1: BACKGROUND OF THE ORGANISATION

1. Name of Organisation .....

2. How long have you been in existence? ☐ <= 5 years ☐ 6 – 10 years

   ☐ 11 – 15 years ☐ 16 – 20 years ☐ > 20 years

3. District: .....

4. What kind of production are you into? .....

PART 2: THE ACTORS AND FLOW OF CASHEW SUPPLY CHAIN

5. What type of farmers do you deal with?

   ☐ Individual farmers

   ☐ Farmers' associations

   ☐ Both individual farmers and farmers' associations

6. How many farmers are you working with? .....

7. How many of them are males and how many are females

   Males ..... Females .....

8. Name some of your main suppliers and indicate their locations?

   1. ..... ☐ Local ☐ International
   2. ..... ☐ Local ☐ International
   3. ..... ☐ Local ☐ International
   4. ..... ☐ Local ☐ International
   5. ..... ☐ Local ☐ International

9. How long have you had business relationships with each of them?

☐ <= 5 years ☐ 6 – 10 years ☐ 11 – 15 years

☐ 16 – 20 years ☐ > 20 years

10. How strong is the business relationship with each of them?

	Very weak						Very strong
	1	2	3	4	5	6	7
1.	☐	☐	☐	☐	☐	☐	☐
2.	☐	☐	☐	☐	☐	☐	☐
3.	☐	☐	☐	☐	☐	☐	☐
4.	☐	☐	☐	☐	☐	☐	☐
5.	☐	☐	☐	☐	☐	☐	☐

11. Name some of your main customers and indicate their locations?

1. ..... ☐ Local ☐ International

2. ..... ☐ Local ☐ International

3. ..... ☐ Local ☐ International

4. ..... ☐ Local ☐ International

5. ..... ☐ Local ☐ International

12. How long have you had business relationships with each of them?

☐ <= 5 years ☐ 6 – 10 years ☐ 11 – 15 years

☐ 16 – 20 years ☐ > 20 years

13. How strong is the business relationship with each of them?

	Very weak						Very strong
	1	2	3	4	5	6	7
1.	☐	☐	☐	☐	☐	☐	☐
2.	☐	☐	☐	☐	☐	☐	☐
3.	☐	☐	☐	☐	☐	☐	☐
4.	☐	☐	☐	☐	☐	☐	☐
5.	☐	☐	☐	☐	☐	☐	☐

PART 3: THE RISKS AND CHALLENGES ASSOCIATED WITH CASHEW SUPPLY CHAIN

14. What are some of the problems (risks) associated with your suppliers?
1 – not so important, 2 – fairly important, 3 – important, 4 – very important, 5 – not applicable

	1	2	3	4	N/A
- Delay in supplying fruits/nuts	☐	☐	☐	☐	☐
- Unattractive fruits/nuts	☐	☐	☐	☐	☐
- Damaged fruits/nuts	☐	☐	☐	☐	☐
- Infested fruits	☐	☐	☐	☐	☐
- Supply less than demand	☐	☐	☐	☐	☐

Others, please specify .....

15. What are the most significant challenges you face in dealing with your customers?
1 – not so important, 2 – fairly important, 3 – important, 4 – very important, 5 – not applicable

	1	2	3	4	N/A
- They do not pay in time	☐	☐	☐	☐	☐
- Do not get buyers	☐	☐	☐	☐	☐
- Demand far less than supply	☐	☐	☐	☐	☐
- Do not inform us of the exact quantity they need	☐	☐	☐	☐	☐
- Do not buy from us at times	☐	☐	☐	☐	☐

Others, please specify .....

16. What other significant risks do you face in your activities?
1 – not so important, 2 – fairly important, 3 – important, 4 – very important, 5 – not applicable

	1	2	3	4	N/A
- Finance	☐	☐	☐	☐	☐
- Theft	☐	☐	☐	☐	☐
- Late payments	☐	☐	☐	☐	☐
- High cost of labour	☐	☐	☐	☐	☐
- High cost of equipment	☐	☐	☐	☐	☐

Others, please specify .....

17. How do you overcome those risks?

1 – not so important, 2 – fairly important, 3 – important, 4 – very important, 5 – not applicable

	1	2	3	4	N/A
- Sourcing credit facilities	☐	☐	☐	☐	☐
- Keeping of records	☐	☐	☐	☐	☐
- Regular inspection	☐	☐	☐	☐	☐
- Enforcement of safety rules	☐	☐	☐	☐	☐
- Attending seminars and workshops	☐	☐	☐	☐	☐

Others, please specify .....

18. General comments: .....

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APPENDIX B

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BUSINESS

QUESTIONNAIRE ADMINISTERED TO CASHEW FARMERS ON AN ASSESSMENT OF FRUIT SUPPLY CHAIN IN GHANA. THE CASE OF CASHEW NUTS.

PART 1: BACKGROUND OF THE FARMER

1. Name of Farm: .....

2. Sex: ☐ Male ☐ Female

3. Age: ☐ <= 20 years ☐ 21 – 30 years ☐ 31 – 40 years
   ☐ 41 – 50 years ☐ 51 – 60 years ☐ > 60 years

4. District: .....

5. How long have you been a farmer? ☐ <= 5 years ☐ 6 – 10 years
   ☐ 11 – 15 years ☐ 16 – 20 years ☐ > 20 years

6. What is your educational background?
   ☐ JHS ☐ MSLC ☐ SHS
   ☐ O'Level ☐ A'Level ☐ HND
   ☐ Bachelor's Degree ☐ Master's Degree ☐ Illiterate
   Others, please specify: .....

PART 2: THE ACTORS AND FLOW OF CASHEW SUPPLY CHAIN

7. Do you produce cashew? ☐ Yes ☐ No

8. What are the sources of your seeds?
   ☐ Own farm ☐ Certified seed dealers ☐ Recognised seed growers
   ☐ Ministry of Food and Agriculture ☐ Farmers' associations

9. How long have you had business relationships with your suppliers?
   ☐ <= 5 years ☐ 6 – 10 years ☐ 11 – 15 years
   ☐ 6 – 20 years ☐ > 20 years

10. How strong is the business relationship with each of them?

	Very weak						Very strong
	1	2	3	4	5	6	7
1.	☐	☐	☐	☐	☐	☐	☐
2.	☐	☐	☐	☐	☐	☐	☐
3.	☐	☐	☐	☐	☐	☐	☐
4.	☐	☐	☐	☐	☐	☐	☐
5.	☐	☐	☐	☐	☐	☐	☐

11. For each of your suppliers, is the person a:

	1	2	3	4	5
Relative	Yes	Yes	Yes	Yes	Yes
	No	No	No	No	No
Friend	Yes	Yes	Yes	Yes	Yes
	No	No	No	No	No
Business partner	Yes	Yes	Yes	Yes	Yes
	No	No	No	No	No

12. Name some of the main customers who buy your produce

☐ Agents of Mim Cashew and Agricultural Products Limited

☐ Agents of some foreign businessmen

☐ Individuals

13. How long have you had business relationships with each of them?

☐ <= 5 years ☐ 6 – 10 years ☐ 11 – 15 years

☐ 16 – 20 years ☐ > 20 years

14. How strong is the business relationship with each of them?

	Very weak						Very strong
	1	2	3	4	5	6	7
1.	☐	☐	☐	☐	☐	☐	☐
2.	☐	☐	☐	☐	☐	☐	☐
3.	☐	☐	☐	☐	☐	☐	☐
4.	☐	☐	☐	☐	☐	☐	☐
5.	☐	☐	☐	☐	☐	☐	☐

15. For each of your customers, is the person a:

	1	2	3	4	5
Relative	Yes	Yes	Yes	Yes	Yes
	No	No	No	No	No
Friend	Yes	Yes	Yes	Yes	Yes
	No	No	No	No	No
Business partner	Yes	Yes	Yes	Yes	Yes
	No	No	No	No	No

PART 3 RISKS AND CHALLENGES ASSOCIATED WITH CASHEW SUPPLY CHAIN

16. What are some of the problems (risks) associated with the sources of your seeds?

1–not so important, 2 – fairly important, 3 – important, 4 – very important, 5–not applicable

	1	2	3	4	N/A
- Delay in supplying seeds	☐	☐	☐	☐	☐
- Unviable seeds	☐	☐	☐	☐	☐
- Damaged seeds	☐	☐	☐	☐	☐
- Infested seeds	☐	☐	☐	☐	☐

Others, please specify .....

17. What are the most significant challenges you face in dealing with your customers?

1–not so important, 2 – fairly important, 3 – important, 4 – very important, 5 – not applicable

	1	2	3	4	N/A
- Do not get buyers	☐	☐	☐	☐	☐
- Demand far less than supply	☐	☐	☐	☐	☐
- Low producer price	☐	☐	☐	☐	☐
- Do not buy from us at times	☐	☐	☐	☐	☐

Others, please specify .....

18. How important do these other risks affect your business?

1–not so important, 2 – fairly important, 3 – important, 4 – very important, 5–not applicable

	1	2	3	4	N/A
- Finance	☐	☐	☐	☐	☐
- Theft	☐	☐	☐	☐	☐
- Bush fires	☐	☐	☐	☐	☐
- Destruction by grazing animals	☐	☐	☐	☐	☐
- Rainfall pattern	☐	☐	☐	☐	☐
- High cost of labour	☐	☐	☐	☐	☐
- High cost of equipment	☐	☐	☐	☐	☐
- Disease and pest infestation	☐	☐	☐	☐	☐

Others, please specify .....

19. How do you overcome them?

1–not so important, 2 – fairly important, 3 – important, 4 – very important, 5–not applicable

	1	2	3	4	N/A
-Sourcing credit facilities	☐	☐	☐	☐	☐
-Prompt application of insecticides	☐	☐	☐	☐	☐
-Regular weeding	☐	☐	☐	☐	☐

Others, please specify .....

20. General comments .....

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APPENDIX C

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BUSINESS

QUESTIONNAIRE ADMINISTERED TO SUPPLIERS OF CASHEW SEEDS ON AN ASSEESMENT OF THE FRUIT SUPPLY CHAIN IN GHANA. THE CASE OF CASHEW NUTS.

PART 1: BACKGROUND OF THE SUPPLIER

1. Name of Organisation: .....

2. How long have you been in existence? ☐ <= 5 years ☐ 6 – 10 years

   ☐ 11 – 15 years ☐ 16 – 20 years ☐ > 20 years

3. District: .....

4. What kind of production are you into? .....

5. Do you produce them yourself? ☐ Yes ☐ No

PART 2: THE ACTORS AND FLOW OF CASHEW SUPPLY CHAIN

6. What type of farmers do you deal with? ☐ Individual farmers

   ☐ Farmers' associations

   ☐ Both individual farmers and farmers' associations

7. Do you have knowledge of their educational background?

   ☐ Yes ☐ No

8. If yes, what is their educational background?

   ☐ JHS ☐ MSLC ☐ SHS

   ☐ O'Level ☐ A'Level ☐ HND

   ☐ Bachelor's Degree ☐ Master's Degree ☐ Illiterates

   Others, please specify .....

9. How many farmers are you working with? .....

10. How many of them are males and how many are females

Males ..... Females .....

11. Do you supply directly to farmers? ☐ Yes ☐ No

12. If no, who are your agents .....
.....
.....

13. Name some of your main suppliers and indicate their locations?

1. ..... ☐ Local ☐ International
2. ..... ☐ Local ☐ International
3. ..... ☐ Local ☐ International
4. ..... ☐ Local ☐ International
5. ..... ☐ Local ☐ International

14. How long have you had business relationships with each of them?

☐ <= 5 years ☐ 6 – 10 years ☐ 11 – 15 years

☐ 16 – 20 years ☐ > 20 years

15. How strong is the business relationship with each of them?

	Very weak						Very strong
	1	2	3	4	5	6	7
1.	☐	☐	☐	☐	☐	☐	☐
2.	☐	☐	☐	☐	☐	☐	☐
3.	☐	☐	☐	☐	☐	☐	☐
4.	☐	☐	☐	☐	☐	☐	☐
5.	☐	☐	☐	☐	☐	☐	☐

16. For each of your suppliers, is the person a:

	1	2	3	4	5
Relative	Yes	Yes	Yes	Yes	Yes
	No	No	No	No	No
Friend	Yes	Yes	Yes	Yes	Yes
	No	No	No	No	No
Business partner	Yes	Yes	Yes	Yes	Yes
	No	No	No	No	No

17. Name some of your main customers and indicate their locations?

1. ..... ☐ Local ☐ International
2. ..... ☐ Local ☐ International
3. ..... ☐ Local ☐ International
4. ..... ☐ Local ☐ International
5. ..... ☐ Local ☐ International

18. How long have you had business relationships with each of them?

☐ <= 5 years ☐ 6 – 10 years ☐ 11 – 15 years

☐ 16 – 20 years ☐ > 20 years

19. How strong is the business relationship with each of them?

	Very weak						Very strong
	1	2	3	4	5	6	7
1.	☐	☐	☐	☐	☐	☐	☐
2.	☐	☐	☐	☐	☐	☐	☐
3.	☐	☐	☐	☐	☐	☐	☐
4.	☐	☐	☐	☐	☐	☐	☐
5.	☐	☐	☐	☐	☐	☐	☐

20. For each of the your customers, is the person a:

	1	2	3	4	5
Relative	Yes	Yes	Yes	Yes	Yes
	No	No	No	No	No
Friend	Yes	Yes	Yes	Yes	Yes
	No	No	No	No	No
Business partner	Yes	Yes	Yes	Yes	Yes
	No	No	No	No	No

PART 3: RISKS AND CHALLENGES ASSOCIATED WITH CASHEW SUPPLY CHAIN

21. What are some of the problems (risks) associated with your suppliers?
1–not so important, 2 – fairly important, 3 – important, 4 – very important, 5–not applicable

	1	2	3	4	N/A
- Delay in supplying seeds	☐	☐	☐	☐	☐
- Unviable seeds	☐	☐	☐	☐	☐
- Damaged seeds	☐	☐	☐	☐	☐
- Infested seeds	☐	☐	☐	☐	☐
- Supply less than demand	☐	☐	☐	☐	☐

Others, please specify .....

22. What are the most significant challenges you face in dealing with your customers?
1–not so important, 2 – fairly important, 3 – important, 4 – very important, 5–not applicable

	1	2	3	4	N/A
- They do not pay in time	☐	☐	☐	☐	☐
- Do not get buyers	☐	☐	☐	☐	☐
- Demand far less than supply	☐	☐	☐	☐	☐
- Do not inform us of the exact quantity they need	☐	☐	☐	☐	☐
- Do not buy from us at times	☐	☐	☐	☐	☐

Others, please specify .....

19. What other significant risks do you face in your activities?
1–not so important, 2 – fairly important, 3 – important, 4 – very important, 5–not applicable

	1	2	3	4	N/A
- Finance	☐	☐	☐	☐	☐
- Theft	☐	☐	☐	☐	☐
- Bush fires	☐	☐	☐	☐	☐
- Rainfall pattern	☐	☐	☐	☐	☐
- High cost of labour	☐	☐	☐	☐	☐

Others, please specify .....

20. How do you overcome those risks?

1–not so important, 2 – fairly important, 3 – important, 4 – very important, 5–not applicable

	1	2	3	4	N/A
- Sourcing credit facilities	☐	☐	☐	☐	☐
- Prompt application of insecticides	☐	☐	☐	☐	☐
- Destruction of diseased plants	☐	☐	☐	☐	☐
- Regular weeding	☐	☐	☐	☐	☐

Others, please specify .....

21. General comments: .....

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