A SOCIO-ECONOMIC ANALYSIS OF THE EMERGING SHEA VALUE CHAIN IN NORTHERN REGION, GHANA

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BY:

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A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES, KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI, GHANA IN FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF PHILOSOPHY

DEPARTMENT OF AGRICULTURAL ECONOMICS, AGRIBUSINESS ANDEXTENSION, FACULTY OF AGRICULTURE, KNUST, KUMASI

FEBRUARY, 2015

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DECLARATION

I hereby declare that this thesis is my own work towards the Master of Philosophy degree in Agricultural Economics, 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 degree of the University or elsewhere, except where due acknowledgement has been made in the text.

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DEDICATION

I dedicate this work to God almighty for His guidance and protection, and to my family for their support. I also dedicate this piece to my wife, Doris Akanbasi for inspiring and standing by me throughout the course.

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ACKNOWLEDGEMENT

I wish to express my profound gratitude to my supervisor, Dr. S.C Fialor for his sound advice, suggestions and patience that has made the completion of this work possible. I am equally appreciative of my second supervisor, Dr. Robert Aidoo and of all lecturers in the department of Agricultural Economics, Agribusiness and Extension of KNUST.

I acknowledge also the immense support, both financial and psychological, from my parents and brother, Mohammed Majeed. My sincere thanks also go to my friend Mr. Abdulai Mohammed Saani and Mba Liman for their support.

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ABSTRACT

The shea VC chain in the Northern Region comprises varied actors including shea nut collectors and/ processors of kernel, shea kernel traders, shea butter processors and shea butter traders with perceived disproportionate variations among the actors in terms of profit margins distribution. This study examines the emerging shea value chain in the Northern Region of Ghana, with emphasis on shea butter processors. Specifically, the study investigates the effects of group formation on shea butter processors participation in the shea value chain and aims to compare shea butter processors operating in groups and shea butter processors operating individually with regards to specific variables such as costs, profit margins and outputs. The analysis in this study involved mapping the shea supply chain and assessing the profit margins and cost structures of the actors at different segments of the chain. Using gross margin analysis and independent sample t-tests results the study revealed that butter processors bear the largest share of cost and receive the lowest profit margin. The independent t- test results show significant differences in profit margins between butter processors operating in groups and butter processors operating individually. Beyond these empirical findings the study also shed light on the issue of governance and upgrading as it relates to the shea value chain in the Northern Region, highlighting various lead firms and auxiliary organizations in the chain and the role they play in the governance and upgrading process in the shea value chain in the Northern Region.

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CBE	Cocoa Butter Equivalent
CBI	Cocoa butter Improvers
CBS	Cocoa Butter Substitutes
CRIG	Cocoa Research Institute of Ghana
EU	European Union
DFID	Department for International Development
FAO	Food and Agricultural Organization
FFA	Free Fatty Acid
GCC	Global Commodity Chain
GDP	Gross Domestic Product
GEPC	Ghana Export Promotion Council
GM	Gross Margin
GSS	Ghana Statistical Service
GVC	Global Value Chain
IFAD	International Fund for Agricultural Development
JICA	Japan International Cooperation Agency
LBA	Local Buying Agents
M4P	Making Market Work Better For the Poor
MSMEs	Micro Small and Medium Enterprises
MOTI	Ministry of Trade and Industry
NASFPB	National Association of Shea Nut Farmers, Processors and Buyers of Ghana
NGO	Non-Government Organization
SNDA	Savelugu /Nanton District Assembly
SNV	StichtingNederlandseVrijwilligers
SHS	Senior High School
SPSS	Statistical Package for Social Scientist
TAMA	Tamale Metropolitan Assembly
TKDA	TolonKumbungu District Assembly
UNCTAD	United Nations Conference on Trade and Development
UNIDO	United Nations Industrial Development Organization
UNDP	United Nations Development Programme
UV	Ultraviolet

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VCA	Value Chain Analysis
WATH West	African Trade Hub

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CHAPTER ONE

INTRODUCTION TO THE STUDY

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1.1 Background to the Study

Shea kernels and shea butter trade have assumed global proportions over the last two decades. The food industry (for chocolate, margarine, confectioneries) uses approximately 95% of the international supply, while the rest is absorbed by the cosmetic industry (D'Auteuil, 2008). Africa produces about 1,760,000 metric tons (t) of raw shea nuts annually from its wild trees mainly in the Savannah and Sahel Regions. However, producers harvest only a fraction, about 35 percent (about 600,000 t), which is then transformed into butter or exported as nuts (IITA, 2002 as cited in Addaquay, 2004). In Ghana only 40% of the existing potential of shea nut is collected (SNV, 2006).

There are two main varieties of shea: *Vitellaria paradoxa*, and *Vitellaria nilotica*. The *Vitellaria paradoxa* grows throughout the West Africa Region and *Vitellaria nilotica* grows in East Africa. The *paradoxa* varieties produces solid fat (butter or stearin) while the *nilotica* variety produces liquid oil (olein). The shea tree variety, *Vitellaria paradoxa* forms a vital part of the environmental, economic and cultural landscape of Northern Ghana. The pulp of the shea nut is eaten as food while the butter extracted from its kernel is used for a myriad of domestic purposes

including cooking or frying, ritual sacrifices and for use as skin pomade. The bark, roots and leaves of the tree are also used in traditional medicine (Ferris et al., 2001).

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Even though the traditional uses of shea nuts and shea nut processed products have declined in importance in homes in the Northern Region over the decades due to changes in consumer preference and the availability of cheaper substitutes such as other vegetable oils and Western-style cosmetic products, there is a growing niche market for shea outside Africa (Scholz, 2009). While Africa's share of world exports has declined about 50% from 1980 to 2007, shea increased in export volume, linking Sub-Sahara Africa Region to the global economy (LMC, 2006 and UNCTAD, 2008 as cited in Scholz, 2009). The demand for shea in the cosmetic industry is growing as its exceptional quality and characteristics such as moisturizing, anti-irritant, regenerative, anti- inflammatory effects and UV absorbing functions are increasingly recognized in many industrialized countries (Carette et al., 2009).

Shea nut picking and butter processing are a non- farm activity traditionally reserved for women in the Northern Region of Ghana. According to a report by SNV (2006) more than 600,000 women in Northern Ghana depend on incomes from the sale of shea butter and other shea-related products as a means of their daily sustenance such as supplementing the family food budget and meeting medical and educational expenses. Women in Northern Ghana are considered as being especially

vulnerable to poverty due to gender inequality. They have less access to resources and assets that make them more vulnerable to poverty. Many studies show that women and children are disproportionately affected by poverty and that empowering women and girls are the most effective way of fighting poverty (UNDP/JICA, 2010; IFAD, 2001; and Moghadam, 2005).

Promotion of non-farm enterprises such as shea kernel processing and shea butter extraction is critical to reducing poverty among women in the Northern Region (Dinye and Deribile, 2004). As a result many non-governmental organizations in the Northern Region have established and or supported women groups to engage in shea butter processing aimed at integrating them into the global shea value chain through collective action.

1.2 Problem Statement

The Ghanaian shea channel tends to have too many intermediaries that add cost rather than value to the product (Rammohan, 2010; SNV, 2006). Various studies (SNV, 2006; Lovett, 2004) found that market accessibility remains a bigger challenge for shea processors because they are price takers and are unable to supply the requisite consistency of quality. Moreover, intermediary traders exploit administrative and institutional support in the retail trade in shea at the local markets resulting in low sales income, low credit and limited business expansion.

In response to these challenges many Non-Governmental Organizations (NGOs) and private companies have formed or facilitated the formation of shea producer groups or cooperatives in the shea producing areas of Ghana to enable shea processors gain higher prices for their produce through collective actions. Carette et al. (2009) observed that over the last two decades, there has been proliferation of shea producer cooperatives and associations in the Northern Region of Ghana. Shea producer groups or cooperatives in Mali have been found to enhance vertical integration as well as improve bargaining power of women processors, improve access to credit, production input and capital (Perakis, 2009).

Within this context, this study seeks answers to the following questions:

1. Who are the actors in the shea value chain and what are their functions?
2. What is the nature of the costs structure and profit margins of the primary actors in the chain?
3. Are there significant differences in costs, output and profits between shea butter processors operating in groups and those not operating in groups?
4. What is the nature of chain governance in the shea value chain in the Northern Region?
5. What value chain upgrading has occurred in the shea value chain in the Northern Region?
6. What constraints do actors in the shea value chain face?

1.3 Objective of the Study

The general objective of this study is to do a socio-economic analysis of the emerging shea value chain in the Northern Region of Ghana. The specific objectives are to:

1. To map the flow of shea, identify the actors and their functions in the chain.
2. Determine and compare the costs, output and profit between shea butter processors in groups and those not in groups.
3. To determine the nature of chain governance in the shea chain
4. To identify and describe the type of upgrading in the chain
5. Identify the constraints faced by actors in the shea value chain.

1.4 Justification of the Study

The shea trade is dominated by women, as such any intervention based on recommendation of the study will have wide spread implication for gender development and equality. Since value chain approach is also interesting for policymakers, who seek to support economic development in line with poverty alleviation, it is necessary to identify factors that influence and trigger the upgrading of a value chain, so that these factors can be precisely addressed through specific development interventions (Nugraha, 2010).

The study will also highlight and deepen understanding of the nature of costs and margin distribution among actors which could go a long way in informing policy makers, researchers and development practitioners on how to enhance equitable distribution of benefits in the shea VC. The study will therefore highlight the complexities of the shea value chain and provide information on policy, institutional, social and infrastructural factors that affect the competitiveness and growth of the shea industry in Ghana. The recommendation on the study would be useful to policy makers and NGOs in their efforts to improve livelihood of people in the shea sub

sector by revealing areas requiring special attention. The study would also add to literature on shea value chain in Ghana.

1.5 Organization of the study

This study is organized into five chapters. Chapter one details the background to the study, the problem statements as well as the research questions and objectives of the study. Chapter two presents a literature review of different value chain methodologies and concepts as well as outlook of the global shea value chain. In chapter three a description of the research area and methodologies and design of the study are presented. In chapter four descriptive and gross margin analyses as well as t-test results are elucidated. Chapter five presents a summary of the main findings of the study and draws conclusions and provides recommendation as well as limitation to the study and suggestions for future research.

CHAPTER TWO

LITERATURE REVIEW

2.1. Definition of Value Chain and Supply Chain

2.1.1 Value Chain

A value chain according to Ahmed (2007) refers to a structure of physical, economic and social transactions between individuals and organizations engaged in

raw material transformation into end products. But Schmitz (2005), refers to it as a group of companies working together to satisfy a market demand. It involves chain of activities that are associated with adding value to a product through the production and distribution processes of each activity. These definitions by these authors are similar since they both emphasize on transformation of product through activities by chain actors, individuals and companies. Kaplinsky & Morris (2001) on the other hand define value chain as the full range of activities that are required to bring a product from conception, through the different phases of production to delivery to final consumers and disposal after use. The definition of VC is distinct from VCA in that VCA is the process of breaking a chain into its constituent parts in order to better understand its structure and functioning (UNIDO, 2009).

According to Sanogo (2010) Value Chain Analysis (VCA) starts with chain mapping as a first step. It involves systematically mapping the actors participating in the production, distribution, marketing, and sales of a particular product (or products). This mapping assesses the characteristics of actors, profit and cost structures, and flows of goods throughout the chain, employment characteristics, and the destination and volumes of domestic and foreign sales (Sanogo, 2010).

In addition to the more elaborate nature of Value Chain definition by Kaplinsky and Morris (2001), Berg et al., (2008) argue that VC can be interpreted in two ways: The narrow sense and the broad sense.

In the narrow approach, a value chain includes the range of activities performed *within a firm* to produce a certain output. This includes the conception and design stage, the process of acquisition of input, the production, the marketing, distribution

activities, and so on. On the other hand, the broad approach to Value Chain looks at the complex range of activities implemented *by various* actors such as primary producers, processors, traders, service providers and others to bring a raw material through retail up to the end of the final product. The broad approach looks beyond activities implemented by a single enterprise to include all its backward and forward linkages up to the level in which the raw material produced will be linked to the final consumer.

In a study of the shea butter value chain, Lovett (2004) identified wide range of stakeholders in the shea industry playing different roles at various stages. These include village pickers and post-harvest processors of dry kernel, local buying agents (LBAs), rural or urban traditional butter processors, large-scale exporters of shea kernel, large-scale processors (mechanical extraction and export) of shea butter based 'in-country', small-scale entrepreneur formulating cosmetics based on shea butter in Africa, external (US, EU, India and Japan) large scale buyers and processors of kernel and butter, external entrepreneurs or companies formulating cosmetics based in shea butter, and external entrepreneurs or companies formulating edible products, including Cocoa Butter Equivalents (CBEs) or Cocoa Butter Improvers (CBIs) based in shea butter.

Brabeck et al. (2008) modeled the shea value chain in Ghana as follows:

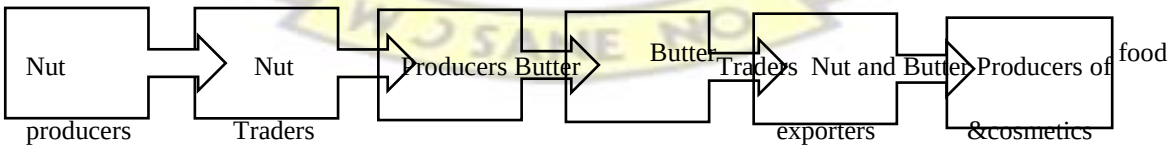

Figure 1: The shea value chain

Source: Brabeck et al. 2008.

The authors' map is based on only the main actors in the shea value chain but they did not map the core processes and specific activities from the core processes in the shea value chain. In addition to highlighting the main actors in the map, this study will highlight the core processes, and specific value adding activities from the core processes as well as flow of shea.

2.1.2 Supply Chain

Kit et al. (2006) opined that a value chain is a type of supply chain. According to the authors the only difference is that with supply chain, there are no binding or sought after formal or informal relationships except where goods, services or financial agreements are transacted. Dunne (2001) on the other hand explains that a supply chain refers to the physical flow of goods that are required for raw materials to be transformed into finished products. In a further elaboration, (MeyerStamer & Waltring, 2007) indicate that supply chains aim at creating a competitive advantage through unique and more efficient supply chain management, and its literature is rooted in the industrial engineering faculties and business schools; while value chain literature is rooted in development studies and sociology and aims to analyze the agriculture and industrial development process in developing countries and lead firms in industrialized countries with emphasis on the power structures in the global economy. Nugraha (2010) also indicates that apart from the use in academic researches, VCA has been widely employed in practical field of development cooperation. Development agencies apply VCA in various forms and in combination

with other concepts as an instrument in planning or assessing, implementing, and conducting monitoring and evaluation of development projects. Its application primarily aims at the economic promotion of micro, small, and medium enterprises (MSMEs) in developing countries in adherence to MDG's goal to eradicate poverty. In this study, the shea value chain is looked at from the broad approach as elaborated by Berg et al. (2006) and the analysis done to reflect this perspective.

2.2 Main Concepts of Value Chain

There are various approaches or methods of analyzing value chains. These methods have evolved over time. In this section three main methods are discussed:

2.2.1 Filiére Concept

This approach (also known as Commodity Chain analysis) was first used by French scholars in the 1960s to analyze the agricultural system of developing countries under the French colonial system. The analysis mainly served as a tool to study the ways in which agricultural production system (especially, rubber, cotton, coffee and cocoa) were organized in the context of developing countries. It was used to map the flow of commodities and to identify agents and activities. Berg et al. (2006) noted that the rationale of the Filiére approach is quite similar to the broader concept of value chain analysis indicated above; and highlights two grounds on which the Filiére approach shares resemblance with value chain analysis:

- The economic and financial evaluation of Filiére focuses on income generation and distribution in the commodity chain and disaggregates costs and incomes between

local and internationally traded components to analyze the spillovers of the chain on the national economy and its contribution to GDP along the 'effect method'.

- The strategy-focused analysis of Filiére is used especially by research institutions working on agricultural development, examining in a systemic way the interplay of objectives, constraints and results of each type of stakeholder in the chain. Individual and collective strategies are also analyzed as well as patterns of regulations. Based on the strategy-focused analysis, Hugo (1985) as cited in Berg et al. (2006) defines four types of strategies with respect to commodity chains in Africa: domestic regulation, market regulation, state regulation and international agribusiness regulation.

The Filiére approach is said to be more static, reflecting relations at a certain point in time and generally applied to domestic value chain, thus it generally stops at national boundaries.

2.2.2 Porter's Concept

Porter (1985) describes value chain as the activities an organization performs and links it to the organization's competitive position. Porter (1985) applies the framework to assess how a firm should position itself in the market and in its relationship with suppliers, buyers, and competitors. Porter (1985) identified five competitive forces interacting within a given industry: the intensity of rivalry among existing competitors, the barriers to entry for new competitors, the threat of substitute products and services, the bargaining power of suppliers, and the bargaining power of buyers.

Porter (1985) argues that the source of competitive advantage of a firm cannot be detected by looking at the firm as a whole. Instead, the firm should be disaggregated in a series of activities and competitive advantage found in one or more of such activities.

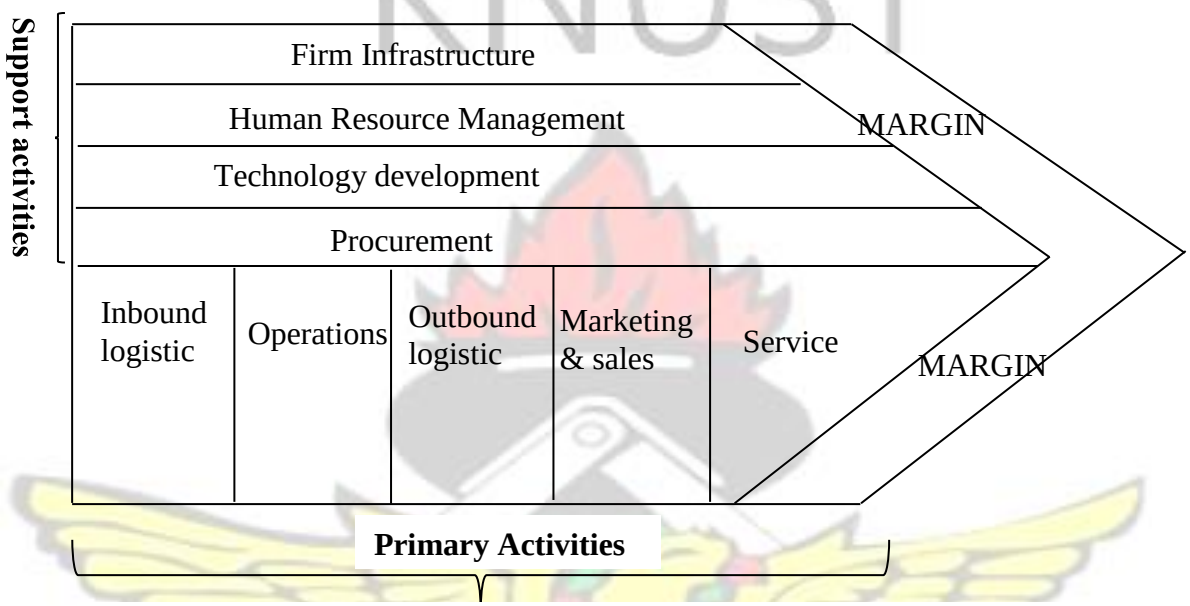

Figure 2: The framework of Porter value chain

Source: Porter, 1985

Porter's framework categorizes the activities the firm needs to undertake to find source of competitive advantage into two: Primary activities and Supporting activities. Porter framework is illustrated in figure 2.

Primary activities contribute directly to value addition in the production of a good or service. Support activities have indirect effect on the final value of the product.

Porter's concept of VC does not imply the idea of a physical transformation and analyzing the competitiveness of an enterprise's value chain using this concept will focus on product design, input procurement, inbound logistic , out bound logistic, marketing, sales, after sales and support services such as strategic planning, the

management of human resources, research activities etc. Porter's framework therefore has strict business application and mainly applied to support management decision and executive strategies.

2.2.3 The Global Approach

The Global Approach to Value Chain Analysis was introduced within the context of globalization. Gereffi (1994) introduced the concept in the mid-1990s and primarily focused on the analysis of international trading system and the increasing economic integration of production marketing chains globally (Roduner, 2004). In the course of globalization there has been the perception that the gap in incomes within and between countries has increased and VCA can help explain this process in a dynamic perspective (Berg et al. 2006).

The Global Commodity Chain (GCC) analysis highlights the power relations that are embedded in value chain with emphasis on governance of the chain. The Global Commodity Chain approach comprises five dimensions, including the technical structures, the actors in the chain, the territories the chain covers, the governance structure and the input-output structure (Gereffi, 1994). The Global Commodity Chain analysis seeks answers to questions relating to how the production process takes place, who participates at what stage, where are the different stages taking place, how are they linked, who has what benefit among other questions. Answers to these questions are critical in determining the relevant points of intervention for the successful integration of the poor in the chain so as to produce market outcomes that benefit the poor.

2.3 Governance and Upgrading in a Value Chain

2.3.1 Chain Governance

The concept of governance is central to the global value chain approach which is used to refer to the inter- firm relationships and institutional mechanisms through which non-market co-ordination of activities in the chain takes place. This coordination is achieved by setting and enforcement of product and process parameters to be met by the actors mostly in developing countries (Humphrey & Schmitz, 2001).

Kaplinsky et al. (2000) refers to Value Chain Governance as the power to define who and who does not participate in the chain, the setting of rules of inclusion, assisting chain participants to achieve the standards set, and monitoring their performance.

On the basis of governance structures value chains are classified into two: buyerdriven value chains, and producer-driven value chains (Kaplinisky and Morris, 2000). Buyer-driven chains are usually labor intensive industries, and so more important in international development and agriculture. In such industries, buyers undertake the lead coordination activities and influence product specifications. In producer-driven value chains which are more capital intensive, key producers in the chain, usually controlling key technologies, influence product specifications and play the lead role in coordinating the various links.

Some chains may involve both producer and buyer driven governance. But in further work by (Humphrey and Schmitz, 2002; Gibbon and Ponte, 2005) it is argued that governance, in the sense of a clear dominance structure, is not necessary a

constitutive element of value chains. Some value chains may exhibit no governance at all, or very thin governance. In most value chains, there may be multiple points of governance, involved in setting rules, monitoring performance and/or assisting producers.

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2.3.2 Value Chain Upgrading

Value chain upgrading is the process that enables a firm or any other actor of the chain to take on more value intensive functions in the chain, make itself harder to replace, and thus appropriate a larger share of the generated profits (Stamm, 2004).
It entails the acquisition of technological capabilities and market linkages that enable firms to improve their competitiveness and move into higher-value activities (Kaplinsky and Morris, 2000).

In many cases, MSEs must respond to market opportunities by innovating and increasing value added, a process also known as "upgrading." Upgrading at the firm level is a necessary (although not sufficient) condition for MSEs in developing countries to participate in and benefit from the global economy (Giuliani, Pietrobelli, and Rabellotti 2005). Through upgrading, MSEs can enhance the competitiveness of a value chain and thus contribute to economic growth. At the same time, they benefit when their increased value-added contributions to the value chain translate into higher returns to the MSEs.

Upgrading involves a learning process through which those who run enterprises acquire new knowledge—often through relationships with other firms in the value

chain or with firms in supporting markets. Firm owners then translate this knowledge into innovations that increase value added. In the ideal situation, upgrading is based on the capacity to innovate and to ensure continuous improvement in products and processes. Upgrading in firms can take place in the form of process upgrading, product upgrading, functional upgrading and channel upgrading (Dunn et al 2006):

Process upgrading is an increase in production efficiency that results in either greater output for the same level of inputs or the same level of output from fewer inputs. Process upgrading reduces the cost of production and may be attributable to improved organization of the production process or by the use of an improved technology.

Product upgrading is a qualitative improvement in the product, making it more desirable to consumers. "Quality" is defined very broadly to include any extrinsic, intrinsic, tangible or intangible changes resulting in the product being able to command a higher final price.

Functional upgrading is the entry of a firm into a new, higher value-added level in the value chain. This moves the firm closer to the final consumer, requires the firm to take on new functions, and positions the firm to receive a higher unit price for the product.

Channel upgrading is the entry of a firm into a pathway leading to a new, higher value-added end market, such as a local, national, regional and/or global end market. Firms may operate in one or more market channels at the same time.

2.4 The Global Shea Value Chain

2.4.1 Trends in Demand and Consumption

A large portion of the nuts collected are processed outside Africa for use as vegetable fat in the confectionary and as cocoa butter equivalent (CBE). Only a fraction of the nuts are either industrially or manually processed in Africa (Scholz, 2009).

Figure 3 depicts the geographical overview of the basic global shea value chain.

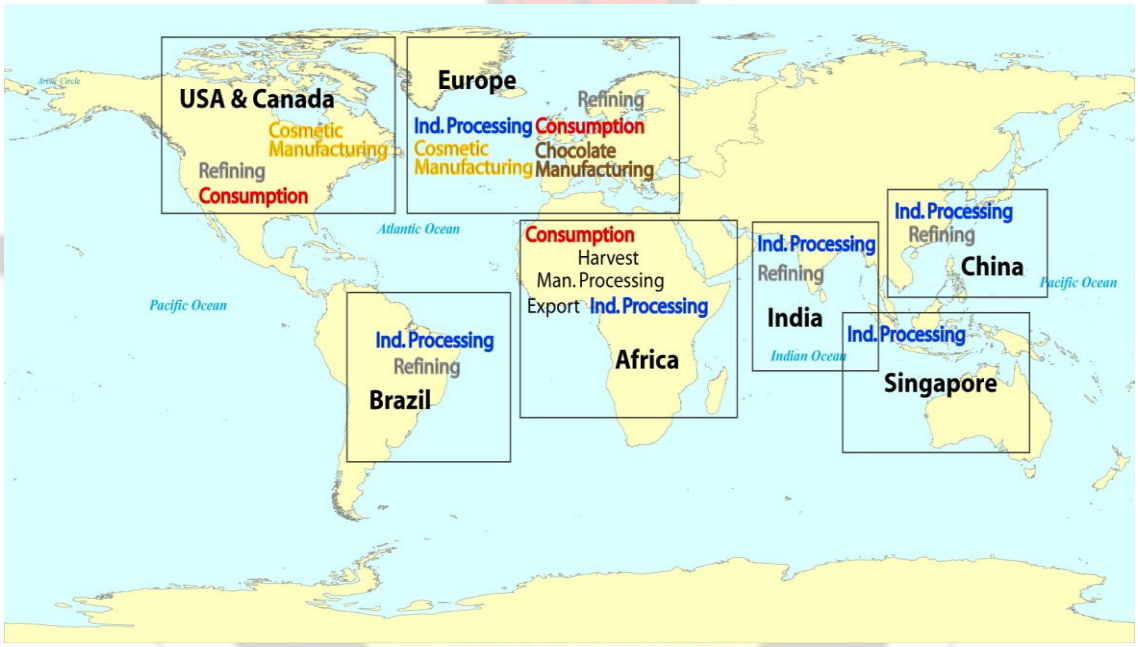

Figure 3: Geographical overview of the shea value chain *Source: Scholz, 2009.*

Several studies (Elias, 2003; Fobil, 2007)) indicate that in the producing countries shea butter accounts for nearly all vegetable fat consumed by rural populations. It serves as an inexpensive alternative to refined imported oils in urban settings. Perakis (2006) noted an increase in consumption of shea oil among both rural and urban poor

in Mali when several cottonseed oil (historically used as cheap cooking oil) companies were closed, resulting in a decreased supply of cottonseed oil on the local market. However, in their analysis of the opportunities and constraints in the shea nut and butter value chain in Ghana, Carette et al. (2009) found that while shea nuts and shea butter production is increasing in Ghana, shea butter consumption around Tamale seems to be decreasing. They attributed the decreased consumption to the fact that people around Tamale make more use of alternative oil products regarded as 'modern' most of which are imported into the country. On the other hand, they explained that the increased production was due to increased demand for shea nut and butter from both southern Ghana and international shea market.

In the global north shea has been used primarily as Cocoa Butter Substitutes (CBS) and in confectionary production. This use accounts for approximately 90% of international sale. The remaining 10% of international sales are absorbed by the cosmetics and pharmaceutical industries. The latter industries are thought to have the greatest near-term growth potential, especially in the USA, which does not allow the use of shea as Cocoa Butter Substitutes (CBS) (Stathacos, 2004). The unsaponifiable (the portion with therapeutic) properties of shea oil makes it attractive for use by the cosmetic industry. Lander (2004) indicates that the main reason for the use of shea butter in high value cosmetics formulation is associated with the unsaponifiable components.

Several studies (Fold, 2000; Elias, 2003; Chalfin, 2004) have noted that shea consumption has increased in the industrialized countries as a result of consumer shifts away from synthetic cosmetics, a phenomenon referred to as the

"naturalizing" of consumption and "green consumerism". The niche market for shea in the cosmetic and pharmaceutical markets demand the highest quality standard as food safety remains an important preoccupation for the European chocolate and confectionary industries.

In a 2009 study of Governance and Upgrading in Non –Timber Forest Products – the case of Shea in Ghana , Scholz indicated that shea nuts quality in Ghana is considered to be high, even though it had previously been negatively affected by poor quality imports and smuggling from neighboring countries. The poor quality in neighboring countries is attributable to the differences in the initial processing techniques and skills. Ghana therefore has a comparative advantage in the area of kernel quality over the other shea producing countries.

In a case study of the Shea Value Chain in Mali, Derks & Lusby (2006) found that Mali had a comparative disadvantage in comparison with Ghana when it comes to shea kernel quality. The authors indicated that Ghanaian shea kernel (nuts) are considered the best quality because unlike the Malian kernels or nuts, Ghanaian kernels (nuts) have consistently lower Free Fatty Acids (FFA) levels, high oil content and are less contaminated by moisture and charcoal from smoke fires and impurities. According to Lovett (2004), the current shea market prefers the following kernel quality (for mechanical extraction and later refinement in EU): Free Fatty Acids (FFA) <6%, kernel fat content 45%-55%, water content <7% and impurities <1%. The study noted that preferences for the cosmetic industry varies but tilted toward kernel qualities such as non-solvent extraction, natural source (organic if possible) , low Free Fatty Acids, 'clean' white to yellow colour instead of grey and high

unsaponifiable fraction (3-12% of total extract).

The gender-specific characteristic of the shea production process contrasted against the monopsonistic oilseed processors has made shea a target for fair-trade purchasing initiatives by a host of socially conscious cosmetic firms (Elias, 2003). Fair-trade and other certification standards schemes are seen as promising strategies of linking vertical and horizontal dimension of value chain upgrading (in the shea industry) (Bolwig et al. ,2008). However, Scholz (2009) noted that trade in certified shea products in food market is almost nonexistent, though it exist marginally in the limited market of cosmetic and pharmaceutical shea products.

2.4.2 Trends in Production and Supply

Shea trees occur naturally in a 5000km long zone, stretching from Sudan to Guinea, with a width of 500km and can be found in twenty countries including Ghana. Figure 4 below shows the countries shea trees are found. In Ghana, the shea tree flourishes extensively in the Guinea Savannah and less abundantly in the Sudan Savannah (FAO 1988a). The shea tree occurs over almost the entire area of Northern Ghana, covering about 77,670 square kilometers in Western Dagomba, Southern Mamprusi, Western Gonja, Lawra, Tumu, Wa and Nanumba, with Eastern Gonja having the most dense stands (CRIG, 2002).

Kernel production is very unpredictable because of climate variation and the three year natural cycle of shea nuts yields. There is also the fact that the shea trees are grown over large areas of the savanna parklands which makes it difficult to obtain reliable production figures. However, in his analysis of the savanna parklands and

Regional shea supply chain, Lovett (2004) estimated both 'potential; and maximum 'actual' shea production figures for all countries across the species range. As much as half (52%) of the total shea harvest in the major WATH producing countries is never collected or utilized, which means that providing stronger economic incentives to women could significantly expand the available supply in the short run. However the study was not able to measure the extent to which tree accessibility, harvest variability or labour availability is constraining increased collection.

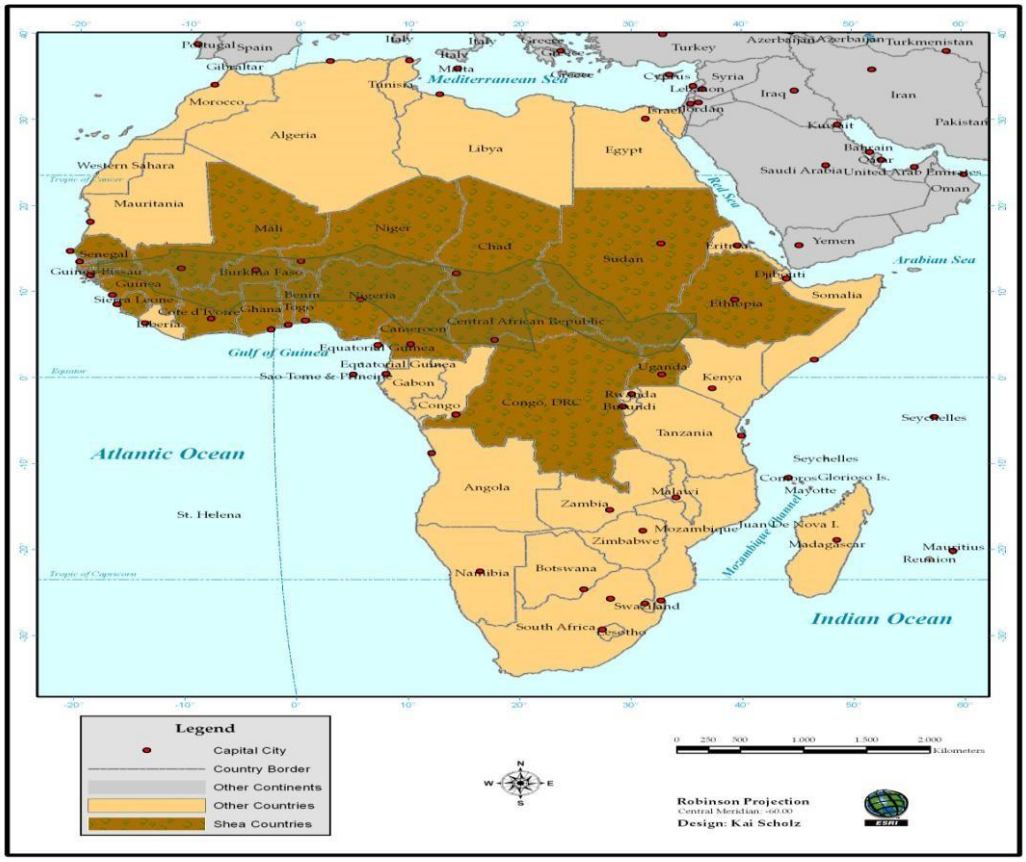

Figure 4: Shea producing countries and the main shea belt *Source: Scholz 2009.*

Ghana's shea industry is believed to be more accurately documented, providing slightly more reliable data on export tonnages. Table1 provides records of shea exports volume and value from Ghana from 2000-2008.

Table 1: Shea nuts (kernels) and shea butter exports from Ghana, 2005-2009

Year	Shea Nuts			Shea Butter		
	Quantity (metric tons)	Price/tonne ($US)	Value ($US'000)	Quantity (metric tons)	Price/tonne ($US)	Value ($US'000)
2005	165.53	175	28,968	0.65	1,451	941
2006	104.80	260	27,249	0.58	1,542	894
2007	57.22	472	27,009	10.30	744	7,660
2008	55.55	449	24,940	4.01	1,617	6,488
2009	67.81	396	26,853	12.57	1,513	19,013

Source: GEPC, 2010 as cited in MOTI 2011

In spite of Ghana's status as a major shea exporter, it is not clear whether all the exports of (about 60,000 to 65,000 t) shea (nuts and butter) per annum are produced in Ghana. It may be assumed that due to its coastal location, neighboring land-locked countries also export their shea kernel and butter through Ghana (FAO 2009; Lovett 2004). According to Scholz (2009) the total potential production in the twenty major shea countries is more than 1,400,000 t dry kernels per annum. But actually, only a little more than 44 % is estimated to be collected annually

(slightly above 620,000 t dry kernel per annum.). The estimated exports are 267,410 t per annum for all countries. The export of raw dried shea nuts is valued at 82% of the total whereas the remaining 18% are exported as shea butter.

One estimate from (WATH, 2009) suggests at least three million rural African women are involved in shea export. Boffa (1999) for instance estimate the total potential production of dry kernel from 500 million producing shea trees (based on five kg dry kernel per tree) to be at 2.5 million tons per annum., while Addaquay (2004) points out that Africa´s potential production is about 1,760,000tonsof raw shea nuts annually. According to this source, out of the total African production of 600,000 tons, only seven West African countries (Ghana, Burkina Faso, Benin, Cote d'Ivoire, Nigeria, Mali and Togo) produce about 500,000 tons of shea nuts annually. These countries export an estimated 270,000 tons as raw nuts and convert the remaining 230,000 tons into roughly 60,000 tons of crude shea butter, half of which is later exported (Addaquay, 2004).

Based on Lovett (2004) estimates, Alhassan (2011) calculated percentage of Ghana's production, consumption, and export of shea (nuts and butter) as a percentage of the total production and supply by the major WATH producing countries.

Table 2: Estimates of shea kernel production and utilization in Ghana and West Africa (equivalent dry kernel/ year)

Parameter	Major West African Producing countries	Ghana	Ghana as a % of major West Africa Total
Total potential production	1,130,000	200,000	17.7
Actual collection	585,000	130,000	22.2
Estimated domestic consumption	321,900	70,000	21.7
Total exports	263,100	60,000	22.8
Exported as kernels	217,000	45,000	20.7

Exported as shea butter	46,100	15,000	32.5

Source: Alhassan, 2011.

Table 3: Shea butter exports from major producing countries

Country	Total shea kernel produced(mt)	Export as shea butter (mt)	Export as shea butter (%)
Benin	35,000	100	0.3
Burkina Faso	40,000	3,000	7.5
Cote d'Ivoire	25,000	10,000	40
Ghana	60,000	15,000	25
Mali	53,000	3,000	6
Nigeria	20,000	0	-
Togo	30,000	15,000	50
All 20 countries	267,410	47,460	18

Source: Alhassan, 2011.

In those major WATH producing countries 55% of the total shea collected is consumed domestically, while 45% is exported. It is estimated that 82.5% of shea exports in these major WATH producing countries is in the form of shea kernels. There would appear to be scope to expand exports of shea butter if technical, quality, and shipping constraints could be resolved in a cost-competitive manner (Lovett, 2004).

2.5 Shea Producer Groups or Associations

Individual women and women producer groups extract about 60% of the crude butter produced in Africa at an extraction rate of 20% using traditional manual processes or methods (Addaquay, 2004). The formation of shea producer groups is mostly facilitated by Non-Governmental Organizations (NGOs) and private

companies. The role of private organizations in forming cooperatives and producer groups has been well documented. Producer groups enable private companies to increase profitability and reduce transaction cost. The producer groups also enable private companies to deal more effectively and efficiently with small holder farmers, enhance the volume and quality of farm produce and improve credit recovery from farmers (Gulatiet al., 2007).

Also, many buyers of produce prefer to deal with producer groups or cooperatives instead of individual farmers because the groups are better able to provide stable supplies of quality products (Vorley et al., 2007). Private buyers transaction cost may be significantly reduced if they deal with groups of farmers selling an aggregated product of homogenous quality rather than with many individuals selling small quantities of uncertain quality (Shiferaw et al., 2011).

According to Perakis (2009) shea cooperatives play the roles of vertical integration, improving bargaining power of women shea kernel and shea butter processors, provides economies of scale in marketing as well as improving access to credit, production input and capital.

Vertical integration, according to Perakis (2009) is said to occur when cooperatives take up one or more upstream or downstream activities ruling out middlemen and potentially increasing returns to production. In Mali, many cooperatives groups identify one woman to transport their product to nearby village or larger trader where they can fetch a better price.

In general individual women cannot access the credit market. Other production inputs and related capital such as donkey, carts (for harvesting fruit and carting butter

to the market), large plastic receptacles or storage sheds are nearly impossible for many rural women to obtain individually. Cooperatives may be able to deal with these market failures by applying for credit and pooling individual resources as a group.

Perakis (2009) notes a potential down side to cooperative marketing of shea in the midst of the numerous advantages. For example the pooling of shea-based products is a source of increased bargaining power of cooperative groups. This involves merging the product of several primary producers and marketing them as a pool. Pooling is important for association level storage and marketing efforts, especially those attempting to achieve the quantity requirements imposed by marketing agents or urban traders. Issues arise when pooling continues despite the failure of certain producers to meet the quality standards set by the organization. The end result is twofold:

First, social dynamics (e.g feeling of solidarity among women) may deter cooperative managers from refusing products of unacceptable quality, resulting in a free-rider behavior. Nugraha (2010) also noted that social norms can pave way for the prevalence of opportunistic behavior. The prevalence of social value "preserving harmonious relationship through the observance of social norms" exerts strong influence on the orientation and thus behavior of individuals in the interaction system between producers and other segment of the value chain. For the actors in cooperative at the community level, any action that could insult the feeling of others or potentially lead to conflict should be avoided. In general, individual tend to avoid

rule enforcement if it is fraught with the potential of inflicting inter-personal conflict, thereby making any rule enforcement difficult.

Secondly, pooling of heterogeneous quality products leads to tainted batches of marketable products. In a worst case scenario, the cooperatives may receive a bad reputation, resulting in lost present and future sale. Pooling may also thwart efforts to improve upstream traceability in the value chain.

In a case study of the shea value chain in Ghana, Scholz (2009) indicated that most of the women interviewed cited they formed their producer groups for the following reason:

- Better marketing of the produce through collective action and improved negotiation power
- Division of labour and input economies of scale
- Management and budgeting skills through training
- Quality and quantity improvements
- Better support of family livelihoods
- Social security system for emergency situations

2.6 Conclusion

There is extensive literature regarding the shea industry, and in particular the shea value chain. The character of the industry as women dominated and also as a non-farm activity has caught the attention of many researchers and organizations aim at reducing poverty among women. But there is no empirical literature regarding comparison of cost structure of the various actors in the shea chain. This study will fill this gap as well as compare other parameters and provide new evidence to achieve

the objectives of the study. The findings will also corroborate or otherwise the literature reviewed in this section.

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CHAPTER THREE

METHODOLOGY

Introduction

This chapter presents the research design and highlights the sampling techniques used, the data collection instruments and data analysis procedure. It also gives description of the study areas

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3.1 Study area

The study was carried out in three administrative districts in the Northern Region. These include Tolon-Kumbungu and Savelugu-Nanton districts and Tamale metropolis (Figure 5). These districts are noted for high production of shea nuts and butter processing. The shea supply chain in these areas are more organized as more shea butter processors are formed into groups and the existence of companies engaged in large scale processing and export of shea butter.

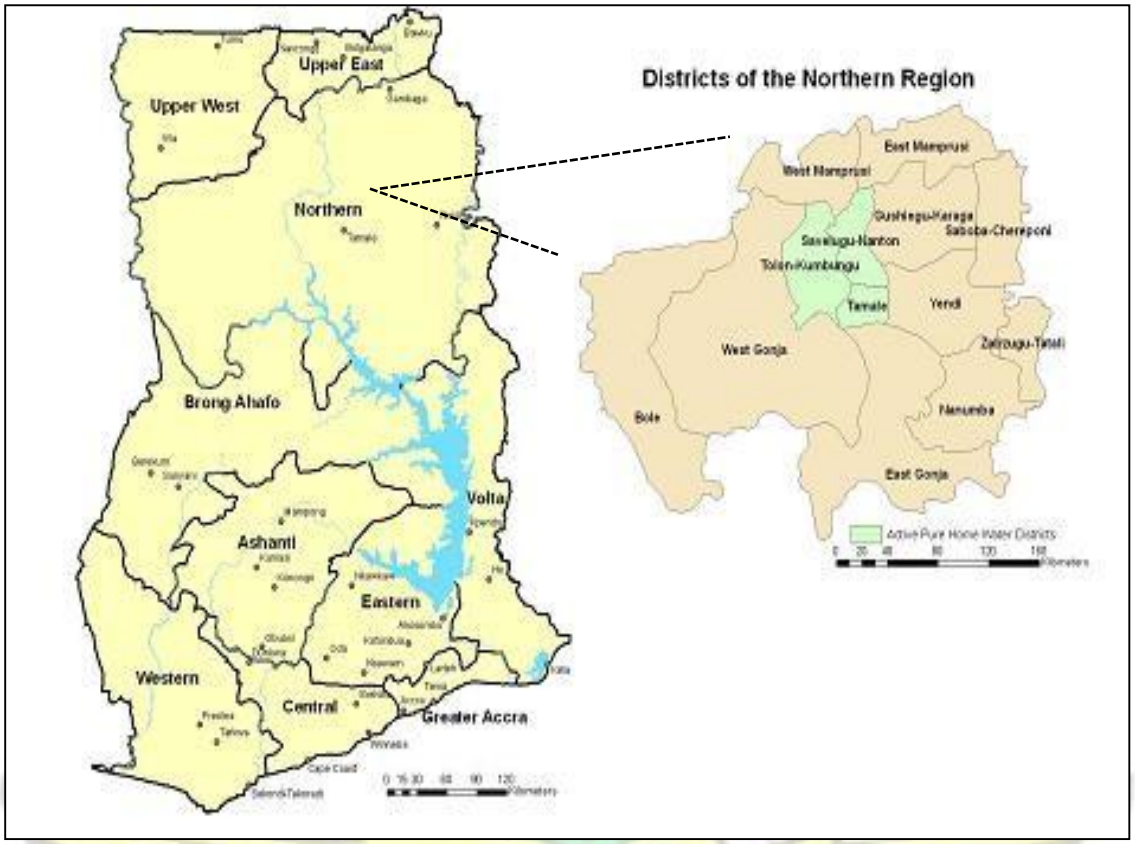

Figure 5: Ghana map showing the study districts

3.1.1 Profile of the study area

3.1.1.1 Savelugu-Naton district

The Savelugu-Nanton covers an area of about 1790.70km^2. It lies between longitudes 0° 30'E and 1°00'East, and latitudes 9° 35'N and 10° 15' N. The district shares boundaries with West Mamprusi to the north, Karaga to the east and Tolon/Kumbungu Districts to the west, as well as Tamale Metropolitan and Yendi Municipal Assemblies to the south and south east respectively.

The population of the Savelugu/Nanton District was 91,415 in 2000 (2000

Population and Housing Census). With a growth rate of 3 per cent, the projected population as at March 2006 was about 109,442. This is broken down into 49 per cent male and 51 percent female.

The area receives an annual rainfall averaging 600mm, considered enough for single farming season. The annual rainfall pattern is erratic at the beginning of the rainy season, starting in April, intensifying as the season advances raising the average from 600mm to1000mm. Temperatures are usually high, averaging 34°C. The maximum temperature could rise to as high as 42°C and the minimum as low as 16°C. The low temperatures are experienced from December to late February, during which the North-East Trade winds (harmattan) greatly influence the District. The generally high temperatures as well as the low humidity brought about by the dry harmattan winds favour high rates of everpotranspiration leading to water deficiencies.

Relating closely to climate and geology is vegetation. The District is located in the interior (Guinea) Savannah woodland which could sustain large scale livestock farming, as well as the cultivation of staples like rice, maize, groundnuts, yams, cowpea and sorghum. The trees found in the District are drought resistant and do not shed their leaves completely during the long dry season. Most of these trees are of economic value and serve as important means of livelihood for women. Notable among these are the shea and the ‘dawadawa’ trees.

The occupation of the inhabitants of the district is mainly farming, including crop farming, livestock rearing, as well as food processing, and petty trading among others. The economy of the District is largely based on agriculture. The sector

engages about 97 percent of the labour force, majority of who produce staple crops on subsistence level (SNDA profile, 2009).

3.1.1.2 Tamale Metropolis

The Tamale Metropolitan Assembly is located at the centre of the Northern Region and covers approximately 922 km^2, representing about 1.3% of the land area of the region (Salifu, 2002). Tamale metropolis is bounded by four different districts in the Northern Region. They include the East and West Mamprusi districts to the south; Savelugu/Nanton district to the north; Yendi district to the east; and Tolon/Kumbungu district to the west.

The population of the metropolis was 300,931 with a growth rate of 3.5% (2000 census). Like most areas of the northern part of Ghana, Tamale metropolis experiences single rainy season which starts from April/May and ends in September/October with a peak season in July/August. The Metropolis records a mean annual rainfall of 1100mm.The dry season starts from November to March with day temperatures ranging from 33^oC to 39^oC while mean night temperature range from 20 ^{o} C to 22^oC.

The Tamale metropolis also lies in the guinea savanna zone characterized by tall grasses and scattered trees. The predominant trees are drought resistant such as shea nut, dawadawa and neem. The economy of the Metropolis is dominated by agribusiness including services and small-scale industries. Currently, it is estimated that about 60% of the people are engaged in agriculture. Major crops cultivated include maize, rice, sorghum, cowpea, groundnuts, soya bean, yam and cassava. (TaMA Profile 2006,).

3.1.1.3 Tolon-Kumbungu district

The Tolon-Kumbungu district has an area of 2,631km^2 and lies at longitudes 10^0 0$^{'}$ and latitudes 9^0 25$^{'}$ and 10º0º1W. The district shares boundaries with West Mamprusi district to the North, West Gonja to the West and South; and to the East with the Savelugu-Nanton district and Tamale metropolis. The district has an estimated population of 135,081 based on the 2000 population census and population growth rate of 3.5% per annum. The population is basically rural with the farming population making up to 90%.Major food crops grown in the district are: cereals (maize, rice, sorghum and millet), root and tubers (cassava, yam and Potatoes), legumes (groundnut, cowpea, soybean, pigeon pea and bambara beans), vegetables (okro, tomatoes, pepper, onions, garden eggs, leafy vegetables) and fruits (cashew, mangoes, water melon and shea fruits).

In terms of climate, the annual average rainfall is 800mm, ranging between 600mm-1000mm. Rain sets in April/May – September/October. The daily maximum temperature is 28ºC to 44ºC. The night minimum temperature is 15ºC to 28ºC.

3.2 Research design, sample size and sampling method

The surveyed population comprised main actors in the shea value chain in the study area i.e shea kernel processors, shea kernel traders and shea butter processors.

The information for the analysis was obtained from primary data collected with the aid of semi-structured questionnaires.

In the absence of any documented list on the number of shea processor groups and the innumerable shea processors and traders in the region, sampling frame was not used during the sampling of the respondents.

Three districts i.e. Tamale metropolis, Savelugu-Nanton and Tolon-Kumbungu districts were purposively selected because a lot of shea processing activities and trade occur there. In each district three communities were selected based on the existence of shea processor groups with not less than three years of existence as of the time of the survey.

Data was collected from a sample of 90 shea butter processors in nine communities using random and snowball samplings techniques. Purposive and random sampling techniques were used in the selection of processors operating in groups while snowball sampling technique was used in selecting processors not in groups. In each community four butter processors belonging to groups and six processors not belonging to groups were selected, except in Kasalgu where six processors belonging to groups and four processors not belonging to group were sampled due to the high number of processors who belong to groups there.

Thus snow ball sampling technique was used to select 50 butter processors who do not belong to groups while purposive random sampling was used to select 40 processors who belong to groups. Purposive was used because there were some butter processors in the groups who were less than three years in the group as of the time of the study.

In all 90 butter processors were surveyed but data from 89 processors were used in the analysis because of the unreasonably high costs of inputs and service charges reported by one particular processor in a group.

In addition 30 shea kernel processors were randomly sampled in six communities. Also 10 shea kernel traders were randomly sampled in the Tamale metropolis for interview. In all a total of 130 respondents were surveyed.

The butter processors and kernel processors were sampled from Gumo, Bognaayili, and Kasalgu in the Tolon-Kumbungu district; Savelugu, Zogu and Yong in the Savelugu-Nanton district. Butter processors and kernel traders were sampled from Gurugu, Jisonayili and Sagnarigu in the Tamale metropolis. Random sampling was used to select the traders. The site for the kernel trader survey was the Tamale aboabo market where out of a list of 60 traders supplied by the secretary of the National Association of Shea Nut Farmers, Processors and Buyers of Ghana (NASFPB) 10 traders were sampled randomly for the interview.

Shea kernel processors were sampled from Zogu, Yong, and Savelugu in SaveluguNanton District; Kasalgu, Tolon, and Bognaayili, in the Tolon-kumbungu District using random sampling. Five respondents were randomly sampled in each community.

In each community data collected included among others general characteristics of processors, and traders as well as costs incurred and revenues earned in processing and trading in shea over a three year period- 2010, 2011 and 2012.

3.3 Estimation of Profits and Margins Distributions in the Shea Chain

Various studies (Dijkhuizen & Huirne, 1997; Zweifel et al., 2009) elucidatedfive basic methods of economic analysis or measures of profitability ie

Gross Margin Analysis (GMA), Cost Effective Analysis (CEA), Cost Utility Analysis (CUA), Partial Budgeting Analysis (PBA) and Cost Benefit Analysis (CBA).

In this study Gross Margin (GM) is used to calculate the profits of actors at the various segments of the shea value chain. Gross margin analysis is chosen for this study because it is the simplest and most practical method of assessing enterprise profitability and it is widely used in farm management economics (Dijkhuizen and Huirne, 1997).The nature of the cost structure in the shea value chain makes GM the appropriate tool since it does not take into account fixed costs which are not found to be incurred by the actors in this study.

Gross Margin equals Price/bag x quantity of shea (bag) less Variable costs. Variable cost incurred by actors in the shea value chain included cost of firewood, water, transportation, loading and offloading, sacks, store rent, milling and crashing.

In this study a 'bag' of butter refers to the amount of butter obtained from processing a bag of shea kernel into butter. The quantity of butter obtained from a 90 kg bag of shea kernel ranges from a minimum of 28kg to a maximum of 38kg of butter per bag. An average of 33kg of butter/bag was therefore used in calculating revenue for butter processors.

3.3.1 Hypotheses of the study

The following hypotheses would be tested:

- There are differences in mean costs of crushing, milling, firewood, transportation and water incurred in a processing a bag of shea kernel into shea butter between shea butter processors operating in groups and shea butter processors not operating in groups.
- There are differences in the mean number of bags of kernel processed into butter and profit earned per bag between shea butter processors operating in groups and butter processors not operating in groups.

3.4 Questionnaire Design, Data Collection and Data Analysis

Three different sets of questionnaires comprising open-ended and close-ended questions were used to collect data from shea butter processors, shea kernel processors and shea kernel traders. In addition key informant interviews were done with secretaries of three of the butter processing groups. The questionnaires for the respondents consisted of five common themes detailing questions to elicit responses from respondents that will answer the research questions and ultimately achieve the objective of the study. The thematic areas include:

a. General household information
b. Household wealth
c. Membership of shea producer group
d. Cost, Marketing and Margin
e. Production and marketing constraints.

The questionnaires were pre-tested in Kanfihayili in the Kumbungu sub-district on 3 butter processors, and 3 collectors while the questionnaire for the kernel traders was pre-tested on three traders at the Kumbungu market.

3.4.1 Data Collection

Data for the survey was collected by the researcher and two assistants. The assistants were taken through the questionnaire to enable them get the import of the questions in the context of the research questions and objectives. The researcher and the assistants translated each questions from English to Dagbani and a common translation for each question was adopted to elicit the appropriate responses. Refresher training for questionnaire administration was done since the assistants were both university graduates.

3.4.2 Theoretical and Analytical Frameworks

The theoretical framework for this study is based on the overarching theory of value chain analysis proposed by DFID (2008). According to this theory, VCA for staple food commodities is based on four aspects:

i. Systematically mapping the actors ii. Identifying the distribution of benefits of actors in the chain iii. Examining the role of value and quality upgrading in the chain and iv. Highlighting the role of governance in the chain

The analytical framework employed in this study is adapted from the shea VC model in Ghana advanced by Brabeck et.al (2009)

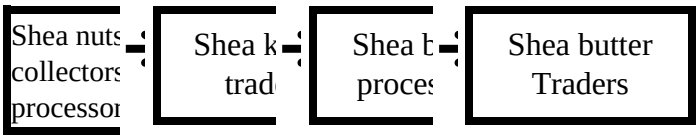

Figure 6: A basic shea value chain

3.4.2 Data Analysis

A total of 129 out of 130 questionnaires were valid and used for the analysis. Descriptive and inferential statistics were used to analyze the data. The descriptive statistic included percentages, means, frequencies and standard deviations. Independent sample t-test was used to test mean differences between shea butter processors operating in groups and shea butter processors operating individually with respect to specific costs in shea butter processing, number of bags of kernel processed per year and profit per bag.

The gross margin was calculated using the expression:

Gross Margin = Price/bag x quantity of shea (bag) – Variable costs

The gross margin represents the percent of total sales revenue that the actor in the shea chain retains after incurring the direct costs associated with producing the goods and services sold by the actor. The higher the percentage, the more the actor retains on each cedi of sales to service its other costs and obligations.

Data was analyzed using excel and spss. Descriptive and inferential statistics as well as averages and percentages were used in analyzing the data collected from shea processors and traders in order to draw meaningful interpretation of the data.

In order to identify major constraints faced by actors in the shea chain, respondents were asked to rank a number of possible constraints from 1 (biggest constraint) to 5 (the smallest constraint).The results are expressed as a percentage of

total responses to each constraint so as to give an idea of the major constraints most actors are facing in the shea industry.

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CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Demographic Characteristics of respondents

4.1.1 Butter Processors

Table 4 shows details of the demographic characteristics of sampled butter processors. The variable, gender was not included in the analysis because all sampled respondents were females. Educational level of respondents was low with only 9% attaining primary education while 91% do not have formal education. 92% of respondents indicated they were married while 8% indicated they were not married. It is interesting to note from table 4 that 29% of respondents reported having no any other source of income besides shea butter processing while another 29% of the

processors indicated farming as another source of income. Majority of the respondents (49.4%) get their drinking water from pipe borne sources.

Table 4: Demographic characteristics of sampled shea butter processors

Variable		Frequency	Percentage (%)
Education	Primary	8	9.0
	No formal	81	91.0
Marital status	Married	82	92.1
	Not married	7	7.9
Other sources of income	Nothing else	29	32.6
	Trading in food stuff	19	21.3
	Petty trading	5	5.6
	Farming	29	32.6
	Charcoal burning	3	3.4
	Other	4	4.5
Source of drinking water	Piped water to the house	9	10.1
	Public tap	35	39.3
	Bore hole	29	32.6
	Dam	16	18.0
Male household member in or completed SHS	Yes	22	24.7
	No	67	75.3
Female household member in or completed SHS	Yes	7	7.9
	No	82	92.1
Variable		**Mean**	**Std. deviation**
Age		44.51	10.73
Household size		10.29	3.24
Female children		2.47	1.28
Male children		2.42	1.25
Female children in or completed Primary school		1.35	1.12

Male children in or completed primary school	1.56	0.93

Source: Field survey, 2012/2013.

The average age of butter processor is 44.5 years with a minimum of 22 years and a maximum of 65 years. The average household size of the respondent was 10.3 members with a minimum of 5 and a maximum of 21 people. The mean household in the study sample is higher than the national average of 4.4 members per household (GSS, 2010). Table 4 further shows that more male household members are either in or have completed SHS (24.7%) compare with females

(7.9%).

4.1.2 Kernel Processors

From table 5 it can be seen that majority of kernel processors (93%) do not have formal education. The mean age of shea kernel processor is 41 years with a minimum of 30 years and a maximum of 54 years. Household size of respondent was above the national average of 4.4 members per household (GSS, 2010) at 12 members per household with a minimum of 6 and a maximum of 20 members.

Table 5: Demographic characteristic of sample shea kernel processors

Variable		Frequency	Percentage (%)
Education	Primary	2	93.3
	No formal	28	6.7
Marital status	Married	27	90.0
	Not married	3	10.0
Other sources of income	Nothing else	4	13.3
	Trading in food stuff	5	16.7
	Petty trading	1	3.3
	Farming	12	40

	Other	8	26.7
Source of drinking water	Piped water to the house	3	10
	Public tap	15	50
	Bore hole	7	23.3
	Dam	5	16.7
Male household member in or completed SHS	Yes	4	13.3
	No	26	86.7
Female household member in or completed SHS	Yes	2	6.7
	No	28	93.3

Variable	**Mean**	**Std. deviation**
Age	40.96	7.1
Household size	12.07	3.53
Female children	2.27	1.44
Male children	2.53	1.27
Female children in or completed Primary school	1.66	1.02
Male children in or completed primary school	1.46	1.04

Source: Field Survey, 2012/2013.

4.2 Value Chain Analysis

4.2.1 Mapping the shea butter value chain in the Northern Region

The flow of shea in the supply chain is complex and involves varied actors. According to Lovett (2004) there are a wide range of stakeholders in the shea industry including shea nuts collectors and post- harvest processors of dry kernel at

the village level; local buying agents (LBAs); rural or urban traditional butter processors; large-scale exporters of shea kernel; large-scale processors (mechanical extraction and export) of shea butter based 'in-country'; small-scale entrepreneurs formulating cosmetics based on shea butter in Africa; external (US, EU, India and Japan) large-scale buyers and processors of kernel and butter; external entrepreneurs or companies formulating cosmetics based in shea butter; and, external entrepreneurs or companies formulating edible products, including Cocoa Butter Equivalents (CBEs) or Cocoa Butter Improvers (CBIs) based in shea butter.

Shea butter VC starts with nuts collected from the farm lands or in the wild by rural women (figure 7). The nuts are eaten leaving the seeds which the collectors processed into shea kernel.

The kernels are bought direct from women kernel processors and in local markets by kernel traders for export and for sale within the region and elsewhere in the country. Butter processors also buy the kernel for processing into butter. Butter processors include companies engage in mechanical extraction as well as women who engage in manual extraction of the butter.

Women group processors are often sub contracted by companies and individual exporters who have received orders from southern Ghana or from abroad to produce butter for them to buy. Most often the companies who engage these women's group bring their own packaging materials with their company names embossed on them. Some of the women groups also manufacture soap and cosmetics from the shea they processed for sale. Among the groups investigated during the study, the Kasalgu shea butter processing centre, Sagnarigu shea butter processing centre and the Gurugu

shea butter processing center (Tiehisuma) are active in producing branded soaps and cosmetics from the butter they processed.

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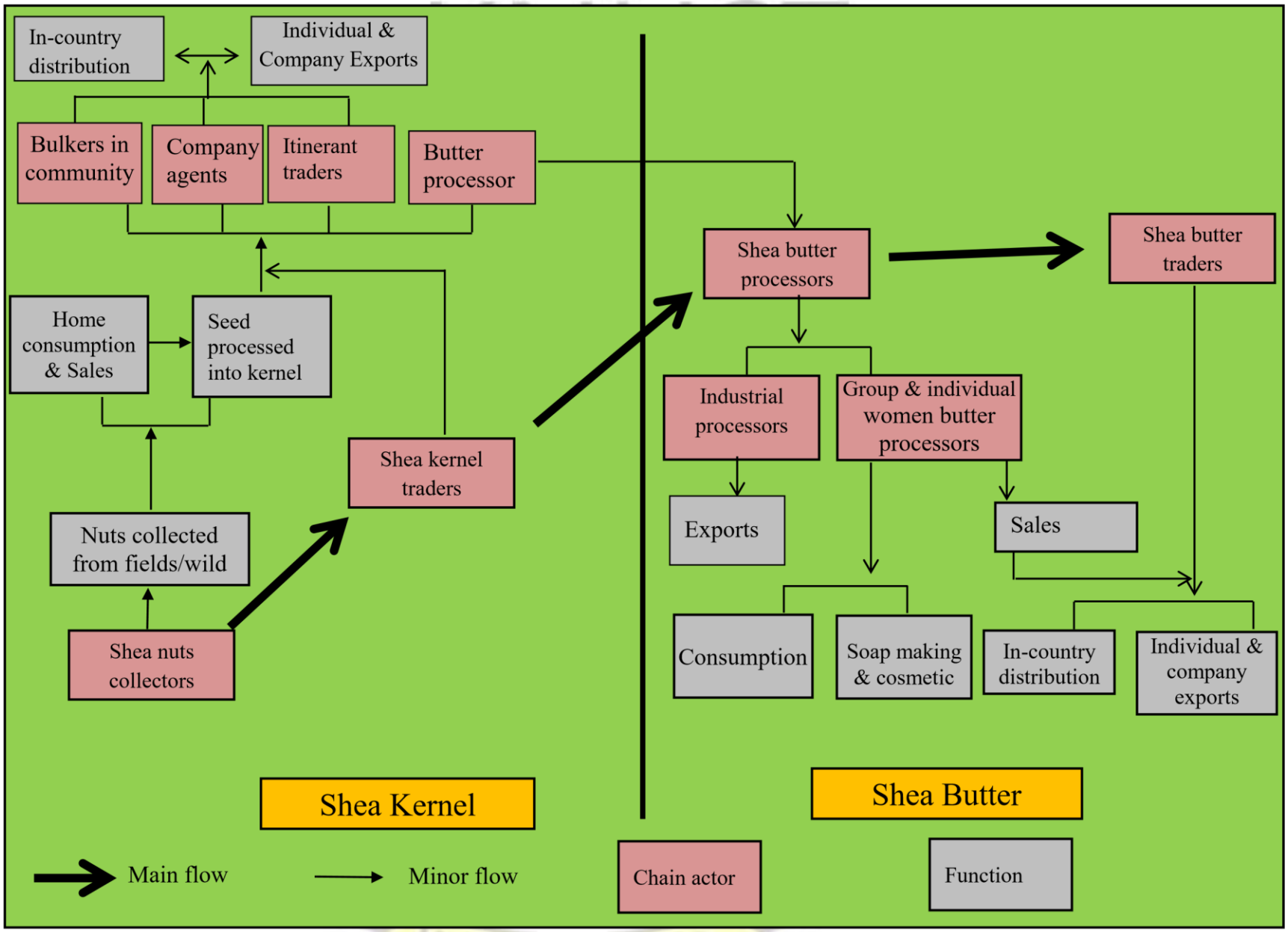


Figure 7: Shea Supply Chain in Northern Region

Source: Own design

4.2.2 Chain Actors and Value Adding Activities

Table 6 itemizes the chain actors and their value adding activities. Chain actors are categorized by experts into direct and indirect actors. Direct actors refer to those involved in commercial activities in the chain (such as shea kernel processors, shea butter processors and traders in shea kernel and butter). Indirect actors are those that provide financial or non-financial support services such as Governments and Non-Governmental Organizations (NGOs), research institutions, credit agencies and other business service providers (Kit et al.2006).

This section highlights the role of direct actors in the shea value chain, specifically shea nut collectors and kernel processors, shea butter processors and shea butter traders.

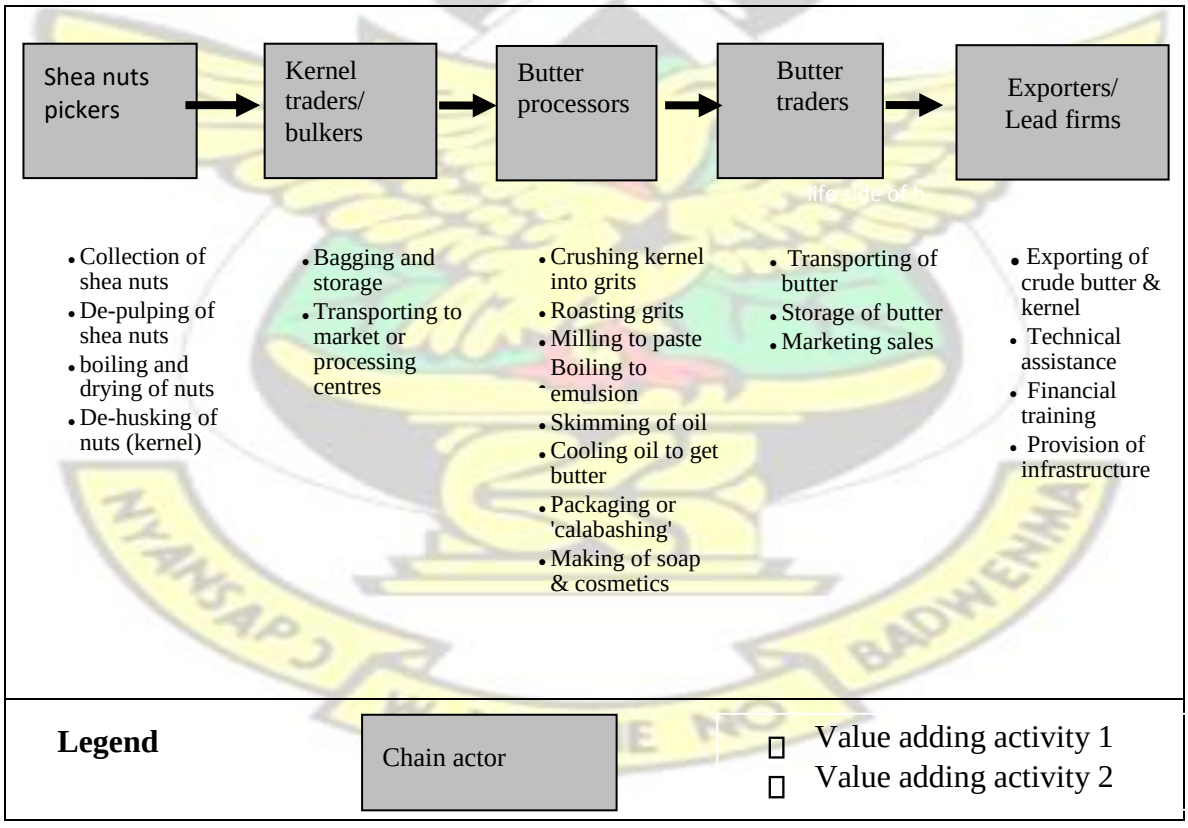
4.2.2.1 Shea nuts collectors/ shea kernel processors

The shea collectors are mainly women and young girls. They leave early in the morning to pick shea fruits. Picking is done on family farm lands and in the wild. When the nuts are brought home they are processed into kernel.

The picking season usually starts in April/May and ends in August/September. This coincides with the traditional hungry season, when work on the subsistence farms is physically most demanding, but the crops are not yet ready to be harvested. The pulp of the shea nut also serves as a nutritious snack during this time and is sold as shea fruit on local markets and at the roadside (Scholz, 2009).

4.2.2.2 Traders of kernel and butter

This is the stage of the shea chain where men are actively engaged, though women still dominate. Carette et. al (2009) investigated 29 bulk shea butter traders in Tamale aboabo market and found that 90-95% of the stores were run by women and only 10-5% by men. But men have strong financial capacity and are able to trade in large volumes of both shea kernel and shea butter. Traders have been grouped into small scale and large scale (Scholz, 2009). Large scale traders contract middlemen as well as community members and pre- finance them to bulk for them for later transport to processing companies or for export. **Table 6: Shea VC actors and their value adding activities**



Source: own design, 2012/2013

4.2.2.3 Butter processors

Butter processors are mainly women. Some of the processors are also involved in picking nuts from the wild. The survey results show that 67% of the butter processors interviewed also do collection and processing of shea nuts into kernel. Butter processing is manually done by both processors who are into groups as well as those who process individually. According to Addaquay (2004) individual women or groups of women extract about 60 % of all the crude butter in West Africa at an extraction rate of 20%. Butter processing has received a lot of attention from NGOs and butter exporting companies leading to upgrading of a lot of activities in this segment of the chain.

4.3 Governance and Upgrading

4.3.1 Governance and coordination

The shea VC in the Northern region is buyer driven as the critical governing role is played by buyers. Shea butter buyers usually supply the butter processors with raw materials (shea kernels) for butter processing. Buyers do dictate the quality and specification of the butter they want in terms of color and texture. Many of the buyers also provide their branded packaging materials for the butter processed by the butter processors for packaging.

Pre-financing is pervasive in the shea value chain, at both kernel and butter processors levels of the chain. Table 7 shows the extent of pre-financing among butter processors.

Table 7: Pre-financing for butter processors

Group status	Pre-financed by buyers?	
	Yes	No

	Freq.	%	Freq.	%
Non -Group	27	**54.0**	23	**46.0**
Group	37	**95.0**	2	**5.0**

Source: Field Survey, 2012/2013

95.0% of butter processors operating in groups have been pre-financed while 54.0% of butter processors operating individually reported they have been pre-financed to process butter. The high rate of pre-financing among butter processors operating in group could be attributed to more trust by buyers as a result of belonging to groups.

On the other hand it takes relatively shorter time for individual butter processors to receive their money after delivery compared to processors who are in groups. Table 8 below shows the breakdown:

Table 8: Time taken to get paid after delivery of butter to buyers

Status	**Time taken to get paid after delivery**							
	Immediately		Within one week		Within two weeks		More than two weeks	
	Freq.	**%**	Freq.	**%**	Freq.	**%**	Freq.	**%**
Non-Group	26	**52.0**	15	**30.0**	8	**16.0**	1	**2.0**
Group	11	**28.0**	7	**18.0**	8	**21.0**	13	**33.0**

Source: Field survey, 2012/2013

From table 8, it can be seen that 52.0% of butter processors not belonging to groups reported receiving payment immediately after delivery of butter while it is 28.0% for processors operating in groups. The longest period of payment after delivery of butter is more than two weeks, and 33.0% of processors in groups reported being paid after two weeks and only 2.0% of processors operating individually reported being paid two weeks after delivery.

4.3.2 Upgrading in the shea VC

End market conditions are the main drivers of upgrading. The various upgrading that has occurred in the shea value chain, particularly the butter processors stage is discussed below:

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Process upgrading

The shea butter processing stage of the shea value chain has undergone process upgrading in response to the quality standards demanded by buyers and also to become more efficient by cutting costs and increasing output through economies of scale.

The Processing centers are equip with facilities and equipment (water source, corn mill, grinders, crushers and roasters) for processing. This has lowered the unit cost per butter processor operating in group compared with butter processor operating individually.

Vertical and horizontal linkages have occurred at the butter processor stage of the VC making it possible for transfer of information and knowledge, finance or credit, and input as well as learning among the group. The star shea network, the Sekaf shea butter company and Savanna Fruit Company were mentioned by butter processors as those they have collaboration with through training and provision of equipment as well as financing.

Trainings have been organized by NGOs and private companies trading in shea butter for shea butter processors to equip them with skills to be able to produce better quality for the market. Training relating to the best ways to harvest or pick the nuts

from the field, the best way to process kernel into butter, the proper handling and storage ways for nuts and kernel before processing as well as grading and sorting.

Table 9 shows that butter processors operating in groups have received more training than butter processors who are not into groups. All butter processors belonging to groups (100%) reported receiving or taken part in trainings relating to shea while only 34% of butter processors who do not belong to groups reported taken part in training.

Table 9: Butter processors participation in training on shea

Status	Taken part in training on shea?			
	Yes		No	
	Freq.	%	Freq.	%
Non-Group	17	**34.0**	33	**66.0**
Group	39	**100.0**	0	**0.0**

Source: Field survey, 2012/2013

Some of the organizations mentioned for conducting training on shea included Sekaf, SNV, Technoserve, Savanna Fruit Company and Starshea.

Product Upgrading

Product upgrading is also motivated by changes in end markets stemming from changes in consumer preference. Because of quality standard demanded by shea butter buyers abroad, especially in the cosmetic industry, butter processors are given the information by intermediaries, especially exporters leading to product upgrading. The

butter produced now contains less impurities and odor. The production of organic butter by some centers is part of product differentiation occurring in the shea VC.

Functional Upgrading

Functional upgrading is motivated by the desire to eliminate the market power of intermediaries. When the market intermediaries are eliminated the functions formally performed by intermediaries are taken up by producers or buyers. In the butter trade for instance, intermediaries of butter processors operating in groups have been reduced, allowing direct transaction between butter exporters and butter processors. Because of the organized functions played by butter processors groups, buyers contact them directly for orders.

Functional upgrading also entails moving to new level of the VC. This has occurred because a number of the processor groups are making value added secondary products such as modern cosmetics and soaps from shea butter.

4.4 Cost Structure and Margins of Actors

4.4.1 Butter processors

Table 10 lists the cost elements of butter processors and corresponding average costs disaggregated into butter processors operating in groups and butter processors not operating in groups.

Table 10: Average cost for group and non-group butter processors: 2010-2012

	2010	2011	2012

Cost element	Group (GhC)	NonGroup (GhC)	Group (GhC)	NonGroup (GhC)	Group (GhC)	NonGroup (GhC)
Shea kernel	30.73	31.49	39.59	37.85	41.41	40.23
Firewood	3.35	3.72	4.61	4.53	5.69	5.92
Water	0.80	1.46	0.80	2.08	1.38	2.73
Transport	2.02	2.00	2.13	2.07	2.43	2.48
Crushing & milling	4.13	4.94	4.72	5.21	5.45	6.73

It can be observed from the table that except for the costs of water, crushing and milling, there is no major difference in average costs of the other costs elements between processors in groups and individual processors. Butter processors who do not operate in groups incur more costs on water as well as crushing and milling relative to processors who belong to groups. This is due to the fact that many butter processors in groups have mills and water sources at their processing centers and they are charged lower rates compared with mills elsewhere. Processor groups who have water sources at their centers pay between GhC 1.00 and GhC1.50 per month for water, regardless of the amount of kernel processed into butter. This lowers the unit cost on water for the processors who have water sources at their centers. Over the three year period under study, butter processors who do not belong to groups spent an average of GHC 2.09 on water per bag of shea kernel. On the other hand processors who belong to groups have spent GHC0.99 on water per bag over the last three years under study.

Another cost saving area for butter processors in groups is transportation to the point of sale. Processors organized into groups are always contacted for the product by their buyers and do not incur any delivery cost in terms of transport. However for processors not organized into groups they usually have to incur transport costs to the markets or delivery centres to sell. The cost of delivery was captured as 'other' costs in this study because these are costs that are not always incurred because processors who operate individual are also sometimes get contacted by buyers who will come for the product, thus eliminating the cost of delivery by the individual processors.

Table 11: Average cost of materials in processing a bag of shea kernel into shea butter

Cost Component	**2010 (GhC)**	**%**	**2011 (GhC)**	**%**	**2012 (GhC)**	**%**
Shea kernel	31.12	**71.82**	38.72	**73.22**	40.82	**69.79%**
Firewood	3.56	**8.21**	4.57	**8.64**	5.79	**9.90**
Water	1.14	**2.63**	1.43	**2.70**	2.06	**3.52**
Transport	2.01	**4.64**	2.09	**3.95**	2.50	**4.27**
Crushing & Milling	4.56	**10.52**	4.98	**9.42**	6.12	**10.46**
Other	0.94	**2.17**	1.09	**2.06**	1.20	**2.05**

Source: Field survey, 2012/2013

Table 11 above presents direct production costs in processing a bag (90kg) of shea kernel into butter for the period 2010 to 2012 as well as corresponding percentage breakdown. The variable costs component for butter processors are shea kernel, firewood, water, transport, and crushing and milling costs. Shea kernel is the main raw

material in shea butter. From table 11, average cost of a unit bag of shea kernel has steadily risen up from GhC 31.12 to almost GhC 40.82 from 2010 to2012, with a mean cost of GHC37.00 over the three years. Similarly, the mean unit cost in processing a bag of shea kernel into shea butter of firewood, water, transport and crushing and milling are GhC 4.64, GhC1.54, GhC 2.20 and GhC5.20 respectively.

The percentage distribution of costs of the materials involved is illustrated in figure 8. Shea kernel constitutes the highest cost component for butter processors at about 72%, 73% and 70% in 2010, 2011 and 2012 respectively. Cost of crushing and milling is the next highest cost component for butter processors at about 11%, 9% and 10% in the period 2010, 2011 and 2012 respectively. From table 11 it can be seen that cost of milling and crushing has steadily increased from an average of GhC 4.56 in 2010, GhC 4.98 in 2011 and GhC 6.12 in 2012.

The absolute costs of crushing and milling have steadily risen over the period for both processors in group and individual processors. However the averaging of the two groups of processors is responsible for the fluctuation in percentages of these costs over the period, giving the fact that there is a significant difference in costs of water, crushing and milling incurred between the two groups.

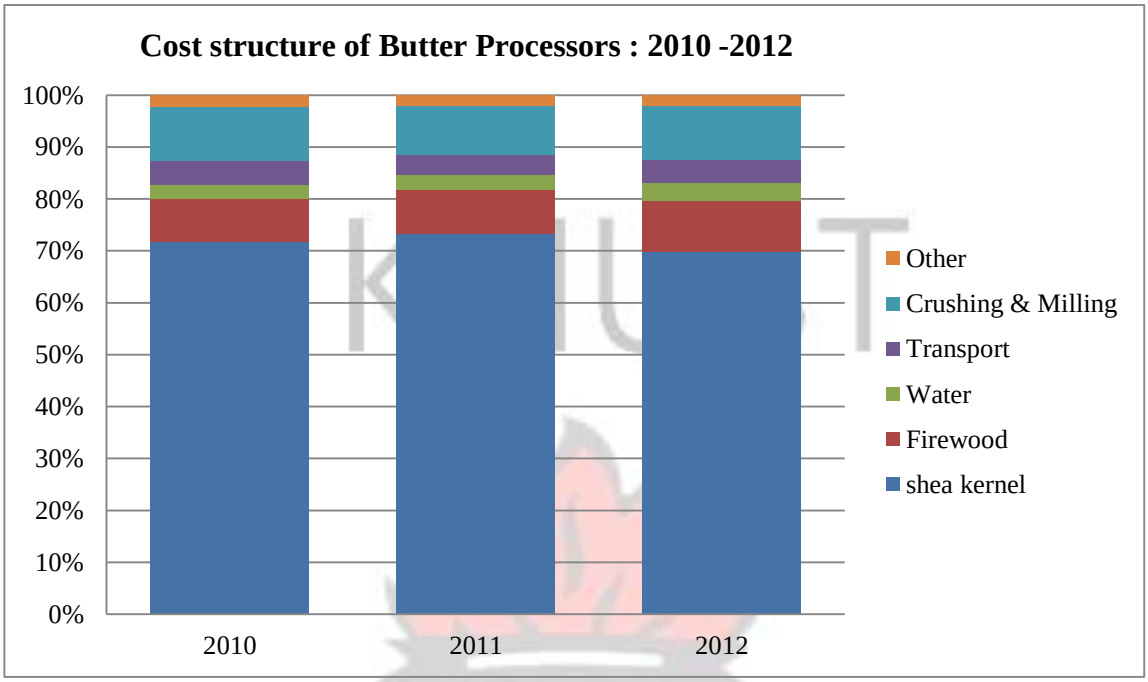

Figure 8: Cost structure of shea butter processors

Source: Field survey, 2012/2013

From figure 8 it can be seen that the next highest contributor to cost of butter processors over the three years is the cost of firewood. Cost of firewood incurred in processing a bag of kernel into butter has steadily risen from an average of GhC 3.56 in 2010, GhC 4.57 in 2011 and GhC 5.79 in 2012 representing 8.2%, 8.6% and 10% respectively of total cost of butter processors.

4.4.2 Kernel traders

Table 12 below indicates the cost elements of shea kernel traders. Transportation is the highest contributor to cost of kernel traders with an average cost of GhC1.8 representing 33 per cent of total cost in 2010 (figure 9).Transportation continued to be the main contributor to cost of kernel traders in 2011 and 2012 at 38% and 37% respectively. The least contributor to cost of shea kernel traders is the loading and

offloading cost at 11% in 2010 and 2011 and at 10 % in 2012. This shows that the rate of increase in loading and offloading cost is less relative to other cost elements such as transportation, store rent and sacks.

Table 12: Cost component of shea kernel traders: 2010-2012

Cost component	2010 (GhC)	%	2011 (GhC)	%	2012 (GhC)	%
Transportation	1.80	**33.33**	2.34	**38.81**	2.86	**37.34**
sacks	1.50	**27.78**	1.50	**24.88**	2.00	**26.11**
store rent	1.50	**27.78**	1.50	**24.88**	2.00	**26.11**
loading and offloading	0.60	**11.11**	0.69	**11.44**	0.8	**10.44**
	5.4	**100**	6.03	**100**	7.66	**100**

Source: Field survey, 2012/2013

From table 12, store rent and cost of sacks remained unchanged in 2010 and 2011 at GhC 1.50, but saw an increase of GhC 0.50 each in 2012, representing an increase of about 33.33% in that year. This has increased contribution to total cost of sacks and rents to 26.11% in 2012. The percentage distributions of the other cost elements over the period 2010-2012 are illustrated in figure 9 below:

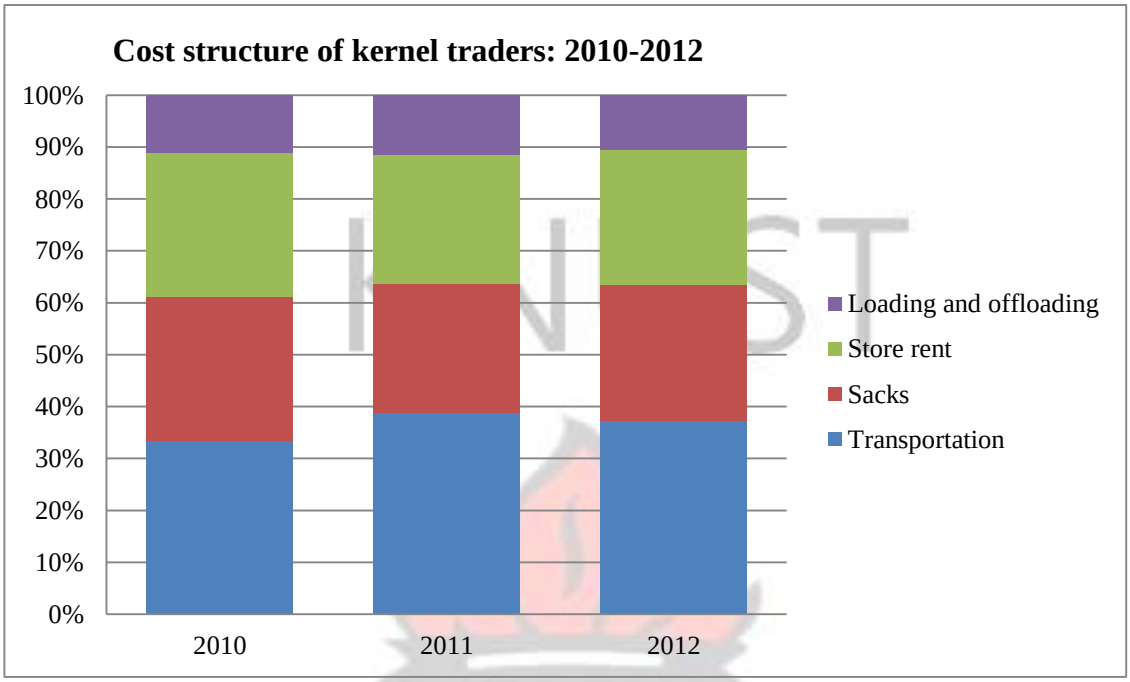

Figure 9: Cost structure of shea kernel traders *Source: Field survey, 2012/2013.*

4.4.3 Kernel Processors

There are two main contributors to cost of kernel processors. These are listed in table 13 below.

Table 13: Cost component of shea kernel processors: 2010-2012

Cost component	2010 (GhC)	%	2011 (GhC)	%	2012 (GhC)	%
Firewood	1.8	**67.67**	2.06	**69.59**	2.5	**70.22**
Water	0.86	**32.33**	0.9	**30.41**	1.06	**29.78**
	2.66	**100**	**2.96**	**100**	**3.56**	**100**

Source: Field survey, 2012/2013

It can be seen from table 13 that fire wood is the main contributor to cost of kernel processors at about 68% in 2010 and 70% in 2011 and 70.22% in 2012.

Addaquay (2004) found that processing 18.5 kg of shea nuts required 48kg of wood to process and 67 liters of water. Scholz (2009) observed that there is a potential for improving performance of shea kernel processors by modifying the use of firewood and water.

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4.5 Gross Margin and Cost distribution

4.5.1 Gross margin

The gross margin for each actor was calculated by subtracting the variable costs from the revenue generated by the actor. In this study the unit of measurement is bags. But in the case of shea butter processors, revenue for each year was arrived at by multiplying the average amount of butter in kilogram obtained from a bag of shea kernel and the average price for that year. The average amount of butter obtained from 90kg of shea kernel is 33kg of butter.

In 2010 the price per kg of shea butter ranged from 1.2/kg to 1.5/kg with an average of 1.35/kg of butter. Table 14 below shows the minimum and maximum prices for 2011 and 2012.

Table 14: Maximum and Minimum price of shea butter/kg: 2010-2012

2010		2011		2012	
Min.	**Max**	**Min.**	**Max.**	**Min**	**Max**
1.2	1.5	1.5	1.9	1.9	2.2

Source: Field survey, 2012/2013

Table 15 presents the gross margin of the various actors for the year 2010 to 2012. It can be seen that shea collectors gain the highest margin per bag in cedi terms, from

GhC25 in 2010 to GhC 30.6 in 2012. The lowest gainer in cedi terms is butter processors ranging from lowest at GhC7.3per 'bag' in 2011 to 11 GhC per 'bag' in 2012.

Table 15: Profit margins of chain actors: 2010-2012

Actor	2010 (GhC)	2011 (GhC)	2012 (GhC)
Collector	25.0	34.5	30.6
Trader	15.5	21.4	16.7
Butter processor	10.06	7.25	11.42

Field survey, 2012/2013

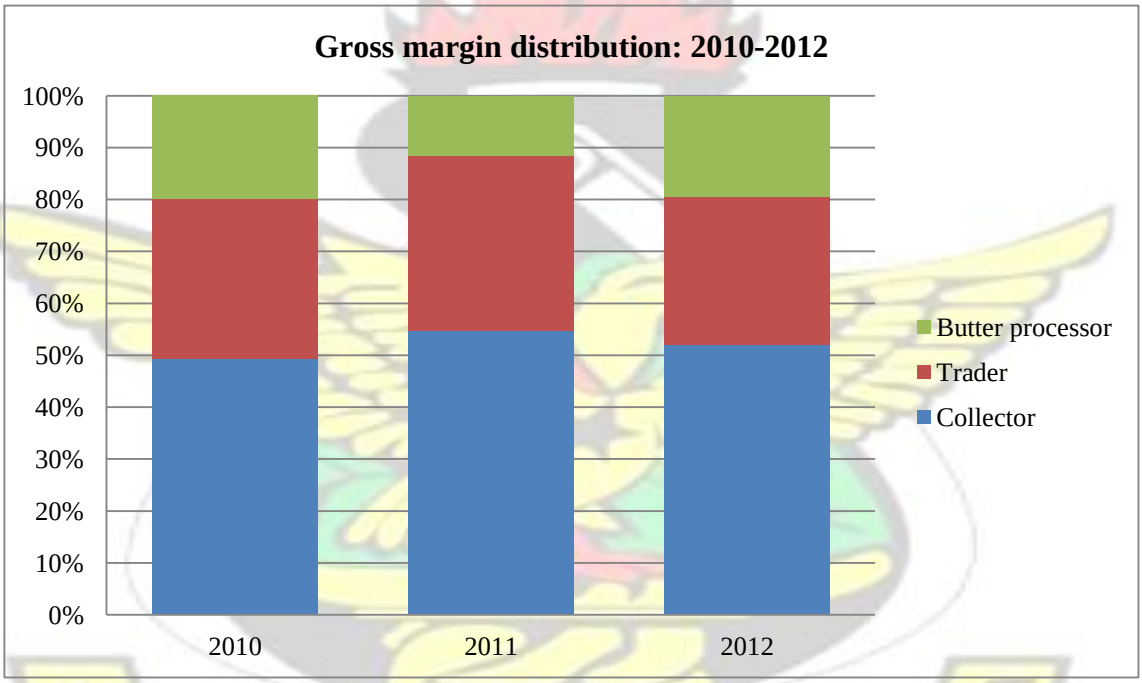

Figure 10: Gross margin distribution in the shea VC

Source: Field survey, 2012/2013

Figure 10 illustrates the percentage distribution of gross margin among the various actors. It can be seen from figure 10 that in 2010 kernel processors earned the largest margin (49%) followed by kernel traders at 31% with the lowest margin (20%) going to

the butter processors. The low margin of butter processors is due to the high cost involved in processing the kernel into butter.

4.5.2 Cost distribution

As can be seen from table 16, butter processors incur the highest cost per bag among the shea actors. In 2010 the cost incurred by butter processors in processing a bag of shea kernel into butter is GhC 38, while it is only GhC 5.4 and GhC 2.6 for kernel traders and collectors/kernel processors respectively for the same period. Shea nut collectors/kernel processors incur the lowest costs among all the actors (Table 16).

Table 16: Cost distribution among chain actors: 2010-2012

Actor	**2010** (GhC)	**2011** (GhC)	**2012** (GhC)
Butter processor	38.82	53.24	58.85
Kernel processor	2.66	2.96	3.56
Kernel trader	5.4	6.03	7.66

Source: Survey results, 2012/2013

Figure 11 illustrates the percentage distribution of cost in the shea value chain among the direct actors. In 2010 butter processors borne the largest cost, 82% in 2010, 85% in 2011 and 83% in 2012; while the lowest cost was borne by nut collectors/kernel processors at 11% in 2010, 9% in 2011 and again 11% in 2012 (figure 11).

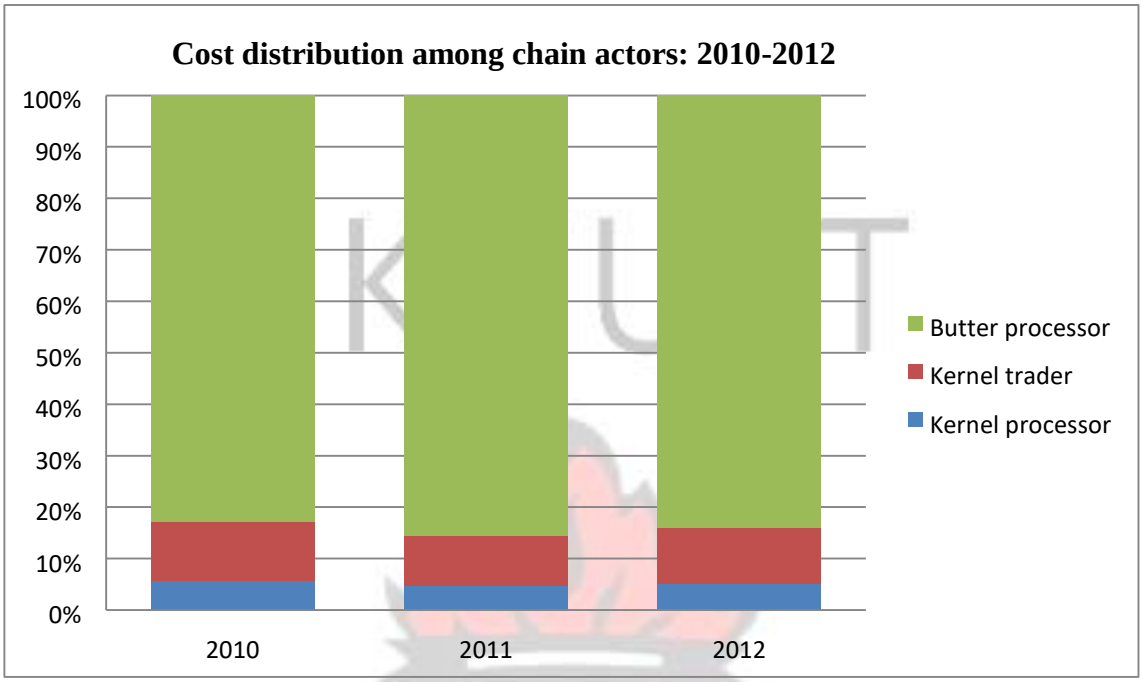

Figure 11: Percentage cost distribution in the shea VC

Source: Field survey, 2012/2013

4.6 Comparison of butter processors in group and butter processors not in groups.

An independent sample t-test was conducted for the period 2010, 2011 and 2012 to compare shea butter processors operating in groups and shea butter processors operating individually with regards to specific variables. These variables include number of bags of kernel processed into butter annually, profit per "bag" of butter as well as the cost elements identified in section 4.3; specifically cost of firewood, water, crushing and milling, as well as transportation cost.

In 2010 there was a significant difference in the number of bags of shea kernel processed per year for butter processors belonging to groups (M=11.82, SD= 4.45) and processors not belonging to groups (M=9.46, SD=4.24); t (87) =2.55, p= 0.013

(see appendix II)

In 2011 the t-test results show a significant difference in number of bags of kernel processed between processors belonging to groups (M=9.82, SD=4.81) and processors not belonging to groups (M=7.94, SD=3.85); t (87) =2.05, p=0.043. There were similar results for 2012 which show a significant difference in the number of bags of kernel processed for butter processors operating in groups (M=11.41,SD= 4.92) and butter processors not operating in groups (M= 8.62, SD=3.49);t (87) = 3.13,p= 0.002.

The t-test results also revealed significant differences between the two groups in terms of profits as well as cost incurred on water, crushing and milling (appendix II).

The results revealed no significant differences between the two groups with regards to costs incur on firewood and transportation (appendix II). The results of the t-test confirm the hypotheses that there are differences in profits earned between butter processors operating in groups and butter processors operating individually.

These results suggest that if a butter processor belongs to a group she would have significant economic benefits. Specifically she would processed more kernel into butter, incur lower cost on water, crushing and milling; and ultimately increased profit.

4.7 Challenges faced by actors along the chain

Figure 12 presents some of the challenges faced by actors along the shea chain. Participants in the shea chain face various challenges including price variability of shea kernel, cutting down of shea nuts trees for charcoal, fluctuation demand for shea butter, aging and low bearing shea nuts trees among others.

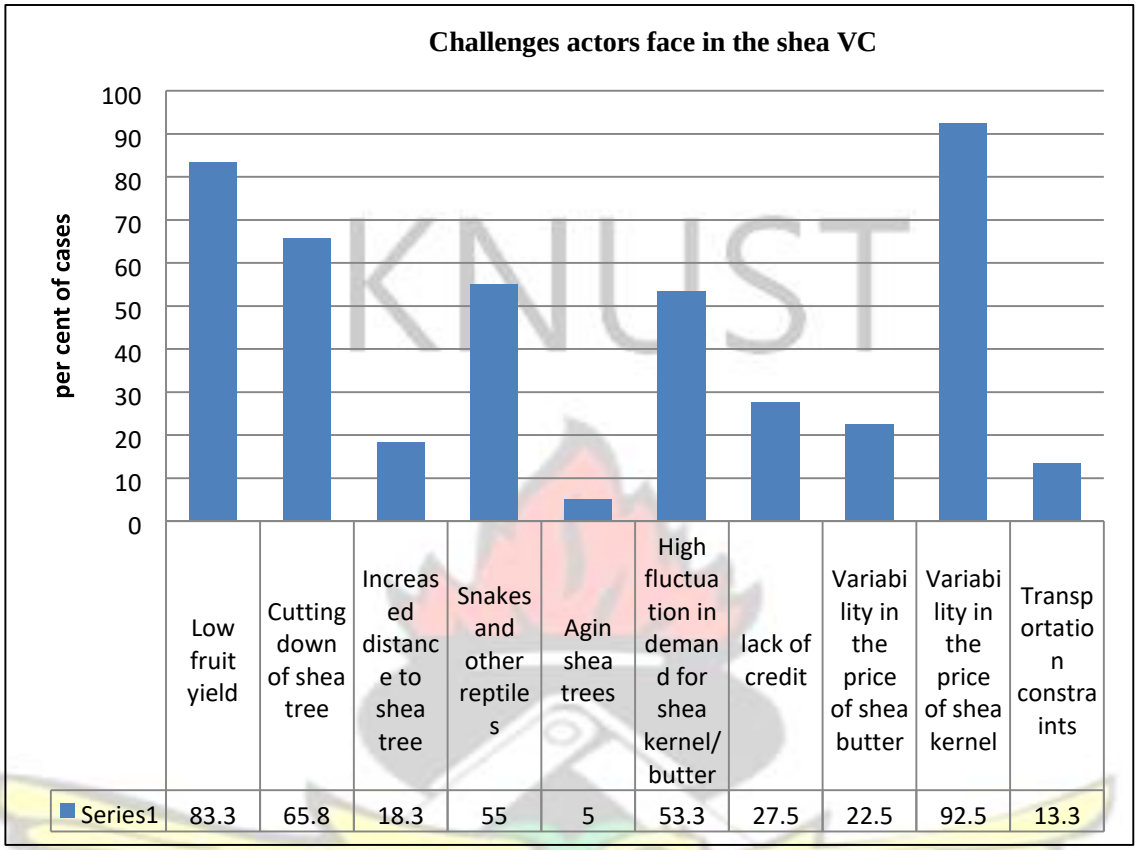

Figure 12: Challenges faced by shea VC actors *Source: Field survey, 2012/2013.*

Variability in price of shea kernel

Majority of actors (92.5%) consider variability in price of shea kernel as the biggest challenge. The price of shea kernel could increase several folds within the year. In 2011 shea kernel sold as low as GhC 0.7 per 2.4kg bowl to as high as GhC 2.50 per 2.4kg bowl. Carrette et. al (2009) also observed that shea kernel prices could rise to about three times in the dry season from the initial price in the harvest season.

They recorded that in 2008 during the harvest season kernel price was $ 0.11/kg and $0.36kg in the dry season. This works out to about GhC 0.16 /kg in the harvest season and GhC0.53/kg in the dry season (using exchange rate of 1GhC= $0.68 in July, 2008)

Price variability of shea kernel presents both opportunities and challenges for various actors. Traders who dabble in price speculation buy kernel during the harvest season and store away awaiting higher prices in the dry season to sell. In many cases shea kernel processors are forced to sell even when they knew prices could rise in the future. This is because many rural households during this season (June-August) are in need of money to buy food since farm crops are not yet ready for harvesting during this period. Women often sell kernels early in the season when prices are low, due to lack of cash flow and a lack of pre-financing opportunities. As a result, they miss the opportunity to sell at a higher price later in the season when the nuts have fully dried and the quality is better (Rammohan, 2008).

Shea butter processors bear the brunt of increase in price of shea kernel. Shea butter processors do not feel they have power over pricing of shea butter. They are price takers. A butter processor in Gurugu, AyishetuTahiru said that “the butter buyers are “united” but we (butter processors) are not united. If you refuse to sell at the price they set others will sell to them. This shows the extent to which butter processors feel disadvantaged. Butter traders and exporters are well organized and are always able to dictate price/kg of butter. On the other hand the shea kernel trade is less organized and its trade is loaded with speculations.

The strategy of butter processors is always to buy enough kernels when prices are low for storage in order to process later. But then here too the question of capital comes

in as many butter processors are not able to find capital to buy large quantities of shea during the harvest season. Many processors indicated they have been approached by many micro credit providers but they rejected it because in their view they will not gain profit as they will use all they make to pay the micro financial institutions in the form of interest rates. But they are ready to take loans from institution that will charge 'moderate' interest on the loans.

It must be noted here that when shea kernel prices are high many butter processors are not able to buy partly because if they buy at the prevailing price during the dry season and process they will make losses and partly also because they do not have the money to buy at such high prices. During this times however, companies and individual supply their own kernels to the women group to process for them for fee or at pre-arrange price per kg of butter.

□ Low fruit yield

Low fruit yield was ranked second (83.3%) by respondents as the most challenge they face. This has direct effect on supply of shea kernel and therefore has effect on demand and prices. This leaves shea kernel supplies highly unpredictable. Schreckenberg (2004) noted that apart from climate variation, the shea tree exhibits a three year natural cycle of yields resulting in unpredictability of productivity both in terms of individual trees of the same species and on an annual basis making sustainable production difficult.

Cutting down of shea nut trees

The third most important constraint faced by chain actors is the cutting down of shea trees. Many respondents, almost 66% indicated that cutting down of shea trees is a concern. This is a major concern to the extent that, chiefs and traditional leaders in some shea producing areas have instituted measures to discourage the cutting down of shea trees for the purpose of making charcoal. In spite of campaign against the cutting down of shea trees the practice is still rampant in many shea nuts growing areas. In areas where mango plantations are being established, shea trees are always cut down to make way for planting mangoes. Carrette et al (2008) also found that the factors that are considered most threatening for regeneration of shea trees is the cutting down of shea trees and the lack of sufficient fallowing to enable regeneration.

Snakes and other reptiles

Shea collectors are exposed to snakes and other reptiles as they go about collecting the nuts from farms and in the wild. From figure 12, 55% of respondents ranked snakes and reptiles as a challenge. Carette et al (2009) in her study of the shea nut and butter value chain indicated that majority of respondents mentioned that early picking of the nuts is a challenge because in the early hours of the day there is little light and visibility is low presenting the risk of getting bitten by snakes or scorpions. In addition to that the snakes are also attracted to shea nuts. Shea nuts collectors have been sensitized to use wellington boots and hand gloves during collection of nuts to minimize the risk of getting bitten by snakes and other reptiles. However, this call has not been put into practice. None of the shea nut collectors interviewed in this study indicated she uses

hand gloves or wellington boots when they go to collect nuts. Some go bare footed to collect the nuts.

Related to snakes is the issue of bush burning. Carette et al (2009) found that reason giving by some people for setting fires to the bush is partly to scare the snakes and other dangerous animals from the fields.

Butter processors in this study also reported encountering snakes from the heaped of fire wood they buy for purpose of processing kernel into butter.

• High fluctuation in demand for butter/ kernel

From figure 12 it is clear that 53.3% of respondents in the study regarded fluctuation in demand for butter /kernel as a constraint. Other studies (Rammohan, 2010, Fold 2008) found that demand for shea butter/kernel is affected by market prices of cocoa butter and cocoa butter alternatives. In a case study of the collaboration in the shea sector in Ghana between PlaNet finance and SAP, the author found that one of the key challenges their initiatives faces in the shea VC is the fact that demand for shea butter is currently weak (Rammohan, 2008). In 2007 for instance there was low demand for butter which many attributed to the world economic crises at the time leading to oversupply of shea kernels. This exposes shea actors to losses as there is no guarantee market in the shea industry unlike cocoa.

• Variability in the price of shea butter

22.5% of respondents indicated variability in price of shea butter as the most constraint they face. Unlike shea kernel, prices of shea butter do no vary as much because the shea butter trade seems to be more organized relative to shea kernel trade

and lead firms have more control. The major issue is the fluctuation in demand for the butter

The vegetable fat in shea nuts is used as cocoa butter improver (CBI) and this is a cheap substitute for cocoa butter. The prices of cocoa and shea are therefore linked to each other (Fold, 2008).

Increased distance to shea tree

Some percentage of actors in this study (18.3%) ranked increased distance to shea nuts trees as a constraint. Due to rapid population growth and urbanization access to shea trees are becoming a challenge. There is virtually no shea nut collection going on in the Tamale metropolis for example. Elias and Carney (2007) reported that shea collectors canvas an area within a radius that extends between one to three kilometers from their household during collection of nuts. With expansion of settlements it may suggest that in future collectors will have to go beyond three kilometers from their residences in order to collect enough. This phenomenon also emphasizes the call for shea nuts trees to be domesticated instead of allowing them to continue to grow in the wild.

Transportation constraints

All actors in the shea value chain require some means of transport. From figure 12, it can be seen that 13.3% of respondents ranked transportation as a constraint. Sometimes shea collectors organize some type of transportation back to their homes when the source is far from their homes (Scholz, 2009).

The introduction of tricycles, popularly called ‘motor king’ in the Northern region has made transportation more accessible to many rural populations. Many shea butter processors and shea traders patronize them. The advantage of using the motor king as reported by some butter processors is that, the motor king will take your kernels to your processing center or your place of residence, but if you board other commercial lorries they will discharge your goods at some place and you will still have to find means to convey it to your preferred destination which attracts additional cost.

Aging shea trees

Aging shea trees appear to be the least constraint of actors in the shea value chain as only 5.0% of respondents ranked aging of shea trees as a challenge. However, studies have found that on a longer term, anthropogenic selection of the trees, the age and regeneration influence the shea nut yield. Various authors have noticed an aging trend of shea trees which they attributed to the shortening of fallow periods due to land pressure and population growth (Carette et al. 2009).

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CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This Chapter presents summary of the main findings of the study as well as conclusions and policy recommendations. It also highlights the limitation to the study and suggestions to guide future research in the shea value chain.

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5.1 Summary of Findings

The study revealed that organizing butter processors into group has economic benefits. Butter processors operating in groups get to process more kernels on average compared with processors who do so individually. They also enjoy economies of scale especially with regards to water, crushing and milling costs.

An independent t-test result revealed there are significant differences between butter processors operating in groups and those operating individually. In 2010, there was significant difference (p= 0.013) in the number of bags of kernels processed into butter between group processors and individual processors. Also in 2010, in terms of other elements such as profit, a p-value of 0.003 was recorded indicating significant difference between the two groups. The t-test results for 2010 also found significant difference between the two groups with regards to cost incurred on water, crushing and milling with a p- value of 0.001 and 0.000 respectively. However, the study found no significant difference between the two groups with regards to cost incurred per bag on firewood (p-value =0.186) and cost of transport (p-value =0.702) .The trend was the same in 2011 and 2012 (appendix II).

The study further found that shea butter processors get the lowest profit margin of

11.0% to 20.0% while kernel processors receive the highest margin of 49.0% to 55.0%. However in terms of costs, butter processors bear 83.0% to 86.0% while nut collectors/kernel processors bear the lowest cost of 9.6% to 11.0%.

The demographic data also show low literacy rate among respondents. Only 10% of respondents had primary education. Demographic data also show that more male than female household members have been to senior high school or completed senior high school (24.7%) for male household members and 7.9 % for female household members.

Mean number of children for respondents was 2.47 for female children and 2.42 for male children. Out of these, an average of 1.35 female children are in or have completed primary school while an average of 1.56 male children are in or have completed primary school.

The study highlighted the challenges faced by chain actors. Majority of respondents, 92% consider variability in the price of shea kernels as the biggest challenge while 83% consider low shea fruits yield as next biggest challenge. Minority of respondents (5%) consider aging of shea trees as the most serious challenge.

5.2 Conclusions

The application of the VCA to the shea supply chain has been revealing. It provided a comprehensive understanding and realistic picture about the nature of costs and margin distribution among the chain actors as well as the interactions and interdependence among the actors.

Among others the following findings were made from the study:

Among the shea chain actors studied, shea butter processors received the lowest profit margins (16.67%) while shea collectors received the biggest margin (52%). In addition, shea butter processors also incur the highest cost while shea kernel processors have the lowest costs- 84% for butter processors and 7% for shea nut collector/kernel processors.

The study supported the hypotheses that shea butter processors operating in groups processed more kernel into butter and earn higher profits than butter processors operating individually. The study also found significant differences between shea butter processors operating in groups and processors operating individually in terms of cost incurred per bag on water, crushing and milling. Butter processors operating in groups spent on average less on these elements relative to butter processors operating individually. However, there were no significant differences between the two groups with regards to cost of firewood and transportation of kernels. Some level of process, product and functional upgrading has occurred in the butter processors segment of the chain while there is little upgrading in the shea kernel processors and traders stage of the shea chain.

5.3 Policy recommendations

In the light of the findings of the study, the following recommendations are made:

To ensure that butter processors obtain competitive prices for the butter they process and be able to influence prices and have control in the shea VC, they should form community based shea butter processors committees in all communities, followed by district level shea butter processors committee and then a regional shea butter processors

apex body. This will give them a voice and power to engage other stakeholders, both direct actors and indirect actors in the shea value chain including policy makers.

Government should set up shea board and come out with regulatory framework that will guide the conduct of all the actors in the shea chain including regulating prices of shea to protect shea actors particularly kernel processors and butter processors so as to increase the benefits they derive by participating in the shea chain.

In order to minimize or stop completely the cutting down of shea nut trees for firewood and making of charcoal, government should collaborate effectively with traditional leaders in the shea producing areas to carry out public education and sensitization on the need to protect and conserve shea trees.

Government should also resource research institutes like CSIR and SARI to domesticate the shea nut tree by developing shea seeds and seedlings with desirable characteristics for distributions to farmers to encourage the establishment of shea farms and plantations.

Non- Governmental Organizations and other relevant bodies should replicate similar strategies that led to the formation and functioning and thriving of shea butter processor group for shea nut collectors because the shea collectors and shea kernel traders association only exist in name.

5.4 Limitation to the Study and Suggestion for future research

The limitation to the study may be the fact that it is limited to only three administrative districts which were purposively selected and focused on only nine butter processor groups out of the numerous butter processor groups scattered across the

Northern Region. Therefore the observations and conclusion in the study may be more typical of these processor groups and actors investigated in this study. Also, relatively limited samples of the actors were interviewed due to budgetary constraints. Therefore one should be careful in generalizing the findings of the study to all actors in the chain. Also in computing the profits of the actors only direct cost were used, alternative uses of the product including portion of shea nuts and butter consumed by actors as well as use of by-products, particularly for butter processors were not factored into the calculations.

In the light of the above I suggest that future research in this area should consider larger sample sizes of the actors and track the flow and prices of shea butter beyond the Northern region to capture the costs and margins of butter traders so as to give a comprehensive picture of the shea VC as well as costs and margins distribution among all the direct actors in the chain. Also future research should cost by-products and its alternative uses by actors and use in computing their profits and margins.

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Appendices

Appendix I: Questionnaire

QUESTIONNAIRE FOR SHEA BUTTER PROCESSORS

SECTION 1: GENERAL HOUSEHOLD INFORMATION

Date of Interview: _____ Name of enumerator: _____

1. Name of respondent: _____
2. Name of community: _____
3. Name of District: _____
4. Age of respondent: _____

5. Gender: **1** **[ ]** Male **2** **[ ]**Female

6. Educational level: **1** [ ] No formal education **2** [] Primary
3 [ ] JHS **4** [] SHS
7 **[ ]** Other

7. Marital status: **1** [ ] Married **0** [ ] Not married

8. Household size?
_____ Male
_____ Female

9. Is there any male member of your household who has completed SHS?
1 **[ ]** Yes **2** **[ ]** No
10. Is there any female member of your household who has completed SHS?
1 [ ] Yes
2 [ ] No 11. How many children do you have? _____ Male
_____ Female
12. How many of the children are in or have completed primary school?
_____ Male
_____ Female

SECTION 2: HOUSEHOLD WEALTH

1. Does your household have?

	1= yes **2**= no		**1**= yes **2**= no
Electricity		Lorry or tractor	
Radio		Mobile phone	
Television		motorcycle	
Bicycle		Sheep or goats	
Motor king		Cow or donkey	
Computer			

2. What is the main source of drinking water for your household?
1 [ ] Piped water to the house **2** [ ] Public tap
3 [ ] Borehole **4** [ ] Dug well
5 [ ] River or stream **6** [ ] Dam
9 [ ] Other, specify _____

SECTION 3: MEMBERSHIP OF PRODUCER GROUP

1. Are you a member of shea butter processors association?

1 [ ] Yes
0 [ ] No

{If not a member please go to Qn. 9}

2. If you are a member, what is the name of your association?

_____

3. Who facilitated the formation of this association?

5 [ ] Self- help group (self initiative)
6 [ ] An NGO/ company; (provide name)

_____

4. How long (years) have you been a member of this group? _____
5. At the time you were joining the shea butter processors group, what were your expectations? Please rank by ticking the appropriate box (1= Most important, 2= More important; 3= important; 4=Less important; 5= Least important)

Reason	Rank				
	1	2	3	4	5
To sell at a better or higher price	[ ]	[ ]	[ ]	[ ]	[ ]
To get access to credit	[ ]	[ ]	[ ]	[ ]	[ ]
To encourage me to save money	[ ]	[ ]	[ ]	[ ]	[ ]
To get easy market for my butter	[ ]	[ ]	[ ]	[ ]	[ ]
Foster unity with other women in the community	[ ]	[ ]	[ ]	[ ]	[ ]
To receive training on shea	[ ]	[ ]	[ ]	[ ]	[ ]
To get equipment support/ tools	[ ]	[ ]	[ ]	[ ]	[ ]
To get market information	[ ]	[ ]	[ ]	[ ]	[ ]

6. Are your expectations for joining the group being met?

1 [ ] Fully met
2 [ ] Not met
3 [ ] Partially

7. Please rank in order of importance the areas you have benefitted by joining the group
(1= Most beneficial, 5= least beneficial)

Benefits enjoy as a group member	**Rank**				
	1	2	3	4	5
I sell at a better or higher price	[ ]	[ ]	[ ]	[ ]	[ ]
I get access to credit	[ ]	[ ]	[ ]	[ ]	[ ]
I save money through the group	[ ]	[ ]	[ ]	[ ]	[ ]
I get guaranteedmarket for the butter	[ ]	[ ]	[ ]	[ ]	[ ]
I enjoy unity with fellow women in the community	[ ]	[ ]	[ ]	[ ]	[ ]
I receive training on shea	[ ]	[ ]	[ ]	[ ]	[ ]
I get equipment support/ tools	[ ]	[ ]	[ ]	[ ]	[ ]
I get market information	[ ]	[ ]	[ ]	[ ]	[ ]

8. Do you undertake the following activities collectively?

	1= yes 2= no
Purchase of inputs/ shea kernel	
Processing	
Marketing of shea butter	
Sourcing credit	
Saving part of profit	

9. ***{ Ask9&10 if not member of a group}*** Why do you not belong to a group?

1 [ ] I was not there when the group was being formed
2 [ ] Leaders of the group frustrates my effort to join
3 [ ] My schedules will not allow me
4 [ ] I am not aware of any group
5 [ ] I do not see the need to join any group
7 [ ] Other, specify_____

10. What kind of collaboration do you have with the producer association in your community?
    1 [ ] Sometimes they buy butter from me
    2 [ ] They give me advice on what kind of butter consumers want
    3 [ ] I have no collaboration with any producer association
    4 [ ] Other (Please specify) _____

11. Apart from shea butter processing what else do you do for a living?
    1 [ ] Nothing else
    2 [ ] Trading in food stuff (grains)
    3 [ ] Petty trading
    4 [ ] Farming
    5 [ ] Charcoal burning
    6 [ ] Other _____

12. Do you have access to credit?
    1 [ ] Yes
    2 [ ] No

SECTION 4: COST, MARKETING AND MARGINS

1. Do you have any contract market for the shea butter you produce?
    1 [ ] Yes
    2 [ ] No

2. How do you dispose of your butter?
    1 [ ] The buyers come to me
    2 [ ] I take the butter to the buyers

3. Who are the main buyers of your butter (**tick all that apply**)? **1** [ ] Company agents
    2 [ ] Butter traders/bulkers in the community
    3 [ ] Local butter processing companies **4** [ ] Individual butter exporters/ traders
    5 [ ] Individual consumers
    77 [ ] Other

4. What portion of your total output does the **main buyer** buy from you?
    4 [ ] 0- 25%
    3 [ ] 26-50%
    2 [ ] 51- 75%
    1 [ ] 76-100%

5. How long does it take to get paid by the main buyer after selling the shea butter?
   1 [] Immediately the butter is delivered or at the point of sale
   2 [] Within one week after delivery
   3 [] Within two weeks after delivery
   4 [] More than two weeks after delivery
   5 [] The next shea season

6. Do you get pre-financed by your buyers?
   1 [ ] Yes **2** **[**] No
7. Who determines the time you dispose of your product
   1 [] Myself
   2 [] The company/buyers
8. Which of the following butters are you able to supply?
   1 [ ] Conventional butter only
   2 [ ] Organic butter only
   3 [ ] Both organic and conventional butter
9. Do you do collective marketing of your butter?
   1 [ ] Yes **2** [ ] No
10. Have you ever taken part in a training/workshop on shea?
    1 [ ] Yes
    2 [ ] No
11. If Yes, tick (√) which of the following aspects were you trained on and who provided the training?

	Aspect		By whom
1.	Conservation of shea nut trees	[]	
2.	Harvesting or picking shea nuts from the field	[]	
3.	Processing nuts into butter	[]	
4.	Handling thenuts before processing	[]	
5.	Storage of butter	[]	
6.	Grading or sorting butter	[]	

12. What were the lowest and highest prices you bought shea kernels for processing and how many bags did you buy in each period?

Year	**Lowest price(GhC)**	**No. of bags**	**Highest price (GhC)**	**No. of bags**
2010				
2011				
2012				

13. Please provide information on total number of bags of kernel processed into butter, quantity of butter obtained and unit prices in each period.

year	Total number of bags of kernels	Quantity of butter obtained (kg)	Lowest price sold/unit (GhC)	Highest price sold/unit (GhC)
2010				
2011				
2012				

14. What materials were involved in processing 1 bag of kernel into butter and how much did each cost you in each period?

Item/material	Unit	2010			2011			2012		
		Unit Price	Qnty	**Total**	Unit Price	Qnty	**Total**	Unit Price	Qnty	**Total**
Firewood										
Water										
Transportation										
Milling										
taxes										
Levies										
Other costs - -										

15. What did you spend the money you got from sale of shea butter on last year (Tick all that apply)?

1 [] Purchased food
2 []Purchased farm inputs or farming services
3 []Spent the money on medical bills
4 [] Spent the money on social activities
5 [] Spent the money on education
9 [] Other; _____

16. How will you describe your shea butter processingbusiness over the past three years:

	1=Yes 2= No
The quantity of shea butter processed has consistently increased	
The amount of money I make on shea butter sales has increased	
More people come looking for butter than before	
I have acquired new skills in shea butter processing	
I use protective gears during picking of shea nuts in the field	

17. How did you always get your kernels to process into butter?

1 **[**] Picked all by myself/ my family supported me
2 [ ] Bought all the nuts
3 [ ] Picked some and bought some

18. Who helps you in your butter processing business?

1 [ ] My husband
2 [ ] My daughters
3 [ ] My sons
4 [ ] others specify _____

SECTION 5: PRODUCTION AND MARKETING CONSTRAINTS

A. PRODUCTION CONSTRAINT

1. Rank the following constraints in order of severity to you
(1= Most severe, 2= More severe; 3= Severe; 4=Less severe; 5= Least severe)

	Constraint	Rank				
		1	**2**	**3**	**4**	**5**
1.	Low fruit yield	[ ]	[ ]	[ ]	[ ]	[ ]
2.	Cutting down of shea trees for charcoal	[ ]	[ ]	[ ]	[ ]	[ ]
3.	Distance to shea nuts has increased	[ ]	[ ]	[ ]	[ ]	[ ]
4.	Snakes and other reptiles on the field	[ ]	[ ]	[ ]	[ ]	[ ]
5.	Aging shea trees	[ ]	[ ]	[ ]	[ ]	[ ]
6.	Lack of credit	[ ]	[ ]	[ ]	[ ]	[ ]
7	Storage problem	[ ]	[ ]	[ ]	[ ]	[ ]

8.	Competition for my time betweenfarm activities and shea butter processing	[ ]	[ ]	[ ]	[ ]	[ ]

B. MARKETING CONSTRAINTS

1. Rank the following constraints in order of severity
(1= Most severe, 2= More severe; 3= Severe; 4=Less severe; 5= Least severe)

	Constraint	Rank				
		1	2	3	4	5
1.	Higher fluctuation in demand for the butter	[ ]	[ ]	[ ]	[ ]	[ ]
2.	Buyers have more power over price setting	[ ]	[ ]	[ ]	[ ]	[ ]
3.	Variability in prices for butter	[ ]	[ ]	[ ]	[ ]	[ ]
4.	Variability in prices of shea nuts(kernels)	[ ]	[ ]	[ ]	[ ]	[ ]
5.	Transportation constraints	[ ]	[ ]	[ ]	[ ]	[ ]
6.	Quality demand of buyers are too high	[ ]	[ ]	[ ]	[ ]	[ ]

QUESTIONNAIRE FOR SHEA NUTS COLLECTORS

SECTION 1: GENERAL HOUSEHOLD INFORMATION

Date of Interview: _____ Name of enumerator: _____

13. Name of respondent: _____
14. Name of community: _____
15. Name of District: _____
16. Age of respondent: _____

17. Sex: **1** **[ ]** Male **2** **[ ]**Female

18. Educational level: **1** [ ] No formal education **2** [] Primary
3 [ ] JHS **4** [] SHS
5 [ ] Tertiary **7** **[ ]** Other

19. Marital status: **1** [ ] Married **0** [ ] Not married

20. Household size?

_____ Male
_____ Female

21. Is there any male member of your household who has completed SHS?
1 **[ ]** Yes **2** **[ ]** No

22. Is there any female member of your household who has completed SHS?

1▒ [ ] Yes
2▒ [ ] No 23. How many children do you have?

_____Male
_____Female

24. How many of the children are in or have completed primary school?

_____ Male
_____Female

SECTION 2: HOUSEHOLD WEALTH

3. Does your household have?

	1= yes **2**= no		**1=** yes **2**= no
Electricity		Lorry or tractor	
Radio		Mobile phone	
Television		motorcycle	
Bicycle		Sheep or goats	
Motor king		Cow or donkey	
Computer			

4. What is the main source of drinking water for your household?

1▒ [ ] Piped water to the house **2**▒ [ ] Public tap
3▒ [ ] Borehole **4**▒ [ ] Dug well
5▒ [ ] River or stream **6**▒ [ ] Dam
9▒ [ ] Other, specify_____

SECTION 3: MEMBERSHIP OF PRODUCER GROUP

13. Are you a member of shea nut collectors association?

1▒ [ ] Yes
0▒ [ ] No

{If not a member please go to Qn. 9}

14. If you are a member, what is the name of your association?

_____

15. Who facilitated the formation of this association?

5▒ [ ] Self- help group (self initiative)
6▒ [ ] An NGO/ company; (**provide name**)

_____

16. How long (years) have you been a member of this association?

_____

17. At the time you were joining the group, what were your expectations? Please rank by ticking the appropriate box (1= Most important, 2= More important; 3= important; 4=Less important; 5= Least important)

Reason	Rank				
	1	2	3	4	5
To sell at a better or higher price	[ ]	[ ]	[ ]	[ ]	[ ]
To get access to credit	[ ]	[ ]	[ ]	[ ]	[ ]
To encourage me to save money	[ ]	[ ]	[ ]	[ ]	[ ]
To get easy market for my kernels	[ ]	[ ]	[ ]	[ ]	[ ]
Foster unity with other women in the community	[ ]	[ ]	[ ]	[ ]	[ ]
To receive training on shea	[ ]	[ ]	[ ]	[ ]	[ ]
To get equipment support/ tools	[ ]	[ ]	[ ]	[ ]	[ ]
To get market information	[ ]	[ ]	[ ]	[ ]	[ ]

18. Are your expectations for joining the group being met?

1 [ ] Fully met
2 [ ] Not met
3 [ ] Partially

19. Please rank in order of importance the areas you have benefitted by joining the group
(1= Most beneficial, 5= least beneficial)

Benefits enjoy as a group member	**Rank**				
	1	2	3	4	5
I sell at a better or higher price	[ ]	[ ]	[ ]	[ ]	[ ]
I get access to credit	[ ]	[ ]	[ ]	[ ]	[ ]
I save money through the group	[ ]	[ ]	[ ]	[ ]	[ ]
I get guaranteed market for the kernels	[ ]	[ ]	[ ]	[ ]	[ ]

I enjoy unity with fellow women in the community	[ ]	[ ]	[ ]	[ ]	[ ]
I receive training on shea	[ ]	[ ]	[ ]	[ ]	[ ]
I get equipment support/ tools	[ ]	[ ]	[ ]	[ ]	[ ]
I get market information	[ ]	[ ]	[ ]	[ ]	[ ]

20. Do you undertake the following activities collectively?

	1= yes 2= no
Purchase of inputs (gloves, w.boots)	
Processing	
Marketing of the shea kernels	
Sourcing credit	
Saving part of profit	

21. ***{ Ask9&10 if not member of a group}*** Why do you not belong to a group?

1 [ ] I was not there when the group was being formed
2 [ ] Leaders of the group frustrates my effort to join
3 [ ] My schedules will not allow me
4 [ ] I am not aware of any group
5 [ ] I do not see the need to join any group
7 [ ] Other,
specify_____

22. What kind of collaboration do you have with the collectors association in your community?

1 [ ] Sometimes they buy kernels from me
2 [ ] They give me advice on what kind of kernels consumerswnt
3 [ ] I have no collaboration with any producer association
4 [ ] Other (Please specify)
_____ 23.

Apart from shea kernels processing what else do you do for a living?

1 [ ] Nothing else
2 [ ] Trading in food stuff (grains)
3 [ ] Petty trading
4 [ ] Farming
5 [ ] Charcoal burning
6 [ ]
Other_____

24. Do you have access to credit?

1 [ ] Yes
0 [ ] No

SECTION 4: COST, MARKETING AND MARGINS

19. Do you have any contract market for the shea kernels you produce?
1 [ ] Yes
2 [ ] No

20. How do you dispose of your kernels?
1 [ ] The buyers come to me
2 [ ] I take the kernels to the buyers

21. Who are the main buyers of your kernels (**tick all that apply**)? **1** [ ] Company agents
2 [ ] Kernels traders/bulkers in the community
3 [ ] Local kernels processing companies **4** [ ] Individual kernels exporters/ traders
5 [ ] Individual consumers
77 [ ] Other

22. What portion of your total output does the **main buyer** buy from you?
4 [ ] 0- 25%
3 [ ] 26-50%
2 [ ] 51- 75%
1 [ ] 76-100%

23. How long does it take to get paid by the main buyer after selling your shea kernels?
1 [] Immediately the kernels is delivered or at the point of sale
2 [] Within one week after delivery
3 [] Within two weeks after delivery
4 [] More than two weeks after delivery
5 [] The next shea season

24. Do you get pre-financed by your buyers? **1** [ ] Yes
0 **[**] No

25. Who determines the time you dispose of your product
1 [ ] Myself
2 [ ] The company/buyers

26. Which of the following kernels are you able to supply?
1 [ ] Conventional kernels only
2 [ ] Organic kernels only

3▒ [ ] Both organic and conventional kernels

27. Do you do collective marketing of your kernels?
    1▒ [ ] Yes
    2▒ [ ] No
28. Have you ever taken part in a training/workshop on shea?
    1▒ [ ] Yes
    0▒ [ ] No
29. If Yes, tick (√) which of the following aspects were you trained on and who provided the training?

	Aspect		By whom
1.	Conservation of shea nut trees	[]	
2.	Harvesting or picking shea nuts from the field	[]	
3.	Processing nuts into kernels	[]	
4.	Handling thenuts before processing	[]	
5.	Storage of kernels	[]	
6.	Grading or sorting kernels	[]	

30. What were the lowest and highest prices you sold shea kernels and how many bags did you sell in each period?

Year	**Lowest price sold/bag (GhC)**	**No. of bags**	**Highest price sold/bag (GhC)**	**No. of bags**	**Total no. of bags sold in the year**
2010					
2011					
2012					

31. What materials were involved in processing 1 bag of shea nuts into kernels and how much did each cost you in each period?

Item/material	Unit	**2010**			**2011**			**2012**		
		Unit Price	Qnty	**Total**	Unit Price	Qnty	**Total**	Unit Price	Qnty	**Total**
Firewood										
Water										
Transportation										
taxes										

Levies										
Other costs -										

32. What did you spend the money you got from sale of shea kernels on last year (Tick all that apply)?

1 [] Purchased food
2 []Purchased farm inputs or farming services
3 []Spent the money on medical bills
4 [] Spent the money on social activities
5 [] Spent the money on education
9 [] Other;
_____

33. How will you describe your shea kernels processingbusiness over the past three years:

	1=Yes 2= No
The quantity of shea kernels processed has consistently increased	
The amount of money I make on shea kernels sales has increased	
More people come looking for kernels than before	
I have acquired new skills in shea kernels processing	
I use protective gears during picking of shea nuts in the field	

34. How did you always get your nuts to process into kernels?

1 **[**] Picked all by myself/ my family supported me
2 [] Bought all the nuts
3 [] Picked some and bought some

35. Who helps you in your kernels processing business?

1 [] My husband
2 [] My daughters
3 [] My sons
4 [] others specify
_____

SECTION 5:PRODUCTION AND MARKETING CONSTRAINTS

C. PRODUCTION CONSTRAINT

2. Rank the following constraints in order of severity to you
(1= Most severe, 2= More severe; 3= Severe; 4=Less severe; 5= Least severe)

	Constraint	Rank				
		1	**2**	**3**	**4**	**5**
1.	Low fruit yield	[ ]	[ ]	[ ]	[ ]	[ ]
2.	Cutting down of shea trees for charcoal	[ ]	[ ]	[ ]	[ ]	[ ]
3.	Distance to shea nuts has increased	[ ]	[ ]	[ ]	[ ]	[ ]
4.	Snakes and other reptiles on the field	[ ]	[ ]	[ ]	[ ]	[ ]
5.	Aging shea trees	[ ]	[ ]	[ ]	[ ]	[ ]
6.	Lack of credit	[ ]	[ ]	[ ]	[ ]	[ ]
7	Storage problem	[ ]	[ ]	[ ]	[ ]	[ ]
8.	Competition for my timebetweenfarm activities and shea nut picking	[ ]	[ ]	[ ]	[ ]	[ ]

D. MARKETING CONSTRAINTS

2. Rank the following constraints in order of severity

(1= Most severe, 2= More severe; 3= Severe; 4=Less severe; 5= Least severe)

	Constraint	Rank				
		1	2	3	4	5
1.	Higher fluctuation in demand for the kernels	[ ]	[ ]	[ ]	[ ]	[ ]
2.	Buyers have more power over price setting	[ ]	[ ]	[ ]	[ ]	[ ]
3.	Variability in prices for kernels	[ ]	[ ]	[ ]	[ ]	[ ]
4.	Variability in prices of shea butter	[ ]	[ ]	[ ]	[ ]	[ ]
5.	Transportation constraints	[ ]	[ ]	[ ]	[ ]	[ ]
6.	Quality demand of buyers are too high	[ ]	[ ]	[ ]	[ ]	[ ]

QUESTIONNAIRE FOR SHEA KERNEL TRADERS

SECTION 1: GENERAL HOUSEHOLD INFORMATION

Date of Interview: _____ Name of enumerator: _____

25. Name of respondent: _____
26. Name of community: _____
27. Name of District: _____
28. Age of respondent: _____

29. Sex: **1** **[ ]** Male **2** **[ ]**Female

30. Educational level: **1** [ ] No formal education **2** [] Primary
3 [ ] JHS **4** [] SHS

5▒ [ ] Tertiary **7**▒ **[ ]** Other

31. Marital status: **1**▒ [ ] Married **0**▒ [ ] Not married 32. Household size?

_____ Male
_____ Female

33. Is there any male member of your household who has completed SHS?

1▒ **[ ]** Yes **2**▒ **[ ]** No

34. Is there any female member of your household who has completed SHS?

1▒[ ] Yes
2▒[ ] No 35. How many children do you have?

_____ Male
_____ Female

36. How many of the children are in or have completed primary school?

_____ Male
_____ Female

SECTION 2: HOUSEHOLD WEALTH

5. Does your household have?

	1= yes **2**= no		**1=** yes **2**= no
Electricity		Lorry or tractor	
Radio		Mobile phone	
Television		motorcycle	
Bicycle		Sheep or goats	
Motor king		Cow or donkey	
Computer			

6. What is the main source of drinking water for your household?

1▒ [ ] Piped water to the house **2**▒ [ ] Public tap
3▒ [ ] Borehole **4**▒ [ ] Dug well
5▒ [ ] River or stream **6**▒ [ ] Dam
9▒ [ ] Other, specify_____

SECTION 3: MEMBERSHIP OF PRODUCER GROUP

25. Are you a member of shea kernel traders association?

1▒ [ ] Yes

0 [ ] No

26. Apart from shea kernels trade what else do you do for a living?
    1 [ ] Nothing else
    2 [ ] Trading in food stuff (grains)
    3 [ ] Petty trading
    4 [ ] Farming
    5 [ ] Charcoal burning
    6 [ ] Other _____

27. Do you have access to credit?
    1 [ ] Yes
    0 [ ] No

SECTION 4: COST, MARKETING AND MARGIN

36. Do you have any contract market for the shea kernels you bulked?
    1 [ ] Yes
    2 [ ] No

37. How do you dispose of your kernels?
    1 [ ] The buyers come to me
    2 [ ] I take the kernels to the buyers

38. Who are the main buyers of your kernels (**tick all that apply**)? **1** [ ] Company agents
    2 [ ] Kernels traders/bulkers in the community
    3 [ ] Local kernels processing companies **4** [ ] Individual kernels exporters/ traders
    5 [ ] Individual consumers
    77 [ ] Other

39. What portion of your total output does the **main buyer** buy from you?
    4 [ ] 0- 25%
    3 [ ] 26-50%
    2 [ ] 51- 75%
    1 [ ] 76-100%

40. How long does it take to get paid by the main buyer after selling your shea kernels?
    1 [] Immediately the kernels is delivered or at the point of sale
    2 [] Within one week after delivery
    3 [] Within two weeks after delivery

4 [] More than two weeks after delivery
5 [] The next shea season

41. Do you get pre-financed by your buyers?
1 [ ] Yes
0 **[**] No

42. Who determines the time you dispose of your product
1 [] Myself
2 [] The company/buyers

43. Which of the following kernels are you able to supply?
1 [ ] Conventional kernels only
2 [ ] Organic kernels only
3 [ ] Both organic and conventional kernels

44. Do you do collective marketing of your kernels?
1 [ ] Yes
2 [ ] No

45. Have you ever taken part in a training/workshop on shea?
1 [ ] Yes
0 [ ] No

46. If Yes, tick (√) which of the following aspects were you trained on and who provided the training?

	Aspect		By whom
1.	Conservation of shea nut trees	[]	
2.	Harvesting or picking shea nuts from the field	[]	
3.	Processing nuts into kernels	[]	
4.	Handling thenuts before processing	[]	
5.	Storage of kernels	[]	
6.	Grading or sorting kernels	[]	

47. What were the lowest and highest prices you bought shea kernels and how many bags did you buy in each period?

Year	**Lowest price bought/bag (GhC)**	**No. of bags**	**Highest price bought/bag (GhC)**	**No. of bags**	**Total no. of bags bought in the year**
2010					
2011					

2012					

48. What were the lowest and highest prices you sold shea kernels and how many bags did you sell in each period?

Year	**Lowest price sold/bag (GhC)**	**No. of bags**	**Highest price sold/bag (GhC)**	**No. of bags**	**Total no. of bags sold in the year**
2010					
2011					
2012					

49. What costs were involved in trading of shea kernels?

Item/material	Unit	**2010**			**2011**			**2012**		
		Unit Price	Qnty	**Total**	Unit Price	Qnty	**Total**	Unit Price	Qnty	**Total**
Transportation										
Loading and off-loading										
Store rents										
taxes										
Sacks/bags										
Other costs -										

50. What did you spend the money you got from sale of shea kernels on last year (Tick all that apply)?

1 [] Purchased food
2 []Purchased farm inputs or farming services
3 []Spent the money on medical bills
4 [] Spent the money on social activities
5 [] Spent the money on education
9 [] Other; _____

51. How will you describe your shea kernels tradebusiness over the past three years:

	1=Yes 2= No
The quantity of shea kernels buled has consistently increased	
The amount of money I make on shea kernels sales has increased	

More people come looking for kernels than before	

SECTION 5: PRODUCTION AND MARKETING CONSTRAINTS

E. PRODUCTION CONSTRAINT

3. Rank the following constraints in the shea industry in order of severity to you (1= Most severe, 2= More severe; 3= Severe; 4=Less severe; 5= Least severe)

	Constraint	Rank				
		1	**2**	**3**	**4**	**5**
1.	Low fruit yield	[ ]	[ ]	[ ]	[ ]	[ ]
2.	Cutting down of shea trees for charcoal	[ ]	[ ]	[ ]	[ ]	[ ]
3.	Distance to shea nuts has increased	[ ]	[ ]	[ ]	[ ]	[ ]
4.	Snakes and other reptiles on the field	[ ]	[ ]	[ ]	[ ]	[ ]
5.	Aging shea trees	[ ]	[ ]	[ ]	[ ]	[ ]
6.	Lack of credit	[ ]	[ ]	[ ]	[ ]	[ ]
7	Storage problem	[ ]	[ ]	[ ]	[ ]	[ ]
8.	Competition for my timebetweenfarm activities and shea nut picking	[ ]	[ ]	[ ]	[ ]	[ ]

F. MARKETING CONSTRAINTS

3. Rank the following constraints in order of severity
(1= Most severe, 2= More severe; 3= Severe; 4=Less severe; 5= Least severe)

	Constraint	Rank				
		1	2	3	4	5
1.	Higher fluctuation in demand for the kernels	[ ]	[ ]	[ ]	[ ]	[ ]
2.	Buyers have more power over price setting	[ ]	[ ]	[ ]	[ ]	[ ]
3.	Variability in prices for kernels	[ ]	[ ]	[ ]	[ ]	[ ]
4.	Variability in prices of shea butter	[ ]	[ ]	[ ]	[ ]	[ ]
5.	Transportation constraints	[ ]	[ ]	[ ]	[ ]	[ ]
6.	Quality demand of the buyers are too high	[ ]	[ ]	[ ]	[ ]	[ ]

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Appendix 2: Independent samples test results for butter processors

Independent sample test results for Butter Processors in groups and Butter Processors not in groups: 2012

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
noofbags	yes	39	11.410	4.9243	.7885
	no	50	8.620	3.4928	.4940
Firewood	yes	39	5.692	1.1275	.1805
	no	50	5.880	1.0428	.1475
waterbag	yes	39	1.587	.6490	.1039
	no	50	2.090	.4657	.0659
Transporbag	yes	39	2.244	.3417	.0547
	no	50	2.360	.4046	.0572
Crushingmilling	yes	39	5.369	.9543	.1528
	no	50	6.716	.6453	.0913
Othercost	yes	39	.359	.1846	.0296
	no	50	1.828	.6618	.0936
profitbag	yes	39	14.0195	5.87639	.94098
	no	50	9.3860	7.38781	1.04479

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
noofbags	Equal variances assumed	2.502	.117	3.125	87	.002	2.7903	.8927
	Equal variances not assumed			2.999	65.816	.004	2.7903	.9305
Firewood	Equal variances assumed	1.087	.300	-.813	87	.418	-.1877	.2309
	Equal variances not assumed			-.805	78.516	.423	-.1877	.2331
waterbag	Equal variances assumed	9.411	.003	-4.254	87	.000	-.5028	.1182
	Equal variances not assumed			-4.087	66.351	.000	-.5028	.1230
Transporbag	Equal variances assumed	1.342	.250	-1.440	87	.153	-.1164	.0808
	Equal variances not assumed			-1.471	86.414	.145	-.1164	.0792
Crushingmilling	Equal variances assumed	7.984	.006	-7.928	87	.000	-1.3468	.1699
	Equal variances not assumed			-7.567	63.665	.000	-1.3468	.1780
Othercost	Equal variances assumed	61.408	.000	-13.445	87	.000	-1.4690	.1093
	Equal variances not assumed			-14.968	58.508	.000	-1.4690	.0981
profitbag	Equal variances assumed	.765	.384	3.204	87	.002	4.63349	1.44617
	Equal variances not assumed			3.295	86.957	.001	4.63349	1.40607

Independent sample test results for Butter Processors in groups and Butter Processors not in groups: 2011

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
noofbags	yes	39	9.821	4.8116	.7705
	no	50	7.940	3.8461	.5439
Firewoodbad	yes	39	4.692	.8321	.1332
	no	50	4.480	.8628	.1220
waterbag	yes	39	1.108	.5913	.0947
	no	50	1.428	.4385	.0620
Transportbag	yes	39	2.128	.2743	.0439
	no	50	2.070	.3032	.0429
Crushmillingbag	yes	39	4.687	.5699	.0913
	no	50	5.206	.5673	.0802
Othercosts	yes	39	.303	.1953	.0313
	no	50	1.712	.5453	.0771
Profitbag	yes	39	9.0915	6.17756	.98920
	no	50	5.8094	7.77419	1.09944

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
noofbags	Equal variances assumed	1.489	.226	2.050	87	.043	1.8805	.9175
	Equal variances not assumed			1.994	71.536	.050	1.8805	.9431
Firewoodbad	Equal variances assumed	.378	.540	1.170	87	.245	.2123	.1815
	Equal variances not assumed			1.175	83.127	.243	.2123	.1807
waterbag	Equal variances assumed	2.578	.112	-2.935	87	.004	-.3203	.1091
	Equal variances not assumed			-2.830	67.898	.006	-.3203	.1132
Transportbag	Equal variances assumed	.018	.893	.936	87	.352	.0582	.0622
	Equal variances not assumed			.948	85.045	.346	.0582	.0614
Crushmillingbag	Equal variances assumed	.191	.663	-4.272	87	.000	-.5188	.1214
	Equal variances not assumed			-4.270	81.621	.000	-.5188	.1215
Othercosts	Equal variances assumed	25.904	.000	-15.373	87	.000	-1.4094	.0917
	Equal variances not assumed			-16.935	64.203	.000	-1.4094	.0832
Profitbag	Equal variances assumed	.548	.461	2.157	87	.034	3.28214	1.52131
	Equal variances not assumed			2.219	86.960	.029	3.28214	1.47894

Independent sample test results for Butter Processors in groups and Butter Processors not in groups: 2010

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
noofbagsprocessedyear	yes	39	11.821	4.4478	.7122
	no	50	9.460	4.2437	.6001
firewoodbag	yes	39	3.354	1.1246	.1801
	no	50	3.720	1.3958	.1974
waterbag	yes	39	.882	.3553	.0569
	no	50	1.118	.3001	.0424
transportbag	yes	39	2.026	.3234	.0518
	no	50	2.000	.3030	.0429
Crushmillingbag	yes	39	4.067	.5372	.0860
	no	50	4.944	.4883	.0691
othercosts	yes	39	.354	.2063	.0330
	no	50	1.406	.5611	.0794
profitbag	yes	39	11.7472	5.43190	.86980
	no	50	8.7502	3.63582	.51418

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
noofbagsprocessedyear	Equal variances assumed	.684	.411	2.549	87	.013	2.3605	.9259
	Equal variances not assumed			2.534	79.887	.013	2.3605	.9314
firewoodbag	Equal variances assumed	3.295	.073	-1.334	87	.186	-.3662	.2744
	Equal variances not assumed			-1.370	86.893	.174	-.3662	.2672
waterbag	Equal variances assumed	1.104	.296	-3.394	87	.001	-.2359	.0695
	Equal variances not assumed			-3.324	74.235	.001	-.2359	.0710
transportbag	Equal variances assumed	1.243	.268	.385	87	.702	.0256	.0667
	Equal variances not assumed			.381	79.102	.704	.0256	.0672
Crushmillingbag	Equal variances assumed	2.188	.143	-8.048	87	.000	-.8773	.1090
	Equal variances not assumed			-7.953	77.725	.000	-.8773	.1103
othercosts	Equal variances assumed	48.559	.000	-11.127	87	.000	-1.0522	.0946
	Equal variances not assumed			-12.241	64.937	.000	-1.0522	.0860
profitbag	Equal variances assumed	4.064	.047	3.111	87	.003	2.99698	.96333
	Equal variances not assumed			2.966	63.213	.004	2.99698	1.01041