ANALYSIS OF COCOA BEANS VALUE CHAIN: A CASE STUDY OF KYELA DISTRICT IN MBEYA REGION

BY

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ABSTRACT

The study on analysis of cocoa value chain was conducted in Kyela District. Kyela is a leading cocoa producing District in the country with annual production of 4344 tonnes. Tanzania exports about 6500 metric tones per year. The general objective of the study was to assess cocoa value chain and performance indicators among smallholder farmers in Kyela District. The specific objectives were to identify the cocoa beans market channels, to determine the gross margin accrued by actors, to compare the gross margin accrued among the actors and to determine the contribution of cocoa fermenting to farmers' gross margin in Kyela District. A cross sectional research design was used in the study. The study population was cocoa producing farmers and cocoa traders in Kyela District. To meet the objectives of the study, qualitative and quantitative analysis methods were applied. The qualitative techniques involved the use of measures of central tendency to describe characteristics of respondents and in the description of the market chain. In analysis of gross margin, linear regression and one way ANOVA were quantitative methods used. During the study three main channels through which cocoa was sold were identified. The first channel comprised of farmers, village collectors, private company agents, private companies and exporters. The second comprised of farmers, private company agents, private companies and exporters. The last channel comprised of farmers, primary cooperative, cooperative union and exporters. It was also found out that, farmers received higher gross margin than other actors and that cocoa fermenting contributed significantly to the level of farmers' gross margin. It is therefore recommended for farmers to sell fermented cocoa through channels that

give them high return. It is also recommended for the Government to establish cocoa board that will be responsible to supervise cocoa business in the District and the Nation at large.

DECLARATION

I KENNEDY JAIRO KIBONA, do hereby declare to the Senate of Sokoine University of Agriculture, that this dissertation is my own original work and that it has neither been submitted nor being concurrently submitted for degree award in any other institution.

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The above declaration is confirmed

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Supervisor

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DEDICATION

This work is dedicated to my father Jairo Kabonde Kibona and sister Ndinhesya. May their gentle and loving soul rest in eternal peace. The work is also dedicated to my mother Atunangisye Namsokwa. May God grant her long life.

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LIST OF ABBREVIATIONS AND ACRONYMS

ACP	Africa Caribbean and Pacific countries
AGM	Average Gross Margin
AMCOS	Agriculture Marketing Cooperative Societies
APP	Average Purchasing Price
ASP	Average Selling Price
AVC	Average Variable Cost
CMAA	Cocoa Merchants Association of America
CTA	Center for Tropical Agriculture
FAO	Food and Agriculture Organisation
FCC	Federation of Cocoa Commerce
FoB	Free on Board
GDP	Gross Domestic Product
ICCO	International Cocoa Organisation
KYECU	Kyela Cooperative Union
KYERUCU	Kyela and Rungwe Cooperative Union
MAFC	Ministry of Agriculture Food and Cooperatives
MM	Market Margin
MSEs'	Medium and Small Enterprises
TCC	Tropical Commodity Coalition
TZS	Tanzania Shilling
URT	United Republic of Tanzania

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of Tanzania Agricultural Sector

Agriculture constitutes the most important sector of the economy, providing about 24.6% of GDP and 80% of employment (URT, 2008, 2010). The major cash crops include coffee, tea, cotton, cashew nuts, sisal, cloves, and pyrethrum. These account for the vast majority of export earnings (URT, 2008). According to URT, (2010) Agriculture growth rate in the year 2009 declined to 3.5% from 4.6% in 2008. This led to the fall in the growth rate of crop output from 5% to 3.4% in the same year. In 2009, performance of export crops exhibited mixed trend for instance, in the case of cotton pyrethrum and tobacco increased volume and value were realized as compared to 2008. On the other hand the production of other traditional crops witnessed a falling trend as coffee and cashew nut production declined by 31% and 30% respectively (URT, 2010).

Export crops in Tanzania represent 12% of the value of total crop production in the country (Conforti and Sarris, 2010). Inefficiency in the nationalization of large- scale farms (tea, and coffee) and marketing organizations coupled with unfavorable world commodity prices, resulted into a subsequent decline in agricultural production and export. According to URT (2008) poor pricing and unreliable cash flow to farmers continue to frustrate the agricultural sector. Raising agricultural income is required in order to meet the country's food security needs in both rural and expanding urban areas. Furthermore agricultural development and increased productivity are crucial for both economic growth and poverty alleviation (Conforti and Sarris, 2010). A

much closer look in the reform period suggests that most exports reached their minimum level in the early 1980s and recovered gradually in subsequent years with fluctuations partly attributed to erratic weather.

At an aggregate level agriculture has performed relatively well over the late 1990s and early 2000s (Nyange, 2003). Tanzania exports mainly unprocessed agricultural products and little value added from retail and wholesale services or processing stays in the country (Eskola, 2005). For many years, Tanzania's economy has relied heavily on a few traditional export crops. This over-dependency is now declining as more farmers diversify to new crops which offer better returns (Mukami, 2003). Cocoa is increasingly becoming an important cash crop in Kyela and Rungwe Districts. The cocoa growing area in Mbeya region has increased from 5022 ha in 1990/91 to 5790 ha in 1994/95 (URT, 1997). The current studies show that the total area from which cocoa is harvested in Mbeya Region is 8872 ha (URT, 2007).

1.1.1 Tanzania cocoa industry

Tanzania exports about 6500 metric tonnes of cocoa each year. The country's cocoa is thought to have originated from Cameroon and is known for its unique flavor profile. Production is 100% organic and 95% organic certified Cocoa has been grown since 1960s, and now counts for over 20 000 smallholder farmers in Kyela district (HAI Tanzania, 2010). The total area of cocoa produced by smallholder farmers in Tanzania is about 16 816 ha of which 15 462 ha is in Mbeya region (URT, 2007).

Mbeya region produces about 5418 tonnes of cocoa per year. Kyela District is the leading cocoa producer in the Region with annual production of 4344 tonnes,

followed by Rungwe (1068 tonnes) and Ileje with only six tones (URT, 2007). Other regions growing cocoa in Tanzania are Tanga and Morogoro as shown in Table 1.

Table 1: Cocoa production in Tanzania

Region	District	Area planted (ha)	Area harvested (ha)	Quantity harvested (tonnes)	Kg/ha
Mbeya	Kyela	7 685	5 058	4 344	859
	Rungwe	7 643	3 708	1 068	288
	Ileje	134	106	6	60
	Sub total	15 462	8 872	5 418	611
Morogoro	Mvomero	937	357	260	730
	Kilombero	11	0	25	0
	Sub total	948	357	285	730
Tanga	Muheza	406	312	233	746
Grand total		**16 816**	**9 541**	**5 936**	**2 883**

Source: URT (2007)

Cocoa and palm oil are major cash crops produced in Kyela District. They contribute to the income of people by 65% of their total income and 70% on the District GDP. According to URT (2009) among the two crops, cocoa is the most prominent permanent crop in the District. Cocoa is providing earning of almost six million US dollars, surpassing many other non-traditional exports in Mbeya Region (Africa News Network, 2008).

1.2 Problem Statement and Justification

Despite the wide range of appropriate climatic conditions, cocoa production in Tanzania is low. Tanzania ranks the 9th among African cocoa producing countries and second in East Africa after Uganda (Appendix 4). A trend in the country's income from cocoa shows that Tanzania's output is low compared to Uganda in East Africa. While export of cocoa to Europe which is a major importer increased from 4.5 to 11.9 million Euros in Uganda, Tanzania earnings increased from 6.7 to 6.8 Million Euros only for the period from 2002 to 2008 (CTA, 2009). There is a need

for a well functioning market structure for products to reach consumers and farmers to market their output at rewarding price as an incentive for increasing and improving cocoa production.

The cocoa value chain passes through a complex trading network comprising a large number of intermediaries like collectors, traders, exporters, processors and manufacturers, before it reaches the consumer. The lack of functional value chains in the country is responsible for the current low state of agricultural commercialization (Thapliya, 2006). Understanding the marketing channels of the product becomes valuable in designing policy instruments to enhance trade in Tanzania (Eskola, 2005).

The rural marketing chains are defined primarily by social identity, which made the impacts of the trade liberalization different depending on the population subgroups (Barrett, 1997). Economic reforms adopted since 1990s have included the liberalisation of marketing of agricultural inputs and commodities. Despites these changes, documentations on agricultural crop value chain in Tanzania are limited to few products such as rice, coffee, cassava and oranges (Mgaya, 2008; Ng'webesa, 2008; Njau, 2008 and Lazaro, 2008). The study on value chain specific for cocoa beans in Tanzania has not been done. In the light of this background, it was considered pertinent to carry out a study whose purpose is to shed light to the understanding of the costs of cocoa production, exports, and the share of the different actors of the cocoa value chain. This would in turn allow for an analysis of the reasons for the differences in benefit within the and for identification of corrective measures, as appropriate as necessary.

This study is important in promoting cocoa, an emerging non traditional crop in Tanzania with high contribution of income to smallholder farmers. The results of this research will come up with policy recommendations for improving the cocoa production and marketing in Tanzania. The outcome of this research will encourage producers to increase cocoa production. Increase in cocoa production benefit cocoa farmers, traders and will end up increasing country export earnings.

1.3 Objectives of the Study

1.3.1 General objective

The general objective of the study was to assess cocoa value chain and performance indicators among smallholder farmers in Kyela District so as to understand cocoa sub-sector for policy recommendations.

1.3.2 Specific objectives

i. To identify the market channels for cocoa beans in Kyela District.

ii. To determine the gross margin accrued by actors at each node of cocoa beans market chain in Kyela District.

iii. To compare the gross margin accrued among the actors of cocoa bean market chain in Kyela District.

iv. To determine the contribution of cocoa fermenting on farmers' gross margin in Kyela District.

1.3.3 Hypotheses

1. There is no significant difference in gross margin between farmers and traders.
2. Cocoa fermenting does not have effect on level of farmers' gross margin.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Concept of Value Chain

Producers in virtually every sector and in every country are locked into production chains. The product reaches the final customer having passed through the hands of a number of intermediaries, each of whom adds value to the final product. However, the concept of the value chain describes more than a set of input-output relationships. In particular it identifies key actors who play a critical role in coordinating production in the chain, define who is to perform what role, what standards are to be met in participating in the chain, coordinating a process of chain-upgrading, and influencing the distribution of returns amongst the various parties who participate in these chains. The value chain describes the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use (Kaplinsky and Morris, 2001).

Gereffi (1994) distinguished two major families of chains; the first one is a "producer-driven chains", in which the key governors are firms imbedded in the production chain itself and commanding core technologies. The second type of chain-governors is a "buyer driven", where the reins of power are held by key buyers, usually at the top end of the chain near the final consumer. These buyers determine the nature of the access of producers to final consumers. In general, developing countries producing for global markets sell into buyer-driven chains.

2.1.1 Value chain framework

As defined by Kaplinsky and Morris (2001) value chains encompass the full range of activities and services required to bring a product or service from its production point to sale in its final markets, whether local, national, regional or global. Value chains include input suppliers, producers, processors and buyers. It has both structural and dynamic components as explained below;

(i) Structural factors

According to Campbell (2008), the structure of a value chain includes all the firms in the chain and can be characterized in terms of five elements as described below:-

(a) End markets

End markets are people, not locations. They determine the characteristics including price, quality, quantity and timing of a successful product or service. End market buyers are a powerful voice and incentive for change. They are important sources of demand information, can transmit learning, and in some cases are willing to invest in firms further down the chain.

The terminal markets for cocoa in London and New York play a vital role in the formation of prices for physical cocoa throughout the world (ICCO, 2010). Once price in the terminal market fall, traders immediately react by paying lower price to farmers. In addition, the terminal markets provide a mechanism for market participants to hedge against price risks, when they are long or short in the physical market (ICCO, 2010).

(b) Business enabling environment

The business enabling environment at the local, national and international levels includes norms and customs, laws, regulations, policies, international trade agreements and public infrastructure (roads, electricity and water) and services (education and healthcare) that either facilitate or hinder the movement of a product or service along its value chain. The national policy and regulatory environment is critical to the functioning of markets and enterprises. Poor local government operations and weak enforcement of legal and regulatory regimes increase transactions costs and risks, limiting investments in relationships and upgrading.

(c) Vertical linkages

Relationships between firms at different levels of the value chain are critical for moving a product or service to the end market. More efficient transactions among firms that are vertically related in a value chain increase the competitiveness of the entire industry. In addition, vertical linkages facilitate the delivery of benefits and embedded services and the transference of skills and information between firms up and down the chain.

Mutually beneficial relationships among vertically related firms can improve Medium and Small scale Enterprises' (MSEs') access to markets, new skills and a wide range of services, and can reduce market risk by securing future sales. Well functioning input and output markets may help farmers acquire and use productivity enhancing inputs, assure vertical integration and coordination functions (input supply, credit, output marketing) and provide alternative employment opportunities.

(d) Horizontal linkages

There is a necessary tension between cooperation and competition among firms performing similar functions in a value chain. Relationships between firms whether formal or informal can reduce the transaction costs for buyers working with many small suppliers. By facilitating bulk purchasing of inputs or enabling large orders to be filled, horizontal linkages can help small firms to generate economies of scale. Industry associations can enable the creation of industry standards and the implementation of marketing strategies. As pointed out by Parsons (2010) the growth of rural enterprises and the industries or sub sectors in which they operate is often limited by the scarcity of institutions offering a range of financial services including overdraft protection, working capital, investment and lease financing, savings and others. In addition to lowering the cost of inputs and services, horizontal linkages can contribute to shared skills and resources and enhance product quality through common production standards. Less-developed agricultural markets hinder the linkages between agricultural and non-agricultural sectors, cause disincentives for production and reduce export earnings (Haji, 2008).

(e) Supporting markets

Support services are key to firm-level upgrading. They include financial services; cross cutting services such as business consulting, legal advice and telecommunications; and sector-specific services, for example, irrigation equipment or handicraft design services. Where these services are needed over the long term, they must be provided commercially or by markets. Value chain analysis should therefore seek to identify opportunities for improved access to services for target

value chain actors in such a way that the support markets will be simultaneously strengthened, rather than undermined.

(ii) Dynamic factors

The firms in an industry create the dynamic elements. The elements such as Value chain governance, inter-firm relationship and upgrading described below through the choices they make in response to the value chain structure.

(a) Value chain governance

Value chain governance refers to the relationships among the buyers, sellers, service providers and regulatory institutions that operate within or influence the range of activities required to bring a product or service from inception to its end use. Governance is about power and the ability to exert control along the chain at any point in the chain, some firm sets and enforces parameters under which others in the chain operate. It is true that producer country government have lost many of their power they previously enjoyed in both the cocoa and coffee sectors (Gilbert, 2008). Producer on other hand who are now free to choose how much they sell, to whom they sell, have gained in power.

(b) Inter-firm relationships

This refers to the nature and quality of the interactions between stakeholders in a value chain. Relationships can be supportive of industry competitiveness that enhances Enterprise benefits or adversarial to it. Supportive relationships facilitate collaboration; enable the transmission of information, skills and services; and provide incentives for upgrading. They are based on a long-term view of the

industry, while adversarial relationships are structured to maximize short-term profits.

(c) Upgrading

In order to respond effectively to market opportunities, firms and industries need to innovate to add value to products or services and to make production and marketing processes more efficient. These activities, known as firm-level upgrading, can provide Enterprise with higher returns and a steady, more secure income through the development of knowledge and the ability to respond to changing market conditions. According to Parsons (2010) there are five principal ways in which a firm, regardless of size, can upgrade; improving its efficiency, improving the quality of the product it produces, specializing in new functions or activities, finding new markets, or developing new products or services for a unique market.

2.1.2 Actors in cocoa value chain

The farming and harvesting of pods, the extraction, fermentation and drying of cocoa beans necessarily occurs on or very near the farm, and has few scale economies (Kaplinsky, 2004). According to Phillips and Tallontire (2007) in the course of converting cocoa beans the raw material will be traded several times, with value different stages, at each of which a margin is taken. Farmers are the basic starting point. They are involved with production of production of cocoa in their field.

Brokers buy well prepared and dried cacao beans from farmers at the farm get price and sell to the licensed buyers. If farmers belong to the cooperative they bring their cacao together. Cooperative and licensed buyers grade the beans and sell to

exporters. The most common outlet is the itinerant buyers who move from village to village like middlemen to buy produce. Many factors may have contributed to this scenario; these people do buy whether dried or fresh cocoa beans and pay their money on the spot. Many farmers may have adopted this because of their urgent need of money and other conveniences attached to it (Phillips and Tallontire, 2007).

The other outlets often patronized by farmers are the cooperative society stores, Cocoa merchants and other farmers. Government agents like marketing boards are not frequent at all. Most cocoa merchants are either licensed or not but they enjoy good patronage by farmers possible because of the similar mode of operation like the itinerant buyers (Phillips and Tallontire, 2007).

Exporters sell to processing factories and processors sell premium quality beans and products to overseas buyers. Processors are the last recipient in the chain. Once shipped to Europe or North America, beans are concerted to cacao butter and cacao powder (Gilbert, 2008). Among some of the factors that inform the choice on market outlet by farmers are the price of produce that are negotiable in some outlets and not negotiable in the others, others include ease of payment, mode of payment, transportation cost and the problem of produce grade that has a direct bearing on the price. This last factor was found out not to be stringent condition with some outlets while very important to others (Phillips and Tallontire, 2007).

2.1.3 Producers value adding

In response to question "Can producer add value?" Gilbert (2008) distinguished the three types of strategy which producers might use to increase their share of the value of the retail product as listed below;

(i) Producer value adding by working against the market

By this strategy producers obtain high share of terminal market prices but these are too low for many producers to make a satisfactory living. This motivates strategy of overriding market forces by imposing a fair price on consumers. This strategy requires considerable unanimity on the part of governments of major producing countries but probably also the active consent of consuming country government.

(ii) Producer value adding by working outside the market

Producers who do not like the world market prices can attempt to sell at higher prices to consumers who are willing to accept these prices. This is the basis for fair-trade coffee and chocolate. Under fair-trade retail prices are calculated on a cost plus basis from fail producer prices instead of producer prices resulting as a residual from the subtraction of intermediation costs from terminal market prices.

(iii) Producer value adding by working with the market

Gilbert (2008) used example of coffee in explaining how producer can add value to their product by working with the market. In case of coffee particularly arabica consumers are willing to pay premia for what they perceive as particularly fine beans. These premia allow producer to obtain acceptable prices even when the terminal prices for standard grade are low. This suggests that producers should strive

to increase quality so that rosters, particularly specialty rosters, can further expand the quality market. Certification of cocoa as organic product offers potential differentiation and hence producer premea.

2.1.4 Conventional versus alternative value chains

A key question for value chain analysis is who holds key positions of influence in the chain. In the mainstream market, it is the major buyers who have most influence (Phillips and Tallontire, 2007). The alternative value chain provides an example of how, given a certain set of criteria a chain can work better for smallholder farmers. By reducing the need for some of the middlemen, farmers may benefit from the more direct relationship. They benefit through receipt of a greater share of the price paid for cocoa, better market information, and community benefits from the social premium (Phillips and Tallontire, 2007).

2.2 Description of the Product under the Study

2.2.1 Overview of cocoa production

Cocoa (*Theobroma cacao*) is a crop of the humid lowland tropics produced largely by small-scale producers and often on farms with a canopy of shade trees (Robert, 2000). Traditionally, cocoa is cultivated in producing countries for export in the form of beans. Importing countries then process the beans, transforming the raw goods into finished or semi-finished products. The main products made from cocoa beans are chocolate, cocoa powder and butterfat, which are all used for human consumption. Butterfat is also used in cosmetics and pharmaceutical products but the amount used for these purposes is insignificant in relation to that used in chocolate manufacture.

In Tanzanian cocoa grows in a highly concentrated area, south of Mbeya in the Rungwe and Kyela Districts. The area forms a basin on the northern tip of Lake Nyasa, surrounded by the Southern Highlands. The region is high in volcanic deposits and the enclosure by mountains ensures proper rainfall as well as plenty of water running down from the mountains (HAI Tanzania, 2009). Organic cocoa is more and more in demand by discerning customers. Supplier for organic cocoa from Tanzania is Biolands. Since 1999, Biolands has worked directly with local cocoa farmers in the district of Kyela, Mbeya region, in southwest Tanzania, to increase production, improve the quality of cocoa, and ensure fair prices are paid to farmers. Biolands provides training and technical advice to ensure compliance with organic certification standards. About 20 000 farmers work with Biolands. In fiscal year 2009/10, they together produced about 3 500 tonnes of certified organic cocoa. Each bag of Biolands cocoa is traceable to the farmer who produced it (Barry Callebaut Company, 2011).

2.2.2 Agronomical factors for cocoa production

Cocoa is produced in countries within 10°N and 10°S of the Equator where the climate is appropriate for growing cocoa trees. Cocoa needs a high amount of rainfall, ranging between 1250 and 3000 mm per year. It grows best in areas where the dry season does not last for more than three months. Cocoa grows best in warm temperatures: between a high of 30 and 32°C and a low of between 18 and 21°C (Asare *et al.*, 2010).

A hot and humid atmosphere is essential for the optimum development of cocoa trees. In cocoa producing countries relative humidity is generally high, often as much

as 100% during the day, falling to 70 and 80% during the night (ICCO, 2011). Cocoa needs a soil containing coarse particles to leave free space for roots and with a reasonable quantity of nutrients to a depth of 1.5 m to allow the development of a good root system. The chemical properties of the topsoil are most important as there are a large number of roots here for absorbing nutrients.

Cocoa can grow in soils with a pH in the range of between 5.0 and 7.5. It can therefore cope with both acid and alkaline soil, but excessive acidity (pH 4.0 and below) or alkalinity (pH 8.0 and above) must be avoided. Cocoa is tolerant of acid soils provided the nutrient content is high enough (ICCO, 2011). The world cocoa market distinguishes between two broad categories of cocoa beans: "fine or flavour" cocoa beans, and "bulk" or "ordinary" cocoa beans. As a generalization, fine or flavour cocoa beans are produced from criollo or trinitario cocoa tree varieties, while bulk cocoa beans come from forastero trees (ICCO, 2011).

2.2.3 Cocoa harvesting

Pods containing cocoa beans grow from the trunk and branches of the cocoa tree. Harvesting involves removing ripe pods from the trees and opening them to extract the wet beans. The pods are opened to remove the beans within a week to 10 days after harvesting. The best way of opening the pods is to use a wooden club which, if it strikes the central area of the pod, causes it to split into two halves; it is then easy to remove the wet beans by hand. A cutting tool, such as a knife, is often used to split the pod though this can damage the beans. After extraction from the pod the beans undergo fermentation and drying process before being bagged for delivery (ICCO, 2011).

2.2.4 Cocoa fermentation

Fermentation of cocoa can be conducted in a number of manners. The ways it can be fermented include: use of baskets, heap covered with banana leaves and use of boxes. In all cases, the bottom and sides of the box or basket should be covered with banana leaves, however banana leaves on the bottom should be not too thick and should be also perforated by a knife to make sure that the liquid from the cocoa pulp will be well drained. The top layer of fermenting cocoa should also be covered with banana leaves or jute bags. This inhibits too much air penetration into the fermenting cocoa also stops too much moisture from being lost.

For all types of fermentation, beans should be turned on various days. Turning means that the beans should be mixed around with a shovel or hands to help get air into the fermenting cocoa and to help make the fermentation even throughout the cocoa. When more air gets into the cocoa, as a result of turning, the rate of fermentation will increase and temperatures will go up a few hours later. The temperature is raised to 40°C and 45°C during the first 48 hours of fermentation. In the remaining days, bacterial activity continues under increasing aeration conditions as the pulp drains away and the temperature is maintained.

2.2.5 Cocoa drying

Cocoa beans are dried after fermentation in order to reduce the moisture content from about 60% to about 7.5%. Drying must be carried out carefully to ensure that off-flavorous are not developed. Drying should take place slowly. If the beans are dried too quickly some of the chemical reactions started in the fermentation process

are not allowed to complete their work and the beans are acidic with a bitter flavour. However, if the drying is too slow moulds and off flavours can develop.

2.2.6 Trading and shipping of cocoa beans

The structure and length of the cocoa marketing channels differ from region to region within the same producing country as well as across producing countries. At one extreme of the spectrum, the marketing channel between cocoa farmers and exporters encompasses at least two middlemen: small traders and wholesalers. Small traders buy cocoa beans directly from farmers, visiting them one by one. In a second stage, small buyers sell the beans to wholesalers, who in turn will re-sell them to exporters.

At the other extreme of the spectrum, cocoa beans are sold directly to exporters by farmers' cooperatives or even directly exported by the co-operative. Cocoa grading differs across producing and consuming countries. However, over the years, the physical market has developed standard practices set out by the main international cocoa trade associations: the Federation of Cocoa Commerce Ltd (FCC) and the Cocoa Merchants' Association of America (CMAA). For example, the FCC distinguishes two grades: good fermented cocoa beans and fair fermented cocoa beans (ICCO, 2011).

2.2.7 Cocoa production and marketing

Cocoa (*Theobroma Cacao*) is a tropical crop produced mostly by smallholder farmers in Africa. The world production of cocoa beans in 2007/08 was about 3.7 million tonnes (TCC, 2009). Although the current economic downturn is likely to

affect the future demand for chocolate products of which cocoa is main ingredient, the International Cocoa Organisation (ICCO) predicts a requirement of at least 4.4 million tonnes by 2012, to meet the growing grinding demand. To meet this demand, world-wide production has to increase, within a short period, by nearly twenty percent (TCC, 2009).

The relevance of cocoa to most developing economies cannot be overemphasized as cocoa is produced by more than fifty developing countries across Asia, Africa and Latin America (Ogunleye *et al.*, 2007). Ivory Coast leads all countries with approximately 35% of total world production while Ghana, Nigeria and Cameroon accounted for 13%, 12% and 4% respectively (Cappelle, 2008).

Cocoa plays an important role in African economies as a main export crop and source of foreign exchange. Tanzania occupies low position among African cocoa growing countries. Even though production is still low, Tanzania has an opportunity to benefit from cocoa trade by producing specialized cocoa for special niche markets. For example, organic cocoa is in a high demand by discerning customers and according to Barry Callebaut Company (2009), the unique flavor characteristics of premium organic cocoa from Tanzania is specially prized.

2.3 Gross Margin

A gross margin is the difference between gross income and the total variable cost. The total gross margin for a farm is the sum of all individual activity gross margins (Murti, 1991). The gross margin is the gross income minus the total operating (or "variable") costs, i.e., all the growing and harvesting costs. This figure represents the

amount available to pay all the ownership (or "fixed") costs and any return to the owner (i.e., Management and investment income). Gross margin is a good measure for comparing the economic and productive efficiency of similar-sized farms (Fleming *et al.*, 2009). More importantly, it represents the bare minimum that a farm must generate to stay in business. Even if a farm in a particular year were to lose money overall, a positive gross margin would enable it to continue to operate, at least in the short run. However, it is not as good measure of a farm's actual profitability or long-term viability (as opposed to mere productive efficiency) as Management and investment income because it does not take into account the site-specific ownership costs, such as the cost of land, orchard establishment, and overhead.

Gross margin is profoundly affected by the number of breaks in marketing channel and the size of the marketing firm. The greater number of breaks in marketing system results to increase in transaction and handling cost. These costs vary with the size of the farm activities. Examples of farm variable cost include fuel, oil, seed, fertilizer, casual labour costs, weed and pest control harvesting and market costs.

2.4 Marketing Margin

Marketing margin is a commonly used measure of the performance of a marketing system (Abbott and Makeham, 1990). It can be a useful descriptive statistics if used to show how the consumers' expenditure is divided among market participants at different levels of the marketing systems. It is defined as the difference between the prices the consumer pays and the price that is obtained by producers, or as the price

of a collection of marketing services, which is the outcome of the demand for and supply of such services (Haji, 2008).

2.5 Share of Farmers, Traders and Exporters in Cocoa Value Chain

According to ICCO (2006) to calculate the shares of the different market participants in the total value of the cocoa beans, one has, first of all, to establish that total value. The best parameter would seem the average Free on Board (FoB) price of cocoa bean exports during a recent period of heavy trading. The share of the farmers is to be based on average ex-farm prices, corresponding to the period for which the FoB prices are calculated.

Estimating the shares of "traders" and "exporters" is less straightforward. A major problem is that, there are in every country, different channels through which the cocoa travels from the farm to the port of export. With costs of commercialization, it seems therefore better to refer to the share taken by the functions to get the cocoa from the farm to the exporter at port as the "trader's share". Similarly, the share taken by the functions to get the cocoa ready for shipment and into the ship, can be referred to as the "exporter's share", although these proceeds could, in practice, accrue to two or even three parties. The shares of the "trader" and the "exporter" can, for the relevant period and perhaps partly building on the estimates of the costs of commercialization, probably rather easily be estimated by local experts/practitioners in cocoa production and commercialization.

2.6 Conceptual Framework for the Study

Agricultural value chain encompasses all the input supply, production, post-harvest, storage, processing, marketing, distribution service and consumption functions along the "farm-to-mouth" continuum for a given product (be it consumed fresh, processed and/or from a food service provider), including the external enabling environment. Here the value chain for cocoa is analysed as an export crop that has practically no domestic market and is thus mainly cultivated for exports. These functions typically span other value chains, geographic and political boundaries and often involve a wide range of public and private sector institutions and organizations. The value chains as networks support three major flows:

- Physical product flows, which are the physical product movements from input suppliers to producers to buyers to final customers;
- Financial flows, which are the credit terms and lending, payment schedules and repayments, savings, and insurance arrangements, and
- Information flows, which coordinate the physical product and financial flows.

Logistics and communications are embedded in all of these flows, and poor logistics and communications are often a major source of problems facing agricultural value chain. The underlying objective of agricultural value chain management is to provide the right products (quality), in the right amounts, to the right place, at the right time, and at a competitive cost. For governments, there may be broader objectives involved, especially where the value chain is especially strategic for trade or critical in the domestic food system. These broader objectives might relate to maintaining low inflation, maintaining social stability and regional development.

Value chain participants can be located domestically or outside national borders. Even within national borders, value chain participants and activities can be spatially dispersed. Some participants and services are specialized, while others are involved in several different chains. Support service providers can be from both the public and private sectors. Logistical support services include transport and communication and information technology. Technical support includes a range of research and extension services, technical assistance and financial services. In the global economy, support service providers and the services themselves can easily cross national borders. Fig. 1 presents a simple schematic description of cocoa value chain framework.

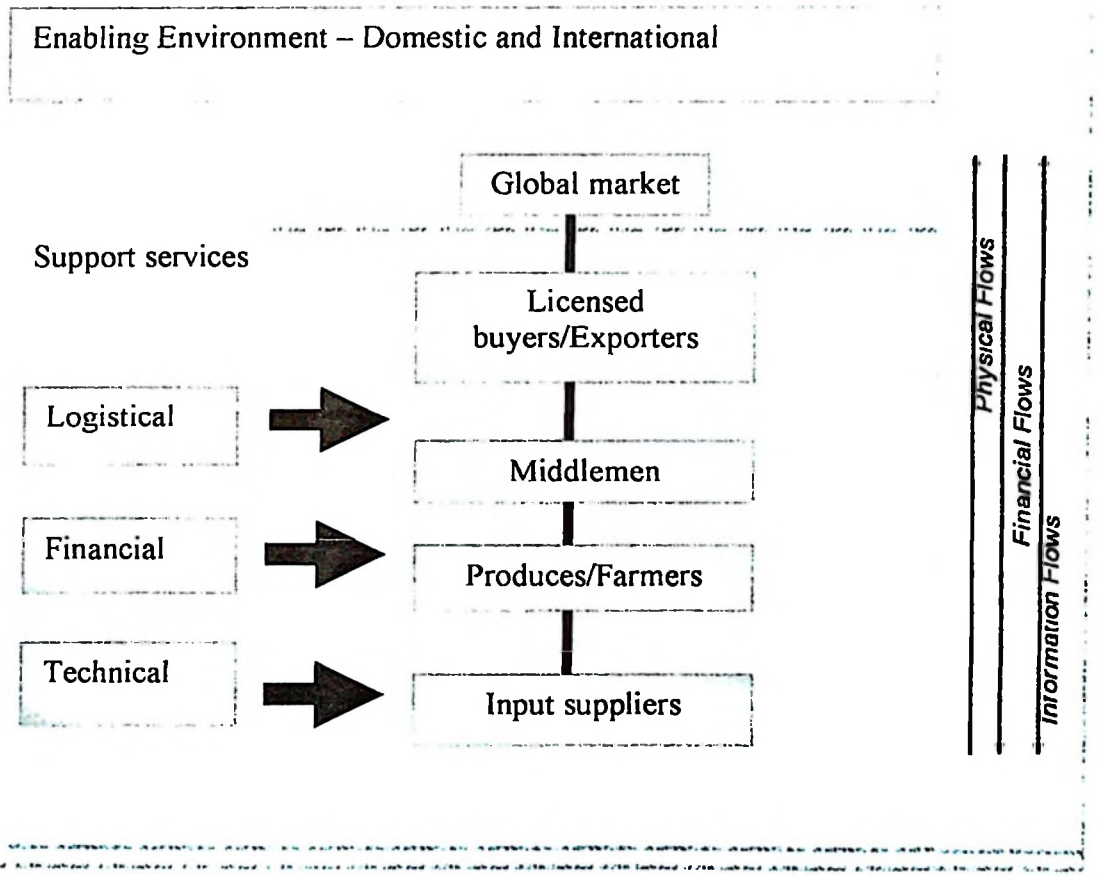

Figure 1: Cocoa value chain framework, modified from Jaffee *et al.*, (2008)

As summarized in Fig. 1, the framework describes the agricultural product which is exported in raw form as what is practiced in cocoa export in Tanzania. The agriculture export system includes farmers and a diverse range of firms, including backward-linked input suppliers and forward-linked middlemen, exporters to the global market. The main activities for direct value chain entities are as follows:

- Input supply: This includes the production and distribution of material inputs such as fertilizer, seeds, packaging, utilized in the primary production, processing and/or trade of the focal commodity.

- Farm production: This stage is concerned with primary agriculture production and ends with the sale of a raw commodity at the farm gate. These transactions may occur literally at the farm gate or at some other point where the farmer hands over ownership of the product to the next supply chain participant. Depending on the crop, some type of primary processing (such as the shelling or bagging of dry grain) may take place at the farm level.

- Export: Licensed buyers or exporters buy commodity from farmers and sell them to the global market. Middlemen are used in linking exporters to farmers. In some cases even village collectors are used in assembling products from farmers in villages to the middlemen who then send them to licensed buyers and exporter.

- Processing: The processing stage involves the transformation of agriculture raw materials into one or more finished goods through drying, canning, freezing, and many other methods. If the product is exported as raw commodity, primary

processing is done in producing countries and the rest processing functions to the final products take place in importing countries.

- Domestic and international logistics: The logistics stage is concerned with the delivery of marketed commodities to their final market destination.

Fig. 1 also maps out private and public sector entities that provide support services such as finance and insurance, advisory services, and logistics and information. Conditioning the entire value chain are the domestic and international enabling environments. From a domestic perspective, this includes fiscal and financial sector policies, pricing and investment incentives and institutions and the regulatory and legal framework. From an international perspective, the enabling environment includes international trade regulations and agreements, other international protocols, and the policies/regulations of nations and trading blocs with whom the focal supply chain sources and sells inputs or products.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Research Design

This study adopted a cross sectional research design in which data were collected at one point in time. Data collection was done from October to November 2010.

3.2 Description of Study Area

The study was conducted in Kyela District, Mbeya region. The district is known for high production of cocoa in Tanzania (Section 1.1.1). Description of the study area location, topography, administration framework and population are given below.

3.2.1 Location

Kyela District is located in the southern end of Mbeya Region and it is one among seven districts in the region. The District lies between 35° 41` and 30° Longitudes East of Greenwich and 9° 25` and 9° 40` Latitudes South of Equator. In the East Kyela District borders with Makete and Ludewa Districts in Iringa region. In the West, the District is bordered by Ileje District and in the North by Rungwe District in Mbeya Region. The Republic of Malawi and Lake Nyasa borders the District in the Southern part (Fig. 2).

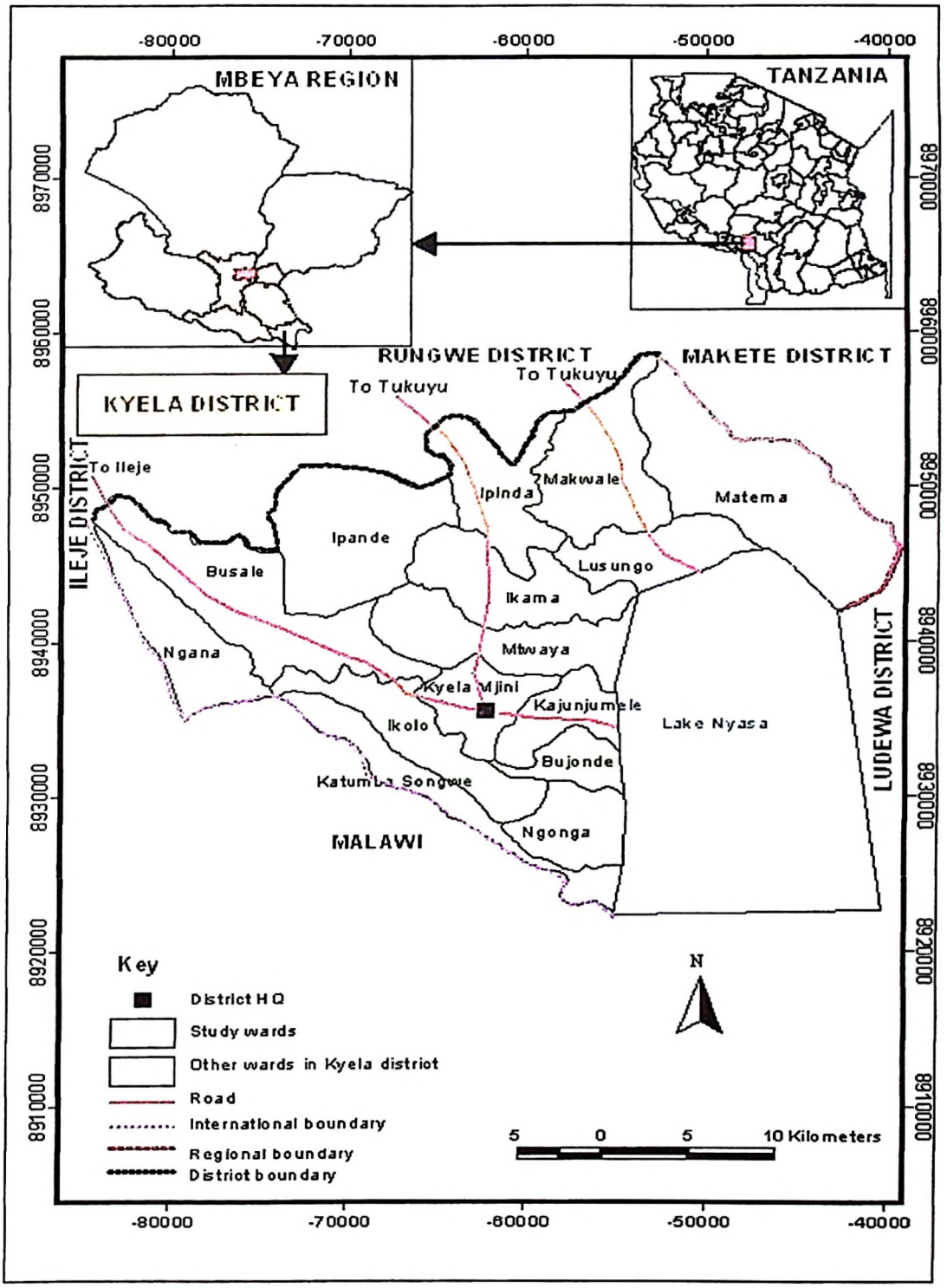

Figure 2: Map of Mbeya Region to show location of Kyela District
Source: URT (2005)

3.2.2 Topography

Kyela District has two distinct agro-ecological zones: the lowland and upland zone. The lowland zone is found at an altitude less than 1200 meters above sea level and the upland zone is found at over 1200 meters above sea level. Most of the low land zone is subject to flooding, threatening house holds' survival, hence a need for special attention.

The two zones are drained by four major rivers; Songwe, Kiwira, Mbaka and Lufilyo. The altitude in lowland zones lies between 500 and 1200 meters above the sea level and between 1200 and 2400 meters above the sea level in upland zones. Rainfall in the lowland zones is between 1600 and 2400 mm and in upland zones is between 1000 and 2000 mm. Soil types in lowland zones is mainly alluvial and feral.

3.2.3 Administration framework and ethnic groups

Kyela District is divided into two divisions namely Ntebela and Unyakyusa and 15 Wards which are subdivided into 101 villages with 383 Hamlets (URT, 2009). The major ethnic group found in Kyela District is Nyakyusa. Other ethnic groups are the Ndali, Kinga, Ngoni and Kisi.

3.2.4 Population

According to 2002 census, Kyela District had a total population of 174 470 having an annual population growth of 2.4%. In the year 2009 population was projected to to have a population of 208 845, among whom females were 108 069 and men were 100 776 (URT, 2009).

3.3 Sampling Design

The sampling frame consisted of smallholder cocoa producing farmers and cocoa traders. Purposive sampling was used to select the district under the study. Decision to select Kyela district was based on its high production of cocoa in Tanzania as indicated in Table 2 below. Purposive sampling was also used in the selection of wards. Wards selected were those from which cocoa production and business was typically done. From the selected wards, random sampling was used to select villages from which farmers' households were randomly selected to participate in the study.

The study drew in all five private cocoa buying companies and one cooperative union (KYECU). The decision to involve all companies was due to the small number of them, and therefore they where within the capacity of researcher. The private company agents (middlemen) and village collectors were randomly selected from the identified villages. For the purpose of this study 103 farmers' households, 10 village collectors, five private company agents, five private companies and one farmers' cooperative union were selected, making a total number of 124 respondents as shown in Table 2.

Table 2: Respondents selected from Kyela district for the study

Farmers									
Division	Unyakyusa				Ntebela				Total
Wards	Ikolo		Bujonde		Ipinda		Makwale		
Villages	Ibungu	Kilasilo	Lubaga	Isanga	Bujela	Ikulu	Ngeleka	Mpunguti	
Farmers	12	12	12	12	13	14	14	14	103
Traders									
Village collectors	1	1	1	1	1	2	2	1	10
Company Agents	1	0	1	1	0	1	0	1	5
Private companies									5
Cooperative union									1
Total									124

3.4 Data Sources and Collection Methods

Primary data were collected from farmers and traders in Kyela District. Secondary data such as export prices were collected from the internet, library and government sources. The structured questionnaires (Appendix 1 and 2) were used to collect data from smallholder farmers and traders respectively. The questionnaire comprised of both open and closed end questions. The questionnaires were translated into Swahili language for easy administration and data collection.

3.5 Data Analysis

In order to meet objectives of the study, qualitative and quantitative data analysis methods were carried out as described below.

3.5.1 Qualitative data analysis

Qualitative data analysis involved the use of central tendencies including means and percentages to describe the general characteristics of producers and traders participating in the chain. Market channels for cocoa were identified by tracing the vertical linkage between the actors in the chain to whom cocoa beans passed from production area to export places. Horizontal linkage was used to identify actors who influence the functioning of the chain and relationship among the actors. Diagrams were used in describing the existing market channels identified during the study.

3.5. 2 Quantitative data analysis

Quantitative data analysis was used in the determination of gross margin, to compare the gross margin obtained among the actors. and to determine the contribution of cocoa fermenting on the level of gross margin received by farmers in the district.

Gross margin analysis was used to calculate the profit received by actors in the chain. One way ANOVA was used to compare the gross margin accrued by each actor in the chain and regression analysis was used to determine the contribution of cocoa fermenting to the level gross margin among farmers.

(a) Gross margin analysis

Gross margin analysis was used in the study to evaluate profit accrued by different actors in the cocoa value chain. Gross margin for chain actors was estimated by adding total revenue and subtracting variable cost incurred at each level of the chain. For each actor, gross margin was calculated using the following formula;

$$GM/_{kg} = \sum \frac{TR - TVC}{Salesvolume(kg)} \quad \text{..... (1)}$$

Where:-

GM/kg = Gross margin per kilogram in Tanzanian Shillings per Kilogram (TZS/kg)

TR = Total revenue (TZS)

TVC = Total variable cost (TZS)

This margin was used to compare the profit accrued among the actors (farmers, middlemen and licensed buyers) in the chain.

Farmers' gross margin was also calculated through dividing gross margin by farm size. The following formula was used for its calculation;

$$GM/_{ha} = \sum \frac{TR - TVC}{Farmsize(ha)} \quad \text{..... (2)}$$

Where:-

GM/ha = Gross margin (TZS/ha)

TR = Total revenue (TZS)

TVC = Total variable cost (TZS)

This margin was used as dependent variable in regression analysis to determine the factors contributing to the level of farmers' gross margin (Equation 3). This analysis was used to test hypothesis that cocoa fermenting do not contribute to the level of farmers' gross margin.

(b) One way ANOVA

One way ANOVA was used to compare the gross margin obtained in equation (1) above among the actors in the chain. This was used to test hypothesis that "There is no significance difference in gross margin between farmers and traders (middle men and licensed cocoa buyers).

(c) Regression analysis

Regression analysis was used to determine the effect of age of household head, level of education, source of income, form in which cocoa was sold and number of cocoa trees per households on the level of gross margin (equation 2) among farmers. This analysis was used to test the hypothesis that Cocoa fermenting does not have effect on level of farmers' gross margin.

$$Y = \alpha + \beta_1 \chi_1 + \sum_{i=1}^{4} \delta_i D_i + \varepsilon \quad \text{..... (3)}$$

Where:

Y = Gross margin per hectare

α = Constant term,

β_1 = Coefficient of independent variable

δ_i = Coefficients of dummy variables

χ_1 = Number of cocoa trees per household

D_1 = Form in which cocoa was sold (Dummy; 1= dry form, 0= wet form)

D_2 = Age of respondents (Dummy; 1= years above 55, 0= years below 56)

D_3 = Education level of the household head (Dummy; 1= attended formal education, 0= did not attend formal education)

D_4 = Sources of income (Dummy; 1= crop production and other, 0 = crop production only)

ε = Error term

Description of the variables used in the model

a) Number of cocoa trees per household

The number of cocoa tree per household reflects the farmers' involvement in cocoa production. Small number of trees could mean that the plot manageable hence high yields per ha may be expected. Alternatively small number of tree could mean that, farmer do not depend much on the product hence less committed to field management. Large number of cocoa tree may increase gross margin due to production of scale. Number of cocoa trees per household may therefore positively or negatively affect the level of gross margin per hectare among farmers.

b) Age of the household head

Older farmers are believed to be more conservative than their younger colleagues. It might be expected that the farmers' age would therefore constrain the adoption of

new technologies and access to information that will automatically to affect the farmers' gross margin. Alternatively farmers' age is associated with production experience, older farmers are believed to have more experience in cocoa production than young one, the situation that could make them receive higher margin. Age of farmers may therefore have positive or negative influence to the level of farmers' gross margin.

c) Education level of the household head

The behaviour and decision of the farmers depend partly on their level of education. High level of education could enable them to appreciate the advantages of new technology and farming practices that will help them to increase income and lower costs of production and hence increase gross margin.

d) Form in which cocoa is sold

Processing of cocoa beans (fermenting) adds value to cocoa and increase farmers' income. According to Ramle *et al.* (2008) processing wet cocoa beans into dry cocoa beans can add value to the cocoa and increase the farmers' income by about 40% of the existing income. On the other hand activities associated with cocoa processing raise production costs. It is therefore the fact that cocoa processing may contribute positively or negatively to the level of farmers' gross margin in cocoa production.

e) Sources of income

Cocoa farmers differ in sources of income for their household. Some depend on crop production only, while others depend on crop production and other sources such as animal production and off-farm activities. Diversification in sources of income may

affect farmers' gross margin. According to Knudsen (2007) Non-farm activities come under pressure in the cocoa lean season. For instance farmers in Juaboso District in Ghana typically bring foodstuff and livestock from their hometowns to sell due to the lack of financial means in the system to purchase goods before they return for the cocoa season where they can fetch higher price.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of Respondents

The results on the socio-economic characteristics of the respondents from Table 3 show that, majority of the respondents (88%) were males and 12% were females. This means that most of the cocoa producing households were headed by men in the District. The highest proportion of male headed household suggests that, most of decision on the production and marketing of cocoa at household level were made by men. According to Enete and Amusa (2010) women are key players in the agricultural sector in developing countries. Despite this major role, men have reportedly continued to dominate farm decision making, even in areas where women are the largest providers of farm labour. This could be counter productive, as there is a potential situation for conflicts when women, as key players, carry out farm tasks without being part of the decision process. This is especially when the decisions made by men fail to recognize their household responsibilities as women.

Information on age distribution is also indicated in Table 3 below. About 46% of the respondents were between 18 and 55 years of age, and 54% had the age above 55 years. This implies that, majority of the cocoa farmers were relatively aged. The age of respondents was more likely to influence productivity and decision making. Market problems, such as low prices, which negatively affect the interests of farmers, tend to force people, especially the youth to migrate to the urban centres and developed countries in search of non-existent or menial jobs (Osei, 2007).

Table 3: Household characteristics

Variables	N	%
Sex category of household head		
Male	91	88
Female	12	12
Total	**103**	**100**
Age group		
Above 55 Years	56	54
18-55 Years	47	46
Total	**103**	**100**
Education level		
Primary education	65	63
No formal education	35	34
Secondary education	03	03
Total	**103**	**100**
Sources of income at the household		
Crop production and Livestock keeping	51	49
Crop production	39	38
Crop, animal production and off-farm activities	13	13
Total	**103**	**100**

It is evident from Table 3 that relatively young people were minimal, which can be attributed to the fact that young people are involved in the rural-urban migration in search for greener pasture. Another reason for small number of young age group involvement in cocoa production could be the scarce land for establishing new cocoa plots. According to URT (1997) high population pressure faces the district limiting cultivation and housing as cultivation rate of arable land is approaching 100% in the District.

There was a remarkable variation in the educational status of the farmers. Relatively low number of farmers (34%) did not attend formal schooling system, while majority of the respondents (63%) attended primary school and very few (03%) had managed to attend secondary education. It means that a good number of farmers were literate. This is important to cocoa farmers, as they can be trained on various production

aspects such as input application as well as record keeping. Farmers can also understand better and adopt practices that improve the quality of cocoa produced in the district with intensive creation of awareness on best farming practices towards good quality cocoa. The small number of farmers with secondary education is a setback, especially when technical proficiency is required in cocoa production.

The results on the source of the household income show that, most of the farmers' income (49%) came from crop and animal production, 38% from crop production only and 13% from the combination of crop, animal and off-farm activities. Diversification in farm production is important in risk management and mutual benefit from the enterprises. According to Ibrahim *et al.* (2009) income and crop diversification are essential strategies for raising income and reducing rural poverty. Production of organic cocoa can be influenced by the use of organic manure from the animals and animal can feed on the byproducts of primary processing of cocoa at farmers household (cocoa pods residue). The income from other enterprises is important to farmers; as they may be used by households when waiting for high price season for them to sell cocoa at high profit at time when prices go up.

4.2 Cocoa Production in Kyela District

4.2.1 Area under cocoa production

The results on size of farm are shown in Table 4. It is indicated that most of the farmers households (71%) had cocoa grown area ranging between 0.1 and 0.5 ha, 23% had area ranging between 0.51 and 1 ha and very few (6%) owned large size of land grown by cocoa (greater than 1 ha). The results portray the fact that cocoa production in the District is mostly done under small scale. This could be associated

with the high population concentration in the District which limits farmers to own larger plots of land for cultivation. This being the case, efforts to increase cocoa production in the District may successfully be attained by increasing production per tree rather than increasing the size of land under production. Production per tree can be improved by promoting recommended use of farm inputs such as fertilizer and pesticides among farmers.

Table 4: Total area grown by cocoa per household

Category of area under cocoa production	N	%
0.1-0.5 ha	73	71
0.51-1ha	24	23
Above 1ha	6	6
Total	**103**	**100**

4.2.2 Number of cocoa trees per household

Tables 5 show results on the number of cocoa tree per household. The results indicate that most of the farmers household, (57%) had small number of cocoa trees between 20 and 250, 29% had cocoa trees between 251 and 500, 11% had cocoa trees between 501 and 1000 and very few (3%) had number of cocoa trees greater than 1000. The number of tree per household can be used in predicting yield from cocoa in the household.

In areas where spacing is not uniform among farmers, the number of cocoa trees per household can be used in determining cocoa productivity. As noted in farm size per household in Table 5, the high percent of farmers having small number of cocoa trees per household suggests that cocoa production activity in the area is dominated by smallholder farmers.

Table 5: Number of cocoa trees per household

Number of cocoa trees (category)	N	%
20-250 trees	58	57
251-500 trees	30	29
501-1000 trees	12	11
Trees above 1000	3	3
Total	**103**	**100**

4.2.3 Cocoa yield per household

The results on annual cocoa harvests per household shows that, most of the farmers (53%) harvested between 50 and 500 kg, 30% harvested between 501 and 1000 kg and very few (17%) harvested relatively high (above 1000 kg) (Table 6).

Table 6: Cocoa yield per household

Amount of cocoa harvested per household	N	%
50-500 kg	55	53
501-1000 kg	31	30
Above 1000 kg	17	17
Total	**103**	**100**

The amount of cocoa harvested per household reflects the amount of household revenue collected per household. Cocoa is produced only for export. Increase in cocoa harvest per household results into increase in household and District income. As pointed by Kyela District Council, Cocoa contributes a lot to farmers' household income and District GDP (URT, 2009).

4.2.4 Farm input utilization in cocoa production

The results on input application per cocoa farm are shown in Table 7. It is shown that none of the interviewed farmers used agrochemical in cocoa farm. The main reason reported by farmers for not using agrochemicals were; restriction from buyers who

requested farmers not to use fertilizers and pesticides (63%), lack of money to buy inputs (19%), inputs were not important because their farms had fertile soils and pesticides problem was not common (16%) and very few (2%) responded that, there were no organic inputs in the markets in Kyela District. The farm inputs referred to here are fertilizers and pesticides.

Table 7: Input utilization in cocoa production

Variable	N	%
Farmers response to use of input		
No	**103**	**100**
Reason for not using inputs		
Restricted by buyers	65	63
Lack of money	20	19
They are not important	16	16
No inputs in the market	2	2
Total	**103**	**100**

Although the production is said to be done under organic, there is a need for farmers to use pesticides and fertilizers. Organic fertilizers could be used by farmers to increase production. Likewise organic pesticides could also be used for treating cocoa against diseases such as black pod, which was reported to affect cocoa pods by most of the farmers in Kyela District.

4.2.5 Primary processing of cocoa

Primary processing of cocoa includes, pod opening (extraction of cocoa beans from the pods), cocoa fermenting and drying. Primary processing was done by farmers at their households. Primary processing is important as it adds value and quality of cocoa produced. Several factors account for the poor quality of cocoa produced by

some farmers. These include harvesting pods at the wrong time, poor fermentation and inappropriate drying methods. Failure to follow the recommended practices in any one of the processing process can result in sub-optimal or poor quality (Sukha, 2003). The results show that, most of the farmers (64%) sold cocoa in dry form while the rest (36%) sold cocoa in wet form (Table 8).

Table 8: Primary processing of cocoa at household

Primary processing activity	N	%
Farmers response on cocoa fermenting		
Yes	66	64
No	37	36
Total	**103**	**100**
Fermenting methods		
Baskets	58	88
Wooden box	2	3
Heaping	2	3
Others	4	6
Total	**66**	**100**
Drying methods		
Drying platform	46	70
Mat spread on the floor	20	30
Total	**66**	**100**

The results on the methods used by farmers in cocoa fermenting show that use of basket was common (88%), followed by heaping and wooden box which counted for 3% each. Other methods used included nylon bags and water buckets, which counted for 6%. Most of the farmers choose to use baskets because the method is cheap, as the baskets are made from locally available materials (bamboo tree) in the District. Other reason for using baskets could be due to small amount of cocoa fermented at a

time, the situation that made it difficult to use other methods such as wooden box which is preferred for fermenting relatively large amounts of cocoa.

After fermenting, cocoa is dried to obtain moisture content suitable for storage. According to Sukha (2003) the suitable moisture content for cocoa storage is from 7 to 7.5. The results on cocoa drying method show that, the use of raised platform was common (70%), followed by use of mates spread on the ground (30%). Drying cocoa at raised platform protects the product from contamination with foreign bodies, hence it is mostly recommended to farmers.

4.3 Cocoa Marketing

Cocoa marketing in Kyela District involves different traders and passes through various channels from the producers to exporters. While some farmers sold fermented cocoa (Dry form), others sold cocoa in wet form. Some farmers sold cocoa to the private cocoa buying companies through company agents while others sold to the cooperative union. Other farmers sold to the village collectors who subsequently sold to company agents. Some farmers signed contracts with buyers to abide by rules and regulations on the production of organic product while others did not. The differences in behavior of farmers to the marketing process have an impact on return to the actors and sustainability of cocoa business in the district.

4.3.1 Form in which cocoa was sold

Cocoa from farmers was sold in wet or dry (fermented) form. The results in Table 9 show that, most of farmers (64%) sold cocoa in dry form and the rest (36%) sold in wet form. Form in which cocoa is sold has impact in both quality and price. The

selling price for cocoa sold in dry form was higher than the price of cocoa sold in wet form. The price difference of about 29% between cocoa sold in dry form and cocoa sold in wet form was realized when the two units were converted in equal volume of dry weight (wet cocoa was sold at approximately 2000 TZS. while Dried cocoa was sold at 2800 TZS per kg). By fermenting and drying cocoa at their households, farmers add value to their product, and hence move to higher position in the chain.

Table 9: Cocoa market information

Form in which cocoa was sold	N	%
Dried cocoa	66	64
Wet cocoa	37	36
Total	**103**	**100**

4.3.2 Buyers of cocoa from farmers

From the results in Table 10 below, the three main categories of cocoa buyers were identified in the district. These include; village collectors (locally known as "Njemuke"), private company agents, and farmers' cooperative union (KYECU). The private company agents (middlemen) dominated the activity by buying 63% of the total amount of cocoa sold, followed by village collectors (35%) and the lastly cooperative union (2%). Village collectors visited farmers' households to collect cocoa and majority of them bought cocoa in wet form. The private company agents bought cocoa from farmers at cocoa buying posts. Although most of the companies stressed that they bought cocoa in dry form only, it was found out that, most of their middlemen bought cocoa in both dry and wet form. During the study, many company agents were found drying cocoa bought in wet form at their collection centres before

transporting to their respective company stations. The middle men enjoyed extra profit by buying cocoa in wet form, in view of the fact that, by buying cocoa in wet form they paid little to farmers and received the second payment that could be received by farmers if they could sell cocoa in dry form to the companies.

Table 10: Buyers of cocoa from farmers

Buyer of cocoa from farmers	N	%
Private buyer agents	65	63
Village collectors	36	35
Cooperative union	2	2
Total	**103**	**100**

The results show that, a small number of farmers (2%) sold cocoa through the cooperative union. According to Mwelukilwa (2001) the Agricultural Marketing Cooperative Societies (AMCOS) have been the main channel for providing effective production support and marketing services to farmers and facilitated production and sales of their produce. Producer organisations have become major mechanisms to link small scale producers to the markets (Vermeulen *et al.*, 2008). According to Vermeulen *et al.* (2008) there are two major reasons for this; first on their own, small scale producers can neither achieve economies of scale nor provide the volume of product required to be competent in modern market, second on their own, small scale producers have little power and political influence and are unable to protect their interest in the market or policy marking arena. The small number of farmers selling cocoa through cooperative union is an indication of weak influence of farmers to the cocoa market in the District.

4.3.3 Place of contact between farmers and cocoa buyers

The two main marketing places where farmers and traders meet in the District were identified. These were farmers' households and company buying posts. The results show that, majority of farmers (51%) sold cocoa at private company purchasing posts, (47%) sold cocoa at their home place while very few (2%) reported that they sold cocoa both at their household as well as company buying posts (Table 11).

Table 11: Distribution of farmers according to place where cocoa was sold

Place of contact with buyers	N	%
Company buying post	53	51
Farmers' home	48	47
Both (home and private buyer's posts)	2	2
Total	**103**	**100**

Cocoa marketing place has the impact on farmers return. By selling at their home place farmers avoid costs associated with transportation to the market. Selling cocoa at home place may however result to problems of cheating which would affect their income from the produce.

4.3.4 Trader-farmers contract

Table 12 shows the distribution of farmers' household according to the households having contract with buyers. The results show that majority of farmers (75%) did not have contracts with buyers while the rest (25%) had contracts with buyers. The common aspect noted in the contract was the requirement for farmers to follow conditions underlying production of cocoa in organic form.

The conditions such as not using inorganic fertilizer and pesticides in the farm were noted in the contract. Another typical aspect was for farmers to abide by labour law

of not using child labour in cocoa production. However the contracts did not restrict farmers on where to sell their produce. Farmers were free to sell cocoa to any buyer regardless of whether they had contract with him or not. Some informal contracts between farmers and buyers were identified; some farmers borrowed money from traders (mainly village collectors) and promised to pay back by giving them equivalent amount of cocoa at agreed price when cocoa were ready for harvesting.

Table 12: Distribution of farmers according to contract with buyer

Farmers having contract with buyers	N	%
No	77	75
Yes	26	25
Total	**103**	**100**

4.4 Cocoa Market Channel

Cocoa produce is rarely delivered directly from producers to exporters. Instead, it passes through the middle men (village collectors and company buying agents) to exporters. There are many functions carried out in transporting the product from the point of production to the point of exportation. Each of these functions requires funding and specific knowledge and experience.

The three main marketing channels were identified in the study area. The first channel begins from producers, village collectors, private company agents and private companies to exporters. The second channel begins from producers, private company agents, private companies to exporters. The last channel starts from producers, primary cooperative union, District cooperative union to the exporters (Fig. 3).

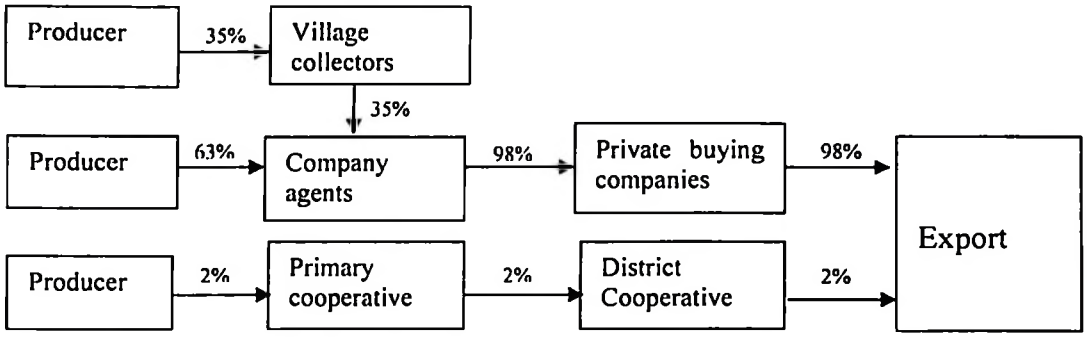

Figure 3: Cocoa market channels in Kyela District

4.4.1 Actors in the cocoa market chain

During the study, actors and their respective roles played in the course of providing the product with time, form and place utilities in the chain were identified. By participating in the chain the actors attain individual and social targets.

(a) Producers

Farmers produced cocoa at their household and sold them to village collectors, company agents or cooperative union. This stage is concerned with farm management practices, cocoa harvesting primary processing (fermentation and drying) and ends with the sale of cocoa either in wet or dried form at the farm gate. These transactions may occur literally at the farm gate or at some other point where the farmer hands over ownership of the product to the next value chain participant such as private company buying posts. Depending on the farmers' interest, some of primary processing may take place at the household before selling. In the course of cocoa value adding some farmers processed cocoa at their households. Value adding activities included; cocoa fermenting, cocoa drying (Plate 1) and transportation to the immediate buyer in their villages. The results show that, 64% of farmers fermented cocoa before selling, 51% sold cocoa outside their households (Table 8 and 11

respectively). The results from two tables above conclude that, some of the farmers participate in cocoa value adding.

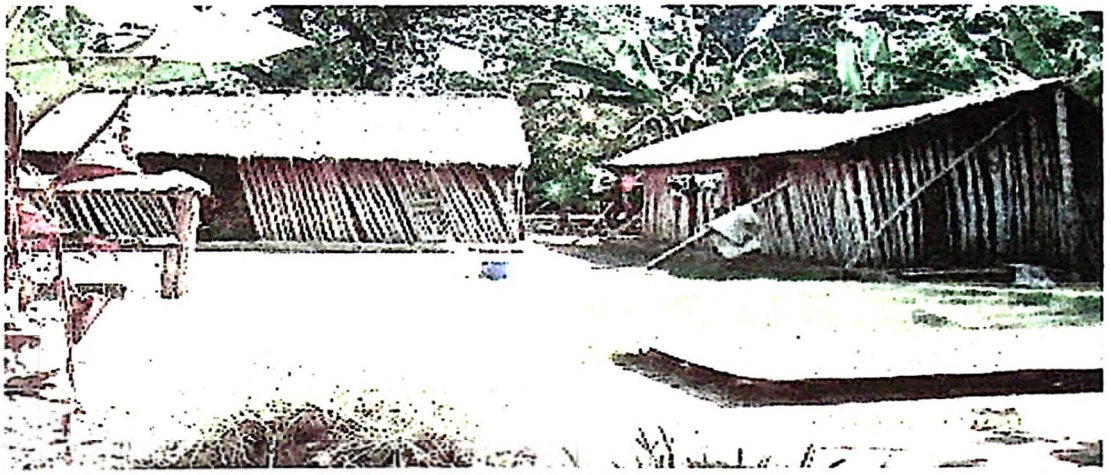

Plate 1: Cocoa drying at farmer's household

(b) Middle men

During the study two categories of middlemen were identified. The first category was that of village collectors who pass at farmers households to collect cocoa. The second category includes the company agents who collect cocoa for companies in cocoa buying posts.

- **Village collectors**

The results show that, village collectors bought 35% of cocoa supplied by farmers (Table 8). Most of the cocoa bought by this category of buyers were in wet form. With respect to cocoa buying place, about 80% of village collectors bought cocoa from farmers' home and the rest (20%) bought cocoa at buying posts. It was identified during the study that about 90% of village collector's bought cocoa in wet form from farmers, while during selling only 20% sold them in wet form to private company agents (Appendix 4). This means that, some

village collectors do ferment and dry cocoa before taking them to private buyers' posts.

- **Private cocoa buying company agents**

  Private company agents work as middlemen between farmers and cocoa buying company. They buy cocoa at company buying posts located in cocoa producing villages. Most of the agents bought cocoa both in wet and dried form, but when sending to their respective companies all cocoa were delivered in dry form. These agents ferment and dry cocoa bought in wet form at their buying posts. By so doing they participate in value adding to the crop. The results show that, 60% of private company agents bought cocoa in dry form while 40% bought cocoa in wet form (Appendix 4).

(c) Licensed buyers

A total of five registered cocoa buying companies and one farmers' cooperative union were found to be operational in the area.

- **Private companies**

  This category of actors includes private companies registered to buy cocoa in the District. The private companies found were Hai Tanzania, Biolands, Mohammed Enterprise, TANCOCO and OLAM. These companies bought cocoa from farmers through their agents located in cocoa producing villages. The main roles played by these companies were cocoa drying, packaging, storage, transportation and cocoa exportation. Some of the companies were involved also with provision services to farmers, such as training, provision of farm working tools such as pruning shears and organic product certification.

- **Farmers Cooperative Union**

  The KYECU was the only farmers' cooperative union involved with cocoa business in Kyela district. It buys cocoa from farmers through the primary cooperative societies found in wards. KYECU bought dried cocoa direct from cocoa producing farmers. About 100% of cocoa bought by KYECU were fermented and dried by farmers. KYECU had small share of cocoa bought from farmers. The main problem reported by KYECU as a cause of the small share was lack of adequate funds. This made it difficult for the cooperative to compete with private buyers in the District.

In the detailed discussion with cooperative leaders, the following were revealed as other problems facing cooperative and cocoa market in Kyela District as listed below;

- Cooperative members lost hope after the breakdown of the activities of KYECU, and after liberalization of crop marketing.
- Private buyers are paying low prices and have led to production of poor grades of the cocoa.
- The certification of organic cocoa, which was being done under the joint partnership of KYECU and Aleria, was hijacked by Aleria (now the Biolands), buying cocoa and selling it but not to the advantages of a farmers.
- Financial position of the Union was very poor due to debts left by the former Kyela and Rungwe Cooperative Union (KYERUCU).
- Most of the assets belonging to union got lost due to several changes to the cooperative movement.

4.4.2 Farmers' organisation and networking

Farmers need to be organized in groups/associations/societies/cooperatives to enhance delivery of essential services e.g. group certification, marketing of produce, solving logistical problems such as transport and bargaining power (Mwasha, 2007). Farmers' organisations are important in creating awareness of issues related to marketing. Farmers who are in groups are even aware of the existence of markets in major towns. They are also aware of companies which buy their produce for export (Muturi, 2001).

The results in Table 13 show that, out of the interviewed farmers 52% were aware of at least one existing agricultural farmers groups in the District, and 48% were not aware. Among the farmers who were aware of existing groups, 74% were members of at least one group while 26% were not. Members of the group mentioned provision of trainings and farm implements as benefits accrued from the groups. On the other hand, farmers who were not members mentioned the reasons like lack of interest (45%), lack of money required for membership fee/registration (20%), long distance from grouping centre (15%), lack of time to participate in group activities and leadership problems in groups as limiting factors for them to join groups which counted for (10%) each.

The results on access to trainings on cocoa production show that, 44% of farmers attended at least one training session, and 56% did not attend (Table 13). The training programmes were provided by private cocoa buying companies, cooperative union and non governmental organisation (Techno Serve). Techno Serve was working with about 5000 farmers organized in 80 groups. Cocoa fermenting, drying

and field management were mentioned to be the main topics covered during the training sessions.

Table 13: Farmers group and networking

Variable	N	%
Farmers awareness to group existence		
Yes	53	52
No	50	48
Total	**103**	**100**
Farmers membership to existing groups		
Yes	39	74
No	14	26
Total	**53**	**100**
Advantages obtained from the group		
Knowledge/skills	36	92
Marketing services	2	5
Financial assistance	1	3
Total	**39**	**100**
Reasons for not joining groups		
Lack of interest	9	45
Lack of money	4	20
Long distance to the group center	3	15
Lack of time	2	10
Leadership problem	2	10
Total	**20**	**100**
Farmers attended trainings on cocoa		
No	58	56
Yes	45	44
Total	**103**	**100**
Place where farmers send complains		
No place	91	88
Village leaders	12	12
Total	**103**	**100**

Individual farmer can not influence decisions pertaining to cocoa market in terms of market price for both cocoa and inputs. The existence of monopoly cocoa buying

companies is likely to create environment of exploitation to farmers. Institutional framework geared to serve interest of farmers is very important in this situation. In response to question on where do farmers send complains concerning cocoa marketing, most of the farmers (88%) replied that, they didn't have the place to send their complains, while only few (12%) reported that, their complains sent to village leaders.

4.4.3 Market information

Farmers require periodical information on commodity prices in order to plan production levels in advance and negotiate for better prices. Availability of information helps to create transparency among all players in the market. Lack of transparency in market discourage production and perpetuates poverty, thus constraining further development of the smallholder agriculture. In contrast, a good flow of information makes commodity prices more competitive of benefit to producer traders and consumers (Muturi, 2001). One of important information to farmers is information about selling price. Cocoa prices are printed in the posters / boards located at cocoa buying post (Plate 2).

Plate 2: A poster for displaying cocoa price

Awareness to product price is necessary but not sufficient factor for encouraging farmers to increase production, farmers need also to be involved in price setting. The response received from farmers and traders to the question "who determine cocoa price in the District?" was licensed buyers (private companies and cooperative union). Farmers were not involved in price setting.

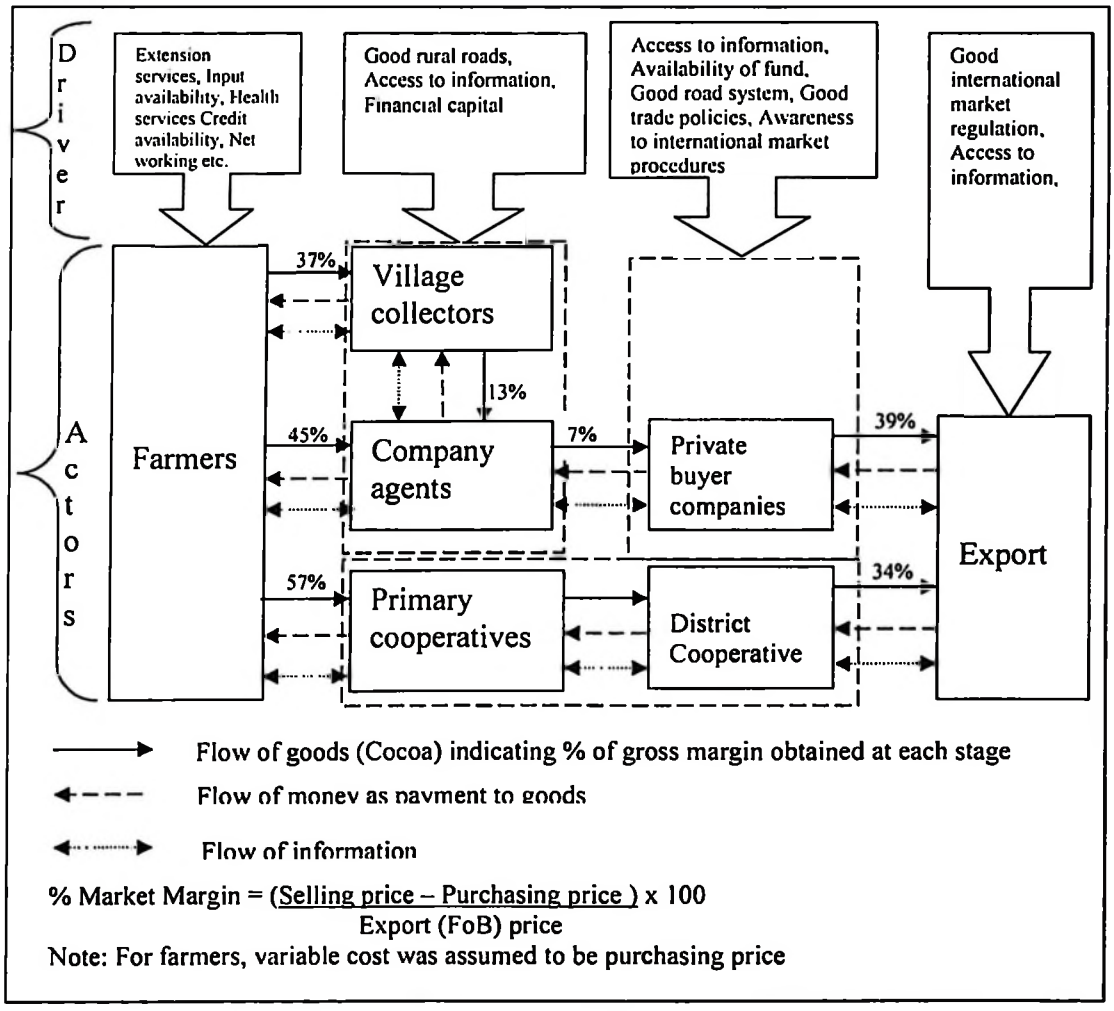

Figure 4: Cocoa value chain in Kyela District

Fig. 4 summarizes the overall process of cocoa marketing, representing the actors involved and their roles, flow of goods, money and information as explained above to describe the cocoa value chain as practiced in Kyela District.

4.5 Marketing and Gross Margin

4.5.1 Marketing margin

Marketing margin is the difference between value of a product at one stage in marketing process and the value of an equivalent product at another stage. This margin indicates how much has been paid for marketing functions such as processing, packaging transportation and other marketing services applied to the product at the particular stage in marketing process.

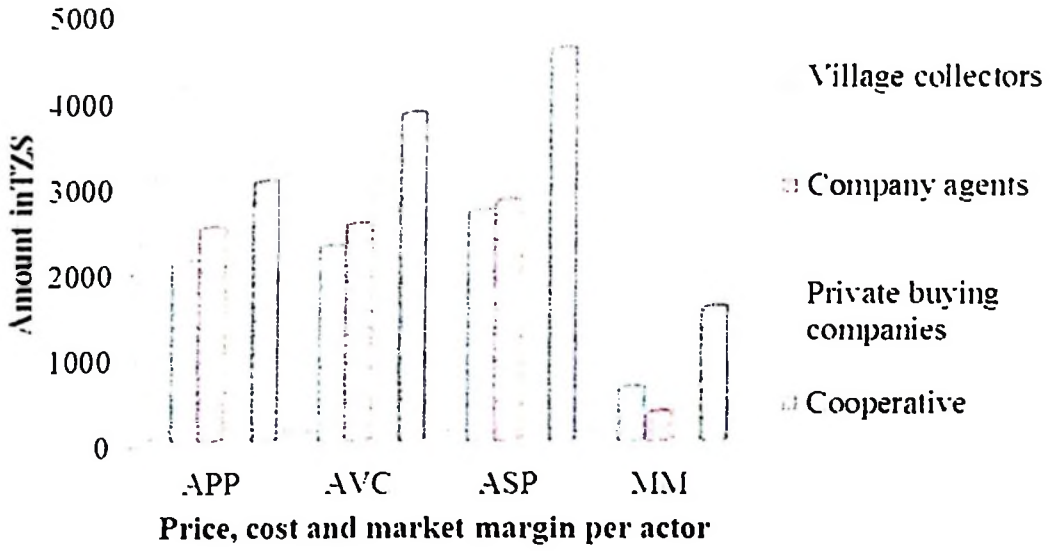

Figure 5: Distribution of market margin among traders in Kyela District
Note: APP = Average Purchasing price, AVC = Average Variable Cost,
ASP = Average Selling Price, MM = Marketing Margin.

The results as presented in Fig. 5 below shows that, private companies received the largest margin followed by cooperative union, village collectors and lastly by company buying agents. The higher marketing margin may reflect the involvement of the actors in value adding activities in the chain or low payment at farm gate price. Private companies played major role in drying, packaging storage and transportation

of cocoa to the shipping point. Although cooperative union performed almost the same activity as licensed buyers do, the relatively small marketing margin of cooperative union could be due to the high price paid to farmers as compared to the private cocoa buying companies. Cooperative union bought cocoa at 3000 TZS per kilogram for which, 2600 TZS was paid on the spot while 400 TZS was paid later as second payment. Private company buyers purchased cocoa at the average price of 2760 TZS per kilogram. The maximum price paid to farmers by private company buyers was 2800 TZS per kilogram. 2400 TZS was paid on the spot and the rest (400 TZS) was paid as second payment.

Village collectors received a relatively high market margin as compared to company buying agents. Most of the village collectors bought cocoa from farmers at low prices in wet form and sold them to company buying agents at relatively high price after drying for only two to three days. From the study it was found that village collectors bought cocoa at average price of 2000 TZS (1000 TZS per Kilogram in wet form) and sold at 2800 TZS after drying.

4.5.2 Gross margin received by actors in cocoa value chain

The results on average gross margin received by actors in cocoa value chain in Kyela District show that, producers (farmers) received the largest percentage of gross margin (47%), followed by private company (34%). Among the middleman, company agents received relatively high gross margin (6%) and village collectors received the low percent (9%). The cooperative union received a lowest percent of gross margin (16%) (Fig. 6). The percentage was calculated by dividing AGM to export price (FoB) and the result was multiplied by 100.

The high margin obtained by farmers could be due to the method used in cocoa production in the District as most of farmers do not use farm inputs (fertilizers and pesticides be it organic or inorganic). Farm inputs do not only increase the level of output, but also raise production costs, that could also be reflected in the level of gross margin among producers (farmers). Private buying companies received a relatively high average gross margin as compared to middle men and cooperative union. Middle men obtained the lowest percent of average gross margin.

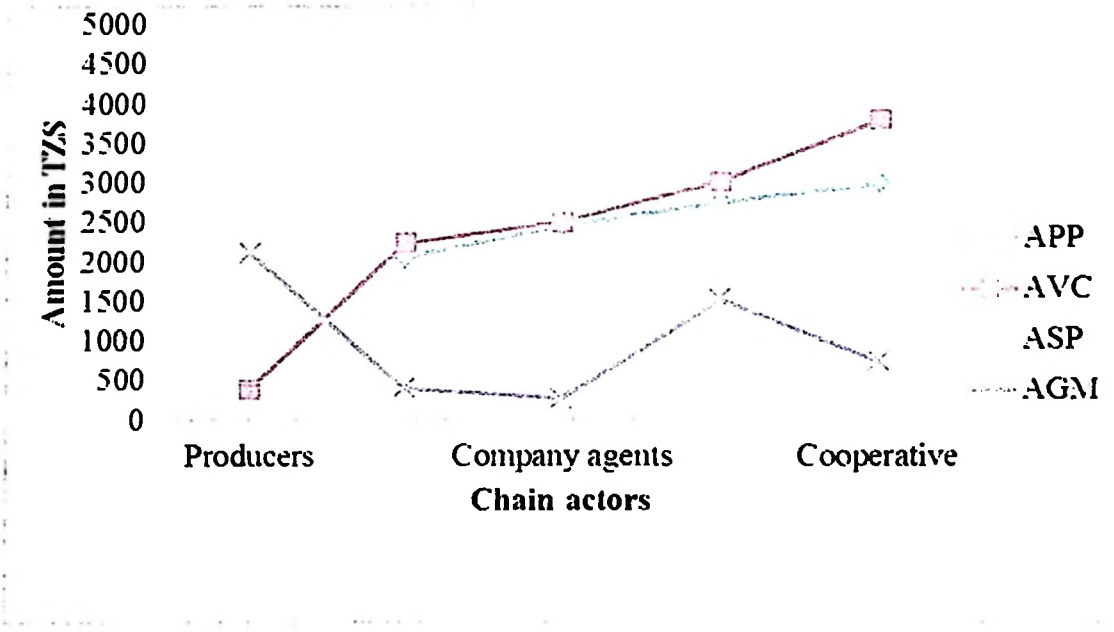

Figure 6: Distribution of Average Gross margin among cocoa chain actors in Kyela District

Note: APP = Average Purchasing price, AVC = Average Variable Cost, ASP = Average Selling Price, AGM = Average Gross Margin.

4.5.3 Gross margin comparison between the actors

One way ANOVA was carried out to compare between the level of gross margin obtained by actors in the chain. This analysis was conducted to test hypothesis that there was no significance difference in gross margin between farmers and traders. The results show that the difference in gross margin between the actors was

significant with F value of 205.5, significant at 5%. Multiple comparison analysis (Table 14) was further carried out to identify the difference in gross margin for each pair of actors. Results of multiple comparison analysis point out that, gross margin was significantly different for each pair of the actors. Large difference is observed between middle men and farmers followed by different between licensed buyers and middle men and the relatively small difference is observed between farmers' gross margin and that of licensed buyers. All pairs were significantly different at 0.05 alpha level.

Table 14: Multiple comparison for gross margin per kilogram among chain actors

(I) Respondents category	(J) Respondent category	Mean Difference (I-J)
Farmers	Middle men	1 651.5*
		(83.3)
	Licensed buyers	742.8*
		(126.6)
Middle men	Farmers	-1 651.5*
		(83.3)
	Licensed buyers	-908.7*
		(145.6)
Licensed buyers	Farmers	-742.8*
		(126.6)
	Middle men	908.7*
		(145.6)

* The mean difference is significant at 0.05, F=205.4
Numbers in parentheses are standard error

Based on the results observed in analysis made above, there is sufficient evidence to reject hypothesis that there was no significance difference in gross margin between

farmers and traders. It is therefore concluded that there is a significant difference in gross margin between farmers and traders.

4.6.1 Distribution of gross margin per hectare among farmers

Table 15 shows the distribution of gross margin per hectare among farmers. The results show that, most of the farmers (70%) received a gross margin of between 1 000 000 and 2 000 000 TZS per hectare, and the rest (30%) were equally distributed among farmers who received a gross margin of between 400 000 and 1 000 000 TZS (15%) and others who received a gross margin of above 2 000 000 TZS occupied (15%).

Table 15: Distribution of gross margin among farmers

Level of gross margin per ha in TZA (000)	N	%
400 - 1000	16	15
1000- 2000	72	70
Above 2000	15	15
Total	**103**	**100**

4.6.2 Factors contributing to the level of farmers' gross margin per hectare

Multiple linear regression analysis was employed in the determination of the factors contributing to the level of gross margin per hectare among farmers. This analysis was conducted to test the hypothesis that, cocoa fermenting does not have effect on level of farmers' gross margin. The results presented in Table 16 below show that, the value of R^2 is 0.40, meaning that, the independent variable accounts for 40% of the variation in the observed output. Adjusted R^2 is 0.37, making difference of -0.03 (3%) from R^2. According to Field (2005) the difference between R^2 and adjusted R^2

means that; if model were derived from the population rather than a sample it would account for approximately 3% less variance in the outcome.

From the summary Durbin Watson (D-W) test gave the value of 1.99. According to Field, (2005), the Durbin-Watson statistic ranges in value from 0 to 4. A value of D-W $\leq$ 2 indicates non-autocorrelation, a value of $>$ 2 indicates positive autocorrelation and value of $\leq$ 0 indicates negative autocorrelation. The value on Durbin Watson obtained above (1.99) is $\leq$ 2, meaning that there was no autocorrelation in residuals.

Table 16: Factors contributing to farmers' gross margin

Variable	Coefficients
Constant	2 161 602*
	(238 227)
Number of cocoa trees	286
	(262)
Form in which cocoa was sold (Dummy)	1 159 809*
	(169 141)
Age of the household head (Dummy)	-665
	(182 238)
Education level of household head (Dummy)	201 904
	(174 677)
Source of household income (Dummy)	298 216
	(164 654)

Dependent Variable: Gross margin per hectare
* The value is significant at 5%
Numbers in parentheses are standard error
R^2 = 40%, Adjusted R^2 = 37%, Durbin-Watson = 1.99

Result on regression output coefficients (Table 16) shows that, out of five factors only one (form in which cocoa was sold) is significant. Coefficient value for cocoa

form is positive, which means that cocoa fermenting results to higher gross margin among farmers. Other factors including age of household head, education level of the household head, number of cocoa trees per household and source of household income, are not significant. Although these variables are not significant, direction of their influence was observed. With exception of age, which found to affect farmers' gross margin negatively; other variables (number of cocoa trees, education level of the household head and source of income) had positive effect. The estimated specific model for cocoa gross margin per hectare is therefore given as follows;

$$Y = 2161602 + 286\chi_1 + 1159809D_1 - 665D_2 + 201904D_3 + 298216D_4$$
$$(238\,227)^{*} \quad (262) \quad (169\,141)^{*} \quad (182\,238) \quad (174\,677) \quad (164\,654)$$

Note: X_1 = Number of cocoa tree, D_1= Form of cocoa sold (1=Dry, 0=Wet), D_2 = Age of household head (1= above 55, 0= below 56 years), D_3 = Education level of household head (1= attended formal education, 0= did not attend formal education), D_4 = Sources of household income (1= Crop and other sources, 0= Crop production only)

Based on the analysis results it is concluded that cocoa fermenting significantly contribute to the level of farmers' gross margin per hectare. By fermenting, the farmer generate 1 159 809 TZS more as compared to farmers who sell cocoa in wet form. It is therefore important for farmers to ferment cocoa for them to realize more profit from cocoa business.

CHAPTER FIVE

5.0 CONCLUSION RECOMMENDATIONS AND AREAS FOR FURTHER RESEARCH

5.1 Conclusion

5.1.1 Introduction

Cocoa marketing in Kyela District involves various actors; farmers, village collectors, Private company agents, private cocoa buying companies and cooperative union. Majority of cocoa producing household are male headed of whom, majority had passed through formal schooling system. Most of the households depend on more than one source of income for their household. The small size of cocoa farm per household, small number of cocoa trees and non use of fertilizers and pesticides are some of the characteristics of cocoa production in Kyela District.

In addition, farmers received high margin by selling cocoa through cooperative union. Relatively low margin was obtained by selling cocoa to the private company agents and the lowest margin was received by farmers who sold cocoa through village collectors. There is a significant difference of average gross margin received between pairs of actors in cocoa market chain and that cocoa fermenting significantly contribute to the level of farmers' gross margin in Kyela District.

5.1.2 Cocoa market channel

Cocoa marketing in Kyela District consists of various actors who link vertically into different channels. The three channels found were as follows;

i. Producers ⟶ Company agents ⟶ Company ⟶ Exporters
ii. Producers ⟶ Village collectors ⟶ Company agents ⟶ Company ⟶ Exporters
iii. Producers ⟶ Primary cooperatives ⟶ District cooperative ⟶ Exporters

The first channel was commonly used by farmers, followed by the second channel and small number of farmers sold cocoa through the third channel.

5.1.2 Gross margin

Producers (farmers) received relatively higher average gross margin, followed by private companies, company agents, village collectors and lastly by cooperative union. One way ANOVA test suggested that, the average gross margin (gross margin per kilogram) was significantly different between pairs of the actors in the chain. The pairs compared were; farmers and middle men (village collectors and company agents), farmers and licensed buyers (private companies and cooperative union), and middlemen and licensed buyers.

5.1.3 Contribution of cocoa fermenting to farmers' gross margin

Regression analysis was used to determine the contribution of cocoa fermenting to the level of farmers' gross margin. In the model, gross margin per hectare was used as dependent variable and number of cocoa trees per household, age of household head, education level of household head, form in which cocoa was sold and source of household income per household were used as independent variables. The results of regression output indicated that, out of the five dependent variables only one (cocoa fermenting) was found to be significant in contributing to the level of gross margin per hectare among the farmers. By fermenting farmers received 1 159 809 TZS more per hectare, as compared to farmers who sold cocoa without fermenting when other factors were assumed to be constant.

5.2 Recommendations and Policy Implications

5.2.1 Recommendations

Cocoa is an important source of income for smallholder farmers and GDP of Kyela District. Improvement of cocoa production is therefore important in the District. It is recommended that efforts to increase cocoa production per household should focus on increasing cocoa production per tree, by improving field management practices, such as application of fertilizers and pesticides (organic fertilizer and pesticides are recommended). Farmers received high margin by selling cocoa through the cooperative union. A support to cooperative union by means of financial and management skills is therefore recommended for it to effectively compete with private companies in the District.

Regression result provided the output that cocoa fermenting significantly contribute to level of gross margin per hectare among farmers. Based on this result it is recommended that farmers should sell fermented cocoa. Practices of buying cocoa in wet form from in farmers' household as it is done by most of the village collectors should be discouraged.

It is hard for Tanzania to compete with large cocoa producing countries in Africa such as Ivory Coast and Ghana, however value adding and production of good quality cocoa will make it possible. Producers in Tanzania need to add value to their products for them to be able to compete in the market. Value addition by working with the market, the method recommended by Gilbert (2008) is important to be adopted under Tanzania condition.

5.2.2 Policy implications

Cocoa is a concealed potential export crop in Tanzania. It is important crop to the economy of individual farmers and the country. If production is improved in the three main cocoa producing regions (Mbeya, Morogoro and Tanga) high economic return will be met. Farmers have to increase production of quality cocoa and traders (private and public traders) have to buy quality cocoa from farmers and pay remunerative prices. Both private and governmental organisations need to support the production and business activities and the government in particular has to support the proper running of cocoa business. In order ensure the sustainability of cocoa production and marketing in Tanzania the following are therefore recommended to policy makers;

- Evaluations of cocoa market channels and setting in place of mechanism which ensures the production of quality cocoa.
- A provision of reliable extension services to farmers need to be done so as to encourage production of quality cocoa.
- The selling of cocoa in wet form should be discouraged in view of the fact that, it results into the production of poor quality cocoa and hence low returns to farmers.

In the light of the recommendations made above, there is a need for the government to structure an institution that will be responsible for supervising cocoa business in Tanzania. Market Institutions, such as cocoa market board is required in order to certain that, only good quality cocoa is produced, no cheating among buyers and accurately collection of government revenue from cocoa business is done.

5.3 Areas for Further Research

The study has managed to shed light on important areas which need improvement in cocoa production in Tanzania. The coverage of the study however was able to cover all areas for improvement in cocoa sector. The same research is recommended to be carried out in other cocoa producing regions (Morogoro and Tanga) as the result obtained in Kyela may not necessarily resemble the situation in other regions due to climatic, cultural and economic differences. Further researches are recommended improvement of Cooperative Unions roles as exporting agent for cocoa and other export crops for small holder farmers in Tanzania. Lastly research is required in promotion of cocoa processing industries in Tanzania and other developing countries, the practice that will help in increasing product value before exporting.

REFERENCES

Abbot, J. C. and Makeham J. P. (1990). *Agricultural Economics and Marketing in the Tropics*. Longman Group Ltd, Harlow. 194pp.

Africa News Network (2008). Tanzania urged to pay more attention to non-traditional export crops. [http://www.africanagricultureblog.com/2008/08/tanzania-urged-to-pay-more-attention-to.html] site visited on 12/4/2010.

Asare, R. and David, S. (2010). *Planting, replanting and tree diversification in cocoa systems.* A guide for participatory farmers' training manual No. 2. Forest and Landscape. 120pp.

Barrett, C. (1997). Food marketing liberalization and trader entry: Evidence from Madagascar. *Journal of World Development* 25(5): 763 - 777.

Barry Callebaut Company (2009). Corporate social responsibility and sustainability, an overview of our activities 2008–2010. [http://www.barry-callebaut.com/download.dhtml?url=/cms%5Ffiles/N-6982-File.pdf,filename=E%5FCabosse%5F2008-10%5 Flow.pdf] site visited on 16/05/2011.

Campbell, R, (Ed.) (2008). Competitiveness at the frontier. Value chains. *A monthly forum promoting Indonesian economic competitiveness.* Indonesia July 2008. 10pp.

Cappelle, J. (2009). *Towards a Sustainable Cocoa Chain.* Oxfam International Research Report. Oxfam International, Ghent, Belgium. 34pp.

Conforti, P and Sarris, A. (2010). Liberalising trade under structural constraints in developing countries, a general equilibrium analysis of Tanzania. In: *Africa in Food security in Africa, Market and trade policy in Africa. (Edited by Sarris, A and Morrison, J.)*, FAO, Cheltenham. pp. 99-114.

CTA (2009). Cocoa trade issues for the Africa Caribbean and Pacific countries. [http://www.acp-eu-trade.org/library/files/Agritrade%20Executive%20Brief _Beef _July%202009.pdf] site visited on 5/7/2010.

Enete, A and Amusa, T. (2010). Contribution of men and women to farming decisions in cocoa based agro forestry households of Ekiti estate, Nigeria. *Tropicultura journal* 28 (2) 77 - 83.

Eskola, E. (2005). Agricultural Marketing and Supply Chain Management in Tanzania: A Case Study. ESRF Working paper series, No. 16, Dar es Salaam. 72pp.

FAOSTAT (2009), Statistics year book 2009. FAO, Rome. 237pp.

Field, A. (2005). *Discovering statistics using SPSS.* Suge publication Ltd., London. 779pp.

Fleming, K., Smith V. E. and Bittenbender, H. C. (2009). The economics of cacao production in Kona. [http://www.ctahr.hawaii.edu/oc/freepubs/pdf] site visited on 10/5/2010.

Gereffi, G. (1994). Organization of Buyer-Driven Global Commodity Chains. ICCO quarterly bulletin of cocoa statistics. In: *Commodity Chains and Global*

Capitalism (*Edited by Gereffi, G and Korzeniewics, M.*), Praeger publishers, Westpoint. pp. 93-122.

Gilbert, C.L. (2008). Value chain analysis and market power in commodity processing with application to the cocoa and coffee sectors. In: *Commodity market review 2007-2008.* (*Edited by Hallam, D. and Rapsomanikis, G.*), FAO, Rome. pp. 5-50.

HAI Tanzania. (2010). High quality organic cocoa with a social conscience. [http://www.haitanzania.com/Tanzanian_Cocoa.htm] site visited on 15/4/2009.

Haji, J. (2008). Economic efficiency and marketing performance of vegetable production in the Eastern and Central Parts of Ethiopia. Thesis for award doctorate degree at Swedish University of Agricultural Sciences Uppsala, Ethiopia, 64pp.

Ibrahim, H., Rahman, S., Envulus, E. and Oyewole, S. (2009). Income and crop diversification among farming households in a rural area of north central Nigeria. *Journal of Tropical Agriculture, Food, Environment and Extension.* 8 (2): 84 - 89.

ICCO (2006). Analysis of the value chain in cocoa producing countries. proposal for a global comparative study. Executive committee 129 meeting, London. 6-8 june 2006. 12pp.

ICCO (2010). Functioning and transparency of the terminal markets for cocoa. An overview and analysis of recent events on the London terminal market. [www.icco.org/documents/documents3] site visited on 1/3/2011.

ICCO (2011). About cocoa growing. [http://www.icco.org/about/growing.aspx] site visited 16/04/2011.

Jaffee, J., Siegel, P and Andrews, C. (2008). *Rapid agricultural supply chain risk assessment.* Conceptual framework and guidelines for application. Agriculture and Rural Development Discussion Paper 47. World Bank. June 13-2008. 50pp.

Kaplinsky, R. (2004). Competitions policy and the global coffee and cocoa value chains. Paper prepared for United Nations Conference for Trade and Development. University of Sussex. May 2004. 31pp.

Kaplinsky, R. and Morris, M. (2001). A Handbook for Value Chain Research, [http://www.inti.gob.ar/cadenasdevalor/manualparainvestigacion.pdf] site visited on 18/8/2010.

Knudsen, M. H. (2007). Making a living in the cocoa frontier, diversifying income in cocoa economy. *Danish journal of Geography* 107 (2): 29 - 44.

Lazaro, A. (2008). Value chain analysis for oranges in Muheza District. Dissertation for award of MSc. Degree at Sokoine University of Agriculture. Morogoro, Tanzania. 85pp.

Mgaya, L.B. (2008). Value chain analysis of rice marketing in Kilosa District. Dissertation for award of MSc. Degree at Sokoine University of Agriculture. Morogoro, Tanzania. 120pp.

Mukami, P. (2003). Review of the agriculture sector. Tanzania national business council, Agriculture investor's round table working group. November, 2003. 29pp.

Murti, S. (1991). Gross margin budget for field crops in the Douglas-Daly. Technical bulletin No. 179. [http://www.nt.gov.au/d/Content/File/p/Tech_Bull/TB179.pdf] site visited 20/03/2011.

Muturi, S.N., Kilungo, J. K., Muendo, K. M., Mairura, Z., and Kariuki, J.G. (2001). Marketing of smallholder produce. A synthesis case studies in the highlands of Kenya. Technical report No 26. RELMA, Nairobi. 56pp.

Mwasha, A. M. (2007). Organizing smallholder supply chain for local markets. Ministry of Agriculture Food Security and Cooperatives. A paper presented to the East African Organic Agriculture Conference in Tanzania, held at Pearl Hotel in Dar es Salaam, Tanzania on 28th May – 1st June 2007. 8pp.

Mwelukilwa, J. S. (2001). The role co-operatives play in poverty reduction in Tanzania, Cooperative College, Moshi, Tanzania. Paper Presented at the United Nations in International Day for the Eradication of Poverty 17 October 2001. 14pp.

Ng'webesa, J. E. (2008). Value chain analysis for coffee in Tanzania, a case study of association of Kilimanjaro specialty coffee growers at Mbeya chapter.

Research paper for award of MSc. Degree at Sokoine University of Agriculture. Morogoro, Tanzania. 68pp.

Njau, P. (2008). Value chain analysis for cassava in the eastern zone of Tanzania. Dissertation for award of MSc. Degree at Sokoine University of Agriculture. Morogoro, Tanzania. 73pp.

Nyange, D. (2003). *Small farmer participation in export production, a case of Tanzania.* FAO, Rome, 2008. 39pp.

Ogunleye, K. Y and Oladeji, J. O. (2007). Choice of cocoa market channels among cocoa farmers in Ila. *Middle-East Journal of Scientific Research* 2 (1): 14 - 20.

Osei, E. (2007). Sustainable practices in the global cocoa economy-a producer's perspective. The 4th Indonesia international cocoa conference and dinner 28 June, 2007. 20pp.

Parsons, H. (2010). Importance of upgrading for Micro and Small Enterprises in the competitive value chain. [http://www.acdivoca.org/site/Lookup/WRFall06-Page8-ValueChainsandUpgradingMSEs/$file/WRFall06-Page8-ValueChainsandUpgradingMSEs.pdf] site visited on 15/12/2010.

Phillips, D and Tallontire, A. (2007). Drivers and barriers to sustainable purchasing practices in the cocoa sector. National Resources and Ethical Trade working paper. [http://www.nri.org/projects/nret/responsible_cocoa.pdf] site visited on 14/2/2011.

Ramle, K., Turiman, S., Azhar, I. and Sapiyah, S. (2008). Evaluation of cocoa smallholder development programme in Tenon Sabash. A paper presented in international conference on agricultural extension on 15 – 19 June 2008 at Hotel Equatorial. Bungi-Putrajaya.

Robert, A. (2000). Cacao cultivation and the conservation of biological diversity. *Ambio Journal of biological science* 29(3) 167-173.

Sukha, D.A. (2003). Primary processing of high quality Trinidad and Tobago cocoa beans – target problems options. *Proceedings of seminar/Exhibition on the revitalization of the Trinidad and Tobago cocoa industry, University* of Wes Indies, USA, 20 September, 2003. 8pp.

TCC (2009). Cocoa barometer 2009. [http://www.teacoffeecocoa.org/tcc/content/download/309/2079/file/Cocoa%20Barometer%202009.pdf] site visited on 15/12/2010.

Thapliya, J. N. (2006). Constraints and approaches for developing market access and vertical linkages in high value agriculture. Economic Policy Network, Government of Nepal. Kathmandu. 86pp.

URT (1997). Mbeya region socio-economic profile. The planning commission and regional commissioners' office, Mbeya. 206pp.

URT (2005). Map of Tukuyu. Ministry of Land and Settlement Development, Survey and Map division, Dar es Salaam.

URT (2007). National sample census of agriculture 2002/03, Volume VI. Mbeya Regional report. Ministry of Agriculture and Food Security. Dar es Salaam. 351pp.

URT (2008). Macro framework policy review for the plan/budget 2008/2009-2010/2011. Ministry of finance and economic affairs. Dar es Salaam. 57pp.

URT (2009). The district investment profile. Kyela district council. 28pp.

URT (2010). MKUKUTA annual implementation report 2009/10. Ministry of finance and economic affairs. Dar es Salaam. 135pp.

Vermeulen, S., Woodhill, J., Proctor, F.J. and Delnoy, R. (2008). *Chain wide learning for inclusive agro-food market development.* A guid to mut-stakeholder processes for linking small scale producers to markets. Wageningen University and Research Centre, Wageningen. 111pp.

APPENDICES

Appendix 1: Questionnaire for farmers' household

Question no ..... Date of interview .....

Name of the enumerator .....

Dear respondent;

Your household has been randomly selected to provide data that will be used to analyse cocoa value chain in kyela district. The information provided will be treated confidentially and will be used for academic purposes only. Therefore, you are kindly requested to respond truthfully and faithfully to the following questions.

I thank you in advance.

Name of the respondent .....

Ward ..... Village .....

Section 1: Farmers characteristics

1.1 Age of household head ..... (Years)

1.2 Sex of the household head .....

1= Male 2 = Female

1.3 Marital status of the household head .....

1= Married 2= Single 3= Widowed 4= Divorced

1.4 Level of education of the household head .....

1= No formal education 2= Primary education 3=Secondary education

1.5 Household composition

Age group (Years)	Male	Female
Below 18		
18-65		
Above 65		

1.6 Source of income for the household (Order according to importance) .....

1= Crop production only 2= Crop production and livestock production

3= Crop production and off farm activities

Section 2: Cocoa production

2.1 Total area under crop production ..... (ha)

2.2 Total area under cocoa production ..... (ha)

2.3 Number of cocoa trees per household .....

2.4 Do you use agrochemicals (fertilizer and pesticides) in cocoa production? .....

1= Yes 2= No

2.5 If your answer is "Yes" in question 2.4 above, Please indicate name and price for agrochemical used

Agrochemical name	Reason for using	Amount (Kg, Lit)	Unit price	Total cost
1.				
2.				
3.				
4.				

2.6 If your answer is "No" in question 2.4 above, please give reason for not using agrochemicals in cocoa production .....

2.7 Do you ferment your cocoa before selling? .....

1= Yes 2= No

2.8 If your answer is "No", in question 2.6 above, please give reason for your answer.....

Section 3: Production cost

3.0 Labour cost (Pleas fill the table below with the cost used for each activity)

Activity	Area	Labour (No/day)	Hrs/Day	No of Activity per year	Total man-day	Man-day price	Total labour cost
Weeding							
Pruning							
Harvesting							
Fermenting							
Drying							
Transport							
Input cost							
Total Cost							

Section 4: Cocoa marketing

4.1 To whom do you sell your product? .....

1= Village collectors 2= Company agents 3= Cooperative union

4.2 In which form do you mostly sell your product? .....

1= Wet form 2= Dry form

4.3 Give reason for your choice in question 4.2 above .....

4.4 Do you have contract with buyers of your crop? .....

1= Yes 2= No

4.5 If your answer is "Yes" in question 4.4 above, what is the main condition/agreement of the contract? .....

4.6 Do you know the price before selling of your product? .....

1= Yes 2= No

4.7. If your answer is "Yes" in question 4.6 above, how do you get information about price? .....

4.8 Who determine the price of your product? .....

4.9 Where do you contact with buyers of your crop? .....

1= Home place 2= Company buying posts 3= Others (Name the place).....

Section 5: Revenue from cocoa

5.0 Output and revenue from cocoa production

Form of product	Buyers name	Amount sold (kg)	Price (Tshs/kg)	Revenue (Tshs)
Raw cocoa				
Fermented/Dry				

Section 6: Producer association and networking

6.1 Are you aware of any farmers' group involved with cocoa production or marketing in your area? .....

1= Yes 2= No

6.2 If your answer is "Yes" in question 6.1 above, are you a member of the group? ..

1= Yes 2= No If your answer is "No" go to question 6.4

6.3 What are the benefits of being member of the group?

i. .....

ii. .....

iii. .....

6.4 What prevent you from joining a group /association?

i. .....

ii. .....

iii. .....

6.5 Have you ever attended any training concerning cocoa production? .....

1= Yes 2= No

6.6 If your answer is "Yes" in question 6.5 above, what was the training about? .....

6.7 Is there any Government or non-government organization that is influencing cocoa production and marketing in this area?

1= Yes 2= No

6.8 Do you receive assistance on cocoa production and marketing in your area? .....

1= Yes 2= No

6.9 If your answer is "Yes" in question 6.8 above, fill the table below to show type of assistance and organisation which provided such assistance

S/No	Name of organisation	Assistance provided
1		
2		
3		

6.10 What are the major problems facing you in cocoa production?

i. .....

ii. .....

iii. .....

6.11 What are your recommendations for improving cocoa production and marketing in kyela District?

i. .....

ii. .....

iii. .....

Appendix 2: Questionnaire for cocoa traders

Question no ..... Date of interview .....

Name of the enumerator .....

Dear respondent;

You/ your company have been selected to provide data that will be used to analyse cocoa value chain in Kyela district. The information provided will be treated confidentially and will be used for academic purposes only. Therefore, you are kindly requested to respond truthfully and faithfully to the following questions.

I thank you in advance.

Name of the respondent .....

Company/trader's name .....

Division ..... Ward .....Village .....

1. Type of trader

1= Individual 2= Company 3= Cooperative union

2. Experience in cocoa business ..... (years)

3. Where do you buy cocoa? .....

1= Farmers bring to your place 2= Farmer home 3= Both

4. In which form do you purchase your product? .....

1= Raw 2= Fermented 3= Both

5. In which form do you prefer to purchase? .....

1= Raw 2= Fermented

6. Give the reason to your answer in question 5 above .....

7. Do you know the price before buying your product? .....

1=Yes 2 = No

8. If your answer is Yes in question 7 above, where do you get those prices.....

9. Who determine the cocoa price? .....

10. Where do you sell your product? .....

11. Marketing costs (Please fill the table below to show the cost incurred in cocoa business

Type of cost	Unit cost	No of activity per year	Total cost /activity
Transportation			
Market fee			
Loading & unloading			
Processing if any			
Storage			
Taxes			
Total cost			

12. Cocoa sales (Please fill the table below to show revenue from cocoa business)

Cocoa form	Buyer name	Amount sold (kg)	Price (Tshs/kg)	Revenue (Tshs)
Raw cocoa				
Fermented				

13. Apart from cocoa buying, do you provide any assistance to farmer? .....

1 = Yes 2= No

14. If your answer is "Yes" in question 13, what assistance do you provide? .....

Appendix 3: Cocoa production per country in Africa (in thousand tons)

Country	2003/04	2004/05	2005/06	2006/07	2007/08
Ivory Coast	1 407.2	1 286.3	1 407.8	1 229.3	1 370.0
Ghana	737.0	599.3	740.5	615.0	675.0
Nigeria	180.0	200.0	200.0	190.0	210.0
Cameroon	165.7	184.9	166.1	166.3	185.0
Togo	21.7	53.0	73.0	75.0	80.0
Guinea	9.8	17.0	19.0	17.5	15.0
Sierra Leone	4.5	7.0	6.3	12.0	10.0
Uganda	4.5	5.0	7.4	8.0	10.0
Tanzania	3.3	5.1	6.9	4.5	6.0
Madagascar	4.4	4.5	4.5	4.5	4.5
Equatorial Guinea	3.0	3.0	3.0	3.0	3.0
Liberia	2.5	3.0	2.5	3.0	3.0
Sao Tome and Principe	2.8	3.5	3.0	2.8	3.0
Dem. Rep.Congo	1.7	1.7	1.7	1.7	1.7
Congo	1.0	1.0	1.0	1.0	1.0
Gabon	0.6	0.2	0.2	0.2	0.2
Benin	0.1	0.1	0.1	0.1	0.1
Total	**2 549.8**	**2 374.6**	**2 642.9**	**2 333.9**	**2 577.5**

Source: FAOSTAT, 2009

Appendix 4: Cross tabulation table to show characteristics of cocoa traders

Trader category	Years in business			Place to buy cocoa		Place to sell product		Form purchased		Form sold		Services provision	
	<=3	4-10	>= 10	Buying post	Farmers' home	Export	Company agents	Wet	Dry	Wet cocoa	Fermented	No	Yes
Village collectors	7	3	0	2	8	0	10	10	0	2	8	10	0
	70%	30%	0%	20%	80%	0%	100%	100%	0%	20%	80%	100%	0%
Private companies	2	0	3	5	0	5	0	0	5	0	5	1	4
	40%	0 %	60%	100%	0%	100 %	0%	0%	100%	0%	100%	20%	80%
Cooperative union	0	0	1	1	0	1	0	0	1	0	1	0	1
	0%	0%	100%	100%	0%	100%	0%	0%	100%	0 %	100%	0%	100%
Company agent	0	5	0	4	1	0	5	2	3	0	5	5	0
	0%	100%	0%	80%	20%	.0%	100%	40 %	60%	0%	100%	100%	0%
Total	9	8	4	12	9	6	15	12	9	2	19	16	5
	43%	38%	19%	57%	41%	29%	71%	57%	43%	10%	90%	76%	24%