ANALYSIS OF WOMEN'S ROLE IN OIL PALM VALUE CHAIN IN THE AKYEMANSA DISTRICT AND BIRIM CENTRAL MUNICIPALITY, EASTERN REGION OF GHANA

BY

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

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DECLARATION

I, DONKOH ERIC NILSON, the author of this Thesis Titled "ANALYSIS OF WOMEN'S ROLE IN THE OIL PALM VALUE CHAIN IN THE AKYEMANSA DISTRICT AND BIRIM CENTRAL MUNICIPALITY" do hereby declare that with the exception of various forms of literature which has been duly acknowledged, this study was undertaken by me from August 2016 to July 2017 in the Department of Agricultural Economics and Agribusiness. This work has never been submitted either in part or whole for the award of a degree or diploma, in this university or elsewhere.

……..

ERIC NILSON DONKOH

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

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(PRINCIPAL SUPERVISOR)	(CO-SUPERVISOR)

DEDICATION

This work is dedicated to the Glory of God, my parents, Madam Rose Tetteh and Mr. Kwasi Donkoh (Late), my Dear wife Priscilla Wuddah, and my children Erica, Tettewa and Eric Jnr.

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ABSTRACT

The analysis of women's entrepreneurship role in agricultural value chains could help policy address challenges that women particularly face in agribusiness. Though oil palm provides several value added products, this study analysed the role of women in the oil palm value chain with particular reference to palm oil in the Akyemansa District and Birim Central Municipality in the Eastern Region. In this study, both women and men are entrepreneurs seeking to maximise profit from their business engagements in various nodes of the value chain. Within a chain node, for example processing of palm oil, the role of women in that chain are analysed by initiation of business, managerial role, decision making, ownership and control of productive resources. The prominent key actors along the chain were ascertained to be producers (farmers), processors and distributors. Primary data was collected using a semi-structured questionnaire, from 74 producers, 109 processors, and 47 distributors. The results of the analysis show that men dominate the production segment of the chain whilst women dominate the processing and distribution segments. It was revealed that the sector is gender segregated and compared to the role of men, 38% of women have initiated production businesses, 29.7% in managerial roles, 40.5% in decision making and 21.6% in control of productive resources along the phases of the chain. Estimates of costs and returns indicate that for every FFB sold by female farmers, 14.3% of the value goes to the farmer, whiles 37% goes to women processors and 68% to the distributor. The results of the analysis of the chain also indicate that women distributors earn greater percentage of the share of value created along the value chain than the farmer and the processor. High cost of labour was identified as the most constraining factor facing the entrepreneurs in farming businesses whiles high transportation cost was identified as the most challenging factor facing processors and distributors. It is recommended amongst others that the Food and Drugs Authority have adequate certification of handlers to ensure traceability of palm oil. The entrepreneurs in the chain must adopt zero waste technologies in order to increase their margins. This will compensate for the cost of labour. The District Assembly must improve the road networks in the area to enable motorist have easy access to cart produce of the actors.

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AV	Added Value
CCA	Commodity Chain Analysis
CPO	Crude Palm Oil
CP	Cost Price
FAO	Food and Agriculture Organisation
FFA	Free Fatty Acids
FFB	Fresh Fruit Bunch
FIAS	Foreign Investment Advisory Services
FELDA	Federal Land Development Authority
GCC	Global Commodity Chains
GIZ	German International Cooperation
GOPDC	Ghana Oil Palm Development Company
GSVA	Global Value Chain Analysis
GSVCA	Global Value Chain Sensitive Analysis
GSS	Ghana Statistical Service
HCV	High Conservation Value
IFAD	International Fund for Agriculture Development
MoFA	Ministry of Food and Agriculture
ILO	International Labour Organisation
ILRI	International Livestock Research Institute
IDRC	International Development Research Centre
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
LSE	Land Suitable Examination
MDGs	Millennium Development Goals
METASIP	Medium Term Agriculture Sector improvement Programme

MAFAP	Monitoring African Food and Agriculture Policies
MoFA	Ministry of Food and Agriculture
MT	Metric Tonnes
NGO	Non-Governmental Organisation
ODI	Overseas Development Institute
OECD	Organisation for Economic Co-operation and Development
OPRI	Oil Palm Research Institute
PP	Primary Producer
QUNO	Quaker United Nations Office
ROI	Return on Investment
SP	Selling Price
UN	United Nations
UNIDO	United Nations Industrial Development Organisation
UNILO	United Nations International Labour Organisation
USAID	United States Agency for International Development
VA	Value Added
WBCSD	World Business Council for Sustainable Development
WFO	World Farmers Organisation

CHAPTER ONE

INTRODUCTION

1.1 Background

Women have played critical roles in agriculture over the years and have formed the majority of smallholder farmers in some jurisdictions (FAO, 2011). Women in agriculture are mostly found in the lower nodes of the value chain characterized by lower gains (UN Women et al., 2011).

According to IFAD (2009) and Rhebergen et al., (2011), the greater proportion of the world's poor and vulnerable dwell in developing countries and most of them are women who live in rural areas where their dominant occupation is farming. Many face challenges in churning their labour force into the higher nodes of the value chain which provide employment activities with higher returns (FAO, 2012). Although Ghana has made tremendous strides in reducing poverty, a significant number of women, rural women in particular, still lack decent work opportunities (FAO, 2012).

Women in Sub-Saharan Africa form the majority of the labour force but lack access to land and have little access to market due to cultural isolation (Meinzen-Dick et al., 2011; Farnworth, 2011). Women also lack the power to exert influence over income in the face of increasing commercial importance of particular commodities (Fischer and Qaim, 2012).

If land, which forms an important asset of collateral for credit, is lacking then there is a greater risk of women not having the capacity to produce enough to sustain household food

security (UN Women and RDI, 2013). According to ODI (2009), increase in food production will require long term ecological sustenance of soil and water resources.

Access to food in the tree crop growing zones in Ghana is gradually becoming threatened due to the problem of improper allocation of arable lands to plantation farming with cocoa and oil palm, rubber and currently to mining. Addressing food insecurity in these areas will require a concerted effort that tackles industrial crops with food crop production and strict mining regulations.

The food crisis in 2007 and 2008 in post agricultural liberalization lays bare the facts that policies engaged by countries have failed to translate into meaningful poverty reduction (QUNO, 2014).

Security of food needs to be guaranteed alongside growth which embraces major strategies that highlight the concentration of commodities which are both sold and consumed.

The government of Ghana in 2003 sought to accelerate economic growth and poverty reduction by supporting cottage industries to create wealth (GPRS II, 2007). Palm oil was identified as Ghana's next major export commodity that can be facilitated through small-scale agro-processing of fresh fruit bunches (FFB) into Crude Palm Oil (CPO) for export (Adjei-Nsiah et al., 2012). The government realized the need to modernize, promote and use local materials such as oil palm, maize, sorghum and other commercially feasible export and domestic market-focused enterprises in the rural areas for economic transformation.

The palm tree, whose fleshy fruits are extracted for the crude palm oil (CPO), is cultivated in the undisturbed wooded (forest) belt of Ghana where the annual precipitation is above 1200mm per annum with bimodal distribution (Ofosu-Budu and Sarpong, 2013). The most

suitable areas for cultivation include the Western, Central and Eastern regions of Ghana. However, the crop can be cultivated in other regions such as Ashanti, Brong Ahafo, and, Volta regions Poku (1998), (Rhebergen et al., 2014). Ghana has four large Oil palm estates across the three most dominant growing areas of the Western, Central and Eastern regions (Ofosu-Budu and Sarpong, 2013).

Oil palm is commercially cultivated in over 28 countries worldwide (IndexMundi, 2016). Amongst the major oilseeds of the world, Oil palm accounts for a little over 5% of the world's land for cultivation. However, this figure produces and accounts for over 30% of the world's oils and fats products. Malaysia and Indonesia alone yield about 85% of the global CPO with Ghana in the 9th position, producing about 520,000MT of Palm oil per annum (Oil World, 2013).

Palm Oil has become Ghana's second most important traded good by economic importance next to cocoa in the tree crop sub-sector of Ghana's agriculture (Danyo, 2013). Palm oil is commercially produced in all the forest zones of the Eastern region made up of districts such as Akyemansa, Birim North and South, Kwaebibirem, Denkyembour, West and East Akyem, Atiwa, Ayensuano, and other districts of the region.

Palm oil has the potential of overtaking Cocoa, due to low risk in its cultivation and also because it has a longer harvesting season as compared to Cocoa which has a high risk of disease infestation and higher susceptibility to weather fluctuations (Danyo, 2013). Oil palm and its main derivative product palm oil, is the best versatile vegetable oil globally owing to its numerous uses in food and for industrial purposes. The Palm oil industry has the Palm kernel oil and pressed fibre industries as accompanying industries in its production process.

Palm oil has several health benefits which include, boosting of hormone balance and alleviating strain on the cardiovascular system. Palm oil prevents cancer due to the presence of tocopherols and also aids in improving energy intensities in the body, limits risk of muscular deterioration and cataracts and prevents vitamin deficiency in women and children (Mukherjee and Mitra, 2009).

Ghana's palm oil received a boost when the oil palm sector initiated the out grower project schemes for the development and expansion of seed nut production to about 5 million seed nuts per year. There was also the cultivation of over 20,000 hectares of small-scale farms (Fold and Whitfield, 2012). The support was intended to increase the supply of oil palm and hence boost the production of palm oil annually to take advantage of Ghana's and West Africa's unmet demand of 350,000 and 850,000 MT respectively (Angelucci, 2013; Rhebergen et al., 2016). Moreover, there is an opportunity for increased palm oil production in Akyemansa and Birim Central Municipality and the region as a whole by area expansion of oil palm. This laudable intervention however, needs pragmatic efforts aimed at reducing rural poverty and increasing employment. It also has the opportunity of moving the rural vulnerable from participating in the lower nodes of the value chain to a higher node with higher profit.

1.2 Problem Statement

Like most districts in Ghana, agriculture serves as the main economic activity of the people in the Akyemansa District and Birim Central Municipality. Information gathered from the GSS (2010) Population and Housing Census indicates that 73.5% of the working population in the Akyemansa district and 57.6% in the Birim Central Municipality engage in diverse agricultural activities. These include tree crop farming (Cocoa, Oil palm, Citrus and Rubber),

staple crop farming (Plantain, Cocoyam, Cassava, Maize, Rice), Palm oil and Palm kernel oil processing, vegetable farming and livestock rearing, including aquaculture, as a source of livelihood. One major livelihood in the two districts is the Palm oil industry which has also led to the establishment of two Palm kernel processing factories in the Akyemansa District. This palm oil industry employs a substantial number of the working population in the districts. Located in every community of the districts is a Palm oil processing facility for milling and extracting oil.

Palm oil processing is a highly stratified activity with distinct roles and responsibilities for both men and women. The industry provides livelihood for a large number of actors, in the forest belt particularly women in the Akyemansa District and Birim Central Municipality. Women play meaningful roles in the value chain but are faced with enormous barriers which tend to limit their active participation to the lower end of the value chain (Mutua et al., 2014). Cultural seclusion is one of the major factors that has limited women's access to markets (Farnworth, 2011; Mutua et al., 2014). Some cultural norms have placed burdens on income control by women with increase in commercial farming and trade (von Braun et al., 1989). Another limitation to women's ability to play their roles to the maximum in the chain is access to technologies (FAO, 2011). Though the majority of the population found in agriculture are women, they lack the basic rights to own land thereby limiting their roles to taking care of commodities owned by the men. In the absence of ownership, women engage in less paid ventures (FAO, 2011). Some of the crucial and complex livelihood coping strategies of women are caring for animals, processing of crops and food preparations, working for less paid or non-paid agricultural or other menial enterprises, collecting fuel

wood, and drawing of water, which are not counted as economically active employment in national accounts (FAO, 2011).

FAO (2011) alluded to the fact that women's participation in rural labour markets exceed that of their male counterparts but invariably they are overrepresented in unpaid, seasonal part time work. They are also often paid less than their male counterparts. In the export zones of Kenya, Mexico and Nicaragua for instance women employees work at the poorer section of the value chains and hence earn smaller rents (Gammage, 2009).

The promotion of growth in smallholder agriculture in developing countries will necessitate significant assimilation of small-scale operating businesses (Delgado and Siamwalla, 1997).

Vertical assimilation however, has challenges in excluding large proportions of farmers, particularly smallholder farmers (Arndt et al., 2005). Vorley and Fox (2004) alluded to the fact that incorporation of smallholders to buyer-driven worldwide food chains can result in exorbitant transportation cost. These associated overheads with either production or marketing of high quality products exclude the *have-nots* from active participation in development opportunities (Delgado, 1999).

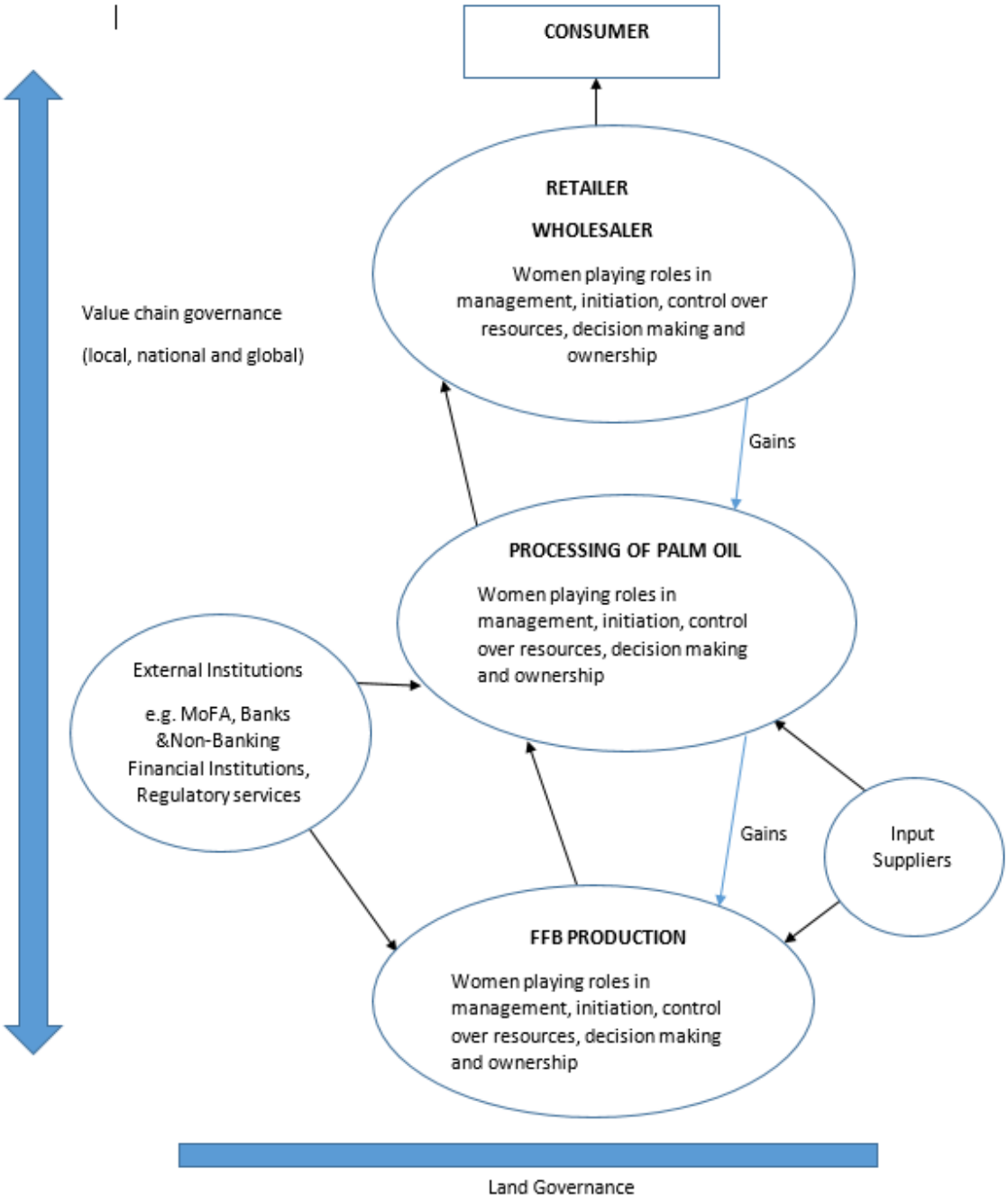
Adopting and developing value chain strategies however, will provide opportunities for achieving competitiveness in the domestic and international markets. Engaging in a value chain alone does not necessarily move women to higher nodes of the value chain or erase social exclusion of women. However, corrective mechanisms of the chain will help increase the income of all participants along the chain, create adequate employment in the rural economy and thereby improve the livelihoods of the people particularly in areas where agricultural products are produced.

The Value chain is the series of activities requisite in bringing merchandise or services from start, over the different production processes, supply to the final consumer and discarding after usage (Kaplinsky and Morris, 2000). As a business model the chain tries to establish the value of the product at all stages of the production, processing and delivery. For effective and efficient generation of value and reliable distribution to be attained, participants along the chain are required to coordinate their activities with precision.

1.2 Conceptual Framework

The study utilised input –process –output framework to develop a set of indicators to inform the development of policies and functions to ensure effective role play of actors in economic activities. Figure 1.1 presents a schematic framework which elucidate the pathways by which women actors in oil palm industry who exert less power in roles in the production, processing and distribution channels is expected to be intervened by actively playing significant roles to ensure the realisation of higher economic rents.

Figure 1.1 Conceptual framework



Adapted from Olawale et al.,2016

The study will rely on individual innovativeness theory by Rogers, (2003) as cited by Olawale et al., (2016). The theory will be utilised due to its appropriateness in examining

constraints of socio-economic characteristics on intervention. The internal governance structure will influence actor's roles performance in all stages of the industry. In essence dominance in roles played along the chain will help actors to have equal access to land, for the production of fresh fruit bunches (FFB), Initiate businesses, manage, take decisions in the running of the business as well as owning the business along the oil palm value chain. The external factors comprised of government institutions and private stakeholders including MoFA, NBSSI, FDA, Banks and other non-banking financial institutions, transport and logistics companies as well as District Assemblies. The study will also adopt input-output-process model. These inputs will involve policies and practices that will enhance socio-economic indicators and provide business solutions for active role play in economic activities. These factors will determine the capacity of chain actors to partake in all activities across sectors. The output factors were determined by the power controlled by chain actors.

Role performance in value chain is the actor's ability to exert control over factors of production which include credit or financial controls, equity or the right to ownership and market shares. Several factors tend to limit role performance of competitors in the value chain of agricultural products. Horizontal relationships can in a way help to reduce gender related disparities on better terms and management encountered in the vertical relationships.

Giving the foregoing, the questions that arise are;

1. What is the nature of the oil palm value chain?

2. What role do women perform in the value chain of oil palm?

3. What are the differences in value added between men and women along the chain?

4. What are the constraints that affect actors at each level of the chain?

1.3 Objectives of the study

The main objective of the study is to analyse women's role in oil palm value chain and assess women's contribution along the chain in the Akyemansa District and Birim Central Municipality of the Eastern region of Ghana.

The specific objectives are:

1. To identify and map the various actors along the oil palm value chain.

2. To describe the major roles and activities performed by women at each stage of the chain.

3. To estimate the difference in the value added between men and women along the chain and test for equity in its distribution.

4. To identify and rank the major constraints that affect actors at each level of the chain.

1.4 Justification for the Study

Actors in the value chain through their interaction collaborate to significantly advance the competitiveness of the final product or service. However, the effectiveness of the linkages may not be fluid due to lack of coordination by various actors. A value chain map will significantly shed more light for stakeholders in the palm oil value chain, to know how proper coordination of their activities will bring better opportunities to bear in their business operations.

In many developing economies women form the majority of the workforce in agriculture but are disadvantaged in the area of land acquisition, owning livestock, access to financial services, technology and resources that will increase their output. However, women mostly

use their income to improve the well-being of their families and communities than their men (FAO, 2011)

The study will highlight the role of women along the chain which can help increase their investments in the various nodes of the value chain in order to gain maximum rents. The role of women and men in a value chain is defined by the contributions made in the realization of a product. These capture the exact contributions of women and men in terms of magnitude and nature. The role women play in agriculture vary significantly across regions globally and understanding the crucial role played by women and men along the agricultural value chains will help capture and streamline the rigidities that tend to lower productivity and profitability of the actors. GPRS I and II identified some selected crops that must be developed and promoted by facilitating small-scale agro-processing industries for exports of which oil palm was one of the principal crops (GPRS II, 2007). Women have become an important part of the international development agenda contributing meaningfully to agro-processing in many developing countries. The Oil Palm industry therefore presents the most effective and efficient sector for poverty alleviation, food security and employment opportunity for many people in the study area. According to Ofosu-Budu and Sarpong (2013), oil palm is an important oilseed used in the production of many products for domestic consumption and also for industrial purposes. The study will provide information that will help Ghana achieve the United Nation's Millennium Development Goal (3); which aims to promote gender equality and empowerment of women. The study seeks to contribute to the promotion of rural development by providing information about the contribution of rural women along the palm oil value chain in Ghana.

The study will also contribute to body of knowledge and existing information in the palm oil sub-sector thereby serving as reference material for future interventions in the industry, and add to the existing body of literature. It could also be used by other stakeholders to influence policy direction.

1.5 Organization of the Study

The study is organised into five chapters. Chapter one presents the background of the study, the problem statement, objectives, and justification for the study. Chapter two reviews relevant literature on the oil palm industry in Ghana, demand and supply of palm oil in the world, West Africa, overview of the oil palm value chain concept, gender and value chain, value chains and pro-poor growth, as well as empirical studies. Chapter three outlines the various methods that are employed to address each of the objectives of the study. The theoretical framework, method of data collection, method of data analysis as well as sampling procedure that were used are all addressed in this chapter. Chapter four presents the results and discussion. Chapter five presents the summary, conclusion and policy recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of works carried out by other researchers and authors that are relevant to the study. Reviewed literature covers important areas such as background to oil palm cultivation, demand and supply of crude palm oil in the world and West Africa, roles and participation of women along the value chain, overview of the entire chain, analysis of costs and margins, value chain and gender inefficiencies. The review also provides highlights of empirical studies that helped in the conceptualization of interest and in the analysis of data.

2.2 Background to Oil Palm production

Oil Palm, an important cash crop, is a perennial oil seed crop belonging to the genus *Elaeis* and contain two species, *E. guineensis* and *E. oleifera* (Poku, 1998). It is known to be a very efficient oil seed plant worldwide compared to other oil producing crops (e.g. soybean, rapeseed, and sunflower) in terms of land use. Out of the 258.9 million hectares of global total agricultural land under oil seed production, Palm Oil production utilized only 5.5% but supplies the highest proportion of 32% by volume of oil. Contribution from the rest of the important oil seed plants are; Soyabeans 22%, Rapeseed 13%, Sunflower about 8%, Cotton about 3%, Groundnut 2%, and other oils (Oil world, 2017; Fry and Fitton, 2010). In terms of World production of vegetable oils, Palm Oil production stood at 53.67 million tonnes followed by soybean (41.66MT), Rapeseed (24.48MT), Sunflower (14.8MT), Kernel oil (5.92MT), Cottonseed oil (5.09MT), Groundnut oil (4.01MT), Olive oil (3.36MT) and Coconut oil at 3.24MT. The oil yields are at an average of 3.74 tonnes per ha per year, on

land size much smaller than required for Soyabeans (Oil World, 2007). Oil palm has risen into an important oil crop globally over the last decade and contributed to more than a quarter of the world's edible vegetable oil (www.elsevier.com/locate/eja, 2016). Malaysia and Indonesia alone account for more than 80% of the world's palm oil. Other significant CPO producing nations are, Nigeria, Papua New Guinea, Colombia and Ecuador. Palm oil production worldwide has exceeded soybean oil as a leading vegetable oil (Ofosu-Budu and Sarpong, 2013). The origin of Oil palm is believed to be the Guinea Coast of West Africa and through the Equatorial regions of Congo and Angola (Poku, 1998). From West Africa the crop was taken to the Americas and then to the tropical regions of the South East Asia by the colonial masters (World Growth, 2011; Ofosu-Budu and Sarpong, 2013).

Global production of palm oil has increased tremendously over the past 3 decades. In the year 2009/10, palm oil production reached a record high of 45 million tonnes. Malaysia and Indonesia, the giants in the industry, each produced over 18 million tonnes during this period. Overall land area converted into palm plantations has increased tremendously worldwide in the last three decades, from 4 million hectares (ha) in the 1980s to more than 17 million in 2013.

2.3 Demand and supply of Palm Oil in the world

Palm oil is an important and versatile raw material for food and non-food functions. Favourable increasing prices of palm oil and the demand for fuel with low greenhouse effects has culminated in the rise in demand for palm oil globally (Yean and ZhiDong,.2012).

According to Fryton and Fitton (2010), global palm oil output is expected to increase by about 6 million MT to ensure sustainable supplies to meet the current demand worldwide.

Rapid increase in demand for palm oil for food is due to population increase and unsustainable supply of fossil-based foils culminated in the search for new technology that utilized agriculture, forestry, and biomass as renewable feedstock, especially in most industrialized countries like the United States, China and Europe (www.zionmarketresearch.com, 2017; Fry and Fitton, 2010). This economic phenomenon presents a significant opportunity for palm oil and coconut oil producing countries such as Indonesia, Ghana, Nigeria, Cameroon, and other African countries to expand production. A greater proportion of expansion is expected to take place in Guinea Coast of Africa through to the Central part of Africa and in Tropical regions of the Americas due to the availability of land for expansion than in Southeast Asia (Shoot et al., 2016). According to Rhebergen. et al. (2016) there is higher demand in oil palm globally leading to sharp expansion of oil palm plantations in Sub-Saharan Africa which has available land for cultivation than in Southeast Asia. Palm Oil production in the continent currently cannot meet the local demand and hence turning African countries into net importers. In Ghana, it is estimated that the present shortfall in CPO supply will increase further from a projected figure of 32,000 MT in the year 2010 to a deficit of 127,000 MT in 2024 (MASDAR, 2012). The expansion of the Malaysian palm oil industry has been a success to the country. The palm oil industry accounted for over 4% of Gross Domestic Product (GDP) of Malaysia (Seng Wong et al., 2014). During the period of 2006 to 2010, the area planted under oil palm rose to about 15.8% to reach some 4.69 million hectares. In 2010 alone Malaysia's export earnings from oil palm derivatives rose by about 20% to 15,031,430,000 million UD dollars. According to Zion Market Research, world palm oil trade was estimated at over USD 65 billion in 2015 and it is expected to hit over USD 92 billion in 2021.

In the 1960s, the Federal Land Development Authority (FELDA) initially introduced about 375 ha of oil palm plantations to raise the income of the landless farmers. As a result of falling prices of rubber and tin, and consequent rise in palm oil prices, aged estate lands of tin and rubber were converted to oil palm estates (Malaysia undoubtedly became the world's leading exporter of palm oil in 1996, overtaken Nigeria as the world leading exporter of palm oil (Fold, N and Whitfield, L.2012). Ghana is currently trying to raise its palm oil demand, by identifying and mapping the opportunities for area expansion. Suitable lands for higher yields is been identified across the oil palm belt of the country. Whilst area expansion is possible, land fragmentation coupled with ownership disputes seems to hinder the establishment of large-scale plantations. There were other land use problems not factored into the assessment. These include competing lands for cocoa and rubber production, staples, mining, high conservation value (HCV) areas, and fallow land been part of slash and burn agriculture. Moreover, land acquisition is further complicated by complex land tenure arrangements that prevail in southern Ghana that make it difficult for investors to acquire land for the development of large-scale plantations (Personal communication).

However, compared with the major producing countries in Southeast Asia and Latin America, average bunch yields in West Africa are very low (Rhebergen et al. 2016). Lower yields recorded by farmers West African farmers are partly the result of sub-optimal climate conditions and poor management practices. Water stress is the main yield-determining factor outside management control in West Africa. In order to guide government policy makers and investors, it is essential to know the most suitable conditions for the expansion of oil palm. Using Ghana as a case study, we describe a framework for evaluating areas that are

both suitable and available for oil palm production based upon land suitability evaluation (LSE) methods and GIS techniques.

2.4 Overview of the Value Chain

Value chain is a business terminology described and made popular by Porter during the mid-1980's through his publication of a book christened: "Creating and Sustaining Superior Performance." During that period, there was a systematic approach by many schools of thought including German, English and the French to analyse and present vertical integration and disintegration of production and processes of distribution

Porter's 1985 description of the activities within and around Organisations, and relating it to analyse the competitive strength of the Organisation.

Many diverging thoughts including those in agreement with others while others were in solitary direction (Roduner, 2004). The concept of value chain started in the 1960's by French scholars whose approach called the filie'r' which meant thread in French or in Business Circles Commodity Chain Analysis (CCA) which was originally used to understand the indigenous economic multiplier effect of input-output relationship between the firms in contractual farming arrangements in French agriculture. This filie'r approach to describe the flow of inputs and services in the production of a product in essence is similar to the modern value chain concept.

This filie'r was later adopted and applied in many agrarian countries mainly with rural agriculture production systems and consumption (Webber and Labaste, 2007). It however, became more associated with political economy according to Raikes et al. (2001). Value Chain approach got a boost from Porter. His Value Chain has been adopted greatly by

majority of entrepreneurs as a tool for understanding complications in business circles with the main objective of organising the business to realise it's competitive advantage (Ransburg, 2006). According to McCormick and Schmitz, (2005) the value chain consist of creating- value sequentially, or required to produce, distribute and position of a commodity. Moreover, on specificity, it describes all the varied undertakings requisite in bringing a merchandise or provision from commencement through the diverse stages of production to distribution to the ultimate consumer and discarding after usage. An integration of sovereign enterprises within a chain of activities that compete on a stated market and to satisfy demands on the market is a Value Chain. Agricultural Value chain encompasses all activities from input supply, actual production, value addition (processing), Distribution (Wholesale and Retail) to the final consumers. According to Porter (1985) this aim of the firm which is allocation of maximum value to the end user must be at a least cost to the company, in order to yield higher rent. The Value Chain to Kaplinsky and Morris (2001) is description of all varied events that are needed to bring a merchandise or provision from start to finish, delivery to the various consumers and discarding after usage.

According to Dempsey et al. (2006) the chain in a way represent the supply chain which comprise dealers of inputs, processors, producers and consumers that bring a product from beginning to its end use. Gereffi and Fernandez- Stark, (2016) however, introduced the Global Commodity Chains (GCC) approach which emphasizes on power relations. He alluded to the fact that chains are characterised by leading firms who control the general atmosphere of the chain and as such in charge for promotion activities within the specific chains.

Value chain is a chronology of targeted oriented blends of creating factors that produce saleable merchandise or service from its beginning to the ultimate consumer (McCormick and Schmitz, 2005) It comprises events such as plan, creation, marketing, delivery and care facilities up to the final consumer. These undertakings which are involved in a value chain can be confined within a single firm or separated among diverse firms as well as sole site or spread across wide zones. WBCSD (2011) coined Development of value chain is a crucial aspect of strategic planning employed currently by many firms. According to the Global Value Chain Initiative (GVCI, 2015), the chain entails the livewire of a complete process which include sourcing of raw materials, manufacturing, delivery to the end user and discarding after usage. This includes processes such as plan, creation, marketing, delivery and support to the final consumer. To the initiative value chain activities can yield goods or services, and can be controlled within a geographical area or spread into bigger or global spheres. GHGP, (2011) refers to value chain as all downstream and upstream activities correlated to the tasks of the reporting company including the use of traded products by consumers and the treatment of the product after use.

A value chain represents a chain of activities that an organisation performs to deliver a valuable product for the the market (Simatupang et al.,2017). According to Simatupang et al.,2017, a value chain concept by Porter which represents a set of activities that a focal firm operating in a specific industry performs in oreder to tpo deliver a product or service for the market has been extended to describe a series of organisational activities that creates, delivers, and captures value at each stage, starting from the processing of raw materials to ending with the finished product in the hands of the end users.

2.4.2 Value Chain Analysis

Value Chain Analysis is a technique for rendering accounts and giving the worth generated in a product or provision as it under goes transformation from raw inputs to finished goods (FIAS, 2007). Rubin et al. (2009) describes analysis of the value chain as a procedure detailing the operations of a chain, and generally comprises charting the performers and estimating the value added along the diverse contacts.

According to Parker (2004), a value chain approach varies from the supply chain tactic in that the rudimentary characteristics of the former is focused on the market cooperation. ILO (2009) describes value chain as the sequence of efforts to develop a product, i.e. raw materials, capital, labour, land, information and the worth of each. Analysis of the value chain according to ILO (2009) is the identification and verification of what worth is being added and how the final market price is dispersed to the actors in the chain. According to Simister (2011) value chain has immense benefit in that it is a bendable approach for looking at one's business, its competitors and the respective spaces in the business's value structure; the value chain can also be used to analyse and fashion competitive advantages on both cost and difference. ODI (2009) posits that analysis of the value chain aid in establishing extreme poor effects in supply chains and organize the best mediations.

A value chain is a complete set of events comprising scheme, creation, selling and delivery companies or business translate ideas, combine raw materials and transform them into tangible, deliver them to the end user and how the waste are disposed of (Arline, 2015). Evaluating the functions of agricultural value chains are imperative to understand the authority of chain development intermediations on smallholders and the rural poor. On

agricultural revolution schemes standpoint, value chain techniques aid orientates agricultural growth more towards a systems viewpoint (Rich et al. 2008).

Analysis of the Value chain dwell more on structural evolutions, behaviour and accomplishment of chains, particularly in reaction to fluctuations in market situations, know-hows and strategies (Kaplinsky and Morris, 2001). By its focus on inter links it allows for an easy discovery of the vigorous flow of economic, organisational and forcible activities between producers inside different segments even on the international scale.

The agricultural value chain tactic is applied by many development intermediations that intend to engage smallholders either individually or jointly into the production of market oriented crops of high value (Anandajayasekeram and Berhanu, 2009). Analysis of agricultural value chain is a vital way that examines how markets and industries react to effect changes in the domestic and international demand and supply for a commodity. The analysis must look at the value chain as a set of establishments and rules; as a set of activities involved in producing, processing, and dispensing commodities; and as a set of actors elaborate in executing the value adding accomplishments. There are three core reasons why analysis of the value chain is essential in the era of rapid globalisation (Kaplinsky and Morris, 2000). Analysis of the value chain centres on variations over a period in the configuration, behavior and presentation of worth chains, principally in reaction to alterations in market situations, know-hows and procedures (Kaplinsky and Morris, 2001).

OECD (2014) recognised the significance of GVC to the 21st Century in the area of trade, investment, expansion and jobs for nations.

Kean (2012) introduced the Global Value Chain approach originally introduced by Gereffi and Fernanadez-Stark in 2016 as an analysis which designates total collection of actions prerequisite in bringing a good or provision from commencement over the intermediary segments of creation, distribution to customers and discarding after usage. The GVC method centers on two important stakes; value conception and management. To start with, it applies a business management tactic by ascertaining constraints of distinct firms and in addition, the Global Value chain uses power inquiry to rendering different forms of governance in a firm. Kaplinsky and Morris, (2000) indicate that value chain differs mutually inside and amongst segments as well as national and indigenous settings. The following methodology could be followed to understand the nature of ultimate market that is progressively becoming the driving force in several value chains.

i. Access to value chain inquiry

ii. Value chains Mapping

iii. Product division and Precarious Success Element's in ultimate markets

iv. Producers entry into final markets

v. Benchmarking creation proficiency

vi. Power in value chain

vii. Elevation in value chains

viii. Distributional concerns

The methodology attempts to synthesise the techniques of analysis used in a varied study not precisely emphasis on value chain inquiry. It is unlikely for a solitary value chain study to wholly utilize this varied set of approaches.

2.4. 1 Definition of Value Chain

Value chain is occasionally misconstrued to mean supply chain, production chain or marketing chain due to the fact that both entails movement of a product or service to end users. The supply chain nonetheless, refers to the entire vertical chain of activities i.e. commencing production, through the processing, delivery and retailing to consumers.

Hoobs et al., (2000) defined value chain as a vertical association or linkage of autonomous organisations or entities within a supply chain. It represents complete assortment of events that are necessary to convey a product or provision from beginning, over the intermediate stages of production, supply to the end user and discarding after use (Kaplinsky and Morris, 2001).

Dzanja, et al., (2013) view value chain as a type of supply chain with no obligation or casual dealings except in cases of transaction involving goods and services. WBSCD (2011) views value chains as an essential part of tactical planning for many companies. A value chain however, refers to the complete cycle of a good or process, including material sourcing, production, consumption and disposal i.e. recycling processes.

If Kaplinsky and Morris (2001), Schmitz (2005) are to be relied upon then it can be said that the production chain, supply chain, and the marketing channels are aspects of the value chain. Value Chain thus can be said to be the tree with the three aforementioned being the branches.

Simatupang et al., (2017) defined value chain as the process of managing all sequences of the integrated activities and information to transfer value along the entire supply chain.

2.4.3 Mapping the Value Chain

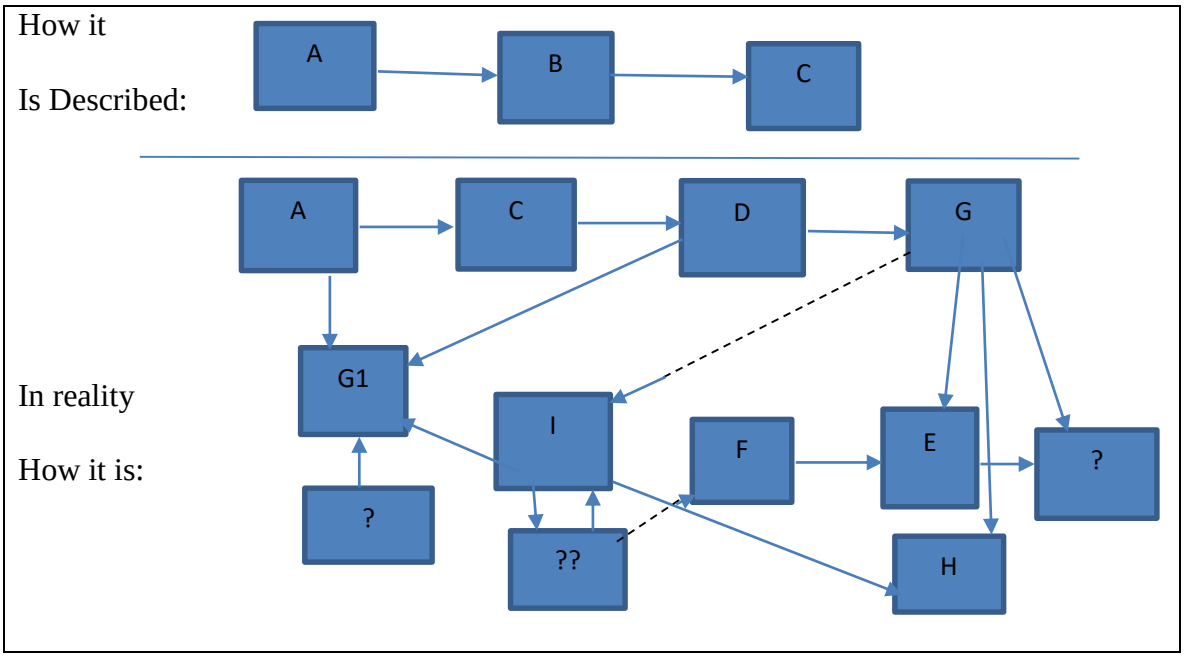
Mapping of the chain is a process of consciously identifying and linking all the key activities involved in the value creation. To draw the map of the chain, frontiers need to be demarcated. The focal hint initially is to ascertain the players and link or 'map' the proposed merchandise movements in the chain which include input resource, production and marketing undertakings. Anja et al. (2009) posits that value chain map include actors, their affiliations, and economic undertakings at separate phase of the chain and related somatic and monetary streams. Again Kaplinsky and Morris, (2001) indicate the theory of value chain may look simplistic but in the practical world situation may look complex. Stein and Baron, (2017) indicated the perception of easiness and precision of emphasis as suggested in theory of value chain, but in reality it is much scrappier, and a subjective verdict must be made in charting a value chain inquiry. Mapping the chains to achieve thoughtful and chronology of undertakings involve key actors and affiliations involved in the value chain UNIDO (2009).

Value chain mapping according to McCormick and Schmitz, (2001) aids a researcher to envisage the movement of the product from beginning to end user over the numerous players. This will help in the identification of all actors of the product chain to understand their roles and bonds. Figure 2.1 below depicts the theory and actuality expression of the chain. The chain has several scopes in actuality, both physical and imperceptible which could be factored in the chain. However, as alluded earlier by Kaplinsky and Morris (2000), no single value chain can contain all the methodologies enumerated. Therefore, depending on the scope and the objective individual chain will have specific features, whose uniqueness and

broader significance can be held and analysed over a considerate of the wider concerns involved.

Many value chains have more final product created from the inputs captured from the initial stage, but each will monitor its own set of courses till reaches the ultimate consumer. In the above scenarios, the course map will look extra complicated besides include analogous procedures as depicted in figure 2.1 below. From Fig.2.1, A represent a particular input on the primary phase of a specific value chain. The alphabets B C D E….H, represent different product coming out of A at diverse stages of the chain. The bolded and fragmented arrows represent major and minor channels or links for the flow of input and output along the value chain. An output from a preceding stage serve as an input for the proceeding one. In real world situation, a transforms from several stages emanating as more than one end product, H, E and I. Individual products undergoes different processes and hence comprise of many stages and players which may perhaps be composite and uneasy to display on a single chart. For straightforwardness, easily recognisable goods at the central stages depicted on the chart. An indication that there are many processes that cannot be presented on a map. This means for ease and space of operations the chain analysis, players in the oil palm value chain connections are categorised in the main occupations of the chain. This is made up of the production, processing and distribution of the final product through wholesaling and retail.

Figure 2.1 Value Chain Map: Theory and Reality



Source: Stein and Baron (2017)

2.5 Governance structure

Governance is the central concept to value chain analysis according to Humphrey and Schmitz, (2001). Governance according to Marshall and Schreckenberg, (2006) is defined as how control is exercised within the value chain actors and play a major role in how production capabilities are upgraded; to determine the sustainability of the value chain and distribution of an equal benefit among the chain actors. Governance can be described as an inter-firm relationship and organisational mechanism through which non-market coordination of economic activities takes place. The starting point for interest in global value chain is the fact that some firms directly or indirectly influence the organisation of global production, logistics and marketing systems. Gereffi et al., (2001) observed that through the governance structures these firms create and take decisions that have vital consequence for

the access of developing country firms to international markets and the range of activities they can undertake.

2.6 Gender and Value Chain

Mutua et al., (2014) defined gender as constructed roles and status of men and women, boys and girls socially. Gender is an essential aspect of the value chain analysis, which in most cases is overlooked and unrecognized (OSFAX, 2016). According to Farnworth and Mahama (2012) generally, women are less dominating in value chains compared to men due to several restrictions that make them less mobile. They also face barriers to markets as well as social norms which impede their active interaction with chain actors. Amadu and Idisi (2014) used Laven and Noortje (2011) gendered equality in agricultural value chain approach to address gaps created by gendered involvement in the cassava value chain in Nigeria. The study identified four empowerment strategies which include; Upgrading as a chain actor, upgrading as activity integrator, adding value through vertical integration, upgrading as a chain partner, upgrading as a co-owner: Developing ownership over the chain. Results from the study indicated that the agricultural sector is the primary source of livelihood for about 38 % of the developing countries but under performing. There exists gender gaps and inequalities in access to land, livestock, farm labour, education, extension services, credit, fertilizers and mechanical equipment and market access. It was identified that the gender gap hinders the productivity of women and reduces their contributions the agriculture sector and to the achievement of broader economic and social development.

2.7 Analysing Costs and Margins

For an individual, or group of persons entering into a particular market or venture, one need know first which business gives the highest profit or returns. This is so crucial for people especially the poor who having limited means and highest to invest in the wrongful business (van den Berg et al. 2008). It is therefore imperative to analysed costs, revenue and margins in the value chain. Analysing costs and margins provide the researcher with a clear and a fair idea of how pro-poor a particular value chain is. Costs is the exact amount an entrepreneur in value chain invests whilst the margin is the money a player receives as a share of profit earned from the investment when all costs are settled. Real cost and margins provide the insight and helps determine whether a particular chain has the potential to generating the needed income to for the underprivileged and whether in can be harnessed by the poor. Trend of events in the particular market provide adequate insight as to whether the chain has the capability of growth in the future. It is important to recognize each individual actor in the value chain as a separate entrepreneur within the chain. Also there should no ambiguity between accounting cost and economic costs. Accounting cost focus on the financial cost, i.e. the monetary expenditure incurred by an actor or participant in a chain by carrying out an activity. Economic costs however, considers the opportunity cost which are cost of employing the productive resources in in a particular venture, rather than investing the resources in alternative business venture.

2.8 Value Chain and Pro-Poor Growth

In recent times value chain has been the driving force in addressing challenges of development (UNIDO, 2011). The pro-poor growth approach to analyse value chains is a vital tool of current developmental organisations and partners in developing nations. Key

focus of the approach is the identification and promotion of economic potentials of the extreme poor and disadvantaged groups (World Bank, 2007). This is mainly to enable the vulnerable or the underprivileged to react and take advantage of the opportunities out of the new market trends to improve equity and access and overcome poverty. Often they make use of lead firms to build up supplier networks among poor and marginalised farmers, helping them gain access to knowledge and production technologies. According to Amadu and Idisi (2014) a gender lens is essential to comprehend the location of rural entrepreneurs in value chain and restrictions to progression. Promotion of value chain in agribusinesses is an attempt by practitioners to improve competitiveness of entrepreneurs at the individual, national, and international markets to increase value addition in a country and beyond (Farnworth and Mahama, 2012).

2.9 Related Empirical Studies

Ghana's Ministry in-charge of Food and Agriculture, GIZ, and BMZ implemented Gender related scheme in maize value chain in the Brong-Ahafo and Northern Regions of Ghana (Farnworth and Mahama, 2012). The project analysed the women's participation in maize value chain by intervening to remove the gender-based constraints that plague women's businesses in the two regions of Ghana. The research sought to conduct a gender sensitive analysis under the auspices of the Market Oriented Agriculture Programme (MOAP) which had three components. 1. Upgrading of selected chains, 2. Policy recommendation and support to the development of private sector organisations.

The research finding came at an opportune time by coinciding with the findings of the FAO report which noted the closing of gender gap in agricultural input eradicating about 150 million people out of hunger. The study showed the major role played by women in crop

production, increasing proportion of women in postharvest processing. The research acknowledged the lack of women involvement both in numbers, decision making roles, control over income and productive resources and ownership.

Gender and Pro-Poor Value Chain Analysis recognised the configuration of actors who may influence capabilities, possess different levels of power and hence affect outcomes along the value chain USAID (2000). The distributional inquiry observes the returns to capital and labour for the diverse players in the chain. It also investigated the power relationships across the chain segmentation; assess how labour market is segmented by sex all over the chain. The research again considered factors and characteristics that mediate men and women's entitlement to productive resources and their capabilities to deploy these resources. The project analysed the value chain of Shrimp from a distributional perspective to explore opportunities to i. improve market outcomes ii. raise productivity and wages iii. decrease gender inequalities and iv. foster pro-poor growth in the sector being analysed; 1. The project identified women as not taking active managerial roles in processing plants; 2. Laid back leadership role by women; 3. and inability of women to own business in the value chain of shrimp.

The research used the Duncan's Index of Dissimilarity to estimate gender desegregation along the shrimp value chain.

Value Chain Analysis provides this study the opportunity of analysing the internal activities of the oil palm industry. It also provides the goal to recognise which activities of the firm are most valuable to the oil palm industry and which ones could be improved to provide competitive advantage to the firm. A gendered value chain analysis approach to the oil palm

value chain increases the visibility of women's roles in the various nodes of the chain and specific barriers to entry and opportunities for growth (Waithanji et al. 2013).

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents an overview of procedures on how the study was conducted. The chapter starts with the theoretical framework. It thus describes the analytical tools used to analyse each of the objectives. It also includes method of data collection, description of the study area, sample size and sampling procedure and analysis of the data.

3.2The Study Area

This study was conducted in the Akyemansa District and Birim Central Municipality of the Eastern which were chosen because they are among the highest producers of oil palm and artisanal palm oil processing in the region. With Oda as the Municipal capital, Birim Central is located in the southwestern angle of the Eastern Region. The Municipality shares border with Akyemansa and Kwaebibirem Districts in the north, Birim South in the West, Asikuma-Odoben -Brakwa and Agona East Districts in the South, and West Akim District to the East. The land is mainly undulating and hilly with the Birim river serving as the main drainage. The Municipality lies within the wet semi-equatorial climate that experience maximum amount of precipitation bi-modally. Mean monthly temperatures of the area is around 26°C, ranging between 21°C to 33°C. The main rainfall season starts around April ending in July with the minor season beginning in September and ends in early part of November. Average humidity of the area in the major season is 80%. The Municipality falls within the semi-deciduous rainforest vegetation which is characterised by tall trees with evergreen undergrowth serving as the source of raw materials for the timber industry.

The Municipality is underlain by granite, phyllites, schist, greywackier, motavo, calnic and quartnite. Major economic activity of the people is agriculture which employs 50.9% of the active labour force, trade and commerce 20.1%, industry 13.1%, and Services employing the rest of the labour force (GSS, 2010). Major crops produced in the area are staples like maize, cassava, rice, Cocoyam, yam, and plantains. Major cash crops grown include citrus, oil palm, and Cocoa. Cattle, sheep, goat, pigs and poultry are the major livestock kept in the Municipality.

The Akyemansa District lies on latitude 1° 10W and 1° 0E. of Ghana. On the Regional level the District is located at latitude 6º N and 1º 9 W of the Eastern Region. The District shares border with Birim North in the north, Amansie East, Adansi South and Asante Akyem South districts to the west, Birim Central Municipal in the south and Atiwa and Kwaebibirem Districts to the east. The district capital Ofoase is located among two principal commercial towns Oda and Nkawkaw and a mining hub New Abirem. The central part of the district extending Northwards to Ofoase, the capital through Chia, Brenase, and Ayirebi to Otwereso in the south and Akokoaso in the east can be labelled as very low lying areas. The District is mainly drained by Birim and Pra Rivers. River Pra serves as the frontier between eastern and the Ashanti Region, whiles the Birim River serves as the southern border of the district. The district lies in the wet semi-equatorial climatic zone that experiences double highest precipitation. The major rainfall season begins around late March to early July and the minor season from middle part of August to late October. The district record precipitation of about 150cm to around 200cm annually. This peaks around May to June and from September to October. Temperatures recorded in the area range between minimum of 25ºC and maximum of 27.9ºC. Relative humidity of about 55-59% is recorded in the area throughout the year.

The district is dominated by the agricultural sector as it employs about 73.5% of the working population. Crops cultivated in the district include cash crops such as oil palm, cocoa, citrus and rubber. Staple crops cultivated are cassava, plantain, cocoyam, rice and vegetables.

Figure 3.1 Map of the Study Area

Source: Ghana Districts.com

3.3 Theoretical Framework

Theories underlying this study include, liberal feminist theory, Value chain approach, resource endowment theory, and Kirtzner's theory of entrepreneurship. The liberal feminist theory deals with political and economic issues and also social rights. In the liberal feminist

approach, women and men are considered equal and private entrepreneurs seeking to maximise economic rent from their business engagements. In this approach any secondary positioning of women is as a result of discrimination and structural inhibitions (Samkange, 2015). A value chain approach employed by Kaplinsky and Morris (2002), their analysis was used in understanding the creation and sharing of values among actors. Women and men are considered equal and private entrepreneurs seeking to maximise economic rents from their business engagements. The framework underlying gendered value chain analysis focuses on what each actor does in the chain and how they are done and introduce interventions where necessary to correct inefficiencies and empower the disadvantaged in the chain (Riisgard et al. 2010), Laven and Verhart, 2011).

Value addition and Return on Investment (ROI) was used to estimate the differences in gains accrue to an actor. The price acquired by a chain actor and the price that the said actor paid for the delivery of inputs by the value chain actors in the preceding phase as well as the intermediate goods bought from the middlemen (such as inputs suppliers) is known as the value added per unit of product (Albu and Al Griffith, 2005). Value addition concentrates on determining the essential characteristics of a product that the customer needs and determining the most economical method of producing it by balancing cost with the quality of the product. The Resource Endowment theory postulates that a business performance is partly a function of the availability of human capital or natural resource. An area rich of a natural resource would entice entrepreneurs who would hire the resources in production: new jobs and support services would chart and the cycle of growth would be perpetuated (Vaughn et al., 2007).

3.4 Methods of Analysis

3.4.1 Identification and Mapping of Actors in the Oil Palm Value Chain

At each operational phase, the major roles that are performed by independent men and women entrepreneurs were identified and the respective number of men and women that carry out an activity was stated. These entrepreneurs include men and women farmers, processors and distributors (wholesalers, retailers, assemblers). The roles identified in the value chain have been categorised as initiation, decision making, control over production resources, ownership and managerial. The actors performing the roles are individuals' entrepreneurs committing their resources into investments for profit motives.

3.4.1.2 Initiation role

The complexity of bringing an idea into reality requires balancing multiple interests and objectives. An actor must first identify the existence of a problem in that sector which needs to be addressed. There must also be the existence of an opportunity that can be tapped to addresses these challenges. An actor or 'entrepreneur' is that farmer or processor who had initiated, organized, and managed risks associated with crop and/or its associated products and activities. The ability of an actor to break barriers to entry and access the opportunities of a particular value chain can lead to an understanding of the possible value chain intervention that has an income as well as equity focus in their outcome.

3.4.1.3 Decision making role

Who decides what and who to do a particular activity in the chain is very crucial? A value chain actor with a decision making ability is likely to operate at the higher node of the value chain. Expressly, a higher node participant reaps higher economic rent than those found at the lower end of the chain. Participating at the higher nodes also ensure better employment

for the actors involved. Where both men and women take comprehensive decision in value chain interventions it tends to benefit both sexes (Coles and Mitchel, 2011).

3.4.1.4 Control over production resources

In a value chain analysis or business circus, those who control productive resources determine or dictate the direction of the business and the associated economic gains. It is therefore important for the removal of social obstacles that tend to prevent ownership of these resources by female participants in a value chain. Inequality of any kind tend to undermine the efficiency and smooth flow of the value chain. According to UN Women et al., (2011) rigidities such as access to capital and technology influence actors particularly women's role and benefits accruing from the value chain. FAO (2011) indicated that mostly women have lower access to capital and technologies than men which decrease their participation in higher levels of the value chain which is characterised by highest economic returns. Women are therefore confined to the lower nodes of the value chain which attracts lower rents.

3.4.1.5 Ownership role

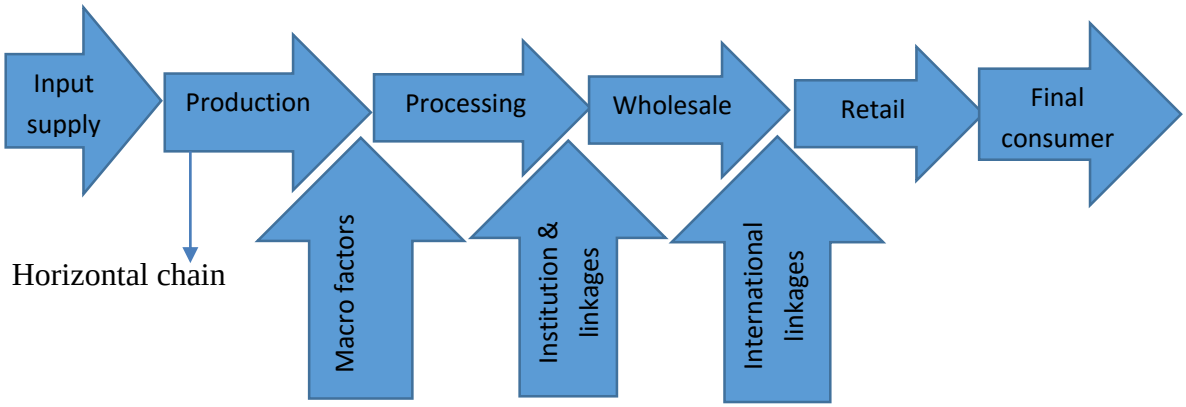
Ownership or equity share of a business is very important as it is determined by several considerations. The financial strength and the information availability will enable a prospective entrepreneur to choose a type of business ownership. Ownership determines the stake of the chain sales, stake in chain value added, share of chain rent, relative rate of rent, share of purchasing power, governor of key technology, information and unique competence, as well franchise or brand name. According to Coles and Mitchel (2011) apart from the flow of goods in a value chain, other determinants of the value chain participation such as changes in ownership rights need to be given a particular consideration.

3.4.1.6 Managerial role

The ability of an actor to plan what to produce, how to organise activities, direct and control a particular chain actor to generate a value within the chain is crucial. It is imperative for chain actors to play managerial roles so as to generate higher profit. Within agricultural value chain men and women have performed many and different gender roles in different enterprises either as planners, or owners, hired processors, or traders (Emerole, et al., 2014). A business with high initial cost may be demanding a partnership of a sort than a business with lower initial cost or start up. The profit motive and risk taking ability will also help in determining the ownership direction of a business.

Making a value chain map is a way of depicting the various businesses, actors, and relationships among parts of the chain and interactions between producers and intermediaries so as to ensure it is easily understood (UNILO, 2009). Also a methodology proposed by Austin (1992) and FIAS (2007) uses a flow chart to establish all operational stages that oil palm moves through from the production point to the final consumer.

Figure 3. 2 Production Chain Linkages



Source: Adapted from Kaplinsky and Morris, (2000)

3.4.2 Estimation of Gender Roles Along the Value Chain using Duncan's Index of Dissimilarity to generate gender segregation.

The Duncan's Index of Dissimilarity was used to measure gender segmentation for the entire value chain. According to Michael and White (1986) and Duncan and Duncan (1955), the Index measures the uniformity with which two mutually exclusive groups are spread across the geographical entities that make up a larger physical entity. The equation is given as:

$$D = 0.5 * \sum_{i=1}^{N} |fi - mi| \qquad (3.1)$$

$$D = \frac{1}{2} * \left[\left| \left(\frac{f_{prod}}{F} - \frac{m_{prod}}{M} \right) \right| + \left| \left(\frac{f_{trad}}{F} - \frac{m_{trad}}{M} \right) \right| + \left| \left(\frac{f_{proc}}{F} - \frac{m_{proc}}{M} \right) \right| \right] \qquad (3.2)$$

Where,

D= Diversity or Index of Dissimilarity

F= the total female population in the chain.

f_i = the proportion of females at a particular chain node.

M= Total male population in the chain

mi= Sample male population at a particular chain node.

prod=Production

trad= Trading and pro= Processing

The index has a range of 0 to 100 or 0 to 1. An index of 0 means a perfect gender integration within the workforce. An index value of 1 or 100% indicates a complete gender segregation within the workforce.

Following from Michael and White (1986) and Duncan and Duncan (1955) we construct tables 3.1 and 3.2 to generate the Dissimilarity Index.

Table 3.1a Roles Performed by Actors along the stages of production

	Production level (%)				Processing (%)				Distribution (Trading) %			
Activities	Male(M) Popn.	% of M Popn	Female (F) Popn.	% of F popn	Male Popn.	% of M Popn.	Female Popn.	% of F Popn.	Male Popn	% of M Popn	Female Popn	% of F Popn.
Initiation	A	% A	B	% B	C	% C	D	% D	E	% E	F	% F
Ownership												
Decision making												
Management												
Control of resources												

Source: Michael and White, (1986)

The table below shows the gender roles for individual actors in the value

Table 3.1b Gender role and Duncan's Dissimilarity Index for the individual chain actors

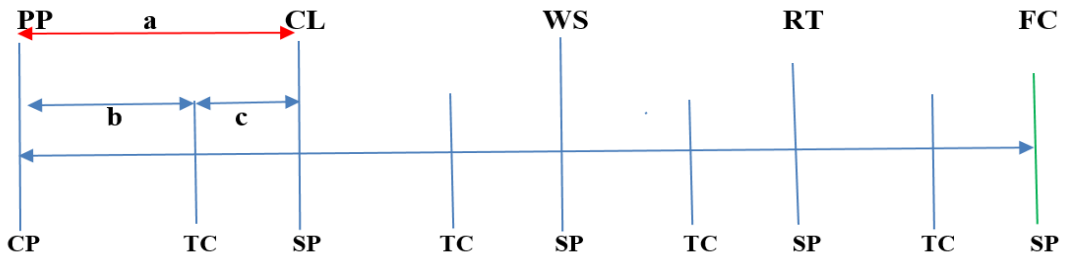
Actors	Male	% Male	Female	% Female	Total	Absolute % Difference
Producer	A	% of A	B	% of B	A+B	A-B (%)
Processor	C	% of C	D	% of D	C+D	D-C (%)
Distributor(Trader)	E	% of E	F	% of F	F+E	F-E (%)
Total	A+C+E (Total males sample)	Total % 100% male sample	B+D+F (Total female sample)	Total (100% female sample)	Total sample size	Absolute % difference (percentage segregation)

Source: Duncan and Duncan, (1955), Michael and White, (1986)

3.4.1 Estimation of Value Addition at each Stage of the Oil Palm Value Chain

Value addition was calculated using the following: variable cost estimation, fixed cost estimation, depreciation, total cost estimation, total revenue estimation, value added estimation and profit estimation. All the various estimates were calculated and presented in Ghana cedis (GH₵) for litres of palm oil produced per week. Evaluation of Value Addition is by estimating the incremental monetary value added to inputs at each stage to generate output for the next level along the value chain. This is illustrated as in Figure 3.3 below.

Figure 3.3 Illustration of Value Addition along the Palm Oil Value Chain and how Value Accumulates as the Chain Evolves.



Source: Lamptey, (2016)

Figure 3.3 in page 38 above, depicts how value accumulates as the evolves. The symbols are defined as follows:

PP= primary producer, *CL*= collector, *WS*- wholesaler, *RT*- retailer and *FC*= final consumer. *SP* and TC represent selling price and total cost respectively. *a* is value addition**,** ***b*** is production cost and c is benefit or profit. *CP*-Cost price, and TC- Total cost.

i. Value added estimation

Value added for distributors (traders) and processors was estimated by finding the difference between the price at which a primary input was purchased from a preceding actor and the price at which it was sold as a finished product.

The equation is given by: (3.3)

$$VA = SP - CP$$

Where:

VA = Value added by actor j

SP = Selling Price for actor j

CP = Cost price of primary input that was purchased from the preceding stage by actor j

Value added for crude palm oil (CPO) processors was estimated per month. The production cost and revenue were estimated for gallons of CPO per 2 weeks and used to calculate the value added.

Value added for oil palm producers was obtained by calculating their total revenue and subtracting the cost of their production input. The result was divided by the number of months that the oil palm was grown by the producer to get the value added per month. The equation is given as:

$$VA_j = \frac{TR - (PP * n)}{\text{Number of months}} \quad (3.4)$$

Where:

TR = Total Revenue

PP = Price of Primary input

n = number of primary inputs

The mean Value Added is estimated as:

$$Mean\ VA = \frac{\sum_{j=1}^{N} VA_j}{N} \quad (3.5)$$

Where:

Mean VA = Mean Value Added

N = number of actors at a given level of the chain.

ii. Gross Margin estimation

The gross margin per unit output (GM) is expressed as;

$$GM = SP - MC \quad (3.6)$$

$$= SP - TC/Q$$

Where:

SP = Selling Price

MC = Marginal cost=TC/Q

TC = Total cost

Q = Output produced

Mean gross margin (Mean GM) was estimated as $\sum_{J=1}^{N} \frac{GM}{N}$ (3.7)

Where: N = number of people in a particular community and j is the number of participants in a value chain.

iii. Estimation of Fixed Cost for Oil Palm Producers, Processors and Distributors

The components considered as fixed cost for the production of the oil palm include the land, tools (earth chisel, cutlasses, lines, watering cans), and labour cost for permanent employees including the farm manager. The fixed cost elements considered for the palm oil producers or processors include trucks, milling plants, extractors, bowls or carriers, basins, boilers, wheel barrow, water tanks or reservoirs, and frying pan. Fixed cost components for distributors/traders include cost of store room, trucks, store, business license, tanks and cost of wage of the businessman or woman. The total fixed cost for each actor was obtained by the addition of the various depreciated fixed cost items of that actor. The items were depreciated using the straight line method. This is expressed as:

$$TFC_j = \sum_{i=1}^{n} FC_i \quad (3.8)$$

Where: TFC_j = Total depreciated fixed cost for actor j

FC_i = Depreciated fixed cost of the i^{th} item

n = number of fixed items for actor j

iv. Using straight line method in Estimating Depreciation

The formula for estimating depreciation using the straight line method is expressed as:

$$D = \frac{I-S}{\mu} \quad (3.9)$$

Where,

D=Depreciation

I=Initial cost

S=Salvage value

μ = Useful life

Mean total fixed cost component of the actors at the same stage of the chain was obtained by adding up the total depreciated fixed costs for the actors and dividing by the total number of actors

$$mean\ TFC = \frac{\sum_{j=1}^{N} FC_j}{N} \quad (3.10)$$

Where: mean TFC = Mean total depreciated fixed cost for actors at the same level

N = number of actors at a given level of the chain.

v. Estimation of variable cost

The variable cost components for the producers included polyethylene bags, pre-germinated seeds, weedicides and pesticides, fertilizers, pruning, harvesting and labour cost. The

variable cost items for the processors were water, transportation, milling and extraction cost, fuelwood, packaging materials. These items were estimated for a gallon of palm oil per fortnight. Palm oil, transportation, rent, tax, gallons, loading and offloading cost were among the variable cost items considered for distributors(traders). The total variable cost of each actor was estimated by adding up the product of the unit price of the respective variable cost items and the quantity of the variable cost items. The variable cost also includes marketing costs. The equation is expressed as:

$$TVC_j = \sum_{i=1}^{n} r_i x_i \tag{3.11}$$

Where: TVC_j = Total Variable Cost for actor j

r_i = unit price of variable item

x_i = quantity of variable cost item

n = number of variable cost items for actor j

The mean Total variable cost for actors at a given level of the chain is obtained as follows:

$$mean\ TVC = \frac{\sum_{j=1}^{N} TVC_j}{N} \tag{3.12}$$

Where: mean TVC = mean Total Variable Cost for actors at a given level of the chain

N = number of actors at a given level

vi. Estimation of the Total Cost

The total cost of an actor is the addition of the fixed cost and total variable cost. This is

expressed as:

$$TC_j = TFC_j + TVC_j \quad (3.13)$$

Where:

TC_j = Total cost for actor j

TVC_j = Total Variable Cost for actor j

TFC_j = Total Fixed Cost for actor j

Mean total cost for all actors at a given level of the chain is given by:

Mean TC = mean TFC+ mean TVC (3.14)

vii. Total revenue estimation

Total revenue was estimated by multiplying the number of bunches of fruits/gallons of palm oil sold by the prevailing market price. Prices of bunches were determined by their sizes. The bigger the bunch the higher the price. However, the gallons have standardized measure therefore easy to ascertain the price. The total revenue of a processor is the number of gallons of CPO produced multiply by the prevailing unit price. The equation is expressed as:

$$TR_j = \sum_{i=1}^{n} pq_i \quad (3.15)$$

Where: TR_j = Total Revenue for actor j

p = price per gallon of CPO

q_i = Quantity of bunches or gallons of oil sold by actor j

The mean total revenue for a given level of actor was estimated using the formula shown below:

$$Mean\ TR = \frac{\sum_{j=1}^{N} TR_j}{N} \tag{3.16}$$

Where: Mean TR = Mean Total Revenue for actors at a given level on the chain

N = Number or actors at a given chain level

Analysing figure 3.2 for example, an Oil palm producer (OPP) purchases a seedling, plants this seedlings, weeds the farm, fertilizes it and takes care of the young plants up to fruiting in about three to four-year period. He or she harvests the fruits and sells it to the processor. The processor then transports it to the processing centre, boils it using fuel wood, milling and extraction and through other processes obtain the crude palm oil (CPO) and then refines it or sells it off to the wholesaler. As such, the value added by the producer (a) is all the activities performed by the processor from the time the palm fruit was purchased to the time the crude palm oil (CPO) was sold off to the wholesaler. The section labelled b represents all the cost the producer incurred in producing the palm oil and section c represents the benefit the producer gets after subtracting all the cost from the selling price of the CPO. The same illustration is repeated for the producer and the processor along the chain until the crude (CPO) reaches the final consumer.

3.4.2 Calculating equity of Benefits Along the Chain

The net income or profit and the margins of the various male and female actors within a particular chain was estimated and used to calculate their returns on investment (ROI) and

ROI/month. The paired sample t-test was used to check the significance among the ROI/month of the various male and female actors within the chain.

i.Net income = Total Revenue – Total Cost

Subsequently, the net income on a product is given by:

Net income/product = net income/ K

Where K is the quantity of a particular product sold.

ii Estimation of Return on Investment(ROI)

The Return on Investment is expressed as follows

$$ROI = \frac{P_o - C_o}{C_o}$$

Where: ROI = Return on Investment

P_O = Value of one unit of output

C_o = Unit cost incurred in producing output

ROI/month = ROI/T

Where T= time in producing output (month)

The Return on investment (ROI) is a performance metric used to calculate the efficiency of a venture or to make comparison of the efficacy of a number of different venture (Ojo et al. 2009., Botchkarev and Andru (2011). ROI measures the amount received from an investment in comparison to the cost of the investment. ROI by definition is a ratio and is calculated as a net investment gains divided by the overall cost of the investment.

The margins created by the various actors or participants in the value chain are estimated as the difference between the price of the actor's value created and the unit cost incurred in the

creation of that output. In this thesis, ROI was used to measure the efficiency of investments made by the various actors of the chain and compared to see their equity or investment.

iii. Hypothesis

Ho: There is no significant difference between the ROI of male producers and female producers in the Oil Palm value chain.

Ha: There is significant difference between the ROI of men and women producers in the Oil palm value chain.

Ho: There is no significant difference between the ROI of men and women processors in the oil palm value chain.

Ha: There is a significant difference between the ROI of men and women processors in the oil palm value chain.

This was repeated for other actors in the chain. The t-test was used to test for difference in the means of ROI/month of males and females and of the various actors in the chain. The decision rule was that:

If t-calculated is greater than t-critical, the null hypothesis H_0 is rejected in favour of the alternate Ha that there is a significant difference in the return on investment per week for the two different actors being tested.

If $p < 0.05$, then there is statistically significant difference in the means therefore we conclude that there exists statistically significant difference between the means among male and female actors.

3.5 Identifying and ranking the major constraints that actors face in the oil palm value chain

Respondents were in agreement with a list of constraints they face which was presented to them to rank from the most critical to the least critical and Kendall's coefficient of concordance was used to test agreement among the rankings. The rankings were collated to find the total sum and the means of the rankings. The sum total was then used to compute the total rank score for each constraint. The constraints with the least sum score was ranked as the most pressing constraint and the one with the highest sum score was ranked as the least pressing constraint. The total rank score was used to calculate the coefficient of concordance (W) to measure the degree of agreement in the rankings. The value of W is positive and it ranges between 0 and 1. W is 1 when there is maximum agreement among the rankings of the actors and 0 when there is maximum disagreement in their rankings.

The formula for the Kendall's coefficient of concordance is given as:

$$W = \frac{12S}{p^2(n^3 - n) - pT}$$

Where T= sum of ranks for each constraint being ranked

n= number of respondents

n= number of rankings

The hypotheses are:

H_0 = there is no agreement among rankings of the constraints

H_A = there is agreement among the rankings of the constraints

The chi-square statistic (X^2) will be used to determine the significance of the Kendall's coefficient of concordance (W) at 1%, 5% or 10% significant levels. The decision rule is that if the estimated chi-square is bigger than chi-square critical, then the null hypothesis is rejected in favour of the alternate hypothesis that there is agreement among the rankings of the constraints.

3.6 Data and Method of Data Analysis, Data Required, Sources and Method of Collection

The type of data used for the study was tabulated as below:

Table 3.2 Data Required, Sources and Method of Collection

Type of Analysis	Data Required	Sources	Method of Collection
Value chain Mapping	Sources of inputs, output produced and output channels	Producers, Processors Distributors (Wholesalers, Retailers)	Questionnaire interviews
	Activities undertaken to support various actors in the value chain	MoFA, OPRI, NGOs Financial Institutions	Key informant interviews
Role performed by men and women along the value chain	Roles and activities performed by women at various stages of the value chain	Initiation, Decision making, Ownership, Management, Control of resources	Questionnaire interviews
Estimation of margins and Return on Investment	Quantities, Costs and Prices	Producers, Processors, Distributors (Wholesalers, Assemblers, Retailers) of Palm oil	Questionnaire interview
Constraints	Scoring using Likert scale	Producers, Processors, Distributors	Questionnaire interview

Source: Author's compilation

From Table 3.2 both quantitative and qualitative data were collected. Prior to the formal survey, a reconnaissance survey and focus group discussions were conducted employing various PRA techniques to gain a general overview of oil palm and palm oil production and marketing arrangements in the study districts. This also helped to formulate the basic

framework for the development and administration of the sets of semi-structured questionnaire that were used for the quantitative data collection. The data required for each of the analysis and method of collection are presented in table 3.2 above.

3.7 Sampling Procedure and Sampling Size.

Table 3.3 below presents the distribution of sample in the two study areas.

Table 3.3 Distribution of Sample, in the study area by Actors

	Producers	Processors	Distributors
Akyemansa District			
Akokoaso	0	6	0
Ayirebi	8	15	18
Abenase	2	4	0
Ofoase	27	9	8
Otwereso	10	20	3
Total	47	54	29
Birim Central Municipality			
Asene	8	20	4
Manso	1	14	0
Oda	5	0	20
Oda-Nkwanta	13	21	4
Total	27	55	28

The sample size was drawn in accordance with Leedy, (1997) who contends that if a population size is higher than five thousand, the sample size becomes almost immaterial and a sample size of 230 is adequate. Again the American Marketing Association argues that the size of the population is irrelevant unless the size of the sample exceeds a few percentage of the total population you are studying. At the farm level, a sample size of 74 farmers were selected with 71 coming from the Akyemansa District and 3 farmers from Birim Central Municipality. The 74 farmers were made up of 43 males and 31 females. At the processing segment, 109 processors made up 18 males and 91 females were selected with Akyemansa district having 54 processors and Birim Central with a total of 55 processors. At the Distribution segment, 47 actors made up of 15 wholesalers, 12 assemblers, and 20 retailers

(19 from Akyemansa, 28 from Birim Central). Akyemansa District and Birim Central Municipality were purposively selected and random sampling was used to select a total of 74 farmers. Snowball sampling was used to select a total of 47 Distributors (Wholesalers, and Retailers). Purposive sampling was used to select 109 processors from the various communities in the two districts.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents the results obtained from the various analysis undertaken to address the objectives of the study. It begins with section 4.2 which outlines of the demographic characteristics of respondents included in the study. It then presents the results on the Value Chain mapping of oil palm in Ghana. The next section discusses the roles and participation of women in the oil palm value chain. Results from the profit margins and Return on investment (ROI) accruing to actors at the various stages of the oil palm and palm oil value chains, Paired Sample Test for the actors as well as constraints faced by actors at production, processing, and distribution stages of the oil palm value chains are also presented in sections 4.6, and 4.7 respectively.

4.2 Demographic Characteristics of the Respondents.

4.2.1 Gender

Table 4.1 below indicates that oil palm industry is an important sub-sector for men and women entrepreneurs. About 41.9% of the 74 farmers interviewed were women. This percentage engagement of women in oil palm is higher than the 25% found by Ofosu-Budu and Sarpong (2013) for fresh fruit bunch (FFB) production in the Kwaebibirim District among oil palm growers.

Table 4.4 Demographic Characteristics of Respondents

Actors	Characteristics	Gender			
		Male		Female	
		Freq.	%	Freq.	%
Producers (Farmers)		43	58.1	31	41.9
	Formal education	30	66.7	15	33.3
	No formal education.	13	44.8	16	55.2
	Major occupation				
	Crop production	69	93.2		
	Other	5	6.8		
Processors	Gender	18	16.5	91	83.5
	Formal education	16	21.6	58	78.4
	No Formal education	2	5.7	33	94.3
	Major occupation				
	Processing	90	82.6		
	Other	19	17.4		
Distribution	Gender	8	17	39	83
	Formal education	5	12.5	30	75
	No formal education	3	43	9	19
	Major occupation				
	Trading	43	91.5		
	Other	4	8.5		

Source: Field Survey, 2017

At the processing segment of palm oil women constitute 83.5% as against 16.5% by men. At the distribution segment, 83% of the traders engaged in the assembling, wholesaling and retailing of palm oil were women. Men contribute about 17% of the activities in the assembling and wholesaling of palm oil in the study area. This is an indication that an intervention in the oil palm sub-sector will greatly have a positive impact in the lives of many women engaged in the sector.

4.2.2 Educational Status

The level of education of farmers presented in Table 4.1 is 64.8%. At the production stage 45% of the farmers have had formal education. This is made up of 30% men and 15% women. Literate women constitute 78% of actors in the processing of oil palm with men

22% been men. At the distribution channel of the oil palm industry, 64% of the actors had had formal education. This is made up of 86% women and 14% men. in the study area. Actors who had no formal education make up 33% of the respondents. Of these 8% percent were men whiles women make up 25% respectively.

4.2.3 Major Occupation of Respondent

Table 4.1 depicts that majority of the respondents at the production, processing, and marketing segments of the value chain have crop production, processing and trading as their major occupation respectively. This means that interventions made in the oil palm sector will be a welcoming news to majority of the farmers, processors and traders respectively. The sector can therefore be effectively used to address unemployment in the districts and in many communities of the forest belt.

4.3 Mapping of Key Actors, Functions and Existing Linkages along the Oil palm value

Figure 4.3 shows an overview of the oil palm industry, the basic structure and the flow of goods and services and also the bonds between the players functioning within the oil palm value chain. Below is the chart that follow each segment of the value chain as Fresh Fruit Bunch transforms into finish product that is to by consumed by consumers.

Figure 4.1 Oil Palm Value Chain Actors, Functions and Existing Linkages

Source: Field Survey, (2017)

4.3.1 Input Suppliers

The value chain above begins with the input supply by input dealers. Inputs such as agrochemicals, seedlings, fertilizers, and farm equipment. The agro-inputs used extensively in the study area are mostly sourced from the Oil Palm Research Institute at Kusi and agents. The study revealed that 80 % of the oil palm producers source their seedlings from the OPRI

directly. 6 % of the farmers sourced their seedlings from traders who claimed to have purchased them from the OPRI and the remaining 4 % sourced their seedlings from their old farms and from family and friends. During farmers' days the OPRI mount a platform to showcase to farmers the various varieties of oil palm available for cultivation. The use of fertilizers is minimal amongst private independent small scale farms holdings across the district

4.3.2 Oil Palm Producers

Oil Palm production in Ghana is dominated by independent small scale holders who produce about eighty (80%) of all CPO in the District and confirmed by what was found out about by Ofosu-Budu and Sarpong (2013) in Ghana's oil palm industry. Majority 58.1% of these producers are males. The production activities involve land preparation which includes bush clearing, felling of trees and other activities. This is followed by line and pegging and actual sowing of seedlings. is done on the farms. Labourers' are occasionally hired by primary producers(farmers) to control weeds and to carry out operations such as pruning and fertilizer application on the farm. This is a perennial crop and is produced virtually under rain-fed conditions under annual precipitation and grows for a period of about 25-30 years. The crop is grown in the forest belt of the Eastern, Central and Western regions of Ghana.

The ideal precipitation for good growth of oil palm is the estimated to be greater than 1200 mm per annum, a topography of and well distributed in bimodal basis and a topography of 400m (Ofosu-Budu and Sarpong, 2013), Verheye (2002). According to Rhebergen et al. (2016), the major oil palm plantations in the country are located within these climatically favourable zones. Ideal soils that support hilly plantation of oil palm are well-drained sandy clayey loamy with top soils of depth of 10-20 cm and sub-soils with deep gravels. On the

slightly sloppy and valley bottoms ideal soils are coarse-textured made up of sandy clay loam and, loamy sand and sandy loams, with deeper and not fully to poorly drained soils (Rhebergen et al, 2016).

It is estimated that 305,758 hectares of total land size is under oil palm cultivation in Ghana (Danyo, 2013). Disparity exists between the large estates and the private small holder independent farms. Highest productivity of 20 tonnes/ha have been attained by plantations in valley bottoms. The large estates achieve productivity levels of between 10–15 tonnes/ha. Smallholders and out growers produce between 7–10 tonnes/ha while private small-scale farms produce about 3 tonnes/ha. The sector according to Ofosu-Budu and Sarpong (2013) is comprised of large plantations who use 20% of the available land space to produce 55% of Ghana's CPO output, medium-scale producers using 5% of the land mass available to produce 5% Crude Palm Oil (CPO). Output and the small scale producers utilize 77 % of the land to produce 39 % of the CPO output. In Ghana, oil palm cultivation has a peak season spanning from February-May and a lean season from September-December

4.3.3 Processing of Oil Palm

Ghana produces about 2,000,000 MT of the fresh fruit bunches (FFB) annually with the small scale processors contributing to over 60% of the total production (Osei-Amponsah et al., 2012). Processing of oil palm in Ghana is tied to the five main types of actors found in the oil palm and palm oil industry. These are the large industrial plantations with large-scale processing mills and a network of smallholder and out-grower farmers who produce to feed the industry. The second is the medium-scale plantations with medium-scale industrial mills with a network of out-growers. The third type of arrangement is the Small independent farmers cultivating less than 10 hectares. The fourth actor is the Small-scale processors using

semi-mechanised mills having the capacities to produce about 6–10 tonnes per day. The fifth and the last group is the Secondary processors who process crude palm oil into refined olein (Danyo, 2013).

According to Osei- Amponsah et al., (2012), about 80% of the processors in the Kwaebibirem District are females. This is close to the observations made at the Akyemansa and Birim Central municipality. The FFB are mostly processed into CPO using semi-mechanised processing equipment at mill sites. This mill called the 'cramer' which was named after a Belgian engineer who first set up a scale processing mill in the Kwaebibirem District in 1982. According to and Osei- Amponsah et al. (2012) Ofosu-Budu and Sarpong (2013) more than 70 % of the oil palm cultivation is done by small scale producers resulting in the establishment of many small scale mills throughout the oil producing communities in the districts. Harvested bunches are conveyed to the processing centre where they are split using many kinds of sharp equipment including cutlass. The fruits are then removed from the spikelet and packed into boilers and boiled for over an hour. The boiled fruits are then conveyed into the miller which crushes the mesocarp containing the oil. There are three main types of pressing equipment used: the digester screw press, the digester with separate spindle press, and the digester with separate hydraulic press.

The digester screw press was used by just 6% of the respondent from the two districts. The digester with separate hydraulic press by 20, and the digester with separate hand spindle press by 74% of the processors. The fresh fruit bunches (FFB) together with the loose fruits are conveyed in trucks from the farm gate to the processing mill. The processors estimate the weight of the fresh bunches by counting the number of bunches or by visual assessment of the processors. Mostly the bunches are not weighed because the technique is mistrusted

by both processors and farmers. The fresh fruit bunches are quartered into spikelet, after which the spikelet are kept on the floor and covered with polyethylene sheets, palm fronds, or simply left uncovered for a period of 3-5 days. This practice is to aid the loosening process pf the fruits. The loosened fruits are then heaped in a metal boiler and boiled for a period of 1 to 4 hours or overnight. The boiled fruits are then carried by the women into the digester which crushes the mesocarp containing the oil. The digester separates the oil, fibre and the nuts into different compartments. The oil is collected at the outlets by the women into containers and then poured into big pots where they are fried under low heat (Field Survey,2017). These frying process is done to remove water from the crude known as clarification (Osei-Amponsah, 2012).

4.3.4 Marketing and Distribution of FFB and Palm Oil (assemblers, wholesalers and retailers of FFB and Palm oil)

Palm oil assembling, wholesale and the retail markets are dominated and controlled by women. An analysis of Duncan's Dissimilarity Index on gender roles in Figure 4.3 revealed that 39 representing 82.98% of distributors were women while 8 representing 17.2%. Traders of palm oil in the Akyemansa and Birim Central Municipality operate as individuals. There are no specific traders' association for palm oil dealers in the districts. However, there are collective traders' association who champion the course of traders' well-fare in the Oda municipality. There exists a market 'queen' status and function is an expression of traditional hierarchies. Together with her other supporting leaders establish informal rules of engagement such as setting of prices for palm oil which is binding on all traders including authority to admit new entrants.

Palm Oil from the processing plants in the two districts are marketed within the districts, region and outside the region. Traders from Accra, Kumasi, Tamale, Dambai and other areas come to buy crude palm oil both for consumption and industrial purposes. Marketers from neighbouring countries such as Togo, Burkina Faso and Nigeria also trade in palm oil in these districts. These marketers from the aforementioned countries have local agents who move from one mill to the other to purchase palm oil. These agents in turn resell to these foreign marketers. Some marketers also buy the oil at the peak season store them until November to February where prices are high before selling them. Apart from these marketers, there exists wholesalers who buy the oil in large quantities directly from the processors located at the production centres and supply them to end users in the large towns or cities. These are entrepreneurs who use their own resources to transport and also bear other marketing costs. Along the marketing chain is also the assembler who use his or her own resources to finance transactions. They sometimes get pre-financed by the wholesalers, who play pivotal roles in financing the informal sector of the rural and urban economy. Transactions are mostly done informally on the market and mostly hinges on mutual trust of the partners.

4.3.5 Retail of Palm Oil

Retail of palm oil is mostly the preserve of women in the Akyemansa and Birim Central Municipal. However, there are few males in this area. Retailers in some cases trade in both palm oil and other vegetable oils in all spheres of the society.

4.3.6 Horizontal Linkages

Many institutions and organisations help to create enabling conditions and activities for the oil palm industry. The Oil Palm Research Institute (OPRI) of the Council for Scientific and

Industrial Research (CSIR) located at Kusi in the Kwaebibirem District shares border with the study area in the Eastern region of Ghana. The Institute plays pivotal role in the oil palm industry as it is the sole research institution in the country responsible for conducting research into the development and release of improved oil palm and coconut varieties in Ghana. Currently Ghana Oil Palm Development Company has brought into the country oil palm variety that is able to produce fruits for up to 50 years (Business and Financial Times, 2016). Though the Centre for Scientific and Industrial Research has no responsibility for providing extension services to farmers, the institute has recommended agronomic practices which they provide to MoFA and farmers who purchase seeds and seedlings from the council at all times. Ministry of Food and Agriculture (MoFA) whose mandate is to promote sustainable agriculture and thriving agribusiness through research and technology development, effective extension and other support services to farmers, processors and traders for improved livelihood (MoFA, 2007). For several years now the Ministry of Food and Agriculture's directorate of extension have been offering technical advice to farmers in groups or association and on individual farmer levels. In the Akyemansa and Birim Central Municipality farmers have been grouped into 15 members each where agricultural extension agents provide technologies to them to improve their farming operations.

4.4 Description of Major Roles Performed by Women at each Stage of the Value Chain

According to World Farmers' Organisation (2016) women play invaluable contributions to the development of rural economies by contributing to 43% of the agricultural labour force and more in other developing countries. Women play critical roles such as Leadership, initiation of businesses, capital contribution to businesses, ownership of businesses, accessibility of productive resources, Decision making and management of business

enterprise (Agbanu, 2015). The roles performed by women along the oil palm value chain in the Birim Central Municipal and Akyemansa district respectively were analysed using percentages.

4.4.1 Initiation role

From table 4.2, 66.2% of the males interviewed initiated the production process. This is more than the percentage of women who initiated the production process. Out of the 109 processors interviewed in the two Districts 17.4% of the males were sure to have initiated the processes. Female participants in the production of palm oil were 82.6% far more than the male counterparts. This is a clear indication of the dominance of women in that node of the production chain. Again at the distribution segment of the chain 17% of the traders interviewed were men. Women again dominate the distribution segment of the chain with 82.9% of respondent.

Table 4.5 Indicators of Role perform by Women and Men along the Oil Palm Value Chain

	Production level (%)				Processing (%)				Distribution (Trading) %			
Roles	Male F	%	Female F	%	Male F	%	Female F	%	Male F	%	Female F	%
Initiation	49	66.2	25	33.8	19	17.4	90	82.6	10	21.3	37	78.7
Ownership	45	60.8	29	39.2	10	9.2	99	90.8	8	17	39	82.9
Decision making	44	59.5	30	40.5	23	21.1	86	78.9	6	12.8	41	87.2
Management	52	70.3	22	29.7	20	18.3	89	81.7	4	8.5	43	81.5
Control of resources	58	78.4	16	21.6	95	103.6	14	12.8	8	21.7	39	82.9

Source: Field Study, 2017

4.4.2 Ownership role

From table 4.2, 45 above 60.8% from a total of 74 farmers interviewed, affirmed that they solely owned the oil palm farms. Women who owned the farms from the two districts were 29 representing 39.2%. From this study man dominate the farming aspect of the oil palm sub-sector. On the processing segment of the oil palm value chain in the Akyemansa District and Birim Central Municipality, 9.2% of the processors' businesses belong to the men. Majority 90.8% of the processing businesses belong to the women. It clearly shows that women virtually take control of the products after harvesting operations. At the trading or the distribution segment of the sector, 6 men representing 12.8 % of the 47 traders own the businesses. Women's dominance is seen in this aspect of the value chain as 87.2% of the traders own the trading enterprises.

4.4.3 Decision making role

Table 4.2 shows that at the production stage of the oil palm industry, 59.5% of the men made decisions to grow oil palm while 40.5% of women thus took decisions on the growing of the oil palm in the study areas. From the two districts 78.9 % of the women took the decision to go into the processing of oil palm while men decision makers on the processing of FFB was 21.1%. With a majority 87.2% women in the study areas dominate the decision making in process FFB.

4.4.4 Management role

Results from the survey conducted in the two oil palm producing districts shows that 70.3% of farmers manage plantations. Women managers of farms make up 29.7% from the study areas. These 29.7% women farmers manage farms that they have cultivated themselves as

well those given to them by their husbands for contributing to the establishment of the family farm. Income realised from these farms are the preserve of the women.

At the processing segment of the chain men play little managerial roles as 18% of men managed the processing enterprises. Women with 81.7% make up majority of managers of the processing businesses in the Akyemansa and Birim Central Municipality. 91.5% of women manage the distribution channel of the value chain in the study areas whiles men manage just 8.5 of the distribution channel.

4.4.5 Control of resources.

From table 4.2, 78.4% of the respondents said that males own the lands, tools and equipment for growing the fruits whiles 21.6% women own these production resources. At the processing segment of the value chain 87.2% of the 109 processors said that men own the processing facilities One interesting observation made was that all the facilities owned by the women are themselves operated by men. From the distribution point of the value chain 82.9% of the traders interviewed said that women owned the assets of the business. There was no male engaged in the retail aspect of the distribution channel.

4.4.6 Measures of Gender Segregation with the Index of Dissimilarity

Duncan's Index of Dissimilarity

$$D = 100 * \frac{1}{2}\left[\left|\left(\frac{f_{prod}}{F} - \frac{m_{prod}}{M}\right)\right| + \left|\left(\frac{f_{trad}}{F} - \frac{m_{trad}}{M}\right)\right| + \left|\left(\frac{f_{proc}}{F} - \frac{m_{proc}}{M}\right)\right|\right]$$

Where,

D = Diversity or Index of Dissimilarity

F=Total female population in production processes

f=Proportion of female actors who initiate production, trading and processing

M=Total male population in initiating production

m=Proportion of males who initiate production processes.

Table 4.6 Gender role and Duncan's Dissimilarity Index.

Actors	Male	% Male	Female	% Female	Total	Absolute % Difference
Producer	43	62.3	31	19.3	74	43
Processor	18	26.1	91	56.5	109	30.42
Distributor(Trader)	8	11.6	39	24.2	47	12.61
Total	69	100	161	100	230	86.03

Field Survey, 2017.

D = ½ * (86.03)

= 43 %

Therefore, the percentage of dissimilarity of roles among men and women in oil palm value chain is 43%. This means that women dominate the entire value chain by 43%.

Individual Level of Dissimilarity amongst the Oil Palm Value Chain Actors

Dissimilarity at the production of FFB stage.

Dp=1/2* Di%

Where p is production stage and Di is dissimilarity at the i^{th} stage

Dp=1/2*43%

Dp=21.55%

From table 4.3 the level of dissimilarity amongst producers is 21.5 and these means men dominate the production of the oil palm by 21.5%.

Dissimilarity at the processing stage

Dpr=1/2*Di%

Where,

pr =processing

Dpr=1/2*30.42%

Dpr=15.2%

From figure 4.4, women dominate the processing segment by about 15%. In absolute terms women dominate the processing segment by 30.42%.

Dissimilarity at the Distribution stage

Dd=1/2*%Di

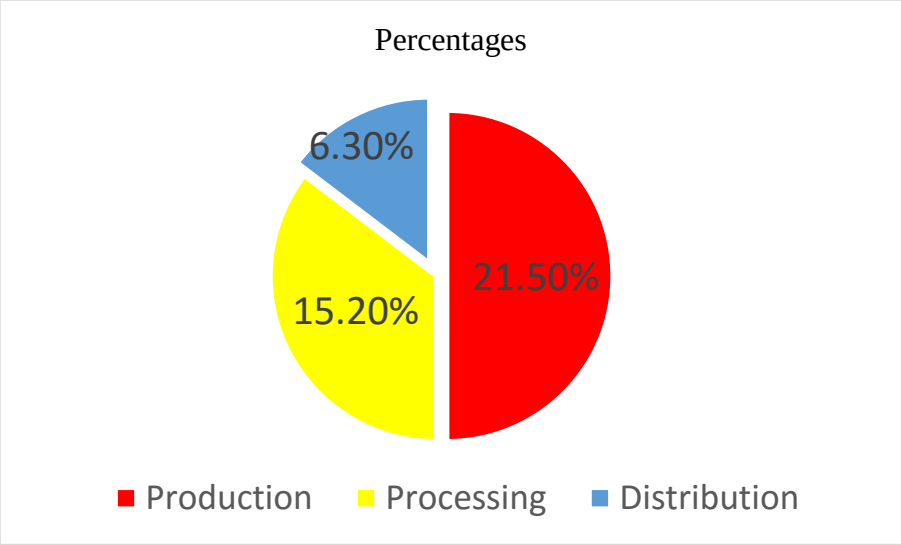
Where d=distributor

Dd=1/2*12.61%

Dd=6.3

At the distribution stage women's dominance is 6%. In absolute terms women dominate the distribution segment by 12.6%.

Figure 4.2 Pie Chart Showing individual level of Dissimilarity in the Production, Processing and Distribution channels of the Oil Palm Value Chain.



Source: Field Study, 2017

4.5 Distribution of Value Addition, Costs and Returns along the Oil Palm Value Chain

The distribution of the value created along the oil palm value chain is represented in Table 4. 4 below. The cost involved as well as the total revenue realised by male and female entrepreneurs in the value chain is represented in Table 4.4 and 4.4b Appendix IV.

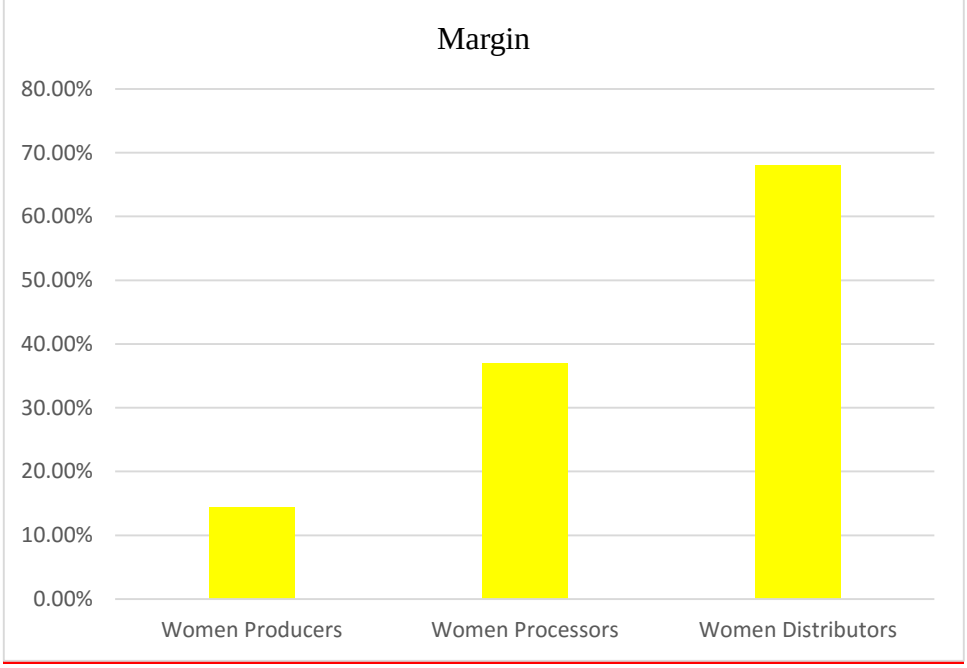
Table 4.7 Showing Value Addition, Margin, and Return on investment for Men and Women Actors.

Actors	Women	Men
Producer		
VA	3.49	3.44
Margin	0.5	0.5
ROI	0.3	0.3
Processor		
VA	3.3	3.0
Margin	1.21	1.11
ROI	0.2	0.2
Distributor		
VA	6.9	6.83
Margin	4.65	4.6
ROI	0.5	0.49

Source: Field Survey, 2017

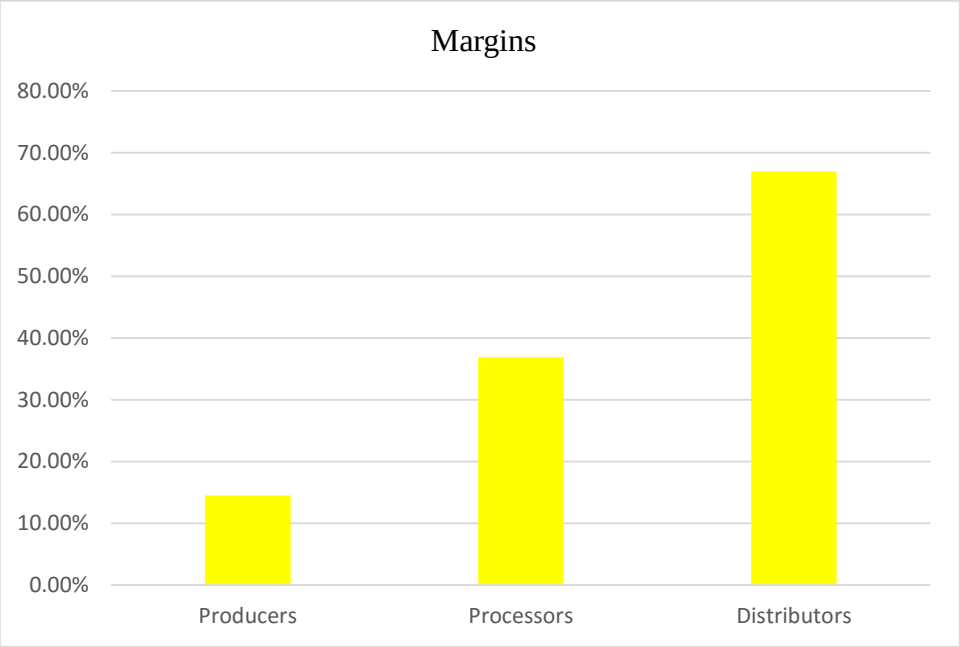
From Table 4.4, Value created when a bunch of fresh fruit bunch (FFB) is sold by a female farmer to the processor was GH₵3.49 out of which GH₵0.5 per every bunch go to the farmer. This represent 14.3% of the value created. Female processors generate a value of GH₵3.3 when they buy fresh fruit bunch from the farmer and process it into a litre of palm oil. Out of this amount GH₵1.21 go to the female processor representing 37%. This is more than twice the amount received by the female farmer in the chain. The distributor generates a value of GH₵6.9 when she sells a litre of palm oil to a consumer. An amount of GH₵4.65 go to the distributor as his percentage of the share of the value created. This represent 68% of the value created. This shows that the farmer receives the least of the value created along the value chain. The distributor receive the greatest share of the value created than processors by 30%. These disparities must therefore be corrected to ensure fair share of the value created by the various actors. Figure 4.3 below shows the distribution of Value, Margin and Return on Investment for women actors.

Figure 4.3 Showing Distribution of Margins for Women Actors at the Production, Processing and Distribution stages.



From Figure 4.4 below, when palm fruit is sold by the male farmer to the processor the value created per bunch is GH₵ 3.44 and GH₵0.44 representing 12.8 % of the value created goes to the farmer along the chain. Male processors create a value of GH₵2.9 of which GH₵0.96 representing 33.3% goes to the processor. This represent more than twice the amount received by the famer. The distributor creates a value of GH₵5.04 when he sells a litre of palm oil to the distributor and generate a margin of GH₵2.8. This represent a 55.6% of the value created along the value chain

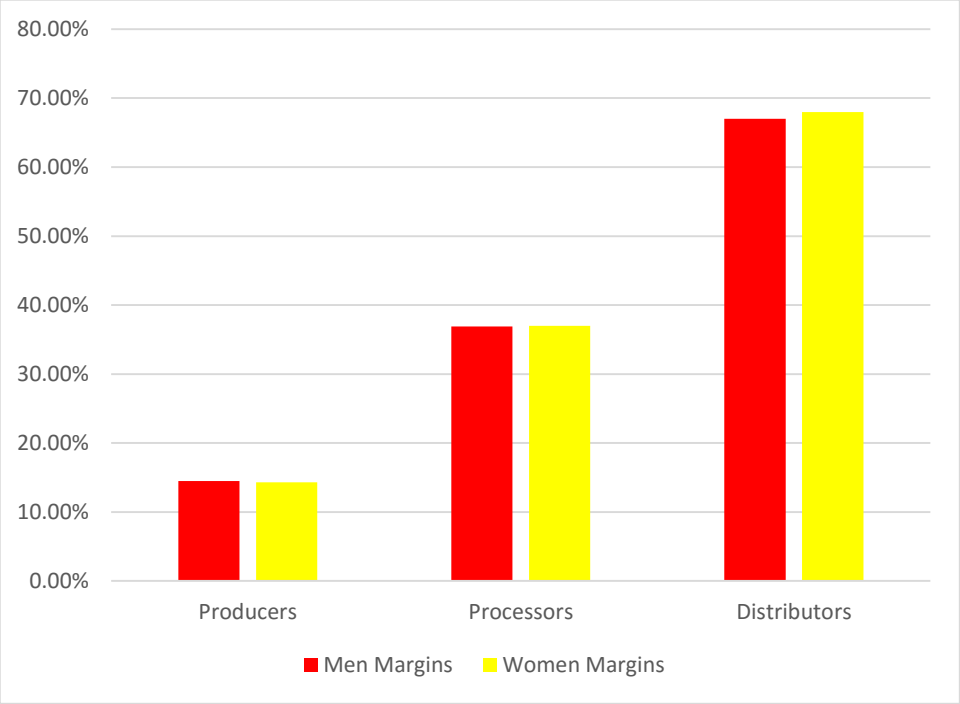
Figure 4.4 Showing the Distribution of Margins for Men at the Production, Processing and Distribution stages of the Value Chain.



From figure 4.5 female farmers receive GH₵ 0.5 share of the GH₵3.49 value created while male farmers receive GH₵₵ 0.44 from the share of GH₵3.44 value created. This means that female farmers receive a margin of 1.5% slightly above the value created by the male farmers who receive 12.8%. Female processors earn a margin of GH₵1.21 from GH₵3.3 value created representing 36.7% of the value added. However, male processors earn a margin of GH₵1.11 representing 36.9% of the GH₵3.01 share created. At the distribution segment of the oil palm value chain, female distributors earn a margin of GH₵4.65 on a litre of palm oil with a value creation of ₵4.6. Male distributors on the other hand earn a margin of GH₵4.6 from a GH₵6.83 share of the value created. It can therefore be concluded that male traders and processor earn less margins from the share of the value created along the oil palm value

chain. For equitable distribution of margins along the palm oil value chain, Pragmatic actions must be taken to reduce cost of operations.

Figure 4.5 Showing the Distribution of Margin for Men and Women Chain Actors.



Source: Field Survey, 2017

4.5.1 Distribution of margins as percentage of overall Value Added of Female Actors oil palm Value chain.

Table 4.8 Distribution of Margin between Male Farmers, Processors and Distributors against Female Farmers, Processors and Distributors.

	Gender		Gender	
Actor	**Female (Margin)**	**Male (Margin)**	**Female ROI**	**Male ROI**
Farmer	14.3%	12.8%	0.3	0.24
Processor	39.3%	33%	0.2	0.2
Distributor	3.3(59%)	2.8(55.6%)	0.5	0.4

Source: Field Survey, 2017

4.5.2 Distribution of Returns on Investment for Male Farmers, Processors and Distributors as against Female Farmers, Processors and Distributors

Table 4.9 Paired Sample Test for Return on Investment of Male and Female Oil Palm Actors

Actor	Mean (ROI)	Standard deviation	t-Value	Decision Rule
Male farmer	0.2	0.0693	0.070	**Ho not rejected**
Female farmer	0.2	0.0704		
Male processor	0.2	0.0144	-4.876	**Ho not rejected**
Female processor	0.3	0.0548		
Male distributor	0.4	0.0516	-3.127	**Ho is rejected**
Female distributor	0.5	0.0578		

Source: Field Survey, 2017

From table 4.6 above male farmers generate a return on investment of 0.2 meaning that for every cedi investment into the cultivation of oil palm an amount of GH₵0.2 will be realised which represent a 20% of the GH₵1invested. For the female farmer the same amount of GH₵0.2 will be the return realised from any cedi invested into the plantation. Female processors generate a 30% revenue from any litre of palm oil processed. What this mean is that for every cedi invested into the processing of the palm oil an amount of GH₵0.30 will be realised from the invested. However, male processors generate 0.2 returns on every cedi invested in processing a litre of palm oil. This means that male processors generate GH₵0.2 on every cedi invested. Clearly this falls short of the percentage realised by the female processors by 10%. At the distribution segment of the value chain female distributors (retailers) generate 0.5 returns on investment. This indicates that for every cedi invested by female traders or retailers GH₵0.5 was realised when a litre of palm oil was sold by the trader to consumers. It clearly shows that a 50 percentage point is generated in the trading business by female traders. Male traders on the other hand make a return on investment of

0.4. This translate into GH₵0.4 or 40% of every cedi invested into trading a litre of palm oil. Comparatively female retailers make a 10% more on the return on investment than the male traders. Clearly one can conclude that the processing and the trading aspect of the value chain is dominated by the female actors. For equitable distribution to

be achieved more holistic approach that deal with especially cost element must be given a necessary attention.

4.6 Analysis of Constraints in the Production, Processing and Marketing Segments of the Value Chain

4.6.1. Constraints facing Men and Women Producers (Farmers)

From Table 4.8 about 96% of women and 98% of men agreed to the constraints been a threat to the farming business. Both men and women in the farming business ranked high cost of labour first in the list of constraints. Men and women farmers ranked it with a mean score of 1.16 and 1.10 respectively. Both men and women farmers in the study areas alluded to the fact that high cost of labour tend to increase their cost of production thereby reducing the amount of margin earned by the farmers. This confirms a study by Rola-Rubzen et al., (2011). In the study by Rola-Rubzen lack of technology was a major constraining factor to horticultural farmers in the study area. Farmers in Akyemansa and Birim Central Municipality employ intensive manual labour leading to high cost of production. The second most ranked constraint by both men and women was high transportation cost with a mean score of 1.90 by women and 1.84 by men respectively. Respondents complained of high transportation cost reducing the margins realised from the sale of their fresh fruit bunches (FFB). This is confirmed by a study carried out in Timor Leste by Rola- Rubzen et al., (2011). In the study farmers of horticultural products were compelled to sell their produce

in the local markets due to high cost of transporting their produce to the high value markets. This leads to a situation where farmers become only price takers as their primary source of price information is the buyers. Farmers can therefore be manipulated by the buyers. Farmers in Akyemansa District and Birim Central Municipality complained of ₵1.00 per bunch charge as been too exorbitant. The third most ranked constraint was poor road network. Farmers complained of bad roads in the districts posing serious challenge to the palm oil industry. From the study by Rola- Rubzen et al., (2011) poorly maintained infrastructure including access roads to farms and poor road network to markets are major constraints facing agricultural development. They complained that motorist sometimes refuse to go to their farms to convey fresh fruit bunches leading to delay in processing the fruits. This leads to the buildup of free fatty acids in the oil reducing the quality in the process. Both farmers ranked high cost of inputs 4^{th} in terms of magnitude. From table 4.8 the fifth most ranked constraint was inadequate storage facility forcing producers to leave the harvested fruits in the farms for more than 24 hours. The farmers complained that these constraint lead to theft of the bunch The 6^{th} most ranked constraint was bush fires. This they say normally happens in the dry season where considerable size of plantations is burnt. Lack of ready market with means of. The seventh most ranked constraint was lack of ready market with a mean score of x=7.03 and x=7.07 by women and men farmers respectively. This is confirmed by Bandarla, (1991). Bandarla found out from a study on small-scale enterprises that lack of market information is a serious problem facing agro-industries. The eighth and ninth most ranked constraint was non-availability of oil palm fertilizers and lack of enforceable contract as a result of weak legislation.

Table 4.10 Showing Constraints faced by Men and Women Oil Palm Producers and how they are ranked

Constraints	**Mean Score by Women**	**Mean Score by Men**	**Ranking**
High cost of labour	1.10	1.16	1st
High transportation cost	1.90	1.84	2nd
Poor road network	3.10	3.12	3rd
High cost of Input	3.98	3.88	4th
Inadequate storage facility	5.03	5.14	5th
Bush fires	6.12	5.88	6th
Lack of ready market	7.03	7.07	7th
Non-availability of oil palm fertilizer	7.95	8.00	8th
Weak contractual agreement	8.78	8.91	9th
Women N=30 Kendall's (W)=0.965 D.F =8 Significance:P-Value=0.000<0.05		Men N=42 Kendall's (W)=0.981 D.F=8 Significance: P-Value=0.000<0.05	

Source: Field Survey,2017

From Table 4.8 below both men and women processors agreed that high cost of transport was the most pressing constraint facing actors in the processing segment of the value chain in the study area. About 95% of the women processors and 96% of the men in the processing business agreed that the constraints presented to the were actually affecting their businesses and ranked them accordingly. This is confirmed by Nidhi et al., (2017). In the publication the researchers identified high cost and lack of transportation as major causes debilitating against the growth of agriculture. Women processors ranked high transport cost first with a mean score of x=1.16 while men processors ranked it first with a mean score of 1.22. Respondents in the processing business said high cost of transport increased their operational cost thereby reducing their profit margins. The second most pressing constraint was high cost of labour. With a mean score of x=1.88 by women and x=1.78 by Men, both actors said

their costs of operation involve several activities which include the deployment of labour. Respondents said that the higher the raw materials the more hands needed to carry out processing operations. The actors said they do not enjoy economies of scale as a result of their limited manual activities confirming the study of Ajala et al., (2015) where problems of postharvest handling, processing and marketing was identified as major factors hindering the progress of the agro-industrial sector. With a score of x=3.07 by women and x=3.25 by men, Poor road network was ranked by actors as the fourth most pressing constraint facing processors in the study area. Processors complained that they sometimes have to carry their fruits and fuelwood on their heads to the processing centre because motorists sometimes refuse to go to the hinter lands to convey fresh fruits and fuelwood. Women and men processors ranked inadequate storage facility as the fifth most processing constraint with a mean score of x=5.17 and x=5.04 respectively. Processors complained of lack of proper storage facility to store crude palm oil (CPO). The processors' complained that this problem compels them to sell their palm oil immediately after production to middlemen. This does not inure to their benefit as they do not earn higher prices for their oil. Nidhi et al., (2017) found out that lack of storage facilities continues to hinder the progress of agriculture in the rural areas. Both men and women processors ranked lack of government support as the next most pressing constraint. Women processors score it x=5.99 while men score it x=5.86. Actors said they receive no support from the government for their processing business. This they said hampers their ability to expand and enjoy economies of scale. All their equipment is acquired by market rates due to non-involvement of government in their activities in the processing business. This was confirmed by Bandarla (1991) in the study of smallholder agro enterprises in India. The seventh ranked constraint was weak contractual agreement

with women soring it x=7.13 and men x=7.14. The processors complained that they do not have enforceable contractual arrangement with clientele (farmers and buyers of palm oil). This is because contracts are mostly verbal and not binding enough leading to frequent breach of agreement. Client of farmers sell their fruits to processors who can offer them the price they prefer and not to processors they are contracted to.

When prices are low distributors go to mostly the nearest and accessible areas to buy their oil leaving those in the hinter lands. The eight most ranked constraint was adulteration. Processors complained that adulteration does not occur at the processing centres but they suffer the repercussions. This they said have reduced patronage of the palm oil particularly the edible oil by both local buyers and those from the sub-region. This is confirmed by Heather and Gorden (2001) in a study to review the experiences of non-governmental and community-based organisations in agricultural marketing initiatives in Sub-Saharan Africa. The ninth ranked constraint by both actors was irregular supply of fresh fruit. Respondents said that irregular supply of fresh fruit is hampering continuous operation of their processing business. These reduces their profit margin and even their capital as a whole as they sometimes fall on their capital as consumption. The respondents said this pose serious economic challenge to their livelihoods as they depend on their meagre income for home consumption and also for social activities. They also blame lack of fertilizer application by the private smallholder farmers as the cause of unreliable supply of fresh fruits bunches for processing. This is confirmed by Rola-Rubzen et al., (2011) on a study of farming systems in Aileu and Maubisse in Timor Leste. The study found that production was characterised by low productivity, fluctuations in production and poor quality products.

4.6.2 Analysis of Constraints facing Men and Women Processors in the Value Chain

Table 4.11 Constraints facing Men and Women Processors and how they are ranked

Constraints	**Mean Score by Women**	**Mean Score by Men**	**Ranking**
High transportation cost	1.16	1.22	1st
High cost of labour	1.88	1.78	2nd
Poor road network	3.07	3.25	3rd
Lack of ready market	3.97	3.86	4th
Inadequate storage facility	5.17	5.04	5th
Lack of government support	5.99	5.86	6th
Weak contractual agreement	7.13	7.14	7th
Adulteration	7.87	7.97	8th
Irregular supply of raw materials	8.78	8.83	9th
Women N=91 Kendall's (W)=0.953 D.F =8 Significance: P-Value=0.000<0.05		Men N=18 Kendall's (W)=0.967 D.F=8 Significance: P-Value=0.000<0.05	

Source: Field Survey, 2017

From Table 4.9, about 89% of women distributors and 96% of the men in the distribution channel agreed to the list of constraints facing the business which was presented to them to rank. Both men and women distributors ranked high transportation cost as the most pressing constraint facing the distribution channel. The actors complained of some motorists refusing to ply the roads due to its bad state. This is corroborated by Baloyi (2010) in the study on the constraints facing smallholder farmers in the Limpopo Province of South Africa. The study identified high transport cost, lack of human capital, lack of information on marketing amongst others. Processors complained that cost of transport takes a substantial proportion of their revenue. Women processors scored it x=1.22 while the men score it x=1.13. With a score of x=2.12 by women and 2.00 by men, the study also found that distributors of agro-products face significant challenges in financing their activities confirming the position of

Rola-Rubzen et al. (2011). Distributors complained of having to fall on their meagre resources and family members to finance their trading activities. Respondents said that high interest rates from Banks, Non-Banking Financial Institutions as well as money lenders turn them away from securing external funds to expand their businesses. The third most challenging constraint facing distributors was adulteration with a score of 3.05 and 2.88 by women and men respectively. Men and women processors ranked it x=1.78 and x=1.88 respectively. Mgbakor et al., (2013) in a study on Problems and prospects of Oil Palm in Isoko South, Delta State Nigeria also found labour intensity as one of the challenges facing oil palm industry in Nigeria. The third most constraining factor is high interest rates with men and women distributors scoring it x=2.12 and x=2.00 respectively. Distributors complained of having to fall on their own meagre resources and family members to finance their trading activities. Respondents said that high interest rates from Banks, Non-Banking financial institutions as well as money lenders turn them away from securing external funds to expand their operations. This constraint was confirmed by Bandarla (1991) who identified inadequate finance as a major setback to the operations of agro industries. Adulteration of Palm Oil was the third most constraining factor hindering the successful operations of distributors in the study area.

With a mean score of x=3.05 for women and x=2.88 for men distributors said many customers of their palm oil are unwilling to buy the edible palm oil in larger quantities for fear of low patronage by retailers. Due to this problem sales to customers from neighbouring countries have also reduced affecting their trade A study by Heather and Gorden (2001) and Bandarla (1991) confirmed this constraint. Heather and Gorden (2001) and Bandarla (1991) found that inability to adopt the appropriate technologies has affected the quality standard

demanded by the market. The fourth constraining factor in terms of magnitude is poor road network. Women distributors scored poor road network x=4.00 while the men and men scored it x=4.13. Respondents said that available road networks in the study area pose serious threat to commuters. The poor nature of the roads makes it difficult to convey palm oil from one locality to the other. They complained of several accidents on the roads which have claimed lives and loss of their wares. Rola-Rubzen et al., (2011) in their study of the production and Marketing of Horticultural products in Timor Leste, found poor road and transportation systems as major challenges facing agro-industries in developing nations. Next in line is inadequate storage facility. Women actors in the distribution segment scored it with a mean of x=5.85 and x=5.63 by the men actors. Distributors have major challenge in securing adequate space in storing their palm. This they say hinders their ability to purchase more of the palm oil especially during the major season where prices are mostly low. With this constraint they are unable to fully take advantage of price differentials in the glut season. This is further confirmed by Bandarla (1991) who identified lack of infrastructural support for agro-processors.

Weak contractual agreement was the seventh constraining factor hindering the smooth running of the distribution channel. Respondents were of the view that governments are less concerned about their activities. They complained of not getting support from the government in terms of funding and adequate regulation on standards. Men scored it x=7.13 while the women distributors scored it x= 6.68. With a mean score of x=7.92 by women and x=7.88 both actors ranked it eighth in an order of magnitude. Respondents were of the view that due to lack of quality standards and labelling it is almost impossible to trace adulterated and sub-standard oil to its source of production. This they say makes it difficult to convince

retailers and exporters of the quality of the oil. This was a confirmation by the study conducted by Bandarla, (1991) on smallholder agro processing enterprises in India.

4.6.3 Analysis of Constraints facing Men and Women Distributors (Wholesalers, Assemblers and Retailers) of Palm Oil in the Value Chain

Table 4.12 Constraint facing Men and Women Distributors

Constraints	**Mean Score by Women**	**Mean Score by Men**	**Ranking**
High transportation cost	1.22	1.13	1st
High interest rates	2.12	2.00	2nd
Adulteration	3.05	2.88	3rd
Poor road network	4.00	4.13	4th
Inadequate storage facility	5.17	5.25	5th
Lack of government support	5.85	5.63	6th
Weak contractual agreement	6.68	7.13	7th
Lack of quality standards	7.92	7.88	8th
Women N=39 Kendall's (W)=0.895 D.F =7 Significance: P-Value=0.000<0.05		Men N=8 Kendall's (W)=0.965 D.F=7 Significance: P-Value=0.000<0.05	

Source: Field Survey,2017

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

The study sought out to analyse the roles of women in the production of oil palm, and especially processing of the fresh fruit and the distribution of palm oil along the oil palm value chain with reference to individual men and women entrepreneurs operating in the value chain in Akyemansa District and Birim Central Municipality of the Eastern Region. The value chain of the oil palm industry was mapped using the flow diagram. The input-output structure was estimated; the entrepreneurial role of women along the oil palm and palm oil value chain were also analysed. The distribution of margins as well as Return on Investment (ROI) for actors in the oil palm and palm oil value chains were adequately estimated. Constraints facing the production of the fruits, processing, marketing and distribution of the final product were then discussed.

The key actors along the oil palm value chain are the producers (farmers), processors and the distributors (assembler, wholesaler, and retailer) of the final output. Various critical developmental institutions both governmental and non-governmental, who are not directly involved in production of the final value along the value chain but whose activities impact efficiently on the chain. These institutions include the Ministry of Food and Agriculture, Oil Palm Research Institute, local and International NGO's, Banks and Non-Banking financial institutions, local money lenders, transport and logistic outfits, amongst others. Analyses on the role of women show that men entrepreneurs dominate the production of the FFB while women dominate the processing and the distribution segment of the chain. men derive the least margin along the chain. In the processing segment of the value chain women outnumber

the men and but does not necessarily mean they receive the highest of the benefits because majority of the farms are owned by the men and the women are part of the household labour. What this mean is that men farm owners receive greater proportion of the rent coming as proceeds from the sale of the palm oil. Also estimates of the return on investment indicate that the farmer receives the least in returns but incur the least cost as subsequent harvest demand least investment for maximum yield.

With the constraints facing the producers, processors and the Distributors or marketers, high cost of labour, and high transport cost were identified as the major constraints facing the production, processing and distribution of oil palm and palm oil products. There are however opportunities in the oil palm value chain. This is because there is adequate land for the expansion of the oil palm farms in the two district. Oil palm processing centres located in every community of the two districts indicate that the segment can offer substantial employment opportunities to greater proportion of the populace.

5. 2 Conclusions

Women in Akyemansa District and Birim Central Municipality play important roles in activities leading to the production, processing and distribution of oil palm products. They dominate in enterprise initiation, ownership, decision making, management and control of resources in the processing and distribution activities. They perform (in terms of value added, margins and return on investment) slightly better than their male counterparts. The constraints women face whiles performing activities in the value chain relate mainly to cost of inputs (labour, transport and credit) and quality maintenance**.**

5. 3 Recommendations

It is refreshing to know that women equally do better in all aspects of the production, processing and distribution of oil palm and palm oil in the Akyemansa District and Birim Central Municipality. 1. Land owners should therefore be willing to give lands to women entrepreneurs for their economic activities. 2. Government (central and local) should construct access roads in these districts to lessen the burden on economic activities. 3. Municipal and Districts Assemblies in these study areas should help form viable association of oil palm and palm oil actors so that the group can use its bargaining power to secure credits and other inputs at affordable prices for their operations. 4.The government through the Food and Drugs Authority should institute Standardisation mechanism for all palm oils produced in Ghana so as to limit adulteration and its consequences on the poor actors

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APPENDICES

UNIVERSITY OF GHANA
DEPARTMENT OF AGRICULTURAL ECONOMICS AND AGRIBUSINESS

This study titled **"WOMEN'S ROLE IN THE PALM OIL VALUE CHAIN IN THE AKYEMANSA DISTRICT AND BIRIM CENTRAL MUNICIPALITY IN THE EASTERN REGION OF GHANA"** is being carried out by Eric Nilson Donkoh, a graduate student at the University of Ghana in partial fulfillment of the requirement of the award of master of philosophy (M. PHIL) degree in Agribusiness. He is soliciting for information for this study and need your consent. Your survey responses will solely be for academic purposes and be highly confidential. Your support and contribution will be very much appreciated. If you have questions about the survey or procedures, you may contact him at ericdonkoh97@yahoo.com or 0246741094. Thank you very much.

QUESTIONNAIRE FOR OIL PALM PRODUCERS

A1. Questionnaire ID		
A2. Date of Survey (DD/MM/YYYY) :		
A3. Enumerator Name :		
A4. Respondent's name:		
A5. Name of Business:		
A6. District of survey (use code)	**District Code**: AKYEMANSA=1 BIRIM SOUTH=2	
A7. Location of Respondent's production point	**Town**	**District**

B. HOUSEHOLD CHARACTERISTICS

B1	Age of Respondent	
B2	Household size of respondent	
B3	What is the role of the respondent?	Owner=1 Employee=2
B4	Educational status	No formal education=1 Primary=2 JHS=3 SHS=4 Voc/Tech=5 Tertiary=6
B5	What production activity do you do?	Crop production=1 Animal production=2 I and II=3 Others=4(Specify……..

B6.	Who initiated the farming business?	
B7	Who owns the land used for the Oil Palm plantation?	Community=1 Rented=2 Family=3 Lease=5
B8	How did you get your land for oil palm farming activities?	Family=1 Rented=2 Leased=3 1&2 above=4 All the above=5
B9	If rented or lease, who pays for the charge?	Male=1 Female=2
B10	How does the community define ownership of farm?	
B11	What is the ownership pattern of your farming business?	Outright ownership=1 Share cropping=2 Tenant=3 Caretaker=4
B12	Number of years in the production activity?	1-5 years=1 6=10 years=2 11-15 years=3 16-20 years=4 21 years and above=5
B13	What are the main crop varieties grown?	Oil Palm=1 Cocoa=2 Citrus=3 Cassava=4 plantain=5 Cocoa=6
B14	Are there crop preferences for women?	Yes=1 No=2
B15	If yes, which crops are preferred by women and why?	Oil palm because they are harvested all year round=1 Cocoa, because the already have market=2 Rice, because they provide income as well as food=3 i and ii only=4 All the above=5
B16	What are some of the improved management practices you use in your farming?	Row planting=1 Pruning=2 Fertilizer application=3 Cover cropping=4
B17	Who manages the farm?	Farm owner=1 Hired private person=2 Family member=3
B18	What informs your decision on the type of oil palm to grow on the farm?	
B19	Who buys the inputs (seedlings, cutlasses, chisel, fertilizers, etc.) used for the farming activities?	Males=1 Females=2 Both male and female=3
B20	Do you get extension services for your farming activities?	Yes=1 No=2
B21	If no why?	The extension officers are not available=1 The extension officers deal with only rich farmers=2 The extension officers deal with only male farmers=3 I don't like the services of extension officers=4
B22	If Yes, who organised the training?	Gov't Extension=1 NGO=2 Farmer's group=3 Other=4 (Specify……..……

B23	Who buys your palm fruits	Large estates=1 Open market=2 Local processors=3 Marketed by producer's association=4 Others(Specify)……
B24	What are the challenges encountered in the marketing of the fresh fruits ?	Difficulty in getting buyers=1 Difficulty in the payment for the fruits=2 Lack of standard pricing regime=3 Difficulty in aggregating fruits for sale=4
B25	What are the coping strategies for this challenge?	Process the fruit myself=1 Have storage facility for storing the fruits=2 Give them out on credit=3 Wait till buyers come around=4 Others (Specify……
B25	Do you belong to any farmer's group or association?	Yes=1 No=2
B27	If yes, what is the sex of the members?	Males=1 Females=2 Both males and females=3
B28	If No, Why?	I don't know of any farmer's group/association=1 There is no such farmer's group or association in my community=3 I am not interested in their activities=3 I am not qualified to belong to farmer's group/association because of my sex=4 Other=5 ……
B29	What is the main purpose of the group/association?	Provision of input materials=1 Marketing of palm products=2 Use the association as a guarantee to obtain loans=3 Use the association as force to obtain technology=4
B30	Do women farmers actively contribute to the decisions made by the association?	Yes=1 No=2
B31	Are you the person who keep records of the activities concerning the farm?	Yes=1 No=2
B32	What are the most common sources of labour?	Family=1 Hired labour=2 =2 Boys=3 Girls=4 Males and Females=5
B33	What are the main constraints faced by women in accessing labour for farm operations?	Male farm hands are difficult to obtain due to cultural issues=1 Female is difficult to obtain due to cultural issues =2 Labourers are difficult to obtain due to high service charge=3 Labour is difficult to obtain due to constant migration=4
B34	Have there been organisations providing training on oil palm cultivation in this community	Yes=1 No=2

B35	Have you attended any of their trainings?	Yes=1 No=2
B36	If no, what is your reason for not attending	I don't like to work with many people=1 I am disqualified because of my sex=2 Their training is meaningless to my farming activities.
B37	What are the most common sources of species information	Oil palm research institute=1 MoFA=2 NGO=3 Farmers association=4 Others (Specify……

What crops do you cultivate and which ones do you sell?(show in order of importance)

B38. Crops cultivated		B39.Crops sold	
Crops	Acreage	Crops	Acreage

	B40.Type of oil palm grown 1.Yes 2.No	B41.Source of seed(see code below the table)					B42. Do you use manure? 1.Yes 2. No (if yes, source)				B43. Do you use fertilizer? 1.Yes 2. No (if yes, source)				B44.Number of bags harvested per acre for the past 4 years			
			2012	13	14	15	use	source			use	source			2012	13	14	15
a.local/indigenous variety																		
b.Dura																		
c.Tenera																		
d.Pesifera																		
Others(Specify)																		

Codes for source of seeds/ seedlings; Purchased(OPRI)=1 Own farm=2

Traders (open market) =3 Relative=4 Others=5(Specify)……		
B45	How far are the sources of seed or seedlings from the community?	
B46	Why do you produce this/these varieties	Reasons
A	Local/indigenous variety	
B	Dura	
C	Tenera	
D	Pesifera	
E	Others(Specify)	
B47	Which variety do processors/customers prefer most?	Local=1 Dura=2 Tenera=3 Pesifera=4 Others=5(Specify)……

C. COST OF PRODUCTION LAST YEAR

FIXED COST INPUTS	**1.Quantity (IndicateUnits)**	**2.Cost(GhC)**	**3.Useful life(Yrs)**	**4. Salvage value**	**5.Shared use**
a.Land					
b.Earth chisel					
c.Cutlass					
d.Line					
e.Watering can					
f.Plastic bag					
g.Hoe					
h.Others					

D. OPERATING COST

OPERATING COST INPUTS(labour in man-days)	6.Family (Number)			7.Hired (Number)			8.Family (Unit Cost)	9.Hired (Unit Cost)
a.Land clearing/slashing	Tot.	M	F	Tot.	M	F		
b. Burning&Stumping								
c.Line & Pegging								
d.manuring/composting application								
e.Weeding(1st weeding)								
f.Weeding(2nd weeding								
g.Weeding(3rd weeding)								
h.Pruning								
i.fertilizer application								
j.Harvesting(no.of days used)								
k.Carrying								
l.Carting								
m.Others(Specify)…….....								

E. CREDIT

E1. Have you acquired any form of Credit in the past 2 years?
E2. Indicate the source and interest rates

Credit source (use code A)	Amount borrowed	Interest rate	Collateral (use code B)	Use of credit (use code C)

Code A	**Code B**	**Code C**
MFI=1 MoFA=2 Banks=3 FBOs=4 Families/friends=5 Other=6(Specify)…….	None=0 land title deed=1 Self-help group/CBO=2 guarantor livestock=3; Savings and shares=4 Other=5 ……	Purchase fertilizer=1 Pay labour=2 Capital costs=3 Consumption=4 Others (specify)=5……..

F. LABOUR COST

Labours	**Number of workers**	**Wage or Salary/worker**
Permanent males		
Permanent females		
Temporary males		
Temporary females		
Others		

G. SALES

Kindly provide information related to your sales for 2015.

Palm fruits	G1.Selling Price per unit (GH₵)	G2.Average price of bunch	G3.No. of bunches harvested/2Wk	G4.Main Customers (use code A)
Whole Bunch				
Ton				
Others(Specify)				
Codes A (Multiple Responses Allowed) Large processing factory=1 Medium size factories=2 Individuals /Artisanal processors=3 Others=4(Specify)……..				

H. CONTRACTS

E1. Do you have contractual agreement with your input suppliers? Yes=1 No=2

E2. If Yes, what is the form of contract? Verbal=1 2=Written=2 Other=3 …….

E3. Do you have contractual agreement with your customers? Yes=1 No=2

E4. If Yes, what is the form of contract? Verbal=1 Written=2 Other=3 …….

I. VALUE ADDED ACTIVITIES

Activity	1=Yes 0=No	Cost (GH₵)
Sorting		
Processing		
Palm kernel		
Storage		
Others		

CONSTRAINTS

Rank these with 1 for the most constraining factor, 2 the second most constraining factor through to 10 the least constraining factor.

CONSTRAINT	Rank	Coping Strategies
Lack of ready market		
Poor transportation network		
High cost of labour		
High transport fee		
Weak contract		
No support from government		
Inadequate storage facility		
Non availability of inputs at the farm gate(Oil palm fertilizer)		
Inadequate labour		
Weak quality control systems		

APPENDIX II

QUESTIONNAIRE FOR PALM OIL PROCESSORS

A. ENUMERATOR ONLY

A1. Questionnaire ID		
A2. Date of Survey (DD/MM/YYYY) :		
A3. Enumerator Name :		
A4. Respondent's name:		
A5. Name of Business:		
A6. District of survey (use code)	**District Code**: Akyemansa=1	Birim South=2
A7. Location of Respondent's sales point	**Town**	**District**

B. HOUSEHOLD CHARACTERISTICS

B1	Age of Respondent	
B2	Household size of respondent	
B3	What is the role of the respondent?	Owner=1 Employee=2
B5	Highest level of education	None=1 Primary=2 JHS=3 SHS=4 Voc/Tech=5 Tertiary=6
B6	Who initiated this processing business?	Self=1 NGO=2 Community=3 Gov't=4
B7	Who owns this processing enterprise?	Self=1 NGO=2 Gov't=3 Community=4
B8	Who provided the initial capital for this processing business?	Self=1 Relative=2 Bank/ Financial inst.=3 NGO=4
B9	Who keep records of the operation of this enterprise?	Owner=1 Hired personnel=2 Relative=3 Others=4 (Specify……..
B10	What palm oil processing activity do you do?	Collector=1 Owner of processing business=2 Mill operator=3 Labourer=4 Other(Specify) ……..…
B11	Number of years in the processing business ?	
B12	Have you received any form of training in your palm oil processing business?	Yes=1 No=2
B13	If Yes, who were the organizers?	Gov't Extension=1 NGO/Church=2 Farmer's group=3 Other=4 (Specify……..……..
B14	If yes in (B9),what type of trainings have you received ?	
B15	What are the most common sources of labour for women processors?	Men=1 Women=2
	What are the sources of your raw materials?	Own farm=1 Private smallholder farms=2 Private out grower farms=3
B17	How far are these sources of raw materials from your processing centre?	
B18	Who owns the processing machine?	Self =1 Private operator=2 Cooperative/Association=3 NGO=4 Others=4 (Specify……
B19	How do you access the services of the milling facility ?	Excellent=1 Very Good=2 Good=3 Fair=4 Bad=5
B20	What activities are mainly done by women in the processing operation ?	
B21	What are some of improved management practices you use for your operation?	

B22	Who determines the type of technology to use for your operation?	Self=1 Machine operator=2 Customer(s)=3 Producers association=4
B23	Who finance the payment of this improved technologies?	Self=1 Customers =2 Gov't agencies=3 NGO=4
B24	Who mainly benefits from these technologies?	Self=1 Machine operator=2 Both 1&2 =3 Other(s)=4 Specify…….
B25	What are the most common sources of information on quality of production for women processors?	Customer(s)=1 Mass media=2 Gov't agencies=3 Processors association=4 NGO=5
B26	What are the main constraints to accessing training and information by women processors?	
B27	What have been the coping strategies?	
B28	Are these efficient in handling the constraints ?	
B30	Do you belong to any processors association?	Yes=1 No=2
B31	Who mainly manages income from the sale of the produce?	Self=1 Producers association=2 Banks/Other financial=3 institution NGO=4
B32	Why do women mainly manage the income?	
B33	What proportion of the income is managed by women?	
B34	What other interventions need to be done to deal efficiently with the constraints?	
B35	If No, Why?	I do not know of any association=1 There is no such association in my community=2 I am not interested in their activities=3 I am not qualified to join the association=4 Other=5 ……
B36	If Yes, what is the main purpose of the association?	Provision of input materials=1 Provide training for its members=2 Marketing of palm oil & products=3 Other=4 ……
B37	Do women actively contribute to the decisions taken by the association?	Yes=1 No=2
B38	If No, why?	

C. PROCESSING COST

C1. Indicate the type of product you process, the supply and the cost.

Type of product	MAIN SUPPLIER	QUANTITY/ 2 PER WEEK	PURCHASE PRICE/UNIT (Ton)	TRANSPORTATION COST
PALM FRUITS(BUNCHES)				
LOOSED FRUITS				
Others(Specify…..				

D. OPERATING COST

Indicate cost either per week or per month

INPUTS	Cost per week	Cost per month
Rent		
Water charges		
Electricity charges		
Working Equipment		
Tax/toll		
Permit (License to commence business)		
Storage facility		
Advertisement		
Market fees		
Packaging/materials		
Labour		
Cost of fuelwood		
Others (specify)		

E. CREDIT

E1. Have you acquired any form of Credit in the past 2 years?

E2. Indicate the source and interest rates

Credit source (use code A)	Amount borrowed	Interest rate	Collateral (use code B)	Use of credit (use code C)

Code A	**Code B**	**Code C**
Banks=1 MFI=2 MoFA=3 FBOs=4 Families/friends=5 Other=6 ……..	None=1 land title deed=2 Self-help group/CBO guarantor=3 Savings and shares=4 Other=5 ……	Processing machine/equipment=1 labour=2 Capital costs=3 Storage facility=4 Others (specify) ……..

F. LABOUR COST

Labours	**Number of workers**	**Wage or Salary/worker**
Permanent males		
Permanent females		
Temporary males		
Temporary females		

G. SALES

Kindly provide information related to your sales for the year ending 2015

PALM OIL	**Selling Price per unit (GH₵)**	**Average price CPO/Ton**	**No. of Tons processed/Wk**	**Main Customers (use code A)**
CPO for consumption				
CPO for industrial purposes				
Palm kernel				
Others(Specify)……				

Codes A (Multiple Responses Allowed)
Wholesalers=1 Retailers=2
Households/Individuals=3
Restaurant=4 Food joint=5 Others=6(Specify)……..

H. CONTRACTS

H1. Do you have contractual agreement with your suppliers? Yes=1 No=2

H2. If Yes, what is the form of contract? Verbal=1 Written=2 Other=3 ……

H3. Who negotiate on the terms of the contract with your clients? Men=1 Women=2

I.ADDITIONAL VALUE ADDED ACTIVITIES

Activity	**Yes=1 No=2**	**Cost (GH₵)**
Sorting/Grading		
Packaging		
Labelling		
Storage		
Soap manufacturing/Processing		
Others		

H. CONSTRAINTS

Rank these with 1 for the most constraining factor, 2 the second most constraining factor through to 11 the least constraining factor.

CONSTRAINT	**Rank**	**Coping Strategies**
Lack of ready market		
Poor transportation network		
High cost of labour		
High transport fares		
Weak contract		
Inadequate support from government		
Inadequate storage facility		
Irregular supply of oil palm inputs		
Adulteration along the chain		

APPENDIX III

QUESTIONNAIRE FOR PALM OIL DISTRIBUTORS (ASSEMBLERS, WHOLESALERS, AND TRADERS)

A. ENUMERATOR ONLY

A1. Questionnaire ID		
A2. Date of Survey (DD/MM/YYYY) :		
A3. Enumerator Name :		
A4. Type of Respondent	Wholesaler=1 Retailer=2 Assembler/Collector=3	
A5. Respondent's name:		
A6. Name of Business:		
A7. District of survey (use code) :	**District Code**: Akyemansa=1 Birim South=2	
A8. Location of Respondent's sales point	**Town**	**District**

B. HOUSEHOLD CHARACTERISTICS

B1	Age of Respondent in years	18-30 years=1 31-40 years=2 41-50 years 51-60 years 61+years=5
B2	Household size of respondent	1 =0 2-6=2 7 - 11=3 12- 16=4 17 and above=5
B4	Sex	Male=1 Female=2
B5	Highest level of education	None=1 Primary=2 JHS=3 SHS=4 Voc/Tech=5 Tertiary=6
B6	What is your primary occupation?	Wage employer=1 Salaried worker =2 Trader=3 Craftsman=4 Labourer=5 Other=6(…….

B7	Number of years in palm oil trading	1-5 years=1 6-10 years=2 11-15 years=3 16-20 years=4 21 years and above=5
B8	Who initiated this trading business ?	Men=1 Women=2
B9	Did you start this trading business with your own capital ?	Own capital=1 Family member=2 Bank loan=3 Non-Bank fin inst=4 NGO support=5 Others(specify……
B10	Who manages this business ?	Men=1 Women=2
B11	Who decide on the quantity of palm oil to be bought ?	Men=1 Women=2
B12	Who handles revenue from this trading business ?	Men=1 Women=2
B13	What proportion of income is managed by men and women from the sale of the stock	
B14	What are the most common markets accessed by women marketers	Export market=1 Local markets=2 Soap manufacturers=3 1&2 above=4 Restaurants and food joint operators=5
B15	Do you have a truck for carting your goods from your customers and to the market?	Yes=1 No=2
B16	If yes in (B14) who keep custody of the truck ?	Men=1 Women=2
B17	If no which vehicle do you use in carting your goods ?	Private commercial vehicle=1 Gov't/public vehicle=2 Association vehicle=3
B18	Who pays for the transport charge?	Men=1 women=2
B19	Have you received any form of training in palm oil business?	Yes=1 No=2

B20	If Yes, who were the organizers?	Gov't Extension=1 NGO=2 Traders association=3 Other=4(……..….
B21	Do you belong to any traders association?	Yes=1 No=2
B22	If No, Why?	I do not know of any trader's association=1 There is no trader's association in my community=2 I am not interested in their activities=3 I am not qualified to belong to an association=4 Other=5 (Specify…….
B23	If Yes, what is the main purpose of the association?	Provision of marketing information to members =1 Provision of business training to traders=2 Provision of capital/credit to members =3 Marketing of palm oil products=4 Other=5(……..……
B24	Does the executive committee of the association include women?	Yes=1 No=1

C. PALM OIL MARKETING COST

C1. Indicate the type of product you trade in, the supply and the cost.

TYPE OF PRODUCT	**MAIN SUPPLIER**	QUANTITY/WK	PURCHASING PRICE/UNIT	TRANSPORTATION COST
Edible CPO				
Industrial CPO				
Others(Specify)				

D. OTHER MARKETING COSTS

Q. No	**INPUT**	**QUANTITY/WEEK**	**PURCHASING PRICE PER UNIT (GH₵)**	**TOTAL PRICE (GH₵)**
D2	Packaging materials			
D3	Loading/Offloading			
D4	Storage			
D5	Inspection cost			
D6	Tax/Tolls			
D7	Certification by FDA/MoH			
D8	Other Expenses			

E. CREDIT

E1. Have you acquired any form of Credit in the past 2 years for your operations?

E2. Indicate the source and interest rates.

Credit source (use code A)	Amount borrowed	Interest rate	Collateral (use code B)	Use of credit (use code C)

Code A	**Code B**	**Code C**
MFI=1 MoFA=2 Banks=3 FBOs=4 Families/friends=5 Other=6(……..	None=0 land title deed=1 Self-help group/CBO guarantor=2 Savings and shares=3 Other 4(……	Acquire Store=1 Truck=2 Labour=3 Capital costs=4 Others=5 (specify) ……..

F. LABOUR COST

Labours	**Number of workers**	**Wage or Salary/worker**
Permanent males		
Permanent females		
Casual males		
Casual females		
Others		

G. SALES OF PALM OIL

Kindly provide information related to your sales for 2015.

Palm Oil	**Quantity/Wk**	**Selling Price per unit (GH₵)**	**Main Customers (use code A)**
Edible CPO (Ton)			
Industrial CPO			

Codes A (Multiple Responses Allowed)

Wholesalers=1 Retailers=2 Households/Individuals=3 Restaurants=4 Food joints=5 Others=6.....

H. CONTRACTS

H1. Do you have contractual agreement with your supplier(s)? Yes=1 No=0

H2. If Yes, what is the form of contract? Verbal=1 Written=2 Other=3 Specify……

H3. Who negotiate for the terms of the contract? Men=1 Women=2

H4. Indicate the nature of the contract with supplier.

Nature of contract	1.Yes 0.No
Provision of input material	
Provision of technical assistance	
Provision of finance/credit	
Buy product	
Provide transport	
Price agreement	
Other arrangements	

H5. Do you have contractual agreement with your customers? Yes=1 No=0

H6. If Yes, what is the form of contract? 1= Verbal 2=Written 3=Other ……

H6. Indicate the nature of the contract customer.

Nature of contract	Yes=1 No=0
Provision of input material	
Provision of technical assistance	
Provision of finance/credit	
Buy product	
Provide transport	
Price agreement	
Other arrangements	

I. VALUE ADDED ACTIVITIES

Do you perform any of these value adding activities?

Activity	Yes/No	Cost (GH₵)
Sorting/Grading		
Packaging		
Soap manufacturing		
Refining		
Others		

J. DISTRIBUTION OF PALM OIL OPERATIONS

Indicate the number of the labourers with respect to males and females involved in the following activities

Palm Oil Activities	Number Of Males	Number Of Females
Harvesting of the bunches		
Assembling of the bunches at the farm.		
Carrying of the bunches		
Shelling/removal of spikelets		
Carrying of fuelwood		
Boiling of the fruits		
Pounding/Milling		
Squeezing of the oil		
Collection of the crude		
Bottling		
Packaging and weighing		
Storage of bottled CPO		
Transportation of the Palm Oil		
Pricing of the CPO		
Marketing of the Palm Oil product		
Loading /Offloading		
Others(Specify…….		

K. CONSTRAINTS

Rank these constraints 1 for the most constraining factor, 2 the second most constraining factor through to 11 the least constraining factor.

CONSTRAINT	Rank(1-11)	Coping Strategies
a. Lack of readily available market		
b.Effect of adulteration on marketing		
c. High cost of fuel wood		
d. Poor transportation network		
e. High cost of milling		
f. High cost of transport		
g. High cost of labour		
h. Inadequate storage facility		
i. Weak contractual arrangement		
j. No government support		
k. Low oil content of fruit		
l.Inadequate flow of marketing information		

L. CUSTOMER INFORMATION

Name Of Customer	Type Of Trade	Contact
Codes for Type of Trade (Multiple Responses Allowed) 1= Wholesalers=1 Retailers=2 Households/Individuals=3 Restaurants=4 Food joint=5 Others=6		

Appendix IV

Table 4.4 Estimation of Value Addition, Revenue, Cost, Return on Investment and Margins for an acre of oil palm, fresh fruit bunch (FFB) and litre of Palm Oil for Female Actors.

Actors	TC	TR	NET REVENUE	UNIT COST	ADDED COST	CP	SP	VA	MARGIN	ROI
Producer Fresh Fruit Bunch	2518.83	2798.52	279.69	1.7	2.99	0.51	4.0	3.49	0.5	0.3
Processor (1000FFB)	6350	7612.4	1362.4	6.06	2.06	3.7	7.0	3.3	1.21	0.2
Trader (240 litres)	1327.8	1645	342	9.24	2.24	7.0	13.9	6.9	4.65	0.5

Source: Field Survey, 2017

Table 4.5 Showing the Value Addition, Returns on Investment, Margins, as well as Costs for Male Actors of the Value chain.

Value Addition, Returns on Investment and Margin Estimation in GH ₵ for Male Actors										
Actors	TC	TR	NET REVENUE	UNIT COST	ADDED COST	CP	SP	VA	MARGIN	ROI
Producer Fresh Fruit Bunch	2498.64	2800	283.17	1.83	3.0	0.57	4.0	3.44	0.44	0.24
Processor (1000 FFB)	6384	7506	1122	5.89	1.9	3.99	7.0	3.01	1.11	0.2
Trader (240 litres)	1330	1630.3	300.3	9.31	2.24	7.07	13.9	6.83	4.6	0.49

Source: Field Study, 2017