

**ANALYSIS OF SUPPLY CHAIN OF SUNFLOWER IN SINGIDA
MUNICIPALITY, TANZANIA**

By

Tubeti Mwita

**A Dissertation Submitted in Partial Fulfilment of the Requirements for the
Degree of Masters of Science in Procurement and Supply Chain Management
(Msc-PSCM) of Mzumbe University.**

2013

CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by the Mzumbe University, a thesis entitled: Analysis of supply chain of sunflower in Singida municipality, Tanzania, in partial fulfilment of the requirements for the degree of Masters of Science in Procurement and Supply Chain Management of Mzumbe University.

Major Supervisor

Internal Examiner

External Examiner

Accepted for the board of School of Business

Chairperson Faculty/directorate board

**DECLARATION
AND
COPYRIGHT**

I, **Tubeti Mwita** declare that this thesis is a result of my own work and that has not been presented and will not be presented any other university or institution for a similar or any other degree award.

Signature_____

Tubeti Mwita

Date_____

©

This dissertation is copyright material protected under the Berne convention, the Copyright Act of 1999 and other international and national enactments, in that behalf, on intellectual property. It may not be reproduced by any means, in full or in part, except for short extracts in fair dealings, for research or private study, critical scholarly review or discourse with an acknowledgement, without the written permission of Mzumbe University, on behalf of the author.

All Rights Reserved

© Copyright by Tubeti Mwita, 2013.

ACKNOWLEDGEMENT

First and foremost, I thank Almighty GOD for his guidance to this point and through his grace I managed to finish this work. Thank you Lord. I greatly appreciate the assistance and openness of the countless farmers (women, men, and youth, elderly) who participated in the field study. I equally acknowledge the sincerity of ward and district extension staff members and their contribution.

Also, I extend my sincere thanks to my supervisor Leonada Mwangi who took all the trouble to make sure that, this thesis is written to the required standards for the award of the degree of Master of Science in Procurement and Supply Chain Management of Mzumbe University. I pray that the good Lord grants her all the rest she needs so that she can be evermore willing to serve her in this academic arena.

I would as well like to thank Dr. Elisante Ole Gabriel, Dr. Srinivas Madishetti and Dr. Mapesa H.J, who took all the trouble to make sure that research as subject is understood among his students and me, being one of them. May the almighty God reward them in a bigger way.

I wish to thank the management of Singida Municipal Council including Agricultural officers for accepted my application letter that allowed me gather all the necessary data that lead to proper findings of the problem under the study.

I lastly appreciate and consider any kind of cooperation I received from anyone who played a vital part in the accomplishment of this research paper. God bless you all.

DEDICATION

To my wife Mwashiri Daniel and my sons Heri and Leina, My brothers and sisters, to my late parents Tubeti Waise and Mgaya Nyamasiriri for giving me education and be caring.

ABSTRACT

This study was conducted to examine supply chain of sunflower in Singida Municipality in Tanzania. Data were collected from primary and secondary sources. Thirty (30) farmers, 15 traders (5 assemblers, 5 wholesalers and 5 retailers) were interviewed using a structured questionnaire. Data were analysed using descriptive statistics. The study revealed that sunflower was marketed through five different channels. These are (1) Farmers-to-assemblers (2) Farmers-to-wholesalers (3) Farmers-to-retailers (4) Farmers-to-processors (5) Farmers-to-consumers. Assemblers were found to have relatively more market power than other chain actors. This was revealed by the high profit margin as compared to other chain actors. Majority of chain actors (38%) had the problem of accessing credit due to lack of collateral and high interest rate. In order to realise the full potential of agricultural trade as a tool in the fight against poverty, the suggested policy interventions are to prioritise and increase funding for physical infrastructure both from national; promote large-scale capacity building in business skills and market orientation; improve equitable access to credit and improve dissemination of market information.

DEFINITION OF KEY TERMS & ABBREVIATIONS

CSCMP:	Council of Supply Chain Management Professionals
FAO:	Food and Agricultural Organisation
GAP:	Good Agricultural Practices
GDP:	Gross Domestic Product
PADEP:	Participatory Agricultural Development and Empowerment Project
UK:	United Kingdom
USA:	United States of America

TABLE OF CONTENT

CERTIFICATION.....	i
DECLARATION AND COPYRIGHT	ii
ACKNOWLEDGEMENT	iii
DEDICATION	iv
ABSTRACT.....	v
DEFINITION OF KEY TERMS & ABBREVIATIONS	vi
TABLE OF CONTENT	vii
LIST OF TABLES	xi
LIST OF FIGURES.....	xii
LIST OF APPENDICES	xiii
CHAPTER ONE	1
1.0. Background of the study	1
1.1. Statement of the Problem.....	2
1.2. Research Objectives	3
1.2.1. General Research objective.....	3
1.3. Specific Research Objectives.....	3
1.4. Study Questions.....	3
1.5. Specific Research Questions	3
1.6. Significance of the study.....	4
1.7. Scope and Limitations	4
1.8. Organization of the study.....	5
CHAPTER TWO	6
2.0 Literature Review	6
2.1 Theoretical Literature Review	6
2.1.1 Supply chain.....	6
2.1.2 Value chain	10
2.1.3 Supply Chain Analysis (SCA)	11
2.1.4 Mapping the supply chain	11
2.2 Supply chain of agricultural produce	12
2.3. Challenges facing agricultural supply chain	14

2.3.1 Production challenges	14
2.3.2 Processing challenges	14
2.3.3 Market related challenges	14
2.3.4 Logistical and infrastructural challenges	15
2.3.5 Management and operational challenges	15
2.3.6 Policy and institutional challenges	16
2.3.7 Environmental challenges	16
2.4 Empirical Literature Review	16
2.4.1 Previous Studies on Supply Chain of Agricultural Produce	17
CHAPTER THREE	21
3.0. Research Methodology	21
3.1. Study Area.....	21
3.2. Research Design.....	21
3.3. Target Population	22
3.4. Sampling	22
3.4.1. Selection of sample areas	22
3.4.2. Selection of respondents	22
3.5. Data Collection Methods	23
3.5.1. Primary Data	23
3.5.2. Secondary Data.....	23
3.6. Data Analysis	23
CHAPTER FOUR	25
4.0. Data Presentation, Analysis and Discussion	25
4.1. Structure of the sunflower supply chain as well as actor's functions and their relationships	25
4.1.1. Sunflower Production	26
4.1.2 Sunflower marketing channels	29
4.1.3 Sunflower trading	29
4.1.3.1 Assemblers	30
4.1.3.2 Wholesaler.....	31
4.1.3.3 Retailers	31

4.1.3.4 Sunflower Processing	32
4.2 Relation of the actors in sunflower supply chain	32
4.2.1 Farmers /traders organizations	32
4.2.2 Sources of market information.....	32
4.2.3 Trade discounts on bulk purchasing	33
4.2.4 Mode of payment.....	33
4.3 Performance along the sunflower supply chain in terms of gross margins	34
4.3.1 Gross margin at farm level.....	34
4.3.2 Gross margin at assembling node.....	35
4.3.3 Gross margin at wholesale node.....	35
4.3.4 Gross margin at retailing node	36
4.4 Prices and marketing margin along the sunflower supply chain.....	37
4.5. Challenges facing sunflower chain actors in the study area	37
4.5.1 Lack of capital.....	38
4.5.2 Limited access to markets	38
4.5.3 Limited access to market information	38
4.5.4 Pests and diseases	39
4.5.5 Lack of storage facilities	39
4.5.6 Limited access to extension services	39
CHAPTER FIVE.....	40
5.0 Overview.....	40
5.1. Summary of the Results.....	40
5.1.1. Structure of the sunflower supply chain	40
5.2. Performance of along the sunflower supply chain	41
5.3. Challenges facing sunflower supply chain actors	41
5.4. Policy Recommendations	42
5.4.1 Facilitate farmer's access to formal markets.....	42
5.4.2 Develop Contractual Arrangement between Farmers and Exporters	42
5.4.3 Formation of Collective Action by Farmers	43
5.4.4 Timing of the Selling Period.....	44
5.4.5 Value Addition	45

5.4.6 Marketing Information.....	45
5.4.7 Supporting Powerful Participants in a Supply Chain	45
5.4.8 Facilitate the Formation of SACCOs.....	46
5.5 Performance of sunflower along the supply chain actors.....	46
5.5.1 Empowering women on marketing of sunflower products.....	47
5.6 Challenges facing sunflower supply chain actors	47
5.7 Areas for Further Research	47
REFERENCES.....	49
BIBLIOGRAPHY	52
APPENDICES	54

LIST OF TABLES

Table 1: Sources of information among chain actors.....	33
Table 2: Mode of payment used among chain actors.....	34
Table 3: Gross margin for sunflower farmers for February-March 2013 cropping season.....	34
Table 4: Gross margin for assemblers of sunflower for February-March 2013 cropping season	35
Table 5: Gross margin for wholesalers of sunflower for February-March 2013 cropping season	36
Table 6: Gross margin for retailers of sunflower for February-March 2013 cropping season.....	36
Table 7: Marketing margin along the chain.....	37
Table 8: Challenges faced by chain actors	38

LIST OF FIGURES

Figure 1: Input-output model for sunflower supply chain.....	7
Figure 3: Sunflower supply chain structure in Singida, Municipality.	25

LIST OF APPENDICES

Appendix I: Research Questionnaires	54
Appendix II: Person Information	61

CHAPTER ONE

1.0. Background of the study

Over the last two decades, the level of produced food has decreased dramatically in Sub-Saharan Africa (SSA) resulting in general deterioration in the standard of living of the population. The challenge facing SSA agriculture is therefore to feed a population that is increasing at an annual rate of about 3%, and which will double in about 20 years (FAO, 1999). The problem of food shortage in developing countries could be overcome through use of modern agricultural technologies like improved seeds, fertilizers, fungicides, pesticides, agricultural machinery and proper spacing (Liberio, 2009).

Some of the benefits that can occur to farmers from use of improved agricultural technologies include reduced risks from pest and disease pressure thus leading to high harvest index (FAO, 1999). However, productivity of crops is directly linked to the amount of rainfall received (PADEP, 2010).

In Tanzania the agricultural sector is a key to economic development (Majule, 2008). Agriculture is the foundation of the Tanzanian economy. It accounts for about half of the national income, three quarters of merchandise exports and is source of food in addition to provision of employment opportunities to about 80% of Tanzanians. Agriculture has linkages with the non-farm sector through forward linkages to agro-processing, consumption and export; provides raw materials to industries and a market for manufactured goods. Sunflower oil is one of the commercial products used by majority of Tanzanians traded along Mwanza-Dar-es-salaam road and Singida-Arusha road, its demand has been increasing day to day according to its characteristics of free cholesterol oil while its consistent production is being deteriorating due to some challenges. In order to improve the marketing arrangements for agricultural products, one needs to understand the channels that are currently used for trade. In fact, the majority of small-scale agricultural producers are consuming their production to large extent within the household. The remaining surplus production can be sold either to the

local markets or to national markets depending on the products and producer's access to the market. The main constraints for markets are the poor infrastructure which makes the transportation of the products from different regions and remote producers difficult, and the lack of capital to expand the business or to engage in storing the products when the price is low so as to sell when the price is high (field study, 2012).

The supply chain from the producer to the final consumer is long and can take many forms along the way and consumed time and money. Despite the fact that most of the traders interviewed for this study had been in business for years, the level of knowledge in basic business skills was very low and the businesses were rarely growing. Especially in rural areas the traders are unable to distinguish between revenue and profit, and thus sometimes end up eating their own working capital while thinking that they are running a profitable business.

The study provides responsibilities of each partner in the supply chain starting from farmers, assemblers, wholesalers and retailers.

1.1. Statement of the Problem

Tanzania is endowed with favourable climatic condition for growing different types of crops (Rogath, 2010). Sunflower is among the crops grown. Sunflower crops play an important role in economic development. Such role includes contribution towards food security, income generation and employment. Sunflower oil is one of the commercial products used by majority of Tanzanian. Its demand has been increasing day to day according to its characteristics of free cholesterol oil while its consistent production is being deteriorating due to some challenges.

These include insufficient physical infrastructure in terms of roads which increases the cost of transportation, works as an informal market barrier, and forms a wedge between the supplier price and consumer price. Lack of know-how shows in poor market orientation and business skills, and leads to difficulties in managing and obtaining loans. Furthermore, the current institutional framework is unable to support the

formation of strong traders and producers' associations and other representative bodies to enhance capacity building and to bargain for fairer terms of trade. In addition, the lack of market information and the weak legal framework lead to difficulties in negotiating trade agreements and enforcing the existing contracts. Thus, the present study was conducted to analyse the supply chain of sunflower in Singida Municipal. Supply chain analysis calls for greater communication between the various actors along the chain, to deflect pressures within sunflower crop by highlighting the need to remain competitive with sunflower production and marketing and argue for more sustainable systems of production and support for local and international markets.

1.2. Research Objectives

1.2.1. General Research objective

The general objective of this study was to analyse supply chain of sunflower in Singida Municipality, Tanzania. To meet this general objective the study was governed by three specific objectives.

1.3. Specific Research Objectives

- i. To identify the structure of the sunflower supply chain as well as actor's functions.
- ii. To determine the performance along the sunflower supply chain in terms of gross margins.
- iii. To examine the business challenges facing sunflower actors in the study area.

1.4. Study Questions

1.5. Specific Research Questions

- i. What is the structure of the sunflower supply chain in Singida Municipality?
- ii. What is the performance of sunflower supply chain in Singida Municipality?
- iii. What are the challenges facing actors in Singida Municipality?

1.6. Significance of the study

Analyzing the supply chain of sunflower indicated the gaps to improve sunflower production and marketing and benefit policy makers and implementers in the area to fill the gaps. In addition to this helped to make appropriate marketing decisions by the producers, consumers, traders, investors, and others. The study also suggested strategies for smooth integration among production and marketing by referring to root causes for supply and marketing problems starting from production till the consumption of the product. The other benefit that could be anticipated is that its significance as a source material for further studies, which could be a major input to formulate appropriate marketing policies. The research study has provided the researcher with potential knowledge on the area of his study.

1.7. Scope and Limitations

This study was conducted in Singida Municipal Council which is located at Central corridor of Tanzania. The study was based specifically on such areas as Procurement and Supply chain sections, sunflower supply chain during farming, production and distribution period. The study analysed supply chain of sunflower in the municipality including factors affecting the performance of sunflower supply chain, structure of sunflower supply chain (production structure, marketing structure and distribution structure). The coverage will include system of farming process, production process, distribution process and prospective laws applied.

During the research period the researcher was limited by the followings:

On the job training took a lot of time for researcher to do other work which had no relation with the researcher topic sometime for research may be limited to acquire the required data through interviews and questionnaires. Some of the farmers that the researcher managed to have spot interview they became reluctant to give what was real practiced in their area in fear that the information collected could be presented to the village management and investigation could be made to the concerned farmers.

Since the research encompasses many expenses, the researcher was constrained by inadequate of funds and since the research required the researcher to go over the field in the remote area sometimes the researcher experienced the problem of transport due to inaccessibility of road.

1.8. Organization of the study

This dissertation is organized into five chapters. Chapter one is the introductory chapter consisting of background information; introduces the topic, statement of the problem; historical perspective of sunflower supply chain in Tanzania, relevance, research objectives and questions, scope and limitations of the study. Chapter two presents the literatures reviewed, theoretical framework, challenges facing agricultural produces. In this chapter transaction cost theory, has been reviewed in detail and its relevance to the current study made clear. Chapter three is dedicated to the research methodology applied and financial budget for the study. The chapter starts with presentation of study area, research design, target population, sample size and sampling techniques, data collection methods, variable measurements and financial budget. Chapter four is devoted to data presentation, analysis and discussion of the findings. Lastly, Chapter five considers summary of the results and recommendations and areas for further research.

CHAPTER TWO

2.0 Literature Review

This chapter contains literature review with respect to the research problem. It contains three major parts which are theoretical literature review, and empirical literature review. The aim of this chapter is to review different issues and theories in the area with an objective of adding knowledge and getting to know what other theories and researchers have contributed towards the subject matter relating to the variables developed in this study.

2.1 Theoretical Literature Review

2.1.1 Supply chain

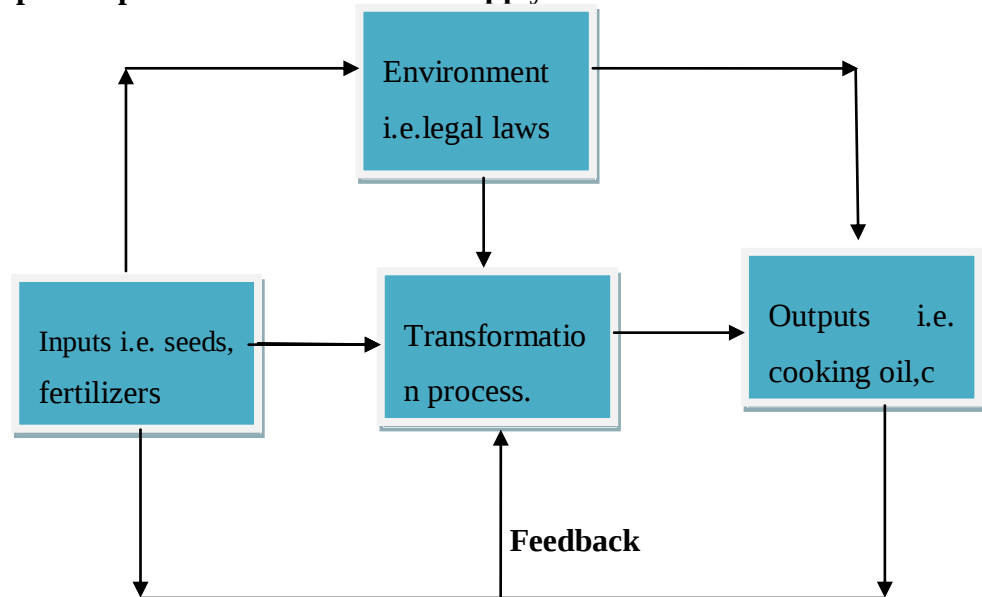
Council of Supply Chain Management Professionals (CSCMP) defines supply chain management as follows: “Supply Chain Management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies. Supply Chain Management is an integrating function with primary responsibility for linking major business functions and business processes within and across companies into a cohesive and high-performing business model. It includes all of the logistics management activities noted above, as well as manufacturing operations, and it drives coordination of processes and activities with and across marketing, sales, product design, and finance and information technology.”

Supply chain refers to all the operations that were linked together so as to provide goods and services through to the end customers.

A typical supply chain begins with ecological and biological and political regulation of natural resources, followed by the human extraction of raw material, and includes several production links (e.g., component construction, assembly, and merging)

before moving on to several layers of storage facilities of ever-decreasing size and ever more remote geographical locations, and finally reaching the consumer. Consider the following diagram below which depicts the input to output model for sunflower production, processing and distribution of the sunflower outputs as cooking oil and other by-products.

Figure 1: Input-output model for sunflower supply chain



Source: Researcher's Construct, (2012).

Christopher (2010) argued that Supply chain is the management of upstream and downstream relationships with suppliers and customers in order to deliver superior customer value at less cost to the supply chain as a whole. The focus of supply chain management is on co-operation and trust and the recognition that, properly managed, the 'whole can be greater than the sum of its parts'

Chandrasekaran (2010) argued that supply chain is the integration of key business processes from the end user through original suppliers that provides products, services and information that add value for customers and other stakeholders. This definition mentions key business processes without limiting itself to processes such as buying, movement or storage, and their integration. The main objective of supply chain is to manage the flow of materials, information and funds across the entire chain, from suppliers to component producers to final assemblers to distribution (warehouse and retailers), and ultimately to the consumer.

A supply chain consists of all parties involved, directly or indirectly, in fulfilling a Customer request. The supply chain not only includes the manufacturer and suppliers, but also transporters, warehouses, retailers, and customers themselves. Within each organization, such as manufacturer, the supply chain includes all functions involved in receiving and filling a customer request. These functions include, but are not limited to, new product development, marketing, operations, distribution, finance, and customer service. A supply chain is dynamic and involves the constant flow of information, product, and funds between different stages. For example, Wal-Mart provides the product, as well as pricing and availability of information, to the customer. The customer transfers funds to Wal-Mart. Wal-Mart conveys point-of-sales data as well as replenishment order via trucks back to the store. Wal-Mart transfers funds to the distributor after the replenishment. The distributor also provides pricing information and sends delivery schedules to Wal-Mart. Similar information, material, and fund flows take place across the entire supply chain.

According to Harrison *et al* (2008), a supply chain is a network of partners who collectively convert a basic commodity (upstream) into a finished product (downstream) that is valued by end-customers, and who manage returns at each stage. The author says that each partner in a supply chain is responsible directly for a process that adds value to a product through transforming inputs in the form of materials and information into outputs in the form of goods and services. The way

on how to manage materials, information and funds across the entire network from original suppliers to the customers has been given out. Therefore in order to increase value in the entire supply chain the chain members need to develop and implement good practices and concepts throughout the supply chain i.e. both upstream and downstream. But this in itself is not an easy task it requires commitment and co-operation, and involves first the recognition of the need to satisfy the ultimate customer. All the functions and efforts should be geared towards the attainment of customer satisfaction, hence may entail cross-functional teams, empowerment, supplier partnerships through sharing of information, flexible management structures. This requires moving away from the traditional price based approaches and reviewing of the concepts of costs and value of each item of raw material purchased from suppliers, with an emphasis on the total cost of acquisition. Ideas which might be regarded in reducing costs and hence increasing value are such as value analysis, reverse engineering, value engineering, and value adding relationships and negotiations, supplier integration, early supplier involvement in new product designs.

According to Lysons *et al* (2006), said that a supply chain is that network of organisations that are involved, through upstream and downstream linkages, in the different processes and activities that produce values in the form of products and services in the hands of the ultimate customer or consumer.

Chopra *et al* (2007), on his book supply chain management strategy, planning and operation defined supply chain as all parties involved directly or indirectly in fulfilling a customer request. The supply chain includes not only the manufacturer and suppliers, but also transporters, warehouses, retailers and even customers themselves. Within each organisation such as a manufacturer, the supply chain includes all functions involved in receiving and filling a customer request. These functions include, but are not limited to, new product development, marketing, operations, distribution, finance and customers service.

Weele *et al* (2005), in his book of purchasing and supply chain management defines supply chain as the way in which materials processes are managed within the company. However, the term relates also to the way in which the external materials processes are managed. Here we can differentiate between the outgoing materials flow and the incoming materials flow. The former relates to the way in which finished products are distributed by the company to its customers (physical distribution). The incoming materials flow covers all activities needed to optimize the goods flows up from suppliers to the point of consumption within the company itself.

According to Baily *et al* (2008), supply chain is concerned with the co-ordinated flow of materials and services from origins through suppliers into and through the organisation and on to the ultimate consumer in such a way as to maximise value added and minimise cost. Associated flows of information and funds are also included. The supply chain includes all those involved in organising and converting materials through the input stages (raw materials), conversion phase (work-in progress), and outputs (finished products). The cycle is often repeated several times in the journey from the initial producer to the ultimate customer as one organisation's finished good is another's input. The structural entity of the supply chain is concerned with activities such as make, transform, move and store.

2.1.2 Value chain

The value chain is a concept which can be simply described as the entire range of activities required to bring a product from the initial input-supply stage, through various phases of production, to its final market destination. The production stages entail a combination of physical transformation and the participation of various producers and services, and the chain includes the product's disposal after use. As opposed to the traditional exclusive focus on production, the concept stresses the importance of value addition at each stage, thereby treating production as just one of several value-adding components of the chain.

Kaplinsky and Morris (2001), argued that value chain is the full range of activities that are required to create and add value to a finished product or service. This refers to the different phases of production from raw material, processing, distribution, and marketing until the product or service reaches the consumer and is disposed of after use. According to Roduner (2007), said that value chain concept in dairy sector is very important as increasingly dairy products are hardly consumed in the place where they are produced but are transformed, combined with other products, and transported from one actor (owner) to the other with value addition to the product, packaged and displayed until it gets to the final consumer. The final consumer in turn, must be able and, willing to pay for the value addition and services involved in the transformation of the product.

2.1.3 Supply Chain Analysis (SCA)

Supply chain analysis is an analytical tool that helps to understand the way in which firms (large and small) are integrated and linked in the value chain. SCA examines all the actors involved in the chain, the linkages between them, and the activities within each link. It also takes into account market demand, buyer requirements, quality standards, and local, regional, national and global influences on the chain (Kaplinsky and Morris 2001). In doing so, the supply chain approach goes beyond firm or activity specific analysis as it looks at all the actors and institutions that play a part of a product or service's life cycle, rather than single enterprises (Gereffi, Humphrey and Sturgeon 2005).

2.1.4 Mapping the supply chain

Mapping a chain means creating a visual representation of the connections between businesses in value chains as well as other market players (ILO, 2009). In its simplest form it is merely a flow diagram (i.e. illustrating the core transactions of value chains). More sophisticated versions show that some enterprises differ in size and that some connections are more important than others; and they help to identify bottlenecks and leverage points (ILO, 2009). The mapping activity helps identify links in the chain where exchanges are made. These linkages are where

inefficiencies and hence transactions costs are incurred. The map also shows graphically where an organisation's time and efforts would be spent. It also enables identify the appropriate linkage between input supplier, the producer and its customers. Likewise supply chain identify linkages in the chain .Linkages in the chain show the activities and roles played by the different players of the supply chain. Recklies (2001), noted that for organisation to realise a profit margin, depends on their ability to manage the linkages between all the activities in the supply chain. The impetus for supply chain optimization is sustainable competitive advantages for all players in the supply chain gained through lower costs and or greater differentiation. Upstream links are largely dependent for their survival on the competitive position of firms or links satisfying the ultimate end user. Likewise, the competitive position of downstream firms is largely dependent upon their supplier's costs and actions. These links are crucial for corporate success (Recklies, 2001). These linkages are flows of information, goods and services as well as systems and processes for adjusting activities.

The importance of linkages in transaction cost analysis originates from the fact that it is between these interfaces where transactions costs are incurred. It is rare in most industries that a single entity performs all the activities from product design, production of produce and final assembly to delivery to the final user by itself. Organisations are elements of supply chain. Consequently there are a lot of exchanges that happen between production and delivery to final end user and as such transaction cost minimisation becomes crucial if the objective of profit maximization and competitiveness are to be accomplished.

2.2 Supply chain of agricultural produce

Agricultural supply chain encompasses all the input supply, production, post-harvest, storage, processing, marketing and distribution and consumption functions along the “farm-to-fork” continuum for a given product (be it consumed fresh, processed and/or from a food service provider), including the external enabling environment. These functions typically span other supply chains, geographic and

political boundaries and often involve a wide range of public and private sector institutions and organizations (Eskola, 2005). Agricultural supply chains are networks that typically support three major flows: physical product flows, which are the physical product movements from input suppliers to producers to buyers to final customers; financial flows, which are the credit terms and lending, payment schedules and repayments, savings, and insurance arrangements and information flows, which coordinate the physical product and financial flows.

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

Agricultural supply chain should be designed to illuminate the problems that can endanger achievement of these (and other) performance objectives by farms, firms and the supply chain as a whole. Supply chain participants can be located domestically or outside national borders. Even within national borders, supply chain participants and activities can be spatially dispersed. Some participants and services are specialized, while others are involved in several different supply chains. Support service providers can be from both the public and private sectors. Logistical support services include transport and communication and information technology. Technical support includes a range of research and business development services, but also technical assistance and financial services. In the global economy, support service providers and the services themselves can easily cross national borders. An agricultural supply chain may be subjected to or experience multiple risks, with farmers and firms facing risks from different sources.

2.3. Challenges facing agricultural supply chain

An agricultural supply chain is subjected to multiple challenges from different sources as described in the subsequent sections:

2.3.1 Production challenges

Due to low and underdeveloped irrigation potential, the main feature of agriculture in Tanzania is its overdependence on natural rainfall. According to the National Irrigation Mast Plan (URT, 2002), the potential area for irrigated agriculture in Tanzania is estimated to be 29.4 million hectares but only 0.26 million hectares are irrigated. Rural areas with long dry seasons, in particular Singida will remain food insecure as long as they continue to depend on rain fed agriculture. Even in the traditional rainfall receiving areas, its high variability from season to season has significantly affected agricultural production. Irrigation development in Tanzania is constrained by low investment and inadequate technical capacity of most producers to develop and manage irrigation schemes in a sustainable manner. Agronomic practice, capital, inadequate knowledge by manufacturers is among the causes.

2.3.2 Processing challenges

The agricultural sector requires financial services but there is limited availability of formal credit supportive to agricultural. With the collapse of the cooperative societies, it is becoming increasingly difficult for farmers to access reliable forms of formal credit to facilitate purchase of critical inputs. For example, capacity and supply mismatch.

2.3.3 Market related challenges

Changes in supply and/or demand that impact domestic and/or international prices of inputs and/or outputs, changes in market demands for quantity and/or quality attributes, changes in food safety requirements, changes in market demands for timing of product delivery, changes in enterprise/supply chain reputation and dependability and inadequate market information. Approximately 90% of the respondents interviewed faced the problems of marketing their produces.

2.3.4 Logistical and infrastructural challenges

Lack of infrastructure and thus high transaction costs is a well-known problem in the developing world and Delgado (1995), argues that especially in Africa market reforms alone are not sufficient as high transaction costs leave the countries only semi-open. Pedersen (2003), agrees that despite years of development and liberalization efforts transportation markets are still underdeveloped and present a major constraint for trade in Sub-Saharan Africa. A common argument in favour of infrastructure development is that trade liberalization policies would yield much greater responses if aided by investments in infrastructure which would, first of all, decrease the transportation costs and, secondly, integrate the currently isolated households (Key et al. 2000, Heltberg and Tarp 2002). It is important to bear in mind, that transaction costs are not merely affecting local trade but also supply and demand of imports and exports (see e.g. Milner et al 2001, Badiane 1998). In many cases the transportation costs actually represent a greater implicit tax to the exporters than explicit distortions (trade policy) at the macro level.

Rural infrastructure development in Singida Region is still inadequate and its coverage is generally limited. Poor and often impossible rural roads presents a major disincentive to farmers as it tends to increase transport cost and often result in deterioration of produce quality. The inadequacy of communication facilities constrains farmers' access to technology and market information. The high level of post harvest losses and wastage is a consequence of the weak rural infrastructure and processing facilities; poor linkages with markets, processing and production chains. Therefore investment in rural infrastructure particularly rural roads, water supply, transportation, processing facilities, communications, electrification and markets are fundamental to stimulating agricultural growth.

2.3.5 Management and operational challenges

Poor management decisions in asset allocation and livelihood/enterprise selection, poor decision making in use of inputs, poor quality control, forecast and planning errors, breakdowns in farm or firm equipment, use of outdated seeds, not prepared to

change product, process, markets, inability to adapt to changes in cash and labour flows.

2.3.6 Policy and institutional challenges

Changing and/or uncertain monetary, fiscal and tax policies, changing and/or uncertain financial (credit, savings, insurance) policies, changing and/or uncertain regulatory and legal policies, and enforcement, changing and/or uncertain trade and market policies, changing and/or uncertain land policies and tenure system, governance related uncertainty (e.g. corruption), weak institutional capacity to implement regulatory mandates. Weather related challenges: Periodic deficit and/or excess rainfall or temperature, hail storms, strong winds.

2.3.7 Environmental challenges

Crop and livestock pests, insects and diseases, contamination related to poor sanitation, human contamination and illnesses, contamination affecting food safety, contamination and degradation of natural resources and environment, contamination and degradation of production and processing processes, major floods and droughts, hurricanes, cyclones, typhoons, earthquakes, volcanic activity.

2.4 Empirical Literature Review

As far as most of the supply function objectives and planning have been oriented towards major business interest like customer satisfaction, space utilization and cost minimization which have been described independently and only became a need for every supplies chain while leaving along other supporting functions like availability of efficient and sufficient handling equipment serves much in the whole activities of inventory manufacture that includes: receiving, storage and dispatching items to the respective customers. Inventory manufacture exercised very cheaply in terms of time. Cost and labours when handling equipment are fully utilized.

2.4.1 Previous Studies on Supply Chain of Agricultural Produce

There are empirical studies done in Tanzania, which explored the aspect of problems during sunflower supply chain as follows:-

Maligwa (2010), in his study mapping and analysing the fresh fruits supply chain found that employment of unqualified staff for purchasing function, absence of purchasing manual, absence of adequate markets for fresh fruits, poor strategies for fresh fruits and non allocation of foreign exchange were among the problems facing agricultural supply chain.

Liberio (2012), in his study factors contributing to adoption of sunflower farming innovations in Mlali ward, Mvomero district, Morogoro region revealed some challenges for sunflower supply chain as economic factors, institutional factors, socio-psychological factors, and farmers characteristics are among the problems towards achieving customer satisfaction.

Rogath (2010), in her study analysis of value chain for pigeonpea in Tanzania found that the main problem faced chain actors was capital constraint. This affect the whole business since it reduced the purchasing power and affect the economies of scale that could be obtained from buying large quantity. In addition capital constraints cause lack of access of important services that could facilitate and stimulate the business downwards in the value chain in order to fetch high price such as transport.

Eskola (2005), found that producers in Morogoro, Mtwara and Dar es Salaam have no permanent exchange point of either selling or purchasing their produce, they sell their products either to local traders at home and sometimes to the buyers from Dar-es-Salaam who always come and buy at home or in the field (farm gate). Most exchanges were based on personal relationships and not on economic forces (demand and supply) due to the fact that price information is limited to most small scale farmers in the area studied. In addition, the lack of market information and the weak legal framework lead to difficulties in negotiating trade agreements and

enforcing the existing contracts were among the factors highlighted by Eskola in her study.

Supply Chain of Agricultural Produce

Agricultural supply chain encompasses all the input supply, production, post-harvest, storage, processing, marketing and distribution, food service and consumption functions along the “farm-to-fork” continuum for a given product (be it consumed fresh, processed and/or from a food service provider), including the external enabling environment. These functions typically span other supply chains, geographic and political boundaries and often involve a wide range of public and private sector institutions and organizations.

Modern agricultural supply chains are networks that typically support three major flows:

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

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

Agricultural supply chain should be designed to illuminate the problems that can endanger achievement of these (and other) performance objectives by farms, firms and the supply chain as a whole. Supply chain participants can be located domestically or outside national borders. Even within national borders, supply chain participants and activities can be spatially dispersed. Some participants and services are specialized, while others are involved in several different supply chains. Support service providers can be from both the public and private sectors. Logistical support services include transport and communication and information technology. Technical support includes a range of research and business development services, but also technical assistance and financial services. In the global economy, support service providers and the services themselves can easily cross national borders. An agricultural supply chain may be subjected to or experience multiple risks, with farmers and firms facing risks from different sources.

In the sunflower supply chain, smallholder sunflower farmers and traders are constrained by inadequate physical infrastructure, lack of capital and market information. Constraints to sunflower production affect supply chain activities. Supply chain activities such as input purchase, sunflower production, harvesting, storage, transportation, distribution and consumption depends on adequate physical infrastructure, availability of capital and market information. Physical infrastructures include communication links, electricity, storage facilities, transportation facilities and roads. Good roads, transportation and communication links are prerequisites to market access, particularly to those potential market participants who reside in rural areas because of the relatively longer distances between them and the markets. Smallholder farmers are mostly found in areas remote from market places where there is a serious lack of the aforementioned facilities, resulting in high costs. Sometimes transportation costs are too high for farmers and traders to get any meaningful benefits from potential trading activities.

Lack of access to capital is the limiting factor among sunflower farmers for purchasing improved sunflower seeds, fertilizer and herbicides and pay for hired labour while traders lack access to capital for buying sunflower from and

transporting them to distant markets. Likewise farmers lack access to market information exposing them to a marketing disadvantage. Market information is vital for production and other management decisions on farms and has considerable market value. They usually depend on middlemen for market information who may be opportunistic and distort the information for their own benefit.

CHAPTER THREE

3.0. Research Methodology

3.1. Study Area

This study was conducted in Singida Municipal Council which is located at Central corridor of Tanzania. Singida regions have generally a savanna type of climate, which is characterized by a long dry season lasting between late April and early December, and a short single wet season occurring during the remaining months. The researcher analysed how climate had an impact on sunflower production across the entire chain. The average rainfall for the region is generally low, not exceeding 850mm, and about 85 percent of this falls in the months between December and April. Apart from the rainfall being relatively low, it is also rather unpredictable in frequency and amount. It is this unreliable rainfall, which has imposed a pattern of risk aversion in traditional agriculture and is a serious constraint on present efforts to improve crop yields. Seasons characterized with low and unpredictable rainfall favour the production of sunflower which is relatively more drought resistant than most of the competing crops (e.g., maize). Apart from sunflower production Singida region is also involved in livestock keeping, production of minerals (jewel) and soils favour the production of sorghum, pearl millet, cassava, sweet potatoes, groundnuts, sesame and grapes.

3.2. Research Design

The nature of the study was survey type of research where the researcher was obliged to go physically to the field, the researcher interviewed respondents (farmers and traders) in their respective locations and hence the use of multiple methods (triangulation) was applied which enabled the researcher to collect different types of data and provide cross-data validity checks. However the nature of the problem and the environment are the guidance on what design to be used. In this survey study means a plan for collecting and observing data about a particular social unit in its natural setting, the researcher went to the field in order to get more clarification about the study.

3.3. Target Population

The targeted population for this study was sunflower producers and marketers in Singida Municipal. The sample involved chain actors who were involved in sunflower production and marketing areas. These were farmers and traders (assemblers, wholesalers, and retailers and processors) within the municipality where sunflower was produced and being traded. All smallholder farming households in the municipality who produce sunflower constituted the study population.

3.4. Sampling

3.4.1. Selection of sample areas

Purposely selection was employed at the first stage where one region (Singida) that is the major producer of sunflower was selected. Secondly, Singida municipality where this research was conducted selected in which each unit in the population of sunflower farmers, assemblers, wholesalers and retailers had an equal chance of being included in the sample. This enabled the researcher to obtain the appropriate respondents. In order to know whether farmers in the municipality were in line with the Government strategy for KILIMO KWANZA and sunflower supply chain was adequately managed.

3.4.2. Selection of respondents

At production level farmers were identified by physical visits to the sunflower farms. The information of where farmers were located was obtained from village executive officers. Assemblers were identified by physical visits to the farmers at which transaction between farmers and assemblers took place. Wholesalers were identified by physical visits to the markets. Retailers were identified through physical visits to their marketing places. Simple random sampling procedure was used to select the respondents. The sample size comprised of 45 respondents which is 5% of the entire population availed to the researcher. Of these 30 were farmers out of the 600 farmers presented to the researcher by village executive officers and 15 traders out of 300 obtained from Municipal trade officer documents (5 assemblers, 5

wholesalers and 5 retailers). Questionnaires were used for data collection from farmers and traders with the involvement of the researcher on supervising the respondents.

3.5. Data Collection Methods

Both primary and secondary data were collected.

3.5.1. Primary Data

Primary data were collected from different sample chain actors along the chain using questionnaires. The questionnaires were pre-tested in a pilot survey that was carried out with 5 farmers, 3 assemblers, 2 wholesalers and 2 retailers. Interviews with farmers took place at respondent's farms; while those with traders were performed at market places where transactions were taking places.

3.5.2. Secondary Data

Under this method the researcher collected data through documentation. This included information from documentary records, published data and internet. This included reading of various documents and records of other research reports done by previous researchers.

3.6. Data Analysis

Data collected from the primary sources were verified, coded and summarized before analysis using the Statistical Package for Social Sciences (SPSS) computer program, version sixteen. One main analytical procedure used to analyze data was descriptive statistics such as percentage counts and frequency and means. The structure of the supply chain was analyzed using a supply chain analysis (SCA). SCA examines all the actors involved in the chain, the linkages between them, and the activities in each link (Gereffi, Humphrey, and Sturgeon 2005). In the present study the SCA examined two key actors-farmers and traders who were involved in production and marketing of sunflower, the linkages between them and the activities within each link. Distribution of sunflower was traced from farmers to the final

consumers. The flow chart was used to trace the supply chain used by farmers to market their produce. The structure of the supply chain helped to determine the relationships between the key actors in the market. The percentage of sunflower sold to different chain actors was analyzed using frequency counts and percentages. Profit margins were estimated to find the performance along the sunflower supply chain. Gross margins are essentially the difference between the gross revenue and the variable costs and are reported in Tanzania Shillings (TZs) per unit of sunflower sold.

The gross revenue was calculated using the prevailing price of sunflower along with the quantity of sunflower sold as reported by the respondents. Total average variable costs for the farmers were mainly costs of inputs spent on production of sunflower (seeds, fertilizer and fungicides) and labour. Total average variables costs for the traders were mainly costs incurred in loading, unloading, market charges and transport costs and were obtained by multiplying quantity of produce bought and sold by their corresponding variable costs.

Lastly, challenges facing chain actors were analysed using frequency counts and percentages.

.

CHAPTER FOUR

4.0. Data Presentation, Analysis and Discussion

Introduction

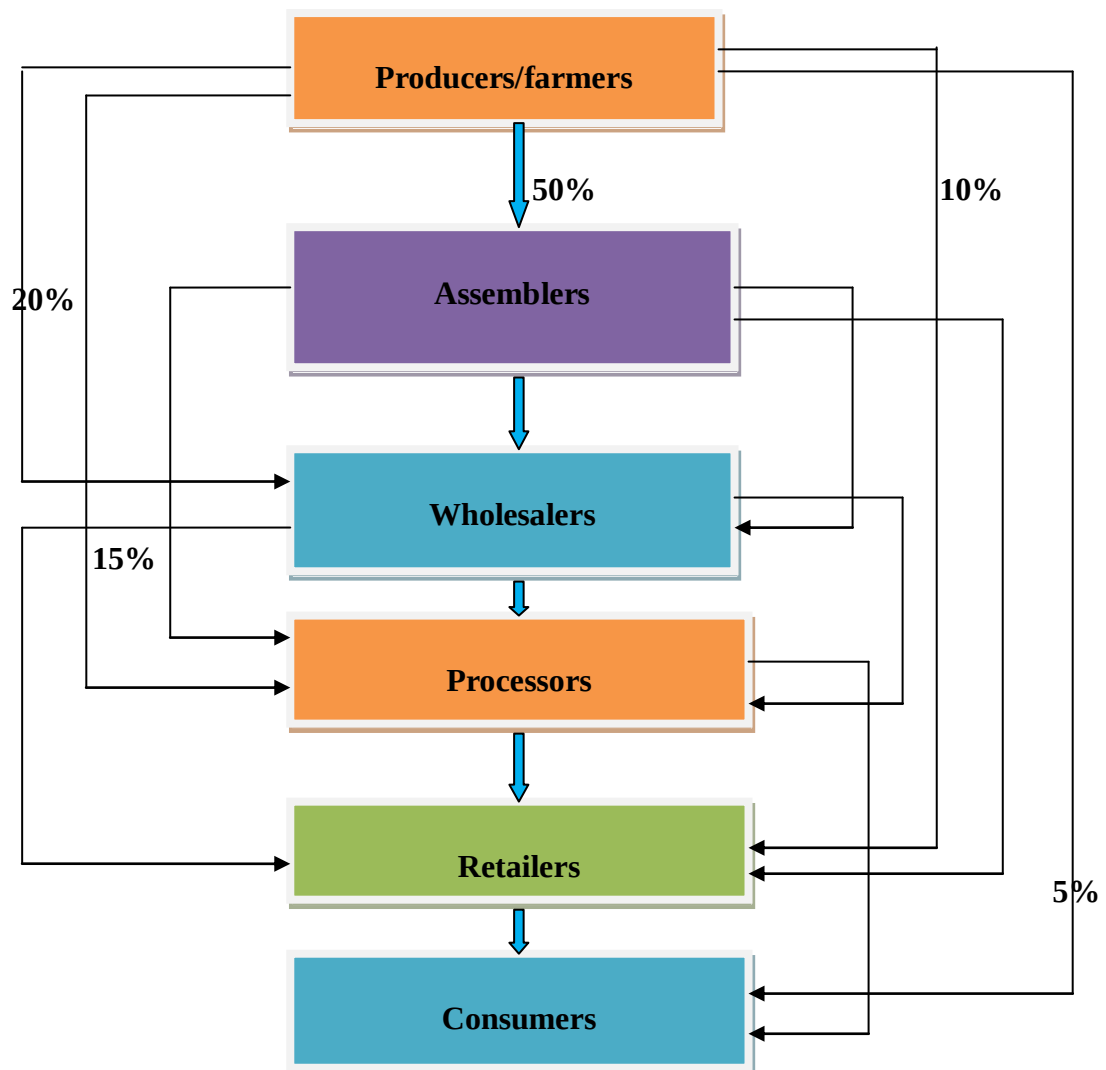
This chapter aims at data presentation, analysis and discussion by the researcher, as far as Analysis of Supply chain for sunflower in Singida Municipality is concerned. Section 4.1 describes the structure of the sunflower supply chain as well as actor's functions and their relationships. Section 4.2 describes the performance of the sunflower supply chain in terms of profit margins and Section 4.3 describes the challenges facing sunflower actors in the study area.

4.1. Structure of the sunflower supply chain as well as actor's functions

The first objective of this study was to identify the structure of the sunflower supply chain as well as actor's functions. The findings in relation to this objective are presented and discussed in the following sub-sections.

Figure 3 shows the sunflower supply chain map encompassing the key actors and the functions they perform. These functions include production, marketing, retailing, wholesaling and assembling. Details of these functions are provided in the subsequent section below.

Figure 3: Sunflower supply chain structure in Singida, Municipality.



Source; Field Survey 2013

4.1.1. Sunflower Production

Sunflower production was predominantly done by small farmers with one to three acres under sunflower. There are however also medium or large scale farmers with more than a thousand acres of sunflower. This study found that approximately 90% of the respondents were small scale farmers owned an average of 1 acre of land. The process of sunflower farming included land preparation (ploughing), planting, regular weeding, and harvesting. While medium and large scale farmers used tractors for ploughing, such service was only available for very few small scale farmers. The production of sunflower involves both women and men while its

marketing is dominated by men, only 4.5% are female. As smallholder farmers used only hand tools they could only work on a maximum of one acre. Small sunflower farmers do not have storage facilities and were interested to sell their crop soon after the harvest. Main inputs in sunflower production in Singida Municipality were seeds and fertilizer. Most of smallholder farmers (80%) used traditional or recycled seeds whose germination rate is rather low. The use of the traditional seeds was because of the recent outbreak of fungus disease and high prices of seeds.

Last season the price for one bag of 65kg of sunflower seeds was sold at from Tshs 35,000/= to Tshs 40,000/=. Production of quality sunflower seeds is critical to production of quality sunflower oil. Currently, the availability of quality sunflower seeds represents the weakest link in the sunflower value chain in the central corridor. This is aggravated by the lack of standards in the existing marketing system of sunflower seeds in the central corridor. The annual production of sunflower seeds in the central corridor fluctuates a lot. This is largely due to changes in weather conditions and in the crop's terms of trade at the farm level. The resulting unstable supply of sunflower seeds leads to perverse capacity underutilization in the sunflower oil milling industry. This affects the level of efficiency and effectiveness in the utilization of investment in the sunflower value chain. For example according to the report produced by Pace Associated Limited (2011), argued that the smallholder farmers, estimated at 160,000 households, account for the bulk of the sunflower seed production in the central corridor. The central corridor accounts for 60 percent of the national production of sunflower seed.

Sunflower seed is traded by some smallholders directly to seed traders or agents of wholesaler or exporters. The bulk of seed exports are destined to Kenya for processing. There were several local seed traders and agents who buy the seeds in the local market for export to Kenya directly or through relatively larger wholesale exporters. Almost all seeds bought and exported to Kenya are sourced from smallholder producers in the central corridor. However, an increasingly large number of smallholders no longer sell seeds as they prefer to add value by

processing it at service oil mills. By doing so, they obtain both raw oil and cake both of which are traded on the local oil and cake markets by the smallholder farmers through oil retailers or oil cake agents. The prices of sunflower seed vary by space (region) and time (within a season). Price variations between the beginning of the marketing season in April/May and the end in November are substantial. Prices almost double within this period. These variations essentially reflect the phenomenon of dwindling supply as the season progresses, largely because of inadequate storage and working capital at both the household and oil mill levels.

Almost all seeds bought and exported to Kenya were sourced from smallholder producers in the central corridor. However, an increasingly large number of smallholders no longer sold seeds as they preferred to add value by processing it at service oil mills. By doing so, they obtained both non-refined oil and cake both of which were traded on the local oil and cake markets by the smallholder farmers through oil retailers or oil cake agents. Medium-scale seed producers usually have their seeds processed at medium scale processors or sell them direct to wholesalers or exporters.

During the survey it was discovered both commercial and subsistence farming were practiced by small holder farmers. Approximately (17%) of the respondents reported that they were dealing with commercial farming only while (33%) of the respondents said that they were dealing with subsistence farming and (50%) of the respondents said that they were dealing with both commercial and subsistence farming. This result indicates that 50% of the respondents cultivated sunflower for household use and commercial to gain extra income. Use of fertilizer is common for sunflower farmers in Singida Municipal. About 87% of the respondents indicated that they used traditional fertilizers while 13% of the farmers reported that they used industrialized fertilizers (modern fertilizers). This indicates that many farmers could not afford to use modern fertilizer. This could be due to lack of government subsidies which could help them acquire fertilizer at low price.

Further analysis was done to determine the total costs incurred to operate the farm. On average a farmer paid Tshs 100,000/= for production and marketing of sunflower. The costs incurred by farmers included loading and unloading costs, transportation costs and market charges. On average farmers harvested 650 kg of sunflower per acre. Farmers used individual warehouse/store to keep small quantity of sunflower after harvest. Most farmers indicated that they stored sunflower before sales.

The modes of transport are important to move products from the farm to the point where the product gets into contact with traders. According to the survey, approximately 80% of the farmers used head ox-cart to move sunflower from their farms to marketing places. This is because farmers were scattered and produced small quantity of sunflower. Therefore it is expensive for a farmer to hire truck to transport small quantity of sunflower from the farm to the warehouse/store or direct to the market place.

4.1.2 Sunflower marketing channels

As illustrated in figure 3 there are five market channels through which farmers sell their produce. According to figure 3 the most important channel consisted of farmers who sold their produce to sunflower collectors. Approximately 50% of the farmers sold their produce to local assemblers or collectors. While 20% of farmers sold their produce to wholesalers, 15 % of farmers sold their produce to processors and 10% of farmers sold their produce to retailers and approximately 5% of farmers sold their sunflower produce to final consumers. The table 4 shows percentage of the amount sold and unit selling price per bag. On average farmers sold 600 Kg at Tshs. 500/= per Kg.

4.1.3 Sunflower trading

There are different actors that work in the trade segment. These include assemblers, wholesalers and retailers.

4.1.3.1 Assemblers

Assemblers are commonly the residents of the village. Some of them are also producers. Assemblers serve as intermediaries between many local producers and buyers. As trade even today is very much based on personal relationships, buyers are reluctant to do business with unknown partners. Thus assemblers are needed in several parts of the supply chain to transfer information of the prices and quantities supplied and demanded. Assemblers commonly buy produce at farm gate and assemble the produce at village markets. They usually buy and consolidate sunflower from individual farmers in rural areas and sells to wholesalers, retailers, processing factory and exporters. Assembler buys a large share of sunflower than the wholesalers because they cover a larger area. Assemblers have direct contact with the farmers, they negotiate price and act as an intermediaries between many farmers and other traders from other parts of the country. The study revealed that 80% of the assemblers purchased sunflower direct from farmers at farm gate while the remaining 20% purchased sunflower from farmers at village markets. The modes of transport used was mostly bicycles, motorcycles, ox-carts and tractors within the village and trucks when collected enough sunflower was taken by truck to the urban market.

In turn assemblers sold their produce to wholesalers, retailers and processing factory. The findings revealed that 60% of the assemblers sold their produce to wholesalers, 10% of the assemblers sold their produce to retailers and 30 % of the retailers sold their produce to processing factory. According to Tilanus in 1997, the assembler who buy and sell without adding value have to be by passed so as to reduce the total cost in a value chain and be competitive in the market by setting low price of the produce. On average assemblers bought approximately 8,100kg of sunflower and sold 8,000 kg of sunflower per season. The buying and selling prices were Tshs. 500/= and Tshs 540/= per kg respectively

4.1.3.2 Wholesaler

The wholesalers normally purchase sunflower from assemblers or directly from producers. Wholesalers buy and sell large quantities of farm produce. Usually they perform their business in wholesale markets. Wholesalers need to collect sunflower from various producers located at different places or from assemblers located at different markets. Afterwards they need to package the sunflower hold inventories and arrange transportation from sunflower source to selling places. The results revealed that 70% of the wholesalers bought sunflower from farmers while 30% of the wholesaler's bought sunflower from assemblers. In turn wholesalers sold their produce to retailers or exporters. The study revealed that 90% of the wholesalers sold their produce to exporters while 10% of the wholesalers sold their produce directly to retailers.

A wholesaler has direct contact with individual farmers and assemblers. Wholesalers have bigger capacity than assemblers since they work as an agent to exporters and get money in advance. Since assembler work in the large area they buy more than wholesalers. The wholesalers used mobile phone to get in touch with the sellers and the buyers too. The cost incurred by the wholesaler is high since they move from one village to another searching for sellers and there is no any market place that all traders are located. Here the issue of frequency of transaction and experience in the business can reduce this cost since relationship among traders can reduce the cost. On average wholesalers bought approximately 6000kg of sunflower and sold 6000kg per season. The buying and selling price was Tshs 547/= and Tshs 600/= respectively.

4.1.3.3 Retailers

Retailers normally buy from producers, assemblers or wholesalers. This study revealed that 75% of the retailers bought their produce from farmers, 15% of the retailers bought their produce from assemblers and 10% of the retailers bought their produce from wholesalers. On average retailers bought approximately 5000kg of

sunflower and sold all 5000kg of sunflower per season. The buying and selling price were Tshs 600/= and Tshs 630/= per kg respectively.

4.1.3.4 Sunflower Processing

As indicated in figure 2, approximately 10% of the farmers sold their produce to the processing company and also 30% of assemblers sold their sunflower produces to the processing factories. At this stage sunflower seeds were added value from seeds to sunflower oil and remains from seeds were used to feed animals. Most of the seed crushing is done by small oil mills that are able to crush 350kg to 400kg of sunflower seeds per day. Medium scale mills can crush about 500kg to 650kg per day. The installed capacity of mills is higher but unknown. The process of crushing includes wheening and removing of foreign particles, crushing, filtering, and oil storing. In many small crushing units the oil is then filled into plastic containers and sold to the market. The sales price of the sunflower oil varies but it is about Tshs 2,700/= per litre if the oil is packed in a five litre container as it was observed from the field.

4.2 Relation of the actors in sunflower supply chain

This section indicates the relationship between chain actors in sunflower supply chain in Singida Municipality.

4.2.1 Farmers /traders organizations

Respondents were asked whether they were members of any social groups. Approximately all respondents (100%) were not members of any association. This indicates that there was no organization at any node along the chain. This put farmers in the weak position to negotiate with traders.

4.2.2 Sources of market information

Respondents were asked to indicate the sources of market information. Approximately 40% of the respondents got marketing information from other traders, 27% of respondents got market information from trade fellow farmers, 20%

of the respondents got market information from radio broadcasting while the remaining 13% of respondents got market information from trade

Table 1: Sources of information among chain actors

Sources of market information	Type of actors		
	Farmers	Traders	Total
	%	%	%
Farmers	33.0	13.0	27
Traders	33.0	53.0	40
Trade fair	17.0	7.0	13
Radio broadcasting and magazine	17.0	27.0	20
Total	100	100	100

The results in Table 1 above show that there was a bi-directional flow of information between producers and traders with traders being at the centre of information transmission. Traders usually play an important role in market information transmission since they act as intermediaries between many producers and other traders. Sharing market information among farmers enabled them to take informed marketing decisions that are related to searching for potential buyers, negotiating, enforcing contracts and monitoring. However, market information shared may not always be accurate.

4.2.3 Trade discounts on bulk purchasing

When asked about the discounts given to those who buy in bulk, approximately 50% of the traders were given trade discounts for bulk purchase. Discounts became common feature of trading in large quantities. Therefore there were economies of scale in bulk purchases.

4.2.4 Mode of payment

Analysis of the terms of payment to different chain actors revealed that both cash and credit systems were used (Table 2). Most farmers sold their produce on cash to

traders. Likewise results in Table 2 shows that traders bought and sold their produce on cash. However 6 respondents indicated that the terms of payment in purchase and sale was on credit.

Table 2: Mode of payment used among chain actors

Type of chain Actor	Mode of payment		
	Cash	Credit	Total
Farmers	25	5	30
Assemblers	4	1	5
Wholesalers	5	-	5
Retailers	5	-	5
Total	39	6	45

4.3 Performance along the sunflower supply chain in terms of gross margins

The second objective was to determine the performance along the sunflower supply chain in terms of gross margins.

4.3.1 Gross margin at farm level

The average gross margin per acre during February-March 2013 farming season on farmers was estimated to be Tshs 200,000/=.

Table 3: Gross margin for sunflower farmers for February-March 2013 cropping season

S/N	Parameters	Parameter value
1	Quantity sold (kg)	600kg
2	Selling price in Tshs per kg	500
3	Total variable costs	100,000
4	Gross revenue (1*2)	300,000
5	Profit margin (4-3)	200,000

4.3.2 Gross margin at assembling node

Assemblers received a total gross margin of Tshs 700,000/= per season. The findings indicated that assemblers received higher profit compared to farmers. This could be because the costs incurred at assembling node are low compared to costs incurred at farm level.

Table 4: Gross margin for assemblers of sunflower for February-March 2013 cropping season

S/N	Parameter	Parameter value
1	Quantity of sunflower bought in kg	8100
2	Buying price in Tshs per kg	500
3	Purchase cost (1*2)	4,050,000
4	Transport costs	40,000
5	Loading and unloading	10,000
6	Total costs incurred (3+ 4+5)	4,100,000
8	Quantity sold in kg	8000
9	Selling price in Tshs per kg	600
10	Gross revenue (8*9)	4,800,000
11	Profit margin (10-6)	700,000

4.3.3 Gross margin at wholesale node

At wholesale node the total gross margin was found to be Tshs 318,000/=.The gross margin at wholesale node was found to be lower compared to that at assembling node. This implies that the costs incurred at wholesale node are higher compared to that at the assembling node.

Table 5: Gross margin for wholesalers of sunflower for February-March 2013 cropping season

S/N	Parameter	Parameter's value
1	Quantity of sunflower bought in kg	6000
2	Purchase price in Tshs per kg	547
3	Purchase cost (1*2)	3,282,000
4	Transport costs	40,000
5	Labour charges	40,000
6	Storage charges	100,000
7	Total cost incurred(3+4+5+6)	3,462,000
8	Quantity sold in kg	6000
9	Selling price in Tshs per kg	630
10	Gross revenue (8*9)	3,780,000
11	Profit margin (10-7)	318,000

4.3.4 Gross margin at retailing node

The total gross margin at the retail node was found to be Tshs 210,000/=. The gross margin at retail node was found to be lower compared to that at wholesale node. This obeyed the rules of economies of scale since at the wholesale node; the amount of sunflower handled was larger than the retail node.

Table 6: Gross margin for retailers of sunflower for February-March 2013 cropping season

S/N	Parameter	Parameter's value
1	Quantity of sunflower bought in kg	5000
2	Buying price in Tshs per kg	600
3	Purchase cost (1*2)	3,000,000
4	Transport costs	40,000
5	Storage charges	100,000
6	Total costs incurred (3+ 4+5)	3,140,000
8	Quantity sold in kg	5000

9	Selling price in Tshs per kg	670
10	Gross revenue (8*9)	3,350,000
11	Profit margin (10-6)	210,000

The results presented in Tables 2-6 shows that assemblers were found to have more market power than other chain actors. This reason could be because of the larger volume of sunflower handled. In addition assemblers had information on demand and so they had a big role to play in price determination.

The average gross profit the actors received in each channel depends on the buying price, selling price and the cost involved. Marketing of sunflower is influenced by variables costs such as costs of identifying, negotiating and concluding an exchange.

4.4 Prices and marketing margin along the sunflower supply chain

Average prices at different nodes are presented in Table 7. The Table shows that prices were lowest at the farm level and highest at the retail level. This comprises with cost based pricing method in which prices are determined by the costs incurred in Production. At farm level it was expected that only production costs were incurred whereas at the assembling stage costs of assembling and transporting from farm to assembling place plus a small profit increased price. At the wholesale stage, cost of transporting, storage increased price.

Table 7: Marketing margin along the chain

Marketing node	Price(Tshs/kg)	Marketing margin
Farm level	500	-
Assembling level	600	100
Wholesale level	630	130
Retail level	670	170

4.5. Challenges facing sunflower chain actors in the study area

The third objective of this study was to examine challenges faced by chain actors along the chain. The research revealed various challenges faced by chain actors as shown in table 8 below.

Table 8: Challenges faced by chain actors

Challenge	Type of chain actors		
	Farmers	Traders	Total
	%	%	%
Limited access to market information	27	20	24
Lack of capital	33	47	38
Pests and disease	20	-	20
Limited access to markets	7	13	9
Lack of storage facilities	7	20	11
Limited access to extension services	7	- -	7
Total	100	100	100

4.5.1 Lack of capital

Lack of capital was mentioned to be the main problem among chain actors. The study found that 38% of the respondents indicated that lack of capital for their business was the most challenging problem. Farmers and traders have limited access to credit due to high interest rates and lack of collateral. This situation limits their ability to increase productivity.

4.5.2 Limited access to markets

Marketing problems was mentioned to be another constraint among respondents. It was indicated by 9% of the respondents. Unreliability of markets for sunflower produce is linked with the poor conditions of feeder roads. This has caused difficulties in transporting the produce from the farms to the markets. This situation leads to the reliance on traders that link farmers to markets. Lack of appropriate public infrastructure such as roads, railways, airports and seaports has resulted into high costs of transportation. As a result, most small-scale farmers and traders are trapped within subsistence agriculture, with minimal orientation towards the market.

4.5.3 Limited access to market information

Access to market information among chain actors was found to be limited. The study revealed 24% of the actors had limited access to market information. The proportion of Small scale farmers have difficulties in accessing market information, exposing them to a marketing disadvantage due to weak public information systems. Farmers relied on traders for market information. This findings support that of Mangisoni, (2006) who found that traders are central actors when it comes to market information dissemination.

4.5.4 Pests and diseases

Pests and diseases were mentioned as the major problem during rain-season among farmers. It was during this period that extensive spraying of pesticides and fungicides was required. However, some farmers complained that sometimes they were unable to use pesticides because of high prices. The demand for pesticides is increasing for the production of sunflower because of climate change. This finding support the finding of Kitule (1999) who found that pesticides and appropriate chemicals are often unavailable or expensive to farmers when they need

4.5.5 Lack of storage facilities

Approximately 11% of the respondents indicated that they lacked storage facilities for sunflower after harvest. Majority of the respondents stated that expensiveness of facilities and small quantities traded were major reasons for not possessing storage facilities. Most of the chain actors at different nodes used open space as storage facility. So farmers and traders cannot put their sunflower for longer duration to get right prices.

4.5.6 Limited access to extension services

Agricultural crops require high use of fertilizer, herbicides, and pesticides. Such high use of the inputs necessitates that smallholder farmers are knowledgeable on their use. Knowledge imparted by extension services is thus crucial. The study revealed that (7%) of the farmers reported that they had the problem of extension services. Studies have indicated that a lack of extension services particularly can

hamper intensification as well as production levels of crops (Gockowski and Ndoum bé, 2001).

CHAPTER FIVE

5.0 Overview

The general objective of this study was to analyse supply chain of sunflower in Singida Municipality, Tanzania. More specifically the study intended to address the following specific objectives, (a) To identify the structure of the sunflower supply chain as well as actor's functions (b) To determine the performance along the sunflower supply chain in terms of gross margins, (c) To examine the business challenges facing sunflower actors in the study area.

Multi-stage random sampling procedure was employed in selecting a total of 30 farmers and 15 traders (assemblers, wholesalers and retailers) from Singida Municipality, Tanzania. Descriptive and quantitative techniques were used to analyze the data. This chapter presents the conclusions and recommendations emerging from the major findings of the study.

5.1. Summary of the Results

5.1.1. Structure of the sunflower supply chain

The first objective of this study was to identify the structure of the sunflower supply chain as well as actor's functions. The findings revealed that there are five marketing channels through which farmers sold their produce. These were farmers-to-assemblers, farmers-to-wholesalers, farmers-to-processors, farmers-to-retailers and farmers-to-consumers. The study found that the common market system used involves many links with no value addition within the channels which increase the total cost by double handling. The findings revealed that 99% of the total productions were sold by farmers to chain actors in 2011/2012 cropping season while the remaining 1% was left for domestic consumption. Also there is lack of capital which constraints participants in a chain which is caused by lack of

knowledge and collateral to get loans. Another issue is of gender participation in this business, for sunflower trading men are involved while farming sunflower involves women. Women are not involved more in sunflower business because the business needs larger amount of capital that they cannot afford.

5.2. Performance of along the sunflower supply chain

The second objective of this study was to determine the performance of sunflower along the supply chain in terms of profit margins. Descriptive statistics were used in analysis of the data. Findings showed that wholesalers, retailers and farmers were found to have relatively less market power than other chain actors. This was revealed by the low profit margin as compared to other chain actors. Furthermore, the study found that assemblers alone got a margin profit of approximately 50% of the total sunflower sold in 2011/2012 cropping season. This is due to bulk purchase of sunflower made by assemblers direct from farmers bypassing intermediaries. Since the direct market seems to be the best option in terms of cost reduction in a chain, farmers should organize themselves and have direct transaction with the exporters.

5.3. Challenges facing sunflower supply chain actors

The third objective of this study was to examine challenges facing sunflower supply chain actors. Results show that actors face different challenges due to the nature of the business and the role of the actors in the supply chain. The study found that approximately 66% of the respondents had the problem of start-up capital for sunflower business. Also the study revealed that smallholder farmer got the problem of accessing credit due to lack of collateral. Furthermore, approximately 34% of the respondents had the problem of limited access to markets due to lack of market information sharing. In all the five channels, there is lack of market information by farmers in upstream and control of big buyers in downstream making farmers to have low bargaining power due to all the amount of sunflower from the upstream of the supply chain bought by the urban exporters.

5.4. Policy Recommendations

5.4.1 Facilitate farmer's access to formal markets

In order to sell at higher price in the international market, farmers through their collective action with the help of government agencies such as Tanzania Tree Seed Agency (TTSA-Morogoro) can plan and select the short term sunflower seeds. The government can facilitate access to domestic market information for sellers especially in the rural market through special events such as seminars and workshops and the use of extension officers. Also the media such as radio which is more used in rural area should be encouraged to provide market price information of specific crops to farmers. The key policy issue is not whether to participate in global markets or not, but how to do so in a way that provides for sustainable income growth. Therefore the government and donor agencies need to facilitate implementation of the policies in the sector to help reduce poverty to smallholder farmers who are mostly affected by the changes in global marketing of agricultural products.

5.4.2 Develop Contractual Arrangement between Farmers and Exporters

Sunflower supply chain should now change the direction of its perception to the vertical coordination kind of relationship among the actors in the chain. Since the direct market seems to be the best option in terms of cost reduction in a chain, farmers should organize themselves and have direct transaction with the exporters. Therefore, there is a need to enter into contract with exporters. The contractual arrangement with exporters can provide farmers with a number of advantages. Exporters can provide farmers with inputs, training by employing extension agents to supervise farmers to ensure that they adhere to the market requirements, technical assistance and other services, and credit, as well as having a guaranteed market for sunflower they produce. This can reduce cost not only in marketing but also in production of sunflower and increase competition in international market because they will get a competitive price.

Farmers produce sunflower specifically for certain company they will be locked up and their bargaining power is reduced but this option is still important since it reduces the total cost of transaction in the supply chain and increase their living standard compared to those who produce individually without any arrangement. According to a report by Food and Agriculture Organization of the United Nation in (2007), traditional buyers who do not get involved in production support programs and usually do not enter into long term commercial relationships with farmers generally buy and sell on a day-to-day basis. They typically lack the capacity to define, monitor, or enforce a quality or safety standard. Through the contractual arrangement, exporters can expand their market to the European market since this market demands high quality and through this arrangement it is easy to meet their requirement. This could benefit the participants in a chain in meeting the more stringent quality standards demanded by European buyers. The small farmers in central Tanzania should be organised into local groups which are provided with appropriate training in village-level grain cleaning and handling. These groups were linked directly to exporters, who in turn were linked with identified European buyers. To facilitate and expand the exporters' cash purchases from these groups, the government and non government organization should help farmers to build capacity on contract issue which can help smallholders to bargain fair terms of trade and avoid opportunism.

5.4.3 Formation of Collective Action by Farmers

Therefore the government through the use of extensionists should facilitate develop of good marketing strategies such as to have collective bargaining through co-operative societies or commercial groups of farmers on upstream in order to have the direct link with the exporters. Collective action occurs when individuals voluntarily cooperate as a group and coordinate their behaviour in solving a common problem. In broad terms, collective action may be defined as action taken by a group (either directly or on its behalf through an organization) in pursuit of

member perceived shared interest, which fits well in the traditional African setting. In the absence of well functioning markets, African farmers have traditionally relied on kinship and other forms of reciprocal relationships in production, marketing and other social activities. Farmer marketing groups as an outcome of collective action are unlikely to emerge on their own, because farmers do not understand the concept of economies of scale when participating in a collective action. The need for collective action depends on the resource type, degree of spatial integration and the time required in achieving the desired outcomes. Conducive environment and political leaderships should be controlled, have shown that groups will emerge and survive where a “critical mass” of individuals has practical knowledge of the potential gains from collective action, but that in the short term emergence can be constrained by landscape factors that affect the potential net gain. In this arrangement, an individual’s choice to participate in collective action will depend on his/her expectation of other member’s behaviour.

The formation of collective action by farmers will have direct effect on production among farmers themselves since the market will be assured and increase farmers’ capacity in terms of bargaining and reduce the control of traders. According to Lutheran World Relief, improving collaboration helps farmers achieve economies of scale by pooling resources to reduce unit costs of inputs and outputs (for example they share cost of searching the buyer, cleaning cost and storage cost) increasing access to credit, technical assistance, transport, and price information; and managing viable enterprises and commercial relationships. Through collective action farmers can use the opportunity of village warehouse available, whereby they can save cost such as rent cost, weighing cost and cost of treatment to avoid pests.

5.4.4 Timing of the Selling Period

By considering substitutes product like chickpeas and beans, this strategy go together with the cost reduction strategy through the use of direct link in a chain. This helps in reducing the selling price of sunflower which can be competitive in the international market compared to the substitute products.

5.4.5 Value Addition

In order to increase the number of processors, the government needs to provide good environment for domestic and foreign investors in sunflower processing by reducing cumbersome procedures and encourage more investment in food processing in general. The processing of sunflower could bring significant changes in the sector. When planning for processing industry, the issue of location of the industry is very important to consider helping reduce the cost of transportation. Much consideration should be paid to cost reduction. By locating processing plants near the farms one can reduce cost and increase the opportunity of farmers to engage in the process and improve their incomes and thereby reduce the level of poverty. It can also help to reduce rural-urban migration.

5.4.6 Marketing Information

In Tanzania, the current institutional framework is unable to support the formation of strong traders and producer's associations and other representative bodies to enhance capacity building and to bargain for fairer terms of trade. In sunflower value chain, assemblers buys sunflower from the farmers by negotiating price while the farmers have no or limited market information. Information systems are hardly present because farmers have no direct contact with the traders to know the market price on the downstream of the chain. Due to the absence of a good marketing system farmers sell the product without knowing the actual price in the market.

5.4.7 Supporting Powerful Participants in a Supply Chain

The government should provide an enabling/conducive environment to encourage traders within the study area to provide support to farmers by providing incentives such as tax exemption or tax deduction and financial incentives for expenditure related to training farmers. Some specific interventions by governments and donors may include co-financing of grant schemes for the private sector to engage in activities such as training and capacity building for small holder farmers. This can

help to bring traders closer to smallholder farmers and enhance contractual arrangements in the market.

5.4.8 Facilitate the Formation of SACCOs

The government and donors can facilitate the formation of SACCOs among the farmers and traders which seems to work out in most of the villages. In this association the farmers can sell together their produce through cooperative societies and have their own bank that helps them to access credit when they are in need.

5.5 Performance of sunflower along the supply chain actors

To attain this objective, mapping of the chain and analysis of the existing performance in terms of price, cost and profit from the source to the downstream of the supply chain has to be done. Since the middlemen have direct contact with exporters, they knew the quality required, they act opportunistically towards the farmers and enjoy the profit by buying at low price with no value addition.

From the findings, many of the respondents said that, in order to improve sunflower supply chain, there should be very effective use of internet because they had sometimes been confronted with many problems due to the application of manual means of obtaining markets. Also farmers are unaware of sources of capital, procedures to follow which could effectively be improved by conducting some seminars on where to obtain capital. They further argued that, the value of the local currency is a well a problem to the well-doing of sunflower business. Many said that, there are no seminars or workshop is conducted related to procurement procedures that would let them know how to conduct international procurement in a fair manner. These seminars could be conducted by those who deem fit in the area of international procurement or even by the professional bodies like NBMM and PPRA. These seminars will enable members of the organization realize the importance knowing how business is done internationally and what are the consequences when one does not adhere to the procedural guidelines of the general process of international procurement.

5.5.1 Empowering women on marketing of sunflower products.

Based on the survey done for the study, women are not engaging in marketing of sunflower and if any they are very few, therefore the government and donor agents should encourage women to participate in the marketing of sunflower by providing awareness on marketing aspect and encourage them to establishing market groups.

5.6 Challenges facing sunflower supply chain actors

The government institutions such as Ministry of Agriculture must organize seminars and workshops to educate farmers and traders on matters concerning credit in general. The government with the help of donors should provide different schemes that can help to finance the groups of farmers and traders who market their produce through collective marketing. Since the main problem that smallholder farmer get in accessing credit is lack of collateral, common arrangements can be made to facilitate farmers in production and marketing of sunflower by large buyers, through the provision of inputs on credit, which they deduct from the payment after farmers have delivered their crops. By facilitating access to credit by farmers can help to alleviate one of the critical challenges of supply chain development. In sunflower marketing, there is no value addition for the product when moving from one point to another. Only the cleaning is done at the first point of the value chain, therefore the direct marketing channel should be adopted to reduce double cost such as loading and offloading, seller or buyer search cost, storage cost and payment to the buying agent.

5.7 Areas for Further Research

In order to reduce poverty and improve production of smallholder farmers by reducing the price of sunflower products and become competitive in the market, it is suggested that, the best option to use is to have the supply chain with minimum cost and only links which add value to the end product should be taken into consideration. Therefore the proposed channel is the direct market system whereby, farmers have direct contact to the exporters and consumers. It is not enough only to reduce cost within the value chain without reduce the power of buyers in

downstream of the supply chain. Improvement of small holder farmers on bargaining power on the value chain can be the area that needs to further study. This can be done by looking at the power dependency among actors in a chain and how to reduce the control of the powerful actors in the chain to the benefit of other partners within the chain.

REFERENCES

- Archirbugi D., Howells, J. and Michie, J. (1998). *Innovation Systems in a Global Economy*. Manchester: University of Manchester.
- Arjan, J. (2005). *Purchasing and supply chain management: analysis, strategy, planning and practice*. Hongkong: C & C Offset.
- Baily, P et al (2008). *Procurement principles and management*, 10th edition. London: Pearson Education Limited.
- Bakari, M. (2010). *Mapping and analysing the fresh fruits supply chain*. Unpublished Msc-PSCM Disertation, Mzumbe Uinversity: Morogoro.
- Kothari, C.R (2009). *Research Methodology, Methods and Techniques*, 2nd edition. New Delhi: New Age International (P) Ltd.
- Chandrasekaran, N. (2010). *Supply chain management: process, system, and practice*, 1st edition. New Delhi: Oxford University Press.
- Chopra, S et al (2007). *Supply chain management: strategy, planning & operations*, 3rd edition. New Jersey: Pearson Education Limited.
- Chopra, S et al (2004). *Supply chain management*: 2nd edition. Upper Saddle River: Pearson Prentice Hall.
- Christopher, M. (2005). *Logistics and supply chain management: creating value-adding networks*. Edinburg Gate: Pearson Education Limited.
- Cousins, P et al (2008). *Strategic Supply Management: Principles, Theories and Practice*, 1st edition. London: Pearson Education Limited.
- Delgado, C.L (1995). *Agricultural Diversification and Export Promotion in Sub-Saharan Africa*, Food Policy, Vol. 20, No. 3, pp. 225-243.
- Justine, L (2012). *Factors contributing to adoption of sunflower farming innovations*. Unpublished Msc-Agriculture Dissertation, Sokoine Uinversity: Morogoro.
- Eskola, A. E (2005). *Agricultral Marketing and Supply Chain Management: a working paper series No.16*: Brighton:Sussex University Press.
- Essang, I., Woin, N and Badeboga, E. A (2003). *Strategies and behaviors of economic actors of onion's chain*. Garoua.

- Frederick, M. and Gereffi, G., (2004). *Globalization and the demand for governance*. Stanford Institute of public policy: Working paper series SAN04-02.
- FAO (2007). *Governance, Coordination and Distribution along Commodity Value Chains*.
- Gereffi, G., Humphrey J and Sturgeon, T (2005). *The governance of global value chains*. New York.
- Graham, F (2010). *Purchasing Contracts, a practical guide*, 2nd edition. London: Spiramus Press Ltd.
- Kaplinsky, R., and Morris, M (2001). *Handbook for value chain research*. (IDRC)
- Kenneth, L *et al* (2006). *Purchasing and supply chain management*, 7th edition. London: Pearson Education Limited.
- Key, N. *et al* (2000). Transactions Costs and Agricultural Household Supply Response, *American Journal of Agricultural Economics*, Vol. 82, pp. 245-259.
- Majule, A. E (2008). Climate change and variability; impact on agriculture and water resources and implications for livelihoods in selected basins, towards climate change adaptation. *Africa Journal of Environmental Science and Technology* 3(8): 206 – 218.
- Mark, S *et al* (2009). *Research Methods for business students*, 5th edition. Edinburg Gate: Pearson Education Limited.
- Milner, C., Morrissey, O., Rudaheranwa, N. (2001). Policy and Non-Policy Barriers to Trade and Implicit Taxation of Exports. *Journal of Development Studies* 31, pp. 505-28.
- Michael, Q (2006). *Purchasing and Supply Chain Management: Strategies and Realities*, 1st edition. New Jersey: IRM Press.

- National Bureau of Statistics (2002) *Singida Regional Socio-Economic Profile*: 2nd edition, National Bureau of Statistic: Dar es Salaam.
- Peter, B *et al* (2010). *Procurement principles and management*. 10th edition, Edinburg Gate: Pearson Education Limited.
- Roduner, D (2007). *Donor Interventions in Value Chain Development*
- Rogath, H (2010). *Analysis of Value Chain for Pigeonpea*. Unpublished MBA Disertation, Molden University College.
- Sounders, M (1997). *Strategic Purchasing & Supply Chain Management*. 2nd edition, London: Pearson Education Limited.
- Tanzania Bureau of Statistics report, (2009).
- Tilanus, B (1997). *Introduction to information systems in logistics and transportation*.
- Ugulumu, E.S (2008). *Sunflower Value Chain*: Kilosa: Ilonga Institute Research.
- Uma, S (2007). *Research Methods for Business: a skills building approach*, Fourth edition, New Delhi: John Wiley & Sons Ltd.
- URT (2002). *Basic Data Agricultural Sector: Agricultural Information Services*: Ministry of Agriculture and Food Security: Dar es Salaam: Government Printer.

BIBLIOGRAPHY

- Cramb, R. A (2003). *Processes affecting the successful adoption of new technologies by smallholders: Working with farmers the key to the adoption of forage technologies: Proceedings of Centre for International Agricultural Research*. (Edited by Hacker, B.), 3 – 5 July 2003, Canberra.
- Czaja, S. J., Fisk, A. D., Hertzog, C. and Rogers, W. A. (2006). *Factors Predicting the Use of Technology: Findings From the Centre for Research and Education on Aging and Technology Enhancement (CREATE)*. *Journal of Psychology and Aging* 21(2): 333 – 352.
- Dasgupta, S (1989). *Diffusion of Agricultural Innovations in Village: Department of Sociology and Anthropology, New Delhi: University of Prince Edward Island*: pp. 10 – 20.
- Degnet, A. and K. Belay, (2001). *Factors influencing adoption of high yielding maize varieties: in south western Ethiopia*. [<http://www.ipms-ethiopia.org>] site visited
- Deligiannaki A. and Maged A., (2011). *Cross-Cultural Influence on Diffusion and Adoption of Innovation: An Exploratory Case Study to Investigate the Social- Cultural Barriers*. Athens, Greece. 7pp.
- Dodge, Y (2003). *The Oxford Dictionary of Statistical Terms*. Oxford University
- Doss C., Mwangi, W. Verkuijl, H. and de Groote, H. (2003). *Adoption of Maize and Wheat Technologies in Eastern Africa. A Synthesis of the Findings of 22 Case*

Due, M (1996). *Tanzania Cultivars Release, Seed Multiplication and Distribution System Technical Report*, Department of Rural Economy, Sokoine University of Agriculture, Morogoro.

Isack, S (2009). “*The Value for Money Approach to Public Sector Procurement*” (online) Available at www.smartprocurement.co.za, accessed on 13/08/2012.

Nicola, C *et al* (2008). *Reducing the Cost of Public Tenders*, a Modest Proposal: 3rd International Public Procurement Conference Proceedings (28 – 30 August 2008 pp 17 -30).

Oliver, E (2002). "*The Theory of the Firm as Governance Structure*, From Choice to Contract," *Journal of Economic Perspectives*, 16(3), pp. 171-195.

Public Procurement Act (2004): Tanzania

Ramadhani, M (2009). *Promoting Integrity in Public Procurement*, Tanzania Procurement Journal (Vol II No 5).

Ronald, H (1937). *The Nature of the Firm*, *Economical* 4 (16): 386–405.

Simon, H (1991). *Bounded Rationality and Organizational Learning*: Organization Science. Studies. D. F., Mexico. 38pp.

APPENDICES

Appendix I: Research Questionnaires

The researcher is intending to conduct research on the analysis of supply chain of sunflower in Singida Municipality. In order for the researcher to get accurate, direct and academic information, a sample of questionnaire will be prepared where it will be sent to the respective respondents.

It is therefore the expectation of the researcher that all questions contained herein will be careful, correct, and completely answered by the respondent for better results.

Please fill in spaces provided or tick in the given box the answer corresponding most closely with your opinion or situation.

PART ONE: Background information

Section One: Personal information

1. Category of actor (a)Producer (b) Collector (c) Wholesaler (d) Retailer (e) Processor
2. Age of respondent.....
3. Sex of respondents.....
4. Education of respondent (years in school).....
5. Experience in sunflower farming/marketing.....(years).

Section Two: Production of sunflower, harvesting, storage and trading pattern

(For Producers only)

Choose an appropriate answer as provided below;-

1. What kind of farming do you practice?

- a) Commercial farmers
- b) Subsistence farmers
- c) Both commercial and subsistence farming.

☐

2. Where do you get the seed for planting each season's crop?

- (a) Own storage from previous year
- (b) From other farmers or farmers association
- (c) From the market

☐

- (d) Government subsidies
- (e) Others.....

2. What kind of fertilizer do you use? Where do you get it?

- a) Traditional fertilizers from cattle's (manure)
- b) Modern fertilizers from chemical industries
- c) Others.....

3. How much money does it cost you (per year) to operate one acre of land?
Tshs.....

4. Where do you learn about farming practices, such as new seed varieties, fertilizers, pests and disease control, or market prices?

- a) Government agents
- b) Friends
- c) Radio broadcasts
- d) Other methods

5. What types of farm equipment do you own?

- a) Owing/using a hoe
- b) Using hand tools (e.g. panga knife, axe etc.)
- c) Using mechanized equipments (e.g. tractors etc.)

6. Do you receive any government or non-government subsidies? 1=Yes,2=No

Yes	1	
NO	2	

7. Do you have non-farm income?

Yes	1	
No	2	

8. Do you depend on rainfall for your better production?

Yes	1	
No	2	

9. How do you measure the level of extension services you receive in your area?

Satisfied	1	
Unsatisfied	2	

Section Three: Harvesting, storage and trading pattern

10. Do you have storage facilities of sunflower? 1=Yes, 2=No.

11. If yes what are these storage facilities?

- a) Containers
- b) Cotton bags
- c) Storehouses
- d) Pallets

12. Please fill the following table concerning the harvest information for an acre of land.

Quantity harvested (kg)	
Quantity consumed at home (kg)	
Quantity deteriorated (kg)	
Who bought most of your produce? (a) Collectors (b) Wholesalers (c) Retailers (d) Processors (e) Individual consumers	
Amount sold (kg)	
Unit selling price in Tshs per kg	

13. What is the means of transport used?

- (a) Vehicles
- (b) Ox-cart
- (c) On-head (self)
- (d) Bicycles
- (e) Sack barrow, wheelbarrow etc.

14. Indicate the marketing costs you incurred in marketing your produce in 2012/2013 cropping season.

Loading and unloading	
Transportation costs	
Labour costs	
Market charges	
Others (specify)	

15. Apart from Tanzania markets do you export sunflower products to abroad?
1=Yes, 2=No.

PART TWO: Traders information (collectors, wholesalers, retailers, processors and consumers)

16. Please fill the following table

Where do you get sunflower?(choose the appropriate answer) (a) Collectors (b) Wholesalers (c) Retailers (d) Processors	
Quantity bought during 2012/2013 cropping season (kg)	
Purchase price in Tshs. per kg	

17. Please fill the following table

Who bought most of your produce (choose the appropriate answer) (a) Collectors (b) wholesalers (c) retailers (d) processors	
Quantity sold (kg)	
Unit selling price in Tshs per kg	

18. Please indicate the marketing costs incurred in Tshs.

Loading and unloading	
Transportation costs	
Labour costs	
Others (specify)	

Marketing information (all respondents)

19. Where do you get market information for your products

- (a) Trade fair
- (b) Traders
- (c) Farmer's association
- (d) Radio broadcasting
- (e) Internet
- (f) Magazine
- (g) Others (specify)

20. Do you incur cost to acquire that market information? 1=Yes, 2=No.

21. If yes how much (Tshs)?.....

Chain actor's relationship (social networks)

22. Do you have farmer/trade group? 1=Yes, 2=No.

23. If yes what is the name of the group?.....

24. Who set the price of sunflower?

- (a) Farmers
- (b) Collectors
- (c) Wholesalers
- (d) Retailers
- (e) Others (specify)

25. Do you sell to specific customers? 1=Yes, 2=No.

26. What is the mode of payment used?

- (a) Credit advancement
- (b) Trustful person
- (c) Always pay in cash

27. How could you explain the gross margin you get in 2012-2013 cropping season?(All respondents)

.....

.....

.....

Challenges in sunflower supply chain (all respondents)

28. Indicate the main problem you face in farming and marketing of sunflower

- (a) Lack of capital
- (b) Lack of storage facilities
- (c) Marketing information problems
- (d) High price of inputs
- (e) Pests and diseases
- (f) Lack of extension services

29. Indicate the main problem you face in trading of sunflower

- (a) Lack of capital
- (b) Limited access to market information
- (c) Limited access to credits

30. What do you suggest to be done to lessen the situation?

.....

.....

.....

31. What is your future prospects regarding farming/trading of sunflower?

.....

.....

.....

Appendix II: Person Information

Category of actor

The researcher wanted to know the contribution of each actor in the supply chain of sunflower. Due to the nature of the question, 28 respondents (28%) said that they are Producers, 18 respondents (18%) said that they are rural assemblers of sunflower after harvest while 19 respondents (19%) said that they are wholesalers but using middlemen to buy on their behalf, 15 respondents (15%) said that they are retailers who are selling at different points and 20 respondents (20%) said that they are processors. Almost all respondents said they had little knowledge on how to market their products in order to expand their business ventures.

Level of Education

The level of education in business is very important. The knowledge that the participant has can help in planning for their business. In sunflower marketing the level of education differs for most of respondents in both markets, from primary school i.e. 0-7 years, secondary school 8 – 13 years and college education 14 years and above. 60% of the participants who are farmers of the sunflower had no more than primary education and 20% of respondents who are traders had secondary education while 20% participant falls in the college level who are retailers (see the table below). This shows that most of participants in the downstream of the value chain have high level of education than participants in the upstream of the value chain. This increases their ability in planning for their business.

			Market chain		
			First market(Farmers)	Second market (Wholesalers)	Third market (Retailers)
Education in years	Primary level	0-7	60	70	40
	Secondary level	7-11	20	20	30
	Diploma level	12-14	15	10	20
	Degree level	>14	5		10
Total (%)			100	100	100
Number of observations			40	30	30

Sex of respondents in sunflower business

In Singida Municipality farmers have organized themselves in groups during production of sunflower (Lisaga-tradional name) but they are marketing their products individually to different participants in the supply chain. There are no developed societies dealing with marketing of sunflower. The production of sunflower involves both women and men while its marketing is dominated by men, only 4.5% are female, the reasons that makes women not to participate in trading of sunflower are lack of capital to do business due to lack of information about credit and high interest rate that limit their access to credit, fear not to pay back on time since they use business money to take care of the family because of lack of education to separate business and private economy.

Sex of respondents in sunflower supply chain

		Sex of respondents in sunflower business						
		Farmers			Traders			
		Producer	Collector	Assembler	Wholesaler	Processor	Retailer	Exporter
Rural market	Male	30	60	60	70	100	40	100
	Female	70	40	40	30	-	60	-
Urban market	Male	30	40	100	100	100	40	100
	Female	70	60	-	-	-	60	-
Total Number		30	10	10	10	10	10	10

Experience in the sunflower farming and business

Years of experience varies from market to market with less experience participants found in the first market in Singida municipality with less than 7 years of experience. While in the third and fourth market participants have more than 8 years of experience. This shows that in order to operate in a downstream of the value chain and face the business challenge, education and years of experience are important.

		Market chain		
		First market (Farmers)	Second market (Traders)	Third market (Extension officers)
Years of experience in sunflower business	0-4	50	90	80
	4-8	30	10	15
	More than 8	20	-	5
Total (%)		100	100	100
Number of observations		30	20	10

Source of seed for planting each season's crop

Through interview the question demanded farmers to bring into light the different sources of where they got seeds for planting each season. Owing to the requirements of the question as far as sunflower supply chain is concerned, 30 respondents(100%)

responded by saying that they got seeds from previous year own storage, while no one said to get from other sources.

Export of sunflower products to abroad

Due to the nature of this question, the researcher wanted to know if farmers had outside market apart from Tanzanian market, 5 respondents (17%) said Yes and 25 respondents (83%) said No, which means almost all sunflower products produced in Singida Municipality are being sold within the region, alongside highways and little being exported.