VALUE CHAIN ANALYSIS OF COCONUT IN TANZANIA: A CASE OF TANGA AND DAR ES SALAAM REGIONS

BY

CHARLES PAUL

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTERS OF SCIENCE IN AGRICULTURAL ECONOMICS OF SOKOINE UNIVERSITY OF AGRICULTURE. MOROGORO, TANZANIA.

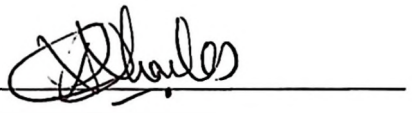
2010

ABSTRACT

This study analysed the coconut value chain in Tanga and Dar es Salaam regions in order to suggest strategies needed to improve coordination in the value chain. The specific objectives were; to assess the roles of actors in the coconut value chain; to study the way coconut value chain is coordinated; to assess the coconut value chain for price and margins at each node and make suggestions for improving coordination of the value chain. The study was cross sectional using data obtained from questionnaires involving 114 respondents. PASW Statistics computer software was used to generate descriptive statistics for describing the characteristics of the value chain. Profit and marketing margins at each node of the value chain were executed to compute efficiency of the value chain. Value chain functions were performed by coconut producers, wholesalers, retailers and consumers. The coconut sub-sector in the study area was characterized by low value addition, low producer price, pests and disease attacking coconut plants. Most of the coconuts (90%) were sold to wholesalers as fresh coconuts without any processing. Vertical coordination or linkage between actors along the chain was found to be moderate but horizontal coordination was found to be weak. Retailers obtained higher profit margins than other actors in the value chain. Key problems to the coconut industry was low coconuts producer price, absence of coconut processing industries, diseases and pests which destroy coconut plants and lack of collective market. The study recommends the establishment of coconut processing industry in the study area, formation of producers' organisation, reinforcing coordination between actors, improvement in roads, market infrastructures, strengthening research extension farmers' linkages in fighting coconut pests and diseases, and access to credit by actors.

DECLARATION

I, CHARLES PAUL, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work and has neither been submitted nor been concurrently submitted for a degree award in any other university.



CHARLES PAUL

(MSc. Agricultural Economics candidate)

15/10/2010

Date

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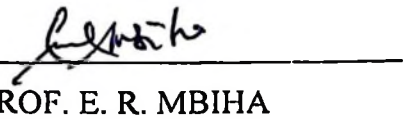

PROF. E. R. MBIHA

(Supervisor)

18/10/2010

Date

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AKNOWLEDGEMENT

Work of this kind would not have been possible without the considerable support of a number of people. It is my pleasure to acknowledge their support. I thank Almighty God for giving me a chance and enabling me to perform this work. To Him be the Glory.

I wish to express my profound gratitude to my supervisor Professor E. R. Mbiha from the Department of Agricultural Economics and Agribusiness, Sokoine University of Agriculture for his intellectual stimulation, guidance and valuable detailed comments without which this work would have been difficult to accomplish. To him I say, God bless you.

I would also like to thank Ministry of Agriculture, Food and Cooperatives for granting permission to pursue this Masters Degree and provision of financial assistance for the whole course. Thanks are extended to the staff and students in the Department of Agricultural Economics and Agribusiness at SUA. My appreciation to Dr. Alois Kullaya and Mr. Newton Temu from MARI for their support in my entire study, special gratitude to Dr. Mwinjaka, S from the Ministry of Industry, Trade and Marketing for his enormous contributions. Special thanks to all officers from Pangani DALDO office and all coconut stakeholders in Pangani Districts and Ilala market who were kind enough and ready to give me the information I needed.

The rest of the family and relatives had a special role in my studies. They gave me love, constant support, encouragement and inspiration during the entire duration of this study. May our almighty God bless you always.

DEDICATION

This work is dedicated to my parents Mr. Paul Hamisi Mnzava and Louisa Paul Hamisi who laid down the foundation of my education.

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LIST OF ACRONYMS/ABBREVIATIONS

APCC	Asian and Pacific Coconut Community
FAO	Food and Agricultural Organisation of United Nations
GOT	Government of Tanzania
LD	Lethal Disease
MARI	Mikocheni Agricultural Research Institute
MCSCSL	Mwelekeo Coconut Sales and Cooperative Society Limited
NBS	National Bureau of Statistics
NCDP	National Coconut Development Programme
PASW	Predictive Analytics Soft Ware or IBM SPSS Statistics (is a new name it was formally known as SPSS - Statistical Package for Social Science) came after IBM acquired SPSS Inc.
Tsh	Tanzania Shilling
URT	United Republic of Tanzania

CHAPTER ONE

1.0 INTRODUCTION

1.1 Coconut Subsector in the World

Coconut is derived from the Spanish and Portuguese word, "coco", which means "monkey/grotesque face", but the plant is known in many countries by local names. For example, it has been known as "naryal" in India for millennia and as "nut of India" by Cosmos (Woodroof, 1970). The coconut palm *Cocos nucifera* grows to about 30 meters tall and is extensively cultivated in tropical climates. It is one of about 2,600 species in the palm family *Arecaceae* and it is the only extant species in the genus *Cocos* (New World Encyclopedia contributors, 2008). The term coconut refers to the fruit of the coconut palm, which consists of a fibrous husk (mesocarp) encasing a large seed or inner stone (New World Encyclopedia contributors, 2008).

Coconut is one of the most important crops in the tropics because it is grown in more than 93 countries in the world by more than 11 million smallholders (Rethinam, 2006). Total area under coconut in 2007 was estimated at 10.9 million hectares and around 93 percent was found in the Asian and Pacific region. Indonesia and the Philippines, the world's two biggest producers, account for about 2.62 million and 3.45 million hectares, respectively (FAO, 2008). While India grows about 1.88 million hectares of coconut, Papua New Guinea leads in the Pacific region where 203 000 hectares of coconut are cultivated (FAO, 2008). Tanzania recorded the largest extent in Africa at 310 000 hectares and is the fifth largest in the world (FAO, 2008). Table 1 shows the top ten leading countries in area under coconut.

Table 1: Top ten countries with large area under coconut in Hectares (Ha) 2006-07

No	Country	2006	2007
1	Philippines	3 337 378	3 450 000
2	Indonesia	2 650 000	2 620 000
3	India	1 946 800	1 880 000
4	Sri Lanka	394 840	394 840
5	Tanzania, United Republic of	310 000	310 000
6	Brazil	289 815	273 459
7	Thailand	258 187	255 490
8	Papua New Guinea	198 000	203 000
9	Malaysia	173 000	172 000
10	Viet Nam	132 700	130 000

Source: FAO (2008)

The world's total production of coconut in 2005 was estimated at about 59.5 billion nuts (APCC, 2005). As it can be shown in Table 2 and Fig. 1, Tanzania stands in a tenth position in the top twelve world leading coconut producers.

Table 2: World production of coconuts in 1000 nut equivalent, 2001-05 (1000 nuts) the top 12 world producers

N	Country	2001	2002	2003	2004	2005
1	Indonesia	15 815 000	15 492 000	16 146 000	16 657 000	16 492 000
2	Philippines	13 146 000	14 068 000	14 294 000	12 459 000	14 056 000
3	India	12 597 000	12 822 000	12 160 000	11 989 000	12 832 900
4	Brazil	2 498 988	3 369 000	3 542 387	3 717 125	3 792 288
5	Sri Lanka	2 769 000	2 393 000	2 562 000	2 591 000	2 215 000
6	Mexico	1 453 750	1 198 750	1 196 750	1 198 750	1 187 500
7	Thailand	1 117 000	1 134 000	1 146 000	1 199 000	1 204 000
8	Vietnam	935 640	789 550	693 500	680 684	677 400
9	Papua New Guinea	553 000	553 000	553 000	812 500	812 500
10	Tanzania	437 500	462 500	462 500	462 500	462 500
11	Malaysia	477 000	477 000	400 000	430 475	391 000
12	Myanmar	328 206	343 750	412 500	437 500	437 500
	Total	52 128 084	53 102 550	53 568 637	52 634 534	54 560 588
	Other Countries	4 728 922	5 002 088	4 858 190	5 309 146	5 009 015
	Total World Production	56 857 006	58 104 638	58 426 827	57 943 680	59 569 603

Note: Data refer to total production of coconut, whether consumed fresh, processed into copra or desiccated coconut. Estimate for non-APCC Countries was calculated by converting the nut weight into whole nuts given in the FAO Production Yearbooks, by using a conversion factor of one ton of husked nuts = 1250 whole nuts

Source: APCC (2005)

In the last twenty years, there was a continuing marginal increase in both hectare and production of coconuts (Bashar, 2002). The production increase in coconut is mainly due to an increase in area over the years. However, the productivity rate has remained almost static, i.e. around 1.0 t/ha/year copra equivalent. This is a major setback, which needs to be addressed by every coconut-growing country (Rethinam, 2006). On the other hand, the coconut producing countries continue to produce due to the importance of the crop as a social crop. These countries realize the potential

that coconut holds in economic development and poverty alleviation particularly, among the rural population (Bashar, 2002).

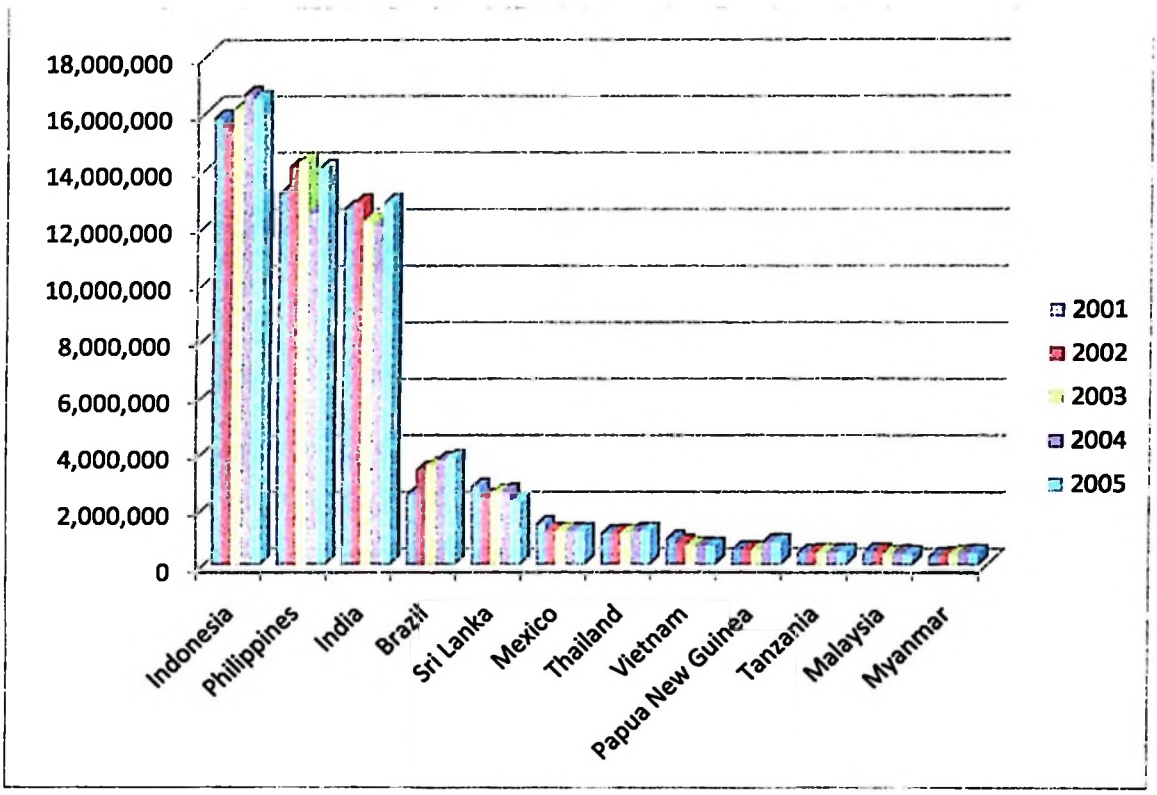

Figure 1: World production of coconuts in 1000 nut equivalent, 2001-05 (1000 nuts)
Source: APCC (2005)

The coconut palm is an important tree in most tropical islands and along the coastal regions of tropical Africa. It is grown in Madagascar, Seychelles, Mozambique, Tanzania, Kenya, Comoro, DRC and Republic of Congo, Cameroon, Sao Tome and Principe, Nigeria, Benin, Togo, Ghana, Côte d'Ivoire, Liberia, Guinea, Sierra Leone, Guinea Bissau and Senegal. Fig. 2 shows countries which grow coconut in Africa.

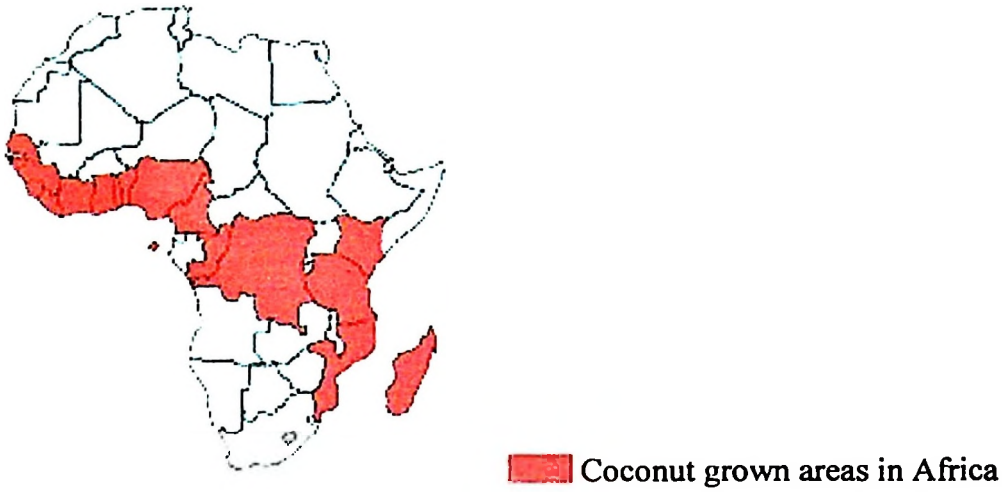

Figure 2: Geographical distribution of coconut in Africa

Source: Infonet-biovision (2010)

Coconut is one of the important crops along the coastal belt of Tanzania (Mwinjaka *et al.,* 1999). It is produced in Dar es Salaam, Coast, Tanga, Lindi, Mtwara, Zanzibar, Pemba, Mafia, inland region of Morogoro and on the shores of Lake Nyasa, Tanganyika and Victoria. The population of palms is estimated at about 25 million in Tanzania. About 95 percent of the coconuts are grown by small-scale farmers while the rest are under medium and large-scale plantations (Kullaya, 1999). Coconut is important as the main source of income for farmers in the coastal belt of Tanzania where 15 percent of the country's population live, source of cooking oil, substitute for other types of cooking oil, especially in rural areas where there are limited alternatives (Mwinjaka *et al.,* 1999).

Mikocheni Agricultural Research Institute (MARI) is the institute which was given the mandate to conduct coconut research and development in Tanzania. The sale and

home consumption of fresh nuts is the main utilization of coconut palm in Tanzania (Mwinjaka *et al.*, 1999). The other uses include coconut water, roofing or thatching and oil processing. Fuelwood and wine making were the third and forth priorities, respectively. Timber, coir/rope and charcoal featured out as priority five.

1.2 Problem Statement and Justification

Coconut palms play an important role in the farming systems along the coastal belt of Tanzania where about 70 percent of coconut palms are intercropped with food crops (Mwinjaka *et al.*, 1999). Despite their significance, coconut palms do not contribute significantly to the livelihood of people in the coastal belt of Tanzania. Low prices paid to the farmers are among the major factors that hinder the contribution of the crop to the livelihood of people. Magitta (1989) asserted that most producers lack adequate transport facilities, low producer prices and theft of the nuts as major problems facing producers, while wholesalers have problems of transport and associated costs, high levy rates and lack of shades; retail traders problems face high transport costs, levy rates and price and supply instability thus low marketing margins.

Studies by Magitta (1989) and Ashimogo *et al.* (1998) found that marketing margins are influenced by costs of production e.g. transport, gunny bags, labour and the extent of competition. When provision of marketing services is difficult, the risks are high and traders tend to seek larger margins. Transport constraints appear to be the most limiting factor for distant trading even though there were few traders who could buy coconuts especially in remote areas.

Although coconut production is confronted with several constraints, many studies have provided better understanding on the crop. In Philippines, Magat *et al.* (1999) assessed the contribution of coconut to the farmer's income; Heydon (1987) assessed the coconut marketing and pricing policy in Zanzibar, Ashimogo *et al.* (1998) concentrated on the production and utilization effect of coconut in the coastal regions of Tanzania; Magitta (1989) focused on marketing channels for fresh nuts and their price differentials in Tanga and Dar es Salaam regions; and Yussuf *et al.* (1998) addressed the status of coconut industry in Zanzibar. Many of these studies focused on production and marketing aspects in general. Only a few of the studies focused on value chain of coconut. No specific study has been done to analyze value chain of coconut in Tanzania.

Therefore, this study is an attempt to analyze the value chain of coconut in Tanzania with reference to Tanga and Dar es Salaam region and consequently explore the existing situation in the areas. This will be the basis for formulating/planning direct interventions geared towards improving the coconut value chain in the study areas. The findings obtained will be useful for various stakeholders in coconut development.

1.3 Objectives

1.3.1 Main Objectives

To analyze coconut value chain in Tanga and Dares Salaam regions in order to suggest strategies needed to improve coordination in the value chain.

1.3.2 Specific Objectives

(i) To assess the roles of actors in the coconut value chain,

(ii) To study the way fresh coconut value chain is coordinated,

(iii) To assess the coconut value chain for price and margins at each node, and

(iv) To put forward suggestion for improving coordination of the value chain.

1.4 Research Questions

(i) What are the features of fresh coconut value chain?

(ii) What is pricing structure at different nodes of coconut value chain?

(iii) What are the constraints facing actors along the value chain and suggestions can be used to improve coordination in the value chain

1.5 Conceptual Framework for Analyzing Coconut Value Chain in Tanzania

Coconut value chain analysis in Tanga and Dar es Salaam will be anaysed by examining factors that influence production (land, labour, capital and technology). Producers incur some costs during coconut production and marketing which in one way or another is influenced by the forces of demand and supply; while taking into account marketing costs they supply coconut to marketing agents who are key players in market. Here, the value chain governance is determined by the their level of organization and coordination along the coconut value chain. The prices, costs and volume of outputs are then measured and analyzed by the levels of marketing margins and costs associated with it. Bearing these factors in mind, marketing agents in one way or another are affected by the level of support services and the forces of demand and supply in the way they sell coconuts to consumers (Fig. 3).

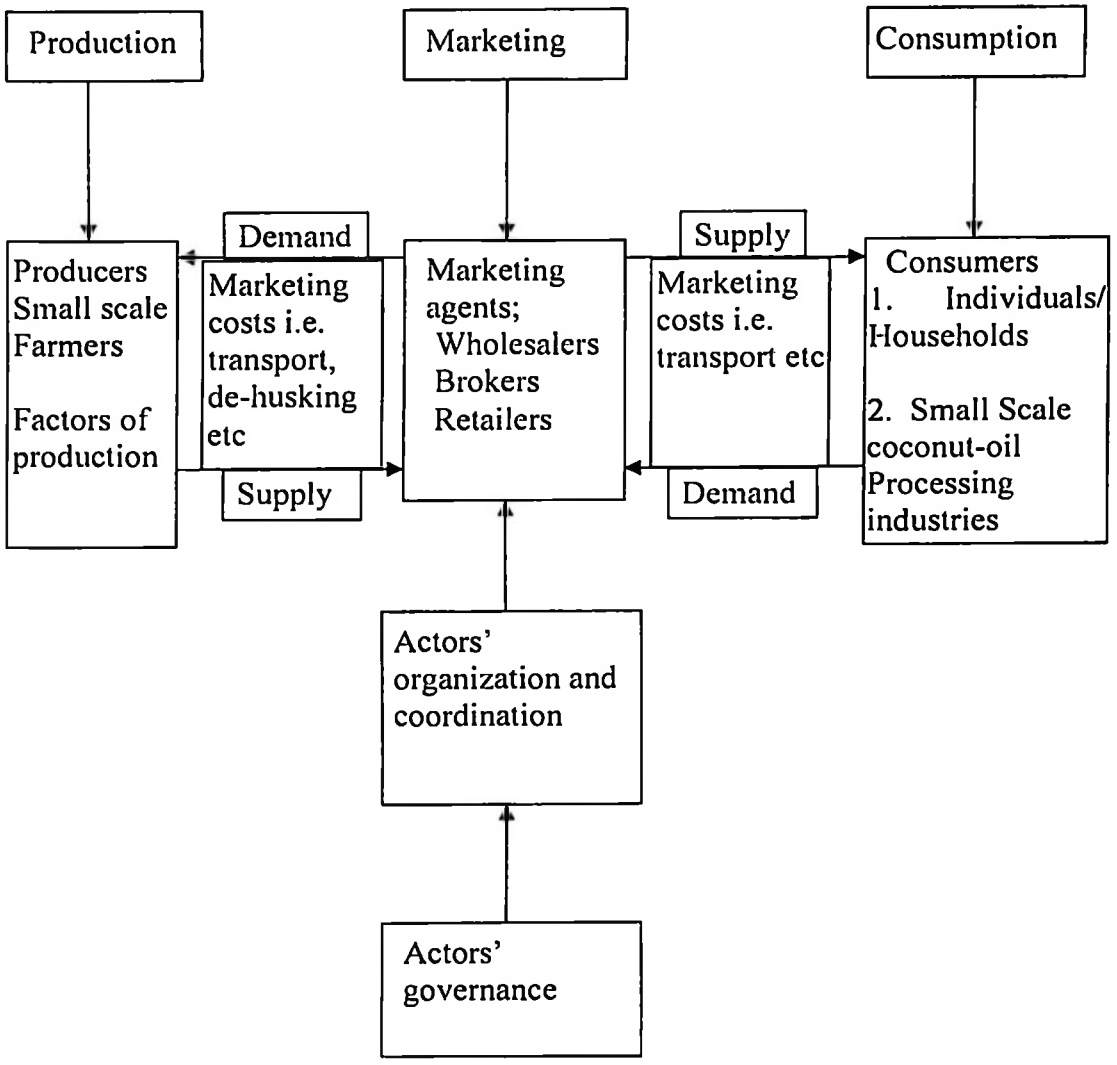

Figure 3: Conceptual framework for analyzing coconut value chain

Source: Modified from Mshote (2006)

1.6 Organization of the Study

This dissertation is organized in five chapters. Whereas chapter one presents the introduction, chapter two reviews various literature related to this study. Chapter three deals with the methodology of the study giving a brief description about main sources of data used and analytical techniques employed in the study. Chapter four presents a discussion of results and findings emanating from the study. Conclusion and recommendartions drawn from the study are presented in chapter five. A list of references cited in the text and appendices are given at the end of this work.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 The Concept of Value Chain

Value Chain describes the full range of activities required to bring a product or service through the different phases of production, including physical transformation, the input of various producer services, and response to consumer demand (Kaplinsky *et al.*, 2000). As such, value chains include the vertically linked interdependent processes that generate value for the consumer. When comparing value chain to supply chain, the term supply chain is used internationally to encompass every activity involved in producing and delivering a final product or service, from the supplier's supplier to the customer's customer (Feller *et al.*, 2006). The primary focus of supply chains is on cost and efficiencies in supply, while value chains focus more on value creation, innovation, product development, and marketing. While both concepts describe the same network of companies that interact to deliver goods and services, the value chain is essentially about value (Austin Associates, 2009).

Kaplinsky *et al.* (2000) have pointed out three main reasons why value chain analysis is important in this era of rapid globalisation. The first one deals with the growing division of labour and the global dispersion of the production of components in which systemic competitiveness has become increasingly important. The second one is efficiency in production which is the only necessary condition for successful penetration into global markets and the last one is entry into global markets which

allows for sustained income growth, that is, making the best of globalisation requires an understanding of the dynamic factors within the whole value chain.

The value chain approach analyzes the firms in a market chain from input suppliers to final buyers and the relationships among them. It analyzes the factors influencing industry performance, including access to and the requirements of end markets; the legal, regulatory and policy environment; coordination between firms in the industry; and the level and quality of support services (ACDI/VOCA, 2006). Value chain analysis is a critical prerequisite for strategy design because it identifies and prioritizes the constraints and opportunities that affect the competitiveness of an industry (USAID, 2008a).

A value chain depicts the many activities involved in getting products from the producer to the consumer. These activities occur in a sequence and are carried out by different participants, including farmers, traders, processors and retailers. Each link in the chain adds value to the product. Value chain analysis in a narrow sense focuses on the primary activities in the chain, such as production, transportation, processing, marketing and information exchange. Value chain analysis in a broad sense also encompasses the 'rules of the game' (i.e. the governance of the chain), as well as the support services, such as quality certification (Da Silva and De Souza Filho, 2007).

In a value chain marketing system, farmers are linked to the needs of consumers, working closely with suppliers and processors to produce the specific goods required by consumers. Using this approach, and through continuous innovation and feedback

between different stages along the value chain, the farmer's market power and profitability can be enhanced. Rather than focusing profits on one or two links (nodes), players at all levels (nodes) of the value chain can benefit. Well functioning value chains are said to be more efficient in bringing products to consumers and therefore all actors, including small-scale producers and poor consumers, should benefit from value chain development (RIU, 2008).

Value chain analysis can play a key role in identifying the distribution of benefits of actors in the chain. That is, through the analysis of margins and profits within the chain, it is possible to determine who benefits from participation in the chain and which actors could benefit from increased support or organisation. One can supplement this analysis by determining the nature of participation within the chain to understand the characteristics of its participants (M4P, 2008).

2.2 Value Chain Governance

Value chain governance refers to the relationships among the buyers, sellers, service providers and regulatory institutions that operate within or influence the range of activities required to bring a product or service from inception to its end use. Governance is about power and the ability to exert control along the chain at any point in the chain. For example, some firm (or organization or institution) sets and/or enforces parameters under which others in the chain operate. The key parameters are (i) what is to be produced? This includes product design and specifications, (ii) how it is to be produced. This involves the definition of the production processes, which

can include elements such as the technology to be used, quality systems, labour standards and environmental standards and (iii) how much is to be produced and when? This refers to production scheduling and logistics (Gereffi *et al.*, 2009; Microlinks, 2009).

Governance implies that interactions between actors in the value chain are frequently organized in a system that allows competitive firms to meet specific requirements in terms of products, processed, and logistics in serving their markets. As such, it recognizes that power is not evenly distributed, and access to market opportunities for the poor requires understanding of how production systems are organized to meet these competitive requirements. In actual fact, the instruments of governance range from contracts between value chain participants to government regulatory frameworks to unwritten "norms" that determine who can participate in a market (M4P, 2008). The analysis of governance aims at investigating the rules operating in a value chain, and the system of coordination, regulation and control in which value is generated along a chain. "Governance" is a description of the dynamic distribution of power, learning, and benefits among a value chain's firms. While the term can have many meanings, in this instance, we use it to describe the sharing of information and systematic standards promoted by the "governing" entity in a value chain (Austin Associates, 2009). Governance ensures that interactions between firms along a value chain exhibit some level of organization rather than simply being random. Value chains are governed when the parameters requiring product, process, and logistic qualification that are set have consequences up or down the value chain, encompassing bundles of activities, actors, roles, and functions. Certainly, one

objective of value chain development is to engender informed, incentive-producing governance targeted at achieving high-value results (Austin Associates, 2009). The various types of governance may be appropriate for a chain at different times. Each type has benefits and limitations. Understanding governance is important for identifying where in a chain to intervene (USAID, 2008b). Thus governance is a dynamic feature of value chains that characterizes the relationships or linkages among stake-holders in the chain and is important as it relates to the ability of a stakeholder to determine, control and/or coordinate the activities of other actors in the value added chain (Gereffi *et al.*, 2009).

2.3 Value Chain Coordination and Organisation

Value chain organisation describes the institutional set up of the marketing agents in the value chain. Moreover, it examines the relationship between actors along the value chain and how the trade is conducted. The value chain organisation describes the marketing channels together with the flows of goods and services in the chain (ITC, 2003). A value chain links the steps a product takes from the farmer to the consumer. It includes research and development, input suppliers and finance. The farmer combines these resources with land, labour and capital to produce commodities (RIU, 2008). Value chain coordination can be defined as the management of the flow of tangible goods at the nodes of a chain; it thus refers to the implementation of rules and their monitoring and coordination is not necessarily connected to power asymmetries and is an essential function of every kind of value chain, and thus not every chain has a governance structure (Stamm *et al.*, 2006).

Moreover, improving the coordination of activities of different actors in the chain can reduce transaction costs, help guarantee product quality and safety, and enhance the design of marketing strategies (Bijman and Ton, 2008). This strengths linkages between the different actors in the marketing system, lays the groundwork for improvements to other constraints; establishment of a contract regime, improvements in the post-harvest and transportation systems, improvements in quality, and the effective use of market information (M4P, 2008).

2.4 Value Chain Analysis Review Studies and Methods

The study by Pascal *et al.* (2005) on green beans supply chain in Arusha and Dar es Salaam used structured questionnaires and checklists to collect primary data. Selection of the sample was done by purposeful proportionate sampling while secondary data collected were used to determine the trend of green beans production and marketing. Water scarcity for irrigation, dependency on rainfall, pest and diseases alongside limited access to marketing information were among the most important problems limiting the capacity of different marketing agents.

In studying cocoa value chain in Indonesia, Panlibuton and Meyer (2004) found that overall, the Indonesian cocoa value chain was characterized as having a market-based governance structure with a low degree of open coordination. In other words, there were no players or entities exerting dominance control over the cocoa value chain. Since product specifications were relatively simple, most transactions between

buyers and sellers took place at "arm's length", based on supply and demand. The costs of switching to new partners were low for both parties.

In analysing tomato value chain in Afghanistan, Rahman and Hossain (2005) found that farmers had a mixed degree of vertical integration and the majority of farmers especially the remote and small farmers were highly disintegrated having production facilities only without any vertical integration and generally produced tomatoes on rented land of the large farmers. The large farmers with strong vertical integration have increased capital investment in higher technologies and created competitive differences both in terms of cost leadership and product differentiation.

In analysing the dairy value chain in Dar es Salaam, Mbiha (2008) used PRA techniques, primary data and secondary data. Marketing margins was used to estimate the proportion of consumer price against producer prices and profit margins was used to assess efficiency at different nodes of the diary value chain. The results showed that the value chain was characterised by low level of value addition activities, small scale operations at all stages of the value chain, seasonality of milk supply, poor quality control systems, poor handling, preservation and packaging practices of dairy products. Overall, the value chain was weakly organized and coordinated.

Kamugisha (2006) conducted a study on supply chain for green beans in Kilimanjaro, Arusha and Dar es Salaam regions Tanzania. The main objective of the study was to examine the structure and functioning of the supply chain of green

beans in Tanzania. Cross-sectional research design was used where a multistage sampling technique was employed. In the sampling process, purposive sampling was used in the selection of major producing districts, markets and respondents while random sampling technique was employed to get different numbers of chain actors in the identified regions. Both primary and secondary data were obtained and analysed by descriptive statistics. Profit margins and marketing margins were estimated to find the efficiency measures, performance of production, marketing of green beans as indicators of performance and market efficiency along the supply chain. The results of the study revealed that marketing margins were higher for retailers (417 Tsh per kg) and lower for assemblers (208 Tsh per kg).

2.5 Previous studies on coconut

Coconut is an important perennial cash and subsistence oil crop that is mainly grown along the coastal belt of Mainland Tanzania and the Islands of Zanzibar and Mafia by about 300 000 small-scale farmers (Kullaya, 1999). For trading operations, the current situation can be described as one in which private traders have been given free rein to set buying and selling prices and to move agricultural products around the country (World Bank, 2000). With regard to Zanzibar, the local marketing of fresh nuts was left to the private sector and price fluctuation of fresh nuts was influenced by increasing consumption compared to the rate of increase in production and the feasibility of export on the Mainland (Yussuf *et al.*, 1998). Moreover, Magitta (1989) found that in many areas most coconut producers lack adequate

transport facilities, in that case marketing costs can be as high as 500/= Tsh per bag of 100 nuts (Magitta, 1989).

Generally, some authorities comment that a disorganized marketing system, with unreliable and irregular transport services, limits the number of outlets in a locality and weakens the farmers' negotiating position in relation to traders (Nyange *et al.*, 2000). This results is high profit margins to traders, high fruit wastage, or poor fruit quality, all making fruit marketing by producers very uncertain and uneconomical (Nyange *et al.*, 2000).

In studying the global scenario of the coconut industry, Samosir *et al.* (2006) have pointed out that coconut producers are not only facing declining fruit production but are also fighting low, and often fluctuating prices for copra (coconut oil). Global supplies of coconut oil are facing strong competition from vegetable and palm oil whose markets are rapidly expanding. As a consequence of this competition, the coconut farmer is reluctant to replant their land with coconut and may replant with oil palm or even just abandon the land. The study suggested that farmers must now turn their attention to the production of other, more diverse products which have a high economic return. Such products will include virgin coconut oil (VCO), shell charcoal and tender-nut water packaged in containers for wider marketing.

In analysing coconut industry in Guyana, the Government of Guyana (2009) found that the industry had not yet reached its full potential not only in terms of productive efficiency but also with regard to the high value added products that use coconut as

their base. Among the constraints that hamper the development of the industry were poor drainage, high and rising costs of production, marketing, inadequate crop husbandry, lack of fertilisation, limited local manufacturing and processing facilities. As a solution to the problems, the Government of Guyana initiated a coordinated approach towards revitalization and development of the coconut industry in cooperation with the private sector, donor community and other stakeholders.

Literature from previous studies on coconut show that the pertinent issues that have been described in this review, which have a direct bearing on this study, were transportation. Transportation affects producers and increases the marketing costs since most of the producers were found in villages which had poor transport facilities. The issue of prices increase was influenced by increased demand and supply and consumption, disorganized marketing system or lack of coordination and organization in value chain, which is also described as one of the issues which require to be investigated in this study. The issue of high profit margins to trades, high fruit wastage or poor fruit quality, needs to be examined in this study in order to assist coconut producers (farmers) in these aspects appropriately.

CHAPTER THREE

3.0 METHODOLOGY OF THE STUDY

3.1 Description of the Study Area

The study was conducted in Pangani district, Tanga and Dar es Salaam cities. Four villages in Pangani district were surveyed. These villages included Madanga, Kimanga, Bweni and Pangani Mashariki. The district was selected because of being the main coconut producer in the Tanga region. Tanga and Dar es Salaam cities were selected due to presence of the coconut markets. Two factors influenced the choice of the two regions for the study. Firstly, both regions have the connection that coconuts produced in Tanga especially Pangani district while the large part of it is transported and sold in Dar es Salaam. Coconut farming is a major income generating activity in Pangani area with vast coconut plantations accounting for over 50% of coconuts in Tanzania (Earthfoot, 2005).

Pangani is one of the seven districts in Tanga region (Fig. 4). It lies between $5^{\circ}15^{l}$ to 6° S and 38° 35^{l} to 39° E with an altitude of up to 95 metres above sea level and covers an area of 1 830.8 square kilometres. It is bordered to the North by the Muheza district, to the East by the Indian Ocean, to the South by the Coast region and to the West by the Handeni district. According to (URT, 2002), Pangani district had a total population of about 44 107. Pangani district is administratively divided into 13 wards namely Bushiri, Bweni, Kimanga, Kipumbwi, Madanga, Mikunguni, Mkalamo, Mkwaja, Mwera, Pangani Magharibi(West), Pangani Mashariki(East), Tungamaa and Ubangaa.

Figure 4: Tanga map showing location of Pangani District
Source: Wikipedia (2009)

3.1.1 Economic activities

Food crops like maize, paddy, cassava and sweet potatoes, pulses, paprika, bananas, oranges and mangoes are predominant in Pangani. These crops are cultivated on small family plots using mainly hand hoes. Coconuts and cashew nuts are grown as cash crops on large farms and small holder farmers. Table 3 shows that coconut ranks second after cassava among the most important income generating crops in Pangani district.

Table 3: Food and Cash Crop Production in Pangani District, 2006-07

Crop	Area (ha.)	Output (tons)	Value (Tshs)
Maize	2 876	5 752	-
Paddy	383	825	-
Cassava	2 482	9 712	971 200 000
Sweet Potato	25	75	7 500 000
Coconuts	12 031	3 903	780 600 000
Cashew nuts	3 821	76	22 800 000

Source: Pangani District Council (2008)

Tanga region is one of the 26 regions of Tanzania. Its Regional Headquarters is in Tanga. According to the 2002 Tanzania National Census, the region had a population of 1 642 015 people. The region is bordered to the north by Kenya and Kilimanjaro region, to the East by the Indian Ocean, to the South by Pwani and Morogoro regions, and to the West by Manyara region.

The choice of Dar es Salaam region as one of the study area was based on the fact that most of the coconuts produced in Tanga is sold in Dar es Salaam city. Dar es Salaam city has a total population of about 2 497 940 people (URT, 2002). The study was conducted in Ilala and Buguruni as the representative of the markets in Dar es Salaam while in Tanga the study was conducted at Pangani and Tanga city.

3.2 Research Design

The study employed a cross sectional research design. Cross sectional data were collected from producers' households and all participants' transactions at wholesale, retail and producer level. This design was chosen because it allows collection of in depth data on respondents at one point at a time and suitable for description purposes as well as the determination of relationships between variables (William, 2002).

3.3 Sampling

3.3.1 Selection of sampled wards and villages

The districts selected for the study were Pangani, Tanga and Ilala district. The choice of the districts and wards (Table 4), were mainly done based on the coconut production and areas which coconut value addition activities were accessible by

road. A multistage purposeful sampling procedure was employed. In Dare es Salaam, two markets were selected, Ilala market, the market which coconuts from Pangani were destined for wholesaling, while Buguruni market from where coconut traders especially retailers received coconuts. In Pangani, four wards were selected from a list of 13 wards. These wards had a higher volume of coconut production. The lists of the selected wards were obtained from the respective District Council. Wards were purposeful selected from the list based on coconut production and marketing, and easier accessibility. Similarly, a list of villages in each ward was obtained from ward government office and villages were similarly selected and included in the sampled villages.

Table 4: Selected ward and villages

Region	District	Ward	Village
1.Tanga	Pangani	Madanga	Madanga
		Kimanga	Boza
		Bweni	Bweni
		Pangani Mashariki	Pangani Mashariki
	Tanga	Ngamiani Kati	Ngamiani Kati
2.Dar es Salaam	Ilala	Ilala Buguruni	Ilala market Buguruni market

3.3.2 Selection of the chain actors

3.3.2.1 Selection of farmers

In sampling coconut farmers, a multistage sampling technique was employed, the first 4 wards, 4 villages were used. Farmers were selected purposively from the

village register depending on the farmers who had large number of coconut palms and produced a large quantity of coconuts from their farms. From each village which was selected, respondents who had coconut palms were randomly selected. The sampling frame of this category of respondents was formed by a total of 60 producers were shown in Table 5.

Table 5: Selected Villages and farmers in Pangani

Pangani villages	Frequency	Percent
Madanga	7	11.7
Kimanga	20	33.3
Bweni	23	38.3
Pangani Mashariki	10	16.7
Total	60	100.0

3.3.2.2 Selection of wholesalers

Purposive sampling was done involving all wholesalers who were found at the market. They were selected purposively while they were selling coconuts to other market traders whom they had established some sale agreements. The list of coconut wholesalers was thus obtained from the respective districts markets and formed a sampling frame 18 wholesalers, of which 6 were drawn from Tanga, 8 from Pangani and 4 from Dar es Salaam.

3.3.2.3 Selection of retailers

Retailers were selected purposively; all retailers who were operating at the market during the survey were interviewed. 8 retailers were interviewed in Ilala market and 8 retailers were interviewed at Buguruni market. In Tanga city, 6 retailers were

selected for interviews. The total numbers of retailers interviewed in both regions were 16.

3.3.2.4 Selection of consumers

Coconut consumers were selected purposively while performing transactions with retailers at Ilala and Buguruni markets in Dar es Salaam. In each of the two markets, 10 consumers were selected. Making a total of 20 consumers interviewed.

3.4 Data Collection

3.4.1 Secondary data

The secondary data were obtained from books, journals, research studies, annual reports and dissertations at various sources including the Sokoine University National Agricultural Library (SNAL), Mikocheni Agricultural Research Institute (MARI) Dar es Salaam, information from internet search, Ministry of Agriculture, Food and Cooperatives (MAFC) and Pangani District Agricultural Office. The data collected includes information on coconut production, prices of coconut and governance; organization and coordination in the value chain.

3.4.2 Primary Data

3.4.2.1 Key informant interviews

Key informants were interviewed to get information about the coconut subsector. These include the Officer in-charge of the Mikocheni Agricultural Research Institute (MARI), Pangani District Agricultural Extension Officer, Chairperson and Secretary of Mwelekeo Coconut Sales Cooperatives Society Ltd i.e. Association of coconut

brokers at Ilala market and some highly experienced coconut traders in Pangani, Tanga and Dar es Salaam.

3.4.2.2 Questionnaire survey

This data was obtained from various coconut value chain actors in the study area using structured questionnaires. Four different structured questionnaires were used to collect information, each questionnaire administered to one of the following actors; coconut farmers, coconut wholesalers, coconut retailers and coconut consumers (Appendix 1). All the questionnaires comprised a section which sought background information including, age, gender, education and occupation respondents. In addition, the coconut farmers' questionnaire contained questions about the problems faced in coconut business. The questionnaire for coconut farmers was pre-tested in Mkuranga, while that of coconut wholesalers, coconut retailers and coconut consumers were pre-tested in Temeke market. Coconut consumers were interviewed in Temeke market at the time they were purchasing coconut.

3.5 Data Processing and Analysis

Predictive Analytics Soft Ware (PASW Statistics 18.0. for Windows, version: 18.0) was used to determine distribution and the magnitude of variables among respondents including maximum, minimum, means, frequencies, percentages and cross tabulation for qualitative analysis. Quantitative analysis involved marketing margins, prices and profit margins analysis was used to data pertaining to buying and selling prices, marketing costs and costs of production.

3.5.1 Gross marketing margin analysis

According to Mendoza (1995), marketing margins should be understood as gross marketing margins. Marketing margin measures the share of the final selling price that is captured by a particular agent in the marketing chain (Scott, 1995). The marketing margin is the percentage of the final weighted average selling price taken by each stage of the marketing chain. It is a common means of measuring market efficiency through evaluating price efficiency. Marketing margin is done by comparing the difference between coconut selling prices and buying prices. There are several types of marketing margins, which are based on the market level being considered. The wholesale margin is the difference between the price paid by the wholesaler and the farm-gate or producer price. The retail margin is the difference between the price the retail trader pays and the retail price he charges to consumers. In this study the marketing margin was estimated by finding the averages price different segment and then comparing them with the final price to the consumer. The consumer price was then taken as the base or common denominator for all marketing margins. The final proportion of the final consumer price received by actors along the channel was estimated to indicate the efficiency at different nodes of the chain. The margins cover the cost involved in transferring the produce from one stage to the next; and provide reasonable return to those doing marketing.

Total gross marketing margin (TGMM) was calculated as follows;

The total gross marketing margins = TGMM = CRsp – CFsp/CRsp*100

Coconut farmer = CFsp – 0/CRsp*100

Coconut wholesaler = CWsp – CFsp/CRsp*100

Coconut retailer = CRsp – CWsp/CRsp*100

Producer/farmer GMMp = 100 – TGMM

CFsp = coconut producer/Farmers selling price

CWsp = coconut Wholesalers' selling price

CRsp = coconut Retailer selling price

3.5.2 Profit margin analysis

From each node, the profit margins was estimated from chain actors by adding the total volume of sales and subtracting all respective costs which were incurred at each node in the value chain. As a result, the actor who had more profit in the value chain had more influence than other actors. The profit margins were calculated from the total revenue obtained from the sale of coconut less the correlated cost associated with the value chain i.e. variable costs, fixed costs, transaction costs, regulatory costs: formal, informal and investment costs.

Therefore profit margin for actor i at node j was (JIij) = TRij – TCij

Where; TRij = Revenue obtained by actor i at node j:

For i = producer and j = production node

TCij = Total cost incurred by actor i at node j.

3.5.3 Marketing channels

The analysis of marketing channels intends to provide a systematic knowledge of the flow of goods and services from original producers to their final consumers (Mendoza, 1995). This was done by studying respective market functionaries and their roles in providing the product in time, form and place utility. It is argued that if

marketing channels are efficient they will induce farmers to become more commercialized (Ashimogo, 1995). Marketing channels were analyzed by looking at various chain actors at each node and movement of the coconut from point of production to the point of consumption.

3.5.4 Validity and reliability of data

In this study the problem of limited literature in coconut industry led to use literature from other crop value chains. Information from the internet was also indispensable. In addition, some wholesalers did not give consistent information regarding the volume of sales, costs incurred, quantity transported to distant markets and quantity purchased same they were afraid of being charged more by the tax collectors. Nevertheless, they provided the information on buying, selling prices and costs incurred. The researcher extenuating trying to get information which is reliable, asked the respondents several questions and also in the case of pricing maximum and minimum used the same case to retailers to whom did not give the right volume purchased or volume/quantity which they sold. Some traders (wholesalers and retailers) had a sense of disbelief in expressing information fearing tax collectors will charge them more if they know the exact information. This made them hesitant in providing information.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Overview

Descriptive statistics of the variables used are discussed in this chapter. The chapter begins by presenting characteristics of actors at each node in the value chain, organization and coordination of actors along the value chain, the analysis and comparison of price, marketing margins and profit margins at each node. Problems facing actors in the coconut value chain and the suggested solutions are also discussed.

4.2 Characteristics of the Actors at Different Nodes in Coconut Value Chain

The term actor refers to any person (e.g. farmer, trader, supplier, and buyer/consumer) who plays a role in the value chain. The characteristics that were examined in the study included age, sex, marital status, level of education, main occupation, use of produce after harvest, where produce was sold in volume and price, why they were sold to a certain actor, the marketing costs, how they were collecting information on price of coconut, major value chain actors problems and the proposed suggestions to improve coconut business.

4.2.1 Producers / Farmers' and their characteristics

Table 6 indicates that 95% of respondents interviewed were farmers, while only five percent did both farming and small business. About 83.3% of respondents were married, 13.3% were single, while the remaining 3.4% were either widowed or

divorced. This shows that most of the community members were married. While 86.6% had primary education, 14.4% had no formal education and the average age of farmers' was 47 years.

Table 6: Farmers' characteristics

	Minimum		Maximum	Mean
Age	28		78	47.28
			Total	**Percent**
Main occupation				
	Farming		57	95
	Business and Farming		3	5
Total			60	100
Marital status	Sex			
	Male	Female		
Single	5	3	8	13.3
Married	42	8	50	83.3
Widowed	0	1	1	1.7
Divorced	0	1	1	1.7
Total	47	13	60	100.0
Respondent (Farmer) Level of education by Sex				
Level of education	Sex			
	Male	Female		
None	3	3	6	10
Primary	42	10	52	86.67
Ordinary Secondary	2	0	2	3.33
Total	47	13	60	100

4.2.1.1 Coconut production and harvests from farmers

Coconut harvests usually take place in two and a half to three months coinciding with selling season (Fig. 5). This means that the income of farmers from coconut is expected at an average of every three months, thus in year, farmers' usually harvests an average of four times. Normally during December to May coconut produce a large

amount of coconuts. In this period, there is higher quantity supplied as opposed to low quantity demanded thus leading to low selling prices. On the other hand, coconut production is affected by dry spells occurring between June and November as indicated by respondents. The low level of quantity of coconut produced during dry season leads to the quantity supplied to different markets to become low leading to increased selling price and vice versa. Also the larger number of coconut in the study area is over the age of 60 years, this reduces the coconut productivity due to ageing.

Figure 5: A man climbing a palm to harvest coconuts

4.2.1.2 Coconut marketing process

The marketing of the coconut involved various activities including harvesting, collection (assembling) into large piles, de-husking, loading, transporting, offloading, grading, pricing and selling. Such activities had costs associated at each stage with transportation incurring higher costs than other value addition activities (Table 7). Most of the coconuts harvested are normally sold and a small amount (2%) is usually for farmer's consumption. The large amount (98%) of coconuts is sold to coconut traders especially coconut wholesalers who purchase fresh coconut which had not undergone any value addition activities like de-husking, sorting and grading. The sampled traders normally assemble coconuts in large piles near Pangani River or at farmers homestead (Fig. 6), followed by de-husking. This process is usually done by casual labourers (Fig. 7). The de-husking operation usually costs Tsh 5 per nut in Pangani. De-husked nuts are then transported to the markets through lorries. In the operation, traders use the same hired labour to load coconuts to the lorry.

Most of the time traders hire a 4 tons lorry with carrying capacity 20 000 coconuts at Tsh 550 000 per Pangani to Dar es Salaam trip, the coconut loading charges is 22 000 Tsh and Tsh 48 000 charged as Pangani district levy for coconuts leaving the district. In addition, Tsh 15 000 charged as Ilala or Temeke districts levy for coconuts entering the market. At Ilala market the offloading operations use hired labour costing Tsh 15 000 per lorry, then coconuts are handled to coconut brokers from Mwelekeo Coconut Sales Cooperative Society Limited (MCSCSL) who employ coconut graders for sorting and grading operations charged at 5 to 10 Tsh per coconut. Three grades are produced; grade one for big coconuts, grade two medium sized coconuts and grade three small and broken or spoiled coconuts. The

wholesaling operation is facilitated by brokers who deduct Tsh 5 to 10 per coconut depending on the negotiation between the brokers and the wholesalers. Transportation costs are most significant to the traders (retailers and wholesalers) and the fee accounts for large part of their cost as revealed in table 7 below.

Table 7: Costs associated with coconut value chain

	Actor	Activities	Cost per 1 coconut in Tsh
1	Producer	Harvesting	10
		Miscellaneous	10
		Total	20
2	Wholesaler	Harvesting	5
		De-husking	5
		Piling	2
		Loading	1
		Transport	27.5
		Offloading	0.75
		Tax and levies	3.15
		Brokers	5
		Wastage	0.1
		Miscellaneous	0.25
		Total	49.75
3	Retailer	Packaging	5
		Transport	12
		loading	5
		Off-Loading	2.5
		Tax and Levies	3.5
		Wastage	2
		Total	30

Figure 6: Harvested Coconuts in piles collected near Pangani River

Figure 7: De-husking being undertaken in Philippines
Source: Tropical traditions (2007)

4.2.1.3 Quantity of coconut produced by farmers 2005-07

The quantity of coconut produced has been declining in the last three years as indicated in Table 8. The results in the table further reveal that coconut production from 2005 and 2006 was the same but during 2007 the quantity produced dropped by 42 percent in comparison with the 2005-06. The 2008 season coconut produced had increased by 111% compared to the 2007 production. As it can be seen, income accruing from coconut has also been decreasing. However, the income generated per week increased in 2008 by 116% compared to that of 2007.

Table 8: Quantity of coconuts produced and price sold in 2005-07

Quantity produced and price	N	Minimum	Maximum	Mean	% increase	Value Tsh
Quantity produced in 2005	60	300	750 000	35 455	0	45 325
Price sold in 2005	60	40	100	66.75		
Quantity produced in 2006	60	270	740 000	36 126	1.8	46 225
Price sold in 2006	60	40	100	66.83		
Quantity produced 2007	60	250	300 000	20 796	-42	29 800
Price sold in 2007	60	40	100	74.67		
Quantity produced 2008	60	150	240 000	44 168	116	64 508
Price sold in 2008	60	30	115	75		

4.2.1.4 Quantity of coconuts sold to wholesalers

Results in Table 9 show that on average in 2008, farmers' harvest 11 042 coconuts per season that is in three months of time, with an average of 841 coconuts per week for sale. Coconut for home consumption averaged at 228 per season implying an

average of 17 nuts per week. This means that from the 11 042 of coconut produced per season, the farmer uses 228 coconuts or 2% for home consumption, the remaining 10 814 coconuts are sold to traders.

Table 9: Quantity of coconut sold and consumed by the farmer

	N	Minimum	Maximum	Mean	Mean/week
Quantity produced per season	60	150	240 000	11 042	-
Quantity Sold	60	150	240 000	10 814	841
Quantity consumed	60	10	2 500	228	17
Average price	60	30	115	75.25	75.25

Table 10 shows that 70% of the sampled producers sold coconut to wholesalers and a small proportion (8.3%) of producers sold to retailers. The large proportion sold to wholesalers signifies that the outlet was the one which most utilized and probably there was a trading relationship between producers and wholesalers. This was due to two reasons; the first one being reasonable price (28%) of producers and the second was market convenience and immediate payment (50%) With regard to proportion of producers selling to wholesalers, justifies that the wholesaler node was better in terms of price, resources and bargaining power.

Table 10: Farmers' coconut market outlets

	Frequency	Percent
Coconut customers		
Individual	13	21.7
Wholesalers	42	70.0
Retailers	5	8.3
Total	60	100.0
Reason for sale to the above		
Reasonable prices	17	28.3
Immediate payments	15	25.0
Marketing convenience.	15	25.0
Transportation is difficult (high transport costs)	13	21.7
Total	60	100.0

In some cases the farmers in Pangani sell coconut through bargaining with the wholesaler based on the quantity to be harvested and price. After reaching a compromise, the wholesaler is shown the coconut palms and allowed to harvest the agreed number of nuts. In other cases, farmers incur only harvesting/climbing costs which stood at Tsh 100 per one palm tree. Most of the farmers sold fresh coconut to wholesalers as fresh without de-husking as described earlier.

4.2.2 Wholesaler's characteristics

The characteristics of the sampled wholesaler's presented in Table 11 shows 83.3% of the respondent's age ranged from 32 to 60 years and all were males and most of whom were married. Regarding the level of education, about 72.2% of the respondents' had attained primary education while 22.2 percent had secondary education and about 6% had no formal education. The main occupation of wholesalers was revealed, 38.9% were farmers owning coconut farms and were involved in transporting and selling them in Dares Salaam. The remaining 60.1%

were involved solely in coconut wholesaling purchasing coconuts from farmers and selling them to traders i.e. retailers in the market. The sampled respondents had an average of 14.7 years of experience in coconut wholesaling business. Most of them 88.9% got start up capital (principal) from their own sources while only 11.1% got capital from their close friends. Most coconut was purchased from farmers' farm (80%), while 20% was obtained from local markets.

Table 11: Age and gender distribution of wholesalers

Age (years)		
Minimum		32
Maximum		60
Mean		44.4
Std. Deviation		9
Age categories		
30 – 40		7
41 - 50		6
51 – 60		5
Gender		
Male		18
Female		0
	Frequency	**Percent**
District		
Pangani	8	44.4
Tanga	6	33.3
Ilala	4	22.2
Total	18	100.0
Marital status		
Single	3	16.7
Married	15	83.3
Total	18	100.0
Education level		
None	1	5.6
Primary	13	72.2
Ordinary Secondary	4	22.2
Total	18	100.0
Main Occupation		
Wholesaler	11	60.1
Wholesaler, Farmer and Transporter	7	38.9
Total	18	100.0

Table 12 indicates the amount of coconut purchased by the wholesalers, revealing that an average of 24 939 coconuts about 70% from farmers were purchased.

Table 12: Quantity of coconut purchased by wholesalers'

Quantity handled	N	Minimum	Maximum	Mean	Std. Deviation
Quantity purchased from farmer in farm	18	600	150 000	24 939	2 662.07

4.2.2.1 Coconuts transportation

Transportation of coconuts was done by several means of transport from farmer's farm to the traders assembling point. Some used boats to transport coconut from villages which were found at the other side of Pangani River to the assembling point where de-husking operations were taking place. For villages found far away from the Pangani River, like Madanga and Kimanga, de-husking operations took place at the farmers' farm or homestead because some of this area transportation was difficult. Figure 8 shows the people loading coconuts into the lorry which was hired by the coconut wholesalers for transport to Dar es Salaam.

Figure 8: Coconuts from farmers are being loaded into the lorry at Pangani

However, most of coconuts from Pangani are transported to Dar es Salaam. The coconuts destined for Ilala market in Dar es Salaam are off-loaded from the lorry ready for the wholesaling operations as shown in Fig. 9 below.

Figure 9: Coconuts from Pangani were off-loaded from the lorry at Ilala market in Dar es Salaam ready for wholesaling

After offloading, the coconuts from Pangani were graded and then sold to coconut retailers through coconut brokers from Mwelekeo Coconut Sales Cooperative Society limited as described earlier. Fig. 10 shows coconuts being graded.

Figure 10: Sorting and grading coconut at Ilala market

Fig. 11 shows some of coconut retailers from various parts of Dar es Salaam purchasing coconuts from coconut wholesalers at Ilala market.

Figure 11: Retailers from various parts of Dar es Salaam purchasing coconuts from coconut wholesalers at Ilala market

4.2.3 Retailer characteristics

4.2.3.1 Distribution of sampled retailers

Retailers characteristics are presented in Table 13 indicating that the retailers' age had a mean of 47 years of age, all were male of which 98.8% had attained primary school education and 6.3% had no formal education. The average level of experience in coconut business was 14.4 years whose mean opening capital was Tsh 31 687 cash (75%) respondents used their own savings while 25% of them got cash through burrowing from friends or through credit offering institutions.

Table 13: Age, Gender and Education level of retailers

Age(years)	
Minimum	29.00
Maximum	70.00
Mean	46.94
Std. Deviation	13.52
Age categories	
20 – 30	3
31 – 40	2
41 – 50	7
51 – 60	0
61 – 70	4
Gender	
Male	16
Female	0
Education level	
None (percent)	6.3
Primary (percent)	93.8
Total	100.0

4.2.3.2 Coconut purchased by the retailers

Table 14 shows that most (50.0%) of the retailers in the study area bought coconut from wholesalers, and 25.5% bought direct from farmers. When purchasing coconuts most of the retailers (75%) paid on cash terms. It was observed that retailers bought an average of 2331 coconuts per week indicating an average of 11.5 bags per week. The fig. 12 below shows the retailing operations at the Ilala market Dar es Salaam.

Table 14: Coconuts purchases by retailers

	Frequency	Percent
Where retailer get coconut for sale		
From farmers	4	25.0
From collectors	1	6.3
Open auction sale	3	18.8
Wholesalers	8	50.0
Total	16	100.0
Points of purchases in these sources		
Roadside	1	6.3
Farm	2	12.5
Local assembly market	13	81.3
Total	16	100.0
Reasons for preferring the purchasing points		
Cheaper buying prices	11	68.8
Proximity to the market	3	18.8
Small capitals	2	12.5
Total	16	100.0

Figure 12: Coconut retailer at Ilala market

4.2.4 Consumers characteristics

The coconut consumers' mean age was found to be 39.6 years and 70% were married. On the other hand, most consumers (80%) attained primary school education and few (20%) had secondary school education. About 40% reported that they had no formal occupation since they were housewives, (20%) petty trader covering and the remaining were (20%) food seller who sells food in small restaurant (*mama lishe*), (15%) domestic servants and 5% tailor's (Table 15).

Table 15: Consumers characteristics

Standard Measure of the Sample		**Age of consumer**
Number of respondents		20
Minimum		26
Maximum		62
Mean		39.6
Std. Deviation		10.9
Age categories		**Frequency**
20 – 30		5
31 – 40		7
41 – 50		4
51 – 60		3
61 – 70		1
Total		20
Marital status	**Frequency**	**Percent**
Single	5	25
Married	14	70
Divorced	1	5
Total	20	100
Education level		
Primary	16	80
Ordinary Secondary	4	20
Total	20	100
Main Occupation		
Housewife	8	40
Petty trader	4	20
Tailor	1	5
Food seller	4	20
Domestic servants	3	15
Total	20	100

The results in Table 16 indicate that most of the coconut consumers (85%) prefer coconut to other sources of cooking oil due to its delicious nature and that it gives food a satiety value (a state in which somebody has had enough). About 5% mentioned that it is cheaper than other types of cooking oil. The size of the coconut is the leading criterion for charging different prices, in this case medium size nuts seem to be mostly preferred compared to other size categories.

Table 16: Reasons for preferring coconut than other cooking oil

Preference	Frequency	Percent
Coconut is more preferred due to		
Cheaper	1	5
More delicious	17	85
Both (i) and (ii)	2	10
Total	20	100
Size of the nuts preferred		
Small	1	5
Medium	14	70
Large	5	25
Total	20	100

4.3 Organization and Coordination along the Coconut Value Chain

4.3.1 Farmers' and traders organization and coordination along the value chain

Table 17 shows most of farmers do not have collective marketing arrangement or a coconut growers association. Thus they obtain information on coconut market price from traders (48.3%), from their neighbours (21.7%) and direct visits to the market place by (18.3%). This shows the low level of horizontal coordination through market information (21.7%). This was due to the fact that they lacked an important

organ for the farmers' linkages which will assist them, among other things, in coordinating in some aspects of governance e.g. bargaining and setting of coconut price.

Table 17: Market information and arrangement

Description	Frequency	Percent
Collective marketing arrangements		
Yes	1	1.7
No	59	98.3
Total	60	100.0
If coconut growers/farmers have an association		
Yes	2	3.3
No	55	96.7
Total	60	100.0
How farmers' got information on coconuts selling price;		
Direct visit to the market place	11	18.3
From traders	29	48.3
From neighbours	13	21.7
Hear from friends	7	11.7
Total	60	100.0

Two types of coordination were observed during the survey, vertical and horizontal coordination. The vertical coordination linked coconut farmers with wholesalers along the coconut value chain through informal contracts (33%). The study observed that about 33.3% coconut farmers in Pangani district had informal contracts with wholesalers (Table 18). However wholesalers' were well informed about coconut producers in all producing regions. The informal contracts between coconut farmers and coconut wholesalers is shown by the willingness of wholesalers acceptance to

harvest coconuts as fresh nuts and all other marketing costs the wholesaler had to incur before selling to retailers or final consumers.

The horizontal coordination among actor at each node of the value chain was fairly weak. There were no associations for coconut farmers in Pangani district thus they had therefore no influence on market prices. Similarly, there were no association for wholesalers at the district or regional level; instead they were operating individually, in both regions. The association which exists was that of coconut brokers at Ilala markets called Mwelekeo Coconut Sales Cooperative Society Limited (MCSCSL) which members have business relationship between them. It usually got information on supplies from wholesalers from Pangani districts and other wholesalers from other coconut producing regions. The wholesaler's set or negotiated the price individually with coconut brokers from MCSCSL.

Table 18: Contact arrangement with buyer/seller

	Frequency	**Percent**
Contractual arrangement with buyer/seller		
Yes	6	33.3
No	12	66.7
Total	18	100.0
Information on producer in all coconut producing areas		
Yes	14	77.8
No	4	22.2
Total	18	100.0

Most of the wholesalers (77.8%) pointed out that they had information on the buying price .i.e. farm gate price in all coconut producing regions (Table 18). They obtained marketing information from their agents (50%), 18.2% from agent wholesaler and 18.2% through brokers (Table 19).

Table 19: Sources of wholesalers marketing information

Market information obtained from	**Percent**
Agent	50.0
Agent wholesaler	18.2
Own investigation visit the area	13.7
Calling coconut brokers	18.2
Total	100.0

The sources of wholesalers marketing information were agents who were in the villages. Through their own investigation managed to access information in Dar es Salaam markets by contacting the coconut brokers by telephone (Table 19). The wholesalers in the coconut business were of the opinion that they had no objections regarding the fact that if one wanted to join the market he/she was required to have enough capital outlay for the business. This was the case with 61% of new entrants in the markets, but of which 27.8% said that business required one to be patient and commented that the business was somehow not straightforward because it also required some experience in conducting business.

In the case of coconut retailers, about 62.5% of retailers obtained information regarding selling prices from other markets which was important for them to

determine how they could sell their coconut profitably, while 31.3 % obtained market information through agents. About 25% got information through investigation and visiting the markets (Table 20).

Table 20: Retailer market information

Market information	Frequency	Percent
If retailers had Information on selling prices in other markets		
Yes	10	62.5
No	6	37.5
Total	16	100.0
Source of information		
Through agents	5	31.3
Through own investigation / visits	2	12.5
Here at the market	4	25.0
Total	11	68.8
Missing	5	31.3
Total	16	100.0

4.4 Prices along the Coconut Value Chain

4.4.1 Coconut prices along the value chain

Market price, negotiations and the forces of supply and demand were recognized by the wholesalers as the forces which determined coconut pricing at 33.3%, 27.8% and 16.7%, respectively. The producer prices were known from farmers by calling the agents and brokers as indicated by 50% and 38.9%, respectively. Factors considered by wholesalers during buying and selling operations were; price (38.9%), accessibility to the markets (33.3%) and quantity of the crop (27.8%) (Table 21).

Table 21: Coconut price setting

	Frequency	Percent
Who set price for coconut		
Wholesalers	2	11.1
Retailers	1	5.6
Market price	6	33.3
Negotiations	5	27.8
Supply and demand	3	16.7
Both Farmers and Wholesalers	1	5.6
Total	18	100.0
Criteria used in setting price		
Costs incurred	3	16.7
Supply and demand	13	72.2
Quality of the nuts, quantity of nuts supplied and on and of	2	11.1
Total	18	100.0
Knowing price from the supply sources		
Calling the agents	9	50.0
Calling the brokers	7	38.9
Prices depends on market demands and supply	2	11.1
Total	18	100.0

The study has unveiled that coconut price was lower at the producers' node and highest at the retail node. Prices at the village were lower than prices at the district level in the region. This was due to costs which traders incurred in transporting coconuts to the demand side. The wholesalers incurred about Tsh 550 000 as transport costs for 20 000 coconuts from producing areas i.e. Pangani to Dar es Salaam. Wholesalers bought coconuts at an average of Tsh 75 and sold to retailers at an average of Tsh 152 per coconut. The costs which the wholesaler incurred were composed of (Variable costs, fixed costs, transaction costs, regulatory costs and investment costs) i.e. transport, de-husking, grading, packaging, portage charges, (loading and off-loading), tax and levies, wastage, brokers charges, miscellaneous

marketing services, meals and information collection costs e.g. mobile phone. All of these made a total of 49.50 Tsh per coconut (Table 7).

Coconuts from Tanga especially Pangani, fetched low prices in comparison to coconuts from Mombasa which fetched better price in Dares Salaam because they were mature and bigger in size, probably due to the fact that coconut producers in Mombasa had the tendency of leaving coconut to mature before being harvested. That was contrary to coconuts from Pangani of which a large percentage were harvested earlier in recent times than the time required for coconut maturity. This had resulted in low quality coconuts which fetched low price at different Tanzanian markets.

Table 22 shows the maximum, minimum and the average prices of coconut for the year 2006-08, The average producer prices for one piece of coconut were Tsh 66.80/=, Tsh 72.60/= and Tsh 75.25/=, respectively (Table 22).

Table 22: Farm gate price of coconuts sold in 2006-08

Price per unit	N	Minimum	Maximum	Mean	Mean per week
Price/unit sold in 2006	60	40	100	66.83	66.80
Price/unit sold in 2007	60	40	100	72.60	72.60
Price/unit sold in 2008	60	30	115	75.25	75.25

Table 23: Average unit producer price in 2008

	N	Minimum	Maximum	Mean
Minimum unit producer price	18	30.00	110.00	60.56
Average unit producer price	18	50.00	140.00	75.25
Maximum unit producer price	18	60.00	180.00	120.56
Average unit Wholesalers' Selling price	18	120.00	250.00	152

Average unit wholesalers' selling price was Tsh 152/= (Table 23).

Before retailers bought coconuts from the wholesalers at the market they looked for the size of coconuts. The grades of coconuts were done according to the size of the coconut. Three grades were produced; grade one which was for big coconuts, grade two medium sized coconuts and grade three small, broken or spoiled coconuts. The small size and those cracked or spoiled coconut fetched relatively low prices. Buying coconuts without checking if the nuts were not spoiled or immature can lead loss to retailers. In this case they bought coconuts which were of good quality. The average unit wholesalers' price was Tsh 152 and the average unit retailers selling price was Tsh 250, or average price which consumers received from the retailer (Table 24). The costs that retailers incurred were transport cost, packaging, porterage loading and offloading, tax and levies and wastage amounting to Tsh 30 per one coconut (Table 7).

Table 24: Retailer unit buying prices minimum, maximum and mean

Buying price	N	Minimum	Maximum	Mean
Minimum unit buying price at the supply source(s)-Wholesaler	14	60.00	200.00	125
Average unit buying price at the supply source(s)-Wholesaler	14	90.00	225.00	152
Maximum unit buying price at the supply source(s)-Wholesaler	14	100.00	250.00	175
The average unit Retailer Selling price	16	120.00	400.00	250

4.5 Gross Marketing Margins Analysis along the Coconut value Chain

Results in Table 25 show the gross marketing margins for different actors in the coconut value chain. The large gross marketing margins was obtained at the retail node, probably due to the fact that retailers incur fewer costs compared to the wholesalers, who for instance incur (Variable costs, fixed costs, transaction costs, regulatory costs and investment costs) i.e. transport, de-husking, grading, packaging, porter age, transport, loading and off-loading, tax and levies, wastage, brokers charges, miscellaneous marketing services, meals, information costs e.g. mobile phone, all costing 49.75 Tsh per coconut. This had resulted in selling coconut at a price which would cover the total costs. However, sometimes due to the forces of demand and supply, when there is a higher supply of coconut at the market than the demand, wholesalers were forced to sell coconut at a low to a throw away price fearing that the likelihood of coconuts getting spoiled was higher due to further delay while waiting for the price to increase, which would make them earn very little profit. On the other hand, coconut producers have relatively lower margins probably because they incur only production cost and they sell un-husked coconuts to traders. Results show that traders were the one who set the coconut price. Because of this farmers experiencing low marketing margins. Farmer had a small participation share 30%, while retailer has higher 39.2%, indicating low distribution of market benefit in the coconut value chain (Table 25).

Table 25: Gross marketing margins and market participation share along the coconut value chain.

Marketing chain actors	Average buying price Tsh/coconut	Average selling price Tsh/coconut	Marketing margins	Participation share (%)
Producer/farmer	0	75	75	30
Wholesaler	75	152	77	30.8
Retailer	152	250	175	39.2

4.6 Profit Margins Analysis along Coconuts Value Chain

Table 26 shows the profit margins deduced from the revenue earned and costs incurred per coconut at each node in the value chain. The calculations of the revenue earned at each node were done per piece of coconut sold. While the proportions of the costs incurred at each node along the value chain were calculated using the average producer price of a coconut at Tsh 75/= (Table 25), bearing in mind that the total producer cost of one coconut was Tsh 20/= or 25% of selling price. Retailers estimated coconut to cost 12% of selling price, which was equivalent to Tsh 15 per coconut. Conversely, the cost incurred at the wholesaler level was Tsh 49.75 per piece of coconut or Tsh 4975/= per bag of 100 coconuts.

Table 26: Profit margins among actors in coconut value chain

Marketing chain actors	Revenue per coconut (Tsh)	Cost per coconut (Tsh)	Profit per coconut (Tsh)
Farmer	75	20	55
Wholesaler	110	49.75	60.25
Retailer	98	30	68

As Table 26 shows, the profit margins among actors in coconut value chain; revealed that the retailers were the one who had a higher profit margin (Tsh 68 per coconut) compared to other chain actors (farmer Tsh 55; wholesaler Tsh 60.25). This could be explained by the fact that retailers incurred least marketing costs compared to the wholesaler. The lowest profit margins were realised by farmer because they have low bargain power and the fact that most of the farmers sell un-husked coconut which receive low price of 30 to 80 Tsh per coconut. Most of the coconut farmers at Pangani depend on coconut business had no other means of earning income, hence were forced to sell coconuts at prices which were dictated by the trader, consequently obtaining low profit margins.

4.7 Marketing Channels

The way actors transfer the produce from production to where it can be used as a final product is referred to as marketing channel. Fig. 13 shows marketing channel for coconut. It shows a systematic flow of coconuts from producers to the consumers. Coconut producers were the primary producer of coconut and therefore the first point in the marketing channel. Five marketing channels were observed in the study area;

1. Producer to consumer: producers sell coconuts direct to individuals. This was done at village level. In this case, the consumer may be the co-villager who does not possesses coconut palm and occasionally urban dwellers who happen to visit the villages.

2. Producer to wholesaler: Producers sell a greater portion of coconuts to traders especially wholesalers who in turn sell coconuts in Pangani districts and Tanga city markets.

3. Producer to wholesaler: Producers sell a greater portion of coconuts to traders (distant market traders) especially wholesalers from Pangani districts, who in turn, transport coconuts to other regions like Moshi, Arusha, Morogoro and Dar es Salaam urban markets. In this channel, wholesalers are assisted by brokers in urban markets who sell coconuts to retailers and to a few consumers.

4. Producer to retailer: Producers sell coconuts to retailers who in turn, sell coconuts to final consumers. This occurs at the village level.

5. Retailer to consumers: In this chain, most of the consumers in urban markets get coconut from retailers who have permanent places at the market. For example, retailers in Buguruni market sell coconut to various consumers in Buguruni, some from Ilala district and consumers who happen to visit the market looking for coconut purchase; in this case, this occurs at all level from village, district to region.

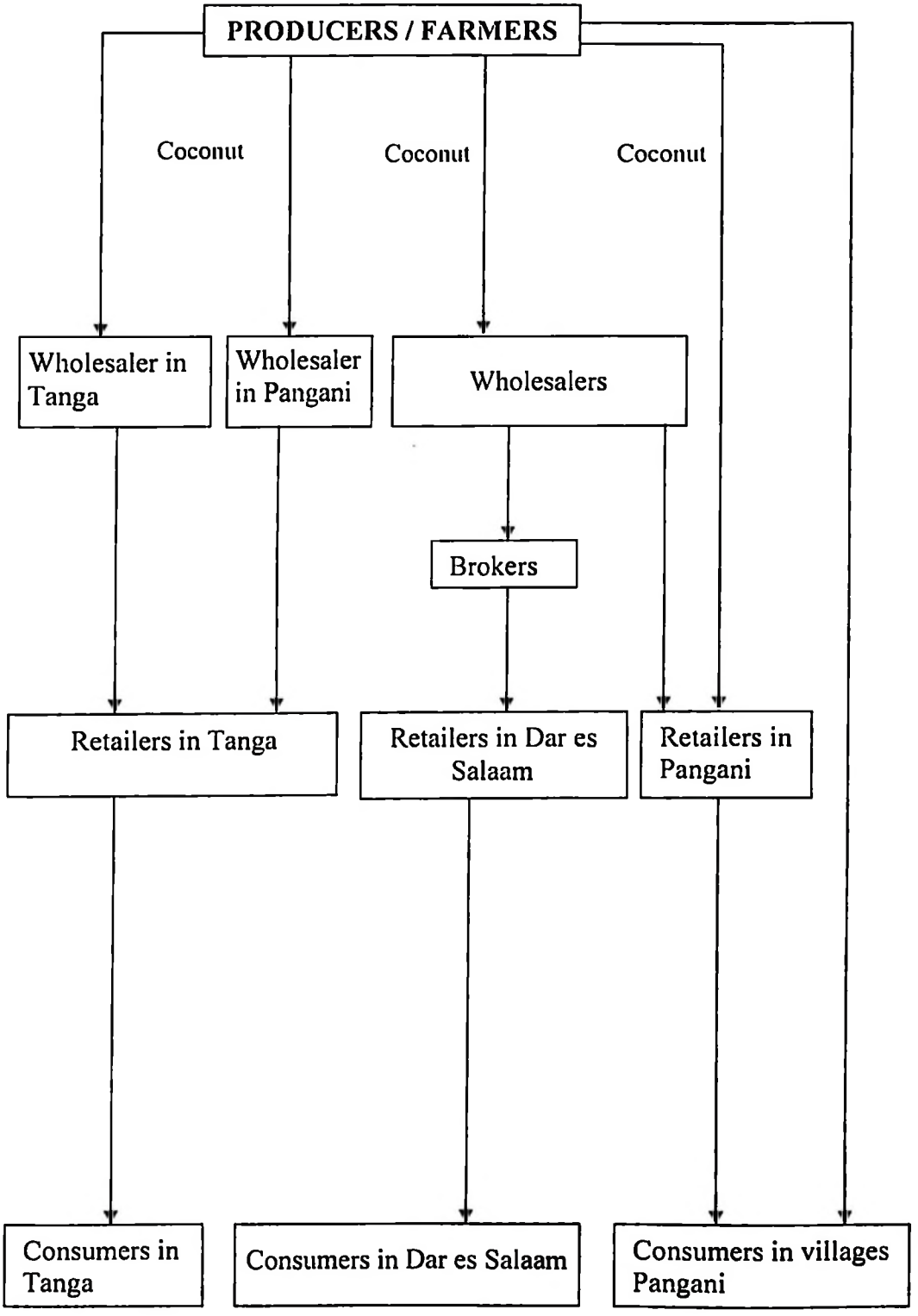

Figure 13: Coconut marketing channels in the study area

4.8 Problems Facing Value Chain Actors and the Suggested Solutions

4.8.1 Farmers problems

Table 27 shows the major problems facing coconut farmers. Most farmers (85%) mentioned the price fluctuations coupled with low prices paid to coconut as a major constraint. Other problems included the absence of coconut processing industries in the area (66.7%) for value addition and pests and diseases (53.3%) which they reported to be a hindrance in the coconut industry, the coreid bug, the rhinoceros beetle, Oliv and coconut mite were the common pests for the coconut. Furthermore lack of market (41.7%), theft of nuts (36.7%), high transport costs (18.3%), lack of farmer's organization as a means of helping coconut farmers to search for a good price, low start-up capital, lack of good seedlings, coconuts from Mombasa which create competition to the coconuts produced in the country and high tax and levies were identified to be constraints in the coconut industry.

Table 27: Farmers' problems

No	Marketing problems	Percent
1	Price fluctuations i.e. Low selling price	85.0
2	No coconut processing industries	66.7
3	Diseases and pests which destroys coconut plants	53.3
4	Lack of market and Open markets are found far	41.7
5	Theft of the nuts	36.7
6	High transport costs	18.3
7	Poor working tools i.e. Lack of appropriate farm implement tools	15.0
8	Higher costs of maintaining the farm	15.0
9	Drought which affect coconut production	13.3
10	No farmers' organization to coordinate marketing activities.	13.3
11	Lack of Capital to expand the business	11.7
12	No Coconut nurseries with good seedlings	10.0
13	Unreliable market	8.3
14	Competition due to high supply of coconut from Mombasa.	5.0
15	Spoiled coconuts	3.3
16	High Tax and Levies	1.7

However, farmers recommended the establishment of processing industries to add value and improve coconut pricing (70%), improvement of the market price of coconuts (68.3%) and provision of loan to improve the coconut business (31.7%). Other suggestions included control of coconut thefts as shown in Table 28.

Table 28: Farmers' Suggestion to the problems

No	Suggestion	Percent
1	Coconut processing industries as a means of adding value and improving coconut pricing	70
2	Increase in selling price	68.3
3	Provision of credit to improve farmers' farms	31.7
4	Establishment of markets close to farmers vicinity	30
5	Action to stop coconut theft in farmers' farm	28.3
6	Controlling coconut diseases and pests	25
7	Provision of farm implements to farmers	25
8	Establishment of coconut nurseries with good seedlings	13.3
9	Formation of farmers organization as a means of helping farmers to get a good price	5
10	High taxes should be imposed to coconut from Mombasa as they cause competition to Tanzanian coconut	1.7
11	Improve infrastructure in the market	1.7

4.8.2 Wholesalers' problems

The results in Table 29 show the constraints facing coconut wholesalers' in Pangani and Dar es Salaam. The majority (24.4%) of coconut wholesalers perceived low coconut selling price together with high transport costs (24.4%) to be the major problems facing the coconut business. This concurs with observations by Ashimogo *et al.* (1998). This was followed by high taxes and levies (14.6%) which were imposed on the coconut entering the markets making the coconut wholesalers to generate low profit margins.

Table 29: Wholesalers' problems and suggested solutions

No	Problems	Response ranking	Calculated percent
1	High transport costs	55.6	24.4
2	Price fluctuations i.e. Low selling price	55.6	24.4
3	High taxes and levies	33.3	14.6
4	Supply of immature coconuts	22.2	9.7
5	Lack of Capital to expand the business	16.7	7.3
6	Theft of the nuts	11.1	4.9
7	High grading costs in Dar es Salaam	11.1	4.9
8	Bad roads lead to difficulties in transport	5.6	2.5
9	High brokers charges	5.6	2.5
10	Poor infrastructure in the market .i.e. selling coconut in open compressed space	5.6	2.5
11	Competition due to high supply of coconut from Mombasa	5.6	2.5
	Total	228	100.0
	Suggested solutions		
1	Reduction in transport costs	50	25.7
2	Small scale coconut processing industries	33.3	17.1
3	Taxes and levies should be reduced	27.8	14.3
4	Reducing competition by imposing high tax to the coconut supply from Mombasa.	22.2	11.4
5	Supply of well matured nuts from farmers	22.2	11.4
6	Action to stop coconut theft in farmers' farm	22.2	11.4
7	Reducing grading costs	11.1	5.7
8	Improvement of market infrastructure	5.6	2.9
	Total	194.4	100.0

4.8.3 Retailers problems

Table 30 shows the retailers' problems in which spoilage of coconuts (37.5%) was ranked high collaborating Magitta (1989), low selling price (25%) and lack of capital to expand the retailing business (18.8%). The spoilage of coconuts may be due to drought, pest and diseases and the fact that most of the Pangani coconut small scale farmers have no other sources of income for livelihood. Consequently they

harvested nuts earlier than the time required. This lead to harvesting of small and immature coconuts that do not stay long before getting spoiled. Storage during transportation of coconuts to various regions was poor as it involved piling them up in the lorry, which probably led to spoilage the coconuts, enclosed tightly and lacked air. In addition, coconut farmers do not have the technology of storing nuts so that they can stay long without getting spoiled.

Table 30: Coconuts retailers' problems

No	Retailers problems ranked	Response ranking	Calculated percent
1	Spoiled coconuts	75	37.5
2	Low selling price	50	25.0
3	Lack of capital to expand business	37.5	18.8
4	Poor infrastructure in the market i.e. lack of sheds	18.8	9.4
5	Sometimes insufficient quantity supplied to the market.	12.5	6.2
6	Lack of proper records – accounting	6.3	3.2
	Total	200	100
	Suggestions	**Frequency**	**Percent**
1	Increase in selling price	10	62.5
2	Credit facility to improve the business	6	37.5
	Total	16	100.0

4.8.4 Consumers' problems

Table 31 shows the major problems faced by coconut consumers. 65% of the consumer mentioned price fluctuations which were caused by demand and supply in the market and seasonality i.e. during on-season coconuts were sold at low price while during the off season coconuts are sold at higher prices. 20% of consumer

respondents mentioned low quality of coconuts due to immaturity and size. An increase in coconut supplied to the market (40%), reasonable retail price (40%) and the supply of quality coconuts to the market (20%).

Table 31: Coconut consumers' major problems and suggestions

No	Factor	Frequency	Percent
	Consumers problems		
1	Price fluctuations	13	65
2	Low quality nuts, small immature	4	20
3	No bargaining	3	15
	Total	20	100
	Suggestion for improving the situation		
1	Increase in coconut Supplied to the market	8	40
2	Reasonable retail price	8	40
3	Supply of quality coconuts to the market	4	20
	Total	20	100

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This study aimed at analyzing coconut value chain in Tanzania, a case of Tanga and Dar es Salaam regions, in order to suggest strategies needed to improve coordination in the value chain. Specifically the study assessed the roles of actors in the value chain of coconut, assessed the coconut value chain for price and margins at each node and made suggestions to improve coordination of the coconut value chain.

5.1.1 Characteristics of coconut value chain

The characteristics of actors along the coconut value chain revealed that most of the producers' were small scale farmers with very low coconut value addition, experienced low producer price, pests and disease and lacked producer s organisation, lack of markets and those available were found far with poor market infrastructures and high transport costs. Findings also revealed that coconuts were produced in large quantities in Pangani but of less quality compared to coconuts from Mombasa due to being harvested earlier than time required to mature. Most of coconuts were sold from farmers as fresh coconuts and most of traders sold them after doing minimal value addition activity of de-husking. Most of coconut consumers were women from different occupations and mostly used coconuts for cooking purposes.

5.1.2 Actors' coordination and organization

Findings also show that most of farmers do not have collective marketing arrangement or coconut growers association that would help them, among other things, to set coconut price and deal with issues related to the development of the coconut industry. This shows low level of horizontal coordination. Thus, farmers had no influence on market prices of coconut. This perhaps has led farmers to believe that they will always get a low price when selling coconuts. The vertical coordination linking coconut farmers with wholesalers along the coconut value chain were limited to informal contracts. The coordination between traders was found to be better than coordination between producers. This makes them to be more informed about the prevailing market conditions and prices than producers. The study observed that the coconut traders are the leading actors in the chain with the ability to determine prices and influence issues related to chain governance. This is related to the fact that traders are fewer than producers and the small scale farmers are very dependent on their services to market their coconuts and thereby get money.

5.1.3 Actors' prices, marketing margins and profit margins analysis along the coconut value chain

The findings of the study indicated that prices and margins obtained by the different actors in the chain varied with retailers obtaining higher prices and profit margins. These incurred less costs compared to the wholesalers. The lowest profit margins were realised by farmers, due to the fact that they have low bargain power, the majority sold un-husked coconuts. Then again the low prices in the on season i.e. when there is high supply of coconuts is related to also the fact that there is no

coconut oil processing industry within the area to absorb part of the over production from the farmers. This had resulted to low marketing and profit margins to farmers. On the other hand transportation costs are most significant to the traders (retailers and wholesalers) accounts for large part of their cost. Producers and traders interviewed in the study mentioned that there was a serious lack of financial support for coconut traders from the local banks. This in their opinion limits their ability to expand their business thus generate more profit from coconut industry.

5.1.4 Problems which face actors along coconut value chain

Farmers faced low producer price, the absence of coconut processing industries, diseases and pests which destroy coconut plants, lack of market and those available were located far. Wholesalers faced high transport costs, low selling price, high taxes and levies, supply of immature coconuts and lack of capital to expand businesses'. Retailers complained of small immature and spoiled coconuts, low selling price, lack of capital to expand business, poor infrastructure in the market i.e. lack of sheds, and sometimes insufficient quantity supply to the market. Consumers complained of price fluctuations, low quality nuts, small immature nuts, and no opportunity to bargain.

5.2 Recommendations

Basing on discussion and conclusions, the following recommendations are made:

5.2.1 Formation of coconut producer organizations

Formation of strong producers' organisations is needed to enhance coordination capacity and build strong legal framework which will enable contracts to be treasured giving smallholders farmers a voice when negotiating with buyers of their crops. Again organizing farmers by forming association is a right move in right direction in order to improve economy of scales and reduction of overhead costs. Further more, farmers' association or producers' organization can organize and facilitate innovation transfer targeted at providing technical assistance to improve on-farm production methods, stimulate farmers to replant more coconut seedlings and facilitate the production and marketing process and encourage farmers to take on the processing and marketing functions. This will result in increased income to farmers and improve their ability to use agricultural inputs to attain higher productivity in all other crops.

5.2.2 Reinforcing coordination or linkages between actors in the value chain

The study revealed poor coordination or linkages between actors along the coconut value chain in the study area. The study recommends strengthening the existing contractual arrangements between farmers, coconut wholesalers and coconut retailers as one of the means to improve horizontal coordination since improved horizontal coordination reduces transaction costs, create economies of scale, facilitate collective learning and risk sharing and contribute to the increased efficiency. In view of the conclusion that there was a weak coordination through market information that linked producers and traders, the study recommends that the market information should be corresponded via mobile phones, radios, television, magazines and

newspapers. Reinforcing and improving/upgrading the value chain is important as value chains upgrade the vertical coordination between the different stages of the coconut value chain increases. This means that relationships will be regulated through agreements and written contracts. A contract can guarantee selling of coconuts for a price agreed in advance, sometimes, the contract includes technical assistance i.e. access to technology, credit services, or inputs from the purchaser.

5.2.3 Improving the value chain functions

To improve the value chain functions two things must happen, one, coconut processing industry must be established in the study area for value addition, to obtain high-value products like virgin coconut oil, tender coconut water, coco bio-diesel, coco wood furniture, coir carpets, coir based-products and coir matting which will fetch relative higher price. Two, marketing and related supporting agencies need to be strengthened. As value chains upgrade to high-value products evolve, contractual relationships between suppliers and buyers develop, consequently both producers or suppliers and buyers can easily switch between trading partners. Improving the value chain functions is one of the means of achieving competitive advantage, because competitiveness also is a function of value chain coordination and the existence of supporting agencies. This will help to improve the whole coconut value chain through mutual gain of all actors.

5.2.4 Infrastructure development

The surveyed areas were found to be extremely affected by poor market infrastructure and lack feeder roads. The combination of all these make farmers to

remain price takers. Because, poor roads make these areas unattractive to traders' due to high transport costs which reduces their profits' margin. To compensate traders usually offer low price to the producers. Hence it's highly recommended that effort be directed to improve feeder roads. Again available markets need to be improved to attract more traders, this will improve competitions. Establishment of markets close to the farmers' vicinity and improve market infrastructure at all rural and urban markets is recommended. This facilitates more organized markets, and improves the value chain coordination to reduce transaction cost.

5.2.5 Storage structures / facilities

Challenges facing coconut business is storage structures and the means of storing coconuts so that they can stay long without getting spoiled. It will be beneficial if farmers and traders will be provided with the technology which will help them to improve shelf life. This will help to maintain supply along the chain during seasonal fluctuations in production.

In the case of spoilage of coconuts prior to marketing due to harvesting earlier than the time required for maturity, the coconut farmers should be educated to let the coconuts mature before being harvested for consumption. Several other alternatives/means of getting income for the livelihood apart from coconuts should be advocated. This could probably reduce the temptation of selling immature coconuts. Appropriate technology and training are important for improving quality of coconuts hence increased income to producers. This could be carried out through a

private public partnership programme coordinated through the Mikocheni Agricultural Research Institute.

5.2.6 Pests and diseases

The study identified pests and lethal diseases which were among of serious problems that hinder the coconut industry. In this case farmers should be educated on the possible prevention measures. For example, the government should support them in the areas of research, extension and education, in order to minimize the risk of pests and diseases which is important for improving production.

5.2.7 Credit

In the light of the findings that producers and traders interviewed in the study mentioned that there was a lack of financial support for coconut producers and traders from the local banks. This in their opinion limits their ability to expand their business and generate more profit from coconut industry. Thus it is recommended that a priority to be given in increasing credit accessibility to smallholder coconut farmer's to meet inputs requirement. Farmers' organisations are in better position to address this problem, by acting as agencies to advance inputs like improved coconut planting materials and chemicals to smallholder coconut farmers. Also, promotion of commercial distribution of improved planting materials especially coconut intercrops that are appropriate for local conditions. Through association they could form SACCOS which would advance credits to traders and farmers.

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APPENDICES

Appendix 1: Questionnaires for important coconut value chain actors

VALUE CHAIN ANALYSIS OF COCONUT IN TANZANIA: A CASE OF TANGA AND DAR ES SALAAM REGIONS

FARMERS' QUESTIONNAIRE:

Name of Enumerator.....
Questionnaire No.....
Date.....

1. Respondent / Farmers name.....
2. Village.....
3. Ward.....
4. District.....
5. Region.....
6. Age.....
7. Sex: 1 = Male 2 = Female

8. Marital status;

1=Single	2=Married	3=Widowed	4=Divorced	5=Separated

9. Level of education (indicate by putting tick)

1=None	2=Primary	3=Ordinary secondary	4=Advanced secondary	5=Diploma	6=Degree

10. Main occupation .....

11. How do you use your produce after harvest?

	Use	Quantity/Proportion/Percentage
1.	Selling	.....
2.	Consumption	.....

12. When did you record your highest / lowest sales?

Limit	Month/season	Quantity	Price
Highest	.....	.....	.....
Lowest	.....	.....	.....

13. How often do you sell your produce?
    1. Daily.....
    2. Weekly.....
    3. Monthly.....

14. How much, at average, do you sell per transaction? Tsh.....
    In the last two years how much did you sell

2006		2007	
Amount produced (Bags, tengas)	Amount sold - Price Tsh/nuts or Tsh/bags	Amount produced (Bags, tengas)	Amount sold - Price Tsh/nuts or Tsh/bags

15. Where do you sell your produce?
    .....

16. Who sets the price for the coconut fresh nuts when selling.....

17. To whom do you sale your coconut fresh nuts?

Type of buyer	Quantity/Proportion	Average Price
1. Individual	.....	.....
2. Wholesalers	.....	.....
3. Retailers	.....	.....
4. Others (Specify)	.....	.....

18. Why do you prefer to sell your produce to any of the above?
    1. Reasonable prices
    2. Immediate payments
    3. Marketing convenience.
    4. Other (Specify).....

19. What marketing activities did you incur and at what costs?

Item		Costs
1.	Gunny bags	.....
2.	Twine	.....
3.	Tinges	.....
4.	Transportation	.....
5.	Porter age	.....
6.	Storage	.....
7.	Levies	.....
8.	Miscellaneous	.....
9.	Harvesting	.....

20. What cost do you incur in transporting one bag of coconut from the farm to the market? .....

21. Do you have any collective marketing arrangements? 1 = YES 2 = NO

22. As coconut growers do you have any association? 1 =YES 2 = NO

23. What are the benefits of the association / organization?

.....

24. How do you collect information on market price of coconut?

1. Direct visit to the market place 3. From traders 5. From neighbours
2. Hear from friends 4. Radio / Newspapers 6. Others (Specify).....

25. What are your major problems are you facing in coconut industry (rank them)

1. .....
2. .....
3. .....
4. .....

26. What suggestions do you give in order to improve the above problems?

1. .....
2. .....
3. .....
4. .....

QUESTIONNAIRE FOR FRESH COCONUT WHOLESALERS:

Name of Enumerator.....
Questionnaire No.....
Date.....

A. Respondents characteristics:

1. Respondent / Wholesalers name.....
2. Village.....
3. Ward.....
4. District.....
5. Region.....
6. Age.....
7. Sex: 1 = Male 2 = Female
8. Marital status;

1=Single	2=Married	3=Widowed	4=Divorced	5=Separated

9. Level of education (indicate by putting tick)

1=None	2=Primary	3=Ordinary secondary	4=Advanced secondary	5=Diploma	6=Degree

10. Main occupation .....

11. Type of wholesale; Private..... Organization.....

12. Duration in the business.....

13. What was your opening capital (Tsh)..... Source .....

B. Information on Marketing Channels and Structure.

14. Where do you get coconut for sale?
    1. From farmers
    2. From collectors
    3. Local markets
    4. Others specify.....

15. What are the points of purchases in these sources?

Point	Amount (Bags)
1. Roadside	.....
2. Farm	.....
3. Local assembly market	.....

16. Why do you prefer this source(s)?

    1. Cheaper buying prices
    2. Proximity to the market
    3. Homeland
    4. Any other reason (specify).....

17. What are the terms of payment to the producers?

    1. Cash terms
    2. Credit terms
    3. Both of the above terms
    4. Other (Specify) .....

18. What is the average amount of fresh coconuts do you buy on weekly basis?
    .....

19. Do you have any contractual arrangement with buyers / sellers?
    1. = YES 2. =NO

20. Do you have information pertaining to producer in all coconut producing areas?
    1. = YES 2. = NO

21. Where do you get market information?
    1. Through agents
    2. Agent wholesalers from the area
    3. Own investigation visit the area
    4. Any other sources specify .....

22. What is your opinion on the new entrants in the market?
    1. No objections
    2. Would prefer restrictions
    3. Any other opinion explain.....

23. Do you have any plan to quit the market in near future?
    1. = YES 2. = NO.

24. If Yes; - what are the reasons?
    1. .....
    2. .....
    3. .....

25. As coconut wholesalers' do you have any **association** in your area / district?
    1 = YES 2 = NO

26. What are benefits of the association / organization?
    .....

27. **Information on Pricing**

28. What is the average unit producer price at which you buy fresh nuts?
Source..... Unit price (Tsh/.....)

29. What kind of marketing cost do you incur?

Item	Unit cost (Tsh per.....)
1. Assembly	.....
2. Grading	.....
3. Packaging	
Gunny bags	.....
Twine	.....
4. Porter age	
By hand	.....
By Bicycle	.....
5. Transport	
From.....To.....	
Lorry hiring (.....Tons lorry).....	
6. Loading	.....
7. Off-loading	.....
8. Meals	.....
9. Levy / taxed	.....
10. Wastage (proportion.....)	.....
11. Miscellaneous marketing services.....	

30. To whom do you sell the produce?

1. Retailers only
2. Co-wholesalers
3. Any other customer (specify).....

31. What is the average unit selling price? Tsh..... Per.....

32. Do you charge different prices to different buyers? Explain.....

.....

33. Gross margin analysis

On season		**Off season**	
Buying price Tsh/Nuts/100 nuts	Selling price Tsh/ Nuts/100 nuts	Buying price Tsh/ Nuts/100 nuts	Selling price Tsh/Nuts/100 nuts

Information on Marketing Efficiency

34. Is the supply from the source(s) uniform over the years?

1. = YES 2. = NO

35. If no, kindly finish information on the following

Source	**Max** supply Months Quantity	**Mini** supply Months Quantity	Unit Buying **Min**	Price Selling **Max**
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....

36. What do you think are the causes of these changes? .....

37. Who set price for coconut?

1. Farmer
2. Wholesales
3. Retailers
4. Any other (specify) .....

38. What criteria used in setting price

1. Costs incurred
2. Supply and demand
3. Through auction
4. Other specify

39. What is your opinion on the existing pricing mechanism? .....

40. How do you learn about prices in the supply sources? .....

41. What is the average quantity of coconut fresh nuts sold per day?

No. of coconut fresh nuts ..... per Day

42. What factors influence the above mentioned amount?

1. Lower than expected
2. Higher than expected
3. Same as expected
4. Any other (Please specify).....

43. What factors do you consider when buying or selling coconuts?

1. Price on which you are going to sell
2. Quantity of the crop
3. Accessibility of the market
4. Others specify.....

44. What the major problems are you facing in coconut business? Rank them

1. .....
2. .....

QUESTIONNAIRE FOR COCONUT RETAILERS

Name of Enumerator.....
Questionnaire No.....
Date.....

A. Background Information:

1. Respondent name.....
2. Village.....
3. Ward.....
4. District.....
5. Region.....
6. Age.....
7. Sex: 1 = Male 2 = Female
8. Marital status;

1=Single	2=Married	3=Widowed	4=Divorced	5=Separated

9. Education level (indicate by putting tick)

1=None	2=Primary	3=Ordinary secondary	4=Advanced secondary	5=Diploma	6=Degree

10. Duration in the business.....
11. What was your opening capital (Tsh)..... Source .....

B. Information on Marketing Channels and Structure.

12. Where do you get coconut for sale?
    1. From farmers 3. Open auction sale. 5. Secret bidding
    2. From collectors. 4. Contract sale 6. Others specify.....

13. What are the points of purchases in these sources?

Point	Amount (bags / tengas)
1. Roadside	.....
2. Farm	.....
3. Local assembly market	.....

14. Why do you prefer this source(s)?
    1. Cheaper buying prices
    2. Proximity to the market
    3. Homeland
    4. Any other reason (specify) .....

15. What are the terms of payment to the producers?

    1. Cash terms only
    2. Credit terms
    3. Both of the above terms
    4. Other (Specify) .....

16. What is the average amount of fresh coconuts do you buy on weekly basis? .....

17. Do you have any information pertaining to selling prices in other markets?
    1. = YES 2. = NO

18. If Yes, how far from those markets?
    1. Rural markets 2. Urban markets

19. How do you obtain such pieces of information?
    1. Through agents
    2. Through own investigation / visits
    3. Any other sources (specify) .....

20. How do you take advantage of such pieces of information? .....

21. What is your opinion on new entrants in this market?
    1. No objection
    2. Would prefer restriction
    3. Any other opinion (specify).....

22. Do you have any plans to quit he market in he near future?
    1. = YES 2. = NO

23. Give reasons for your answer please.....

24. As coconut retailers' do you have any **association**? 1 =YES 2 = NO

25. What are the benefits of that association/organization? .....

Information on Pricing

26. What is the average unit buying price at the supply source(s)

Source	Unit price (Tsh.....)
1. Wholesalers	.....
2. Other retailers	.....
3. Farmers	.....
4. Any other sources (specify)	.....

27. If the unit of measure is not a single unit, what is the average number of nuts in such a measure or container? ..... Per nut.....

28. What kind of marketing costs do you incur?

	Item	Unit cost (Tsh per.....)
1.	Assembly	.....
2.	Grading	.....
3.	Packaging	
	Gunny bags	.....
	Twine	.....
4.	Porter age	
	By hand	.....
	By Bicycle	.....
5.	Transport	
	From ..... To	
	Lorry hiring (.....Tons lorry).....	
6.	Loading	.....
7.	Off-loading	.....
8.	Meals	.....
9.	Levy / taxed	.....
10.	Wastage (proportion.....)	.....
11.	Miscellaneous marketing services.....	

29. To whom do you sell the produce?

1. Consumers
2. Other traders
3. Any other customer (specify).....

30. What is the average unit selling price? Tsh .....Per .....

31. Do you charge different prices to different buyers? Give reasons.....

32. Gross margin analysis

On season		**Off season**	
Buying price Tsh/ Nuts /100 nuts	Selling price Tsh / Nuts /100 nuts	Buying price Tsh/ Nuts/100 nuts	Selling price Tsh/Nuts/100 nuts

Information on Marketing Efficiency

33. Is the supply from the source (s) uniform over the years?

1. YES 2. = NO

34. If **NO**, kindly finish information on the following

Source	**Max** supply Months Quantity	**Mini** supply Months Quantity	Unit Buying **Min**	Price Selling **Max**
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....

35. What do you think are the causes of these changes in supply?

36. Who set price for coconut?

1. Farmer
2. Retailers
3. Wholesales
4. Any other (specify) .....

37. What criteria used in setting price

1. Costs incurred
2. Through auction
3. Supply and demand
4. Other specify .....

38. What is your opinion on the existing pricing mechanism? .....

39. What is the average quantity of Coconut fresh nuts sold per day? .....

40. No of nuts / bags..... per Day

41. What factors influence the above mentioned amount?

1. Lower than expected .....
2. Higher than expected.....
3. Same as expected .....

42. What factors do you consider when buying or selling coconuts?

1. Price on which you are going to sell
2. Accessibility of the market
3. Quantity of the fresh nuts
4. Others specify.....

43. What are your major problems / challenges are you facing in your business?

.....
.....
.....

44. What should be done to improve the situation above?

.....
.....
.....

QUESTIONNAIRE FOR COCONUT CONSUMERS

Name of Enumerator.....
Questionnaire No.....
Date.....

1. Respondent / Consumer name.....
2. Village.....
3. Ward.....
4. District.....
5. Region.....
6. Age.....
7. Sex: 1 = Male 2 = Female
8. Marital status;

1=Single	2=Married	3=Widowed	4=Divorced	5=Separated

9. Level of education (indicate by putting tick)

1=None	2=Primary	3=Ordinary secondary	4=Advanced secondary	5=Diploma	6=Degree

10. Main occupation.....

11. Why do you prefer coconut to other sources of cooking oil?
    1. Cheaper
    2. More delicious
    3. Both (i) and (ii)
    4. Any other reason .....

12. What particular size of nuts do you usually prefer to buy?
    1. Small. 2. Medium. 3. Large.

13. Why do you prefer the size in (explain) .....

14. How many coconuts do you buy per week? Average.....

15. How much money do you spend on the nuts in above? Average Tsh.....

16. How frequently do you buy in this market?
    1. Daily..... 2. Weekly..... 3. Monthly.....

17. Besides this market, Do you get supplies from other sources? 1 = YES 2 = NO

18. If YES what are they?

1. Rural markets
2. Outside sellers
3. Peddlers/hawkers
4. Other (specify) .....

19. How do you determine the buying prices?

1. Fixed buy the retailer
2. Bargaining with the retailers
3. Other (specify) .....

20. What is the mode of payment?

1. Cash
2. Credit
3. Any other terms (specify) .....

21. How do you view the price determination mechanism?

1. Fair
2. Unfair
3. Any other opinion .....

22. What do you think could be done to improve the situation above? (Explain)

.....

.....

23. What are the major problems with regard to coconuts in this market (Rank them starting with the main problem)

1. Inadequate supplies
2. Price fluctuations
3. Low quality nuts small immature
4. Rigid pricing methods / no bargaining
5. Any other problems.....

24. What do you think should be done to arrest the situation above?

1. .....
2. .....
3. .....
4. .....

SEP

THANKS A LOT FOR YOUR COOPERATION

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