

**VALUE CHAIN ANALYSISFOR SAWNWOOD FROM ULANGA DISTRICT TO
MOROGORO MUNICIPALITY, TANZANIA**

REHEMA SELEMANI MWINYIMKUU

**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
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ABSTRACT

This study analyzed sawnwood value chain in Ulanga District and Morogoro Municipality. Specifically, the study mapped the actors along the chain, determined profit at each node and examined factors influencing profitability among actors along the value chain. The sample of 66 respondents was selected for interview from four wards based on their market relationship. Both qualitative and quantitative data were collected. Content analysis was used to analyze qualitative data and sub-sector mapping was employed to map sawn wood value chains, while SPSS computer software was used to analyze quantitative data. Results indicated that there were various actors along the sawn wood value chain but the major ones found in the study area were sawn wood producers, transporters, wholesalers, retailers and consumers as well as service providers. The profit accrued along the value chain is comparable among retailers and wholesalers but producers are far less benefiting whereby retailers take a share of 46.3% of the total profit followed by wholesalers and/or transporters who earn a share of 38.5% of the total profit while producers accrue only 15.5% of the total profit. Regression analysis revealed that price, quality of sawnwood and capital of the actors were statistically significant at ($P < 0.05$) in influencing sawnwood profitability. It is recommended that sawnwood producers should organize themselves in groups and share their capital so as to be in a position to search for the market and transport consignment to the distant markets such as Morogoro, instead of selling within the district which will help them to have negotiation leverage to wholesalers and hence maximize their profit.

DECLARATION

I, RehemaSelemaniMwinyimkuu, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work done within the period of registration and that it has neither been submitted nor being concurrently submitted in any other institution.

Rehema Selemani Mwinyimkuu
(MSc. Candidate)

Date

The above declaration is confirmed by;

Prof. J.M. Abdallah
(Supervisor)

Date

Dr. J. R. Makindara Date(Supervisor)

Mr. B. J. TemuDate
(Supervisor)

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LIST OF ABBREVIATIONS AND ACRONYMS

⁰ C	Degree Centigrade
a.s.l	Above Sea Level
AIDS	Acquired Immune Deficiency Syndrome
DFM	District Forest Manager
DFO	District Forest Officer
FAO	Food and Agriculture Organization of United Nation
FD	Forest Division
GCC	Global Commodity Chain
GMA	Gross Margins Analysis
GN	Government Notice
GOT	Government of Tanzania
GVC	Global Value Chain
HIV	Human Immunodeficiency Virus
m ³ Cubic Meter	
MEWNR	Ministry of Environment, Water and Natural Resources
mm	Millimeter
MMC	Morogoro Municipal Council
MNRT	Ministry of Natural Resources and Tourism
MR	Multiple Regression
NAFORMA	National Forest Resources Monitoring and Assessment
NBS	National Bureau of Statistics
NDC	National Development Corporation
NGOs	Non Government Organizations
SHFP	Sao Hill Forest Plantation

SPSS	Statistical Package for Social Sciences
TFS	Tanzania Forest Service
TIN	Tax Payer Identification Number
TP	Transit Pass
TRA	Tanzania Revenue Authority
TWICO	Tanzania Wood Industries Company
TZS	Tanzania shilling
UDC	Ulanga District Council
UNIDO	United Nations Industrial Development Organization
URT	United Republic of Tanzania
USD	United State Dollar
VC	Value Chain
VGC	Village Government Council
VNRC	Village Natural Resources Committee

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Demand for forest products especially sawnwood in Tanzania is growing rapidly due to factors such as expansion of construction sector and increases in infrastructure development (Nyamoga *et al.*, 2016). The demands are met through sawnwood value chains, which stretches from production to final consumers although in most areas timber is harvested unsustainably in natural forest and even in plantations (MNRT, 2015).

According to MNRT and NAFORMA (2015) assessment results it showed that total annual supply (growth) of wood at national level is estimated at 83.7 million m³. However, only about half of this, i.e. 42.8 million m³ is available for harvesting at a sustainable level out of total wood volume of 3.3 billion m³, present in Tanzania Mainland. Yet about 97% of the total volume is from natural forests and only 3% is harvested from forest plantation (MNRT, 2015).

Unlike agricultural products, timber harvesting is not as simple as felling trees (Pulhin and Ramirez, 2016). It encompasses various interconnected activities to provide wood products to the market. This is represented by a value chain that includes every effort of actors to produce and deliver a final product or service, from the suppliers to customers (Pulhin and Ramirez, 2016), and hence forms an important source of income for people living near the forests and even those located far from forests as it creates industry which provide jobs in various value adding activities along the chain such as production, transportation and processing of sawnwood products (Schaafsman *et al.* (2014). However, it

is argued that the information on sawnwood value chain are still scanty and especially in the study areas.

1.2 Problem Statement and Justification

In Tanzania sawnwood production from natural forests is mainly done by pit sawyers and licensed saw-millers. Pit sawing alone meets almost half of the total wood requirement (Kapinga, 2010). However, due to the increase in demand for sawnwood as building materials and for furniture production the majority of urban population in Tanzania will continue to depend on timber for unforeseeable future, thus increasing pressure on natural forests from where hard wood timber are exploited (Wall *et al.*, 2005). In addition, commercial timber extraction for furniture making and building materials require significant amount of wood which in turn depletes tree stocks (Malimbwi *et al.*, 2005).

There are several researches that have been done on fire wood and charcoal value chain and their flow into the urban areas such as Morogoro and Dar as Salaam (Blodgett, 2011; Kazimoto, 2015; MEWNR, 2013). But the value chain for sawnwood has received little research attention to date especially in the study area.

Ulanga District has high amount of forest cover and with high rates of forest product extraction particularly from natural forests and exotic forest plantations (Makeru, 2009). However, little is known about the value chain of sawnwood extracted in Ulanga forests. According to Pulhin and Ramirez (2016), timber value chain comprises of links or segments that are being performed by different actors and governed under both formal and informal set of rules or regulations. Along these chains there is an exchange of information among actors themselves at different levels who aim to maximize profits while meeting

social environmental, operational and economic constraints. According to Azouzi *et al.* (2012), sawnwood value chain has been dominated by large firms that have management capability required to coordinate complex relationship with suppliers and customers.

Furthermore, information on how the sawnwood value chain is organized, coordinated, and function at the key nodes, are still scanty. In addition, there is scanty information on the roles of actors and it is unclear whether revenues and profit shares are either evenly distributed among stakeholders or skewed in favour of vendors making others engage in timber business just to earn their living or for profitability. Therefore, this study intended to uncover systematic analysis of sawnwood value chain by taking all players along the chain into account.

The scientific information generated from this study may be used as baseline data for future assessments of timber value chain in Tanzania and possibly elsewhere in the tropics. The study also provides information that can serve as a basis for budget allocation to the forestry management and better use of government resources as well as providing initial information for private players who want to engage themselves in sawn wood business or establishing timber plantations.

1.3 Objectives of the Study

1.3.1 Overall objective

To analyze sawnwood value chain from Ulanga District to Morogoro Municipality, Tanzania.

1.3.2 Specific objectives

- (i) To map key actors in the sawnwood value chain in the study area,

- (ii) To determine profitability in each node along the sawnwood value chain in the study sites and,
- (iii) To investigate factors influencing profitability of the key actors along the sawnwood value chain in the study area.

1.4 Research Questions

- (i) Who are the key actors along the chain and what are their roles?
- (ii) How are the actors organized and function along the chain?
- (iii) What are the prevailing prices?
- (iv) How profits are distributed to the actors along the chain?
- (v) How products, information and knowledge flows along the value chain?
- (vi) What is the volume of products, the number of actors and jobs?

1.5 Organization of Dissertation

This study is organized into five chapters including this chapter which presents the background information, problem statements, general objective, specific objectives and research questions. The second chapter reviews literature relevant to the study while the third chapter presents the methodologies used to assess the extent to which the study research questions hold. Chapter four presents and discusses the findings of the study while the last chapter presents conclusion and recommendations based on the major findings of the study.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Theoretical Framework

2.1.1 Overview of global commodity chain

According to Gereff *et al.* (2001) Global Commodity Chain (GCC) are rooted in production system that gives rise to a particular pattern of coordinated trade. A production system which links the economic activities of firms to technological and organizational networks that permit companies to develop, manufacture and distribute specific commodities. GCC perspective highlights the need to look not only at the geographical spread of transitional production arrangement but also at their linkages between various economic agent, raw materials suppliers, factories, traders and retailers in order to understand their sources of stability and changes (Gereff *et al.*, 2001).

In addition, Gereff *et al.* (2005) described the GCC in three dimensions which are :-

- i) An input-output structure that is a set of products and services linked together in a sequence of value adding economic activities;
- ii) A territoriality, that is spatial dispersion or concentration of production and distribution networks comprised of enterprises of different size and type; and
- iii) The last is governance structure that is authority and power relationship that determine how financial, materials and human resources are allocated and flow within a chain.

Furthermore, Raikes *et al.* (2000) describe GCC in two aspects which are producer – driven commodity chain and buyer driven commodity chains. Producer driven commodity chain refers to those industries in which transnational corporation or other large integrated

industrial enterprise play central role in controlling the production system. This is the characteristic of most capital and technology intensive industries such as automobile, computer and electrical machines. While buyer driven GCC refers to those industries in which large retailers, brand named merchandisers and trading companies play the pivotal role in setting up decentralized production networks in a variety of exporting countries typically located in the third world countries(Raikes *et al.*,2000) .

However,most are characterized by consumer goods industries such as foot wears, toys, housewares and a wide range of handcrafted while maintaining their main job which is to manage these production and trade networks and makes sure all the pieces of the business are together as an integrated whole. Therefore, in this studybuyer driven commodity chain was used due to the nature of sawnwood value chain which is influenced by buyers. Buyers are the ones determine the type of timber species to be produced, size and quantity (Raikes *et al.*, 2000).

2.1.2 Global value chain

According to Gereffiet *al.* (2005) the Global value chain (GVC) research is considered as a different wayto examine how global production and distribution systems are integrated and possibilities of firms in developing countries to improve their position in global markets. Value chain analysis focuses on more than overall revenue and gross physical output, it is also very much focused on net value added, the cost build-up and value accretion as well as the distribution of burden or benefit in both actors (Kaplinsky and Morris, 2002).

2.1.3 The structure of value chain

The structure of value chain includes all firms in a chain based on their organization and linkages (horizontal or vertical), conducive environment and market

opportunities (Teischinger, 2009). Market is a starting point of value chain analysis and its end markets is people. In a chain, buyers have a powerful voice and incentive for change. Chain also operates in a business enabling environment that can be local, national or global or all at once, which includes norms, international trade agreements, and public infrastructure (Sewando, 2012; Teischinger, 2009). This study assessed sawnwood value chain enabling environment from Ulanga to Morogoro.

In addition, horizontal linkages (formal and informal) between firms at all levels in a value chain can reduce transaction costs, create economies of scale and contribute to the increased efficiency and competitiveness of an industry. Such linkages also facilitate collective learning and risk sharing, while increasing the potential for upgrading (Sewando, 2012).

Moreover, vertical cooperation reflects the quality of relationships among vertically linked firms up and down the value chain. More efficient transactions among firms that are vertically related in a value chain increase the competitiveness of the entire industry. In addition, coordination of the value chain is the act of making all stakeholders involved in the organized value chain; more emphasis is on vertical coordination supply chain (Sewando, 2012). Coordination implies a set of two or more actors who performs tasks in order to achieve stated goal (Sewando, 2012). Therefore, this study among other issues analysed how the chain is coordinated, transaction costs incurred, how risks are shared and how the economies of scale is considered along the chain (Sewando, 2012).

2.1.4 Value chain actors

According to Haverhalset *al.* (2014) sawnwood value chain involves various individuals (actors) who are connected along a chain producing, transforming and bringing goods and

services to end-consumers through a set of sequenced activities which involved in bringing a sawnwood product from the tree or forest, through processing and production, to delivery to the final consumers and ultimately disposal. This include activities such as harvesting, transport, design, processing, production, transformation, packaging, marketing, distribution and support services. In this study the sampled actors consist of harvesters/producers, traders, retailers and service providers, so as to gather information on how the chain is being organized among the key actors in-order to fill the gap of the information on the value chain organization and coordination among actors in the study area.

2.1.5 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 production to its end use(Mitchell *et al.*, 2009). Governance is about power and the ability to exert control along the value chain at any point in the chain. Some firm (or organization or institution) sets and/or enforces parameters under which others in the chain operate or abide. The rules set out so as to ensure that the actors along the chain follows the regulations which are based on standards of product and ban the actors not to produce, or supply products which are beyond the standards stated by the regulations (Mitchell *et al.*, 2009). Therefore, in this study among other issue assessment of sawnwood quality attributes and compliance along the chain was done.

2.1.6 Value chain analysis

Value chain (VC) describes the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving

a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use (Kaplinsky, 2013). Also it explains the activities and income particularly in a dynamic perspective. A value chain analyse the way in which products, firms and regions linked to the economy which determine the value addition outcomes of production systems and the capacity which individual producers have to upgrade their operations to launch themselves onto a path of sustainable income growth (Kaplinsky and Morris, 2000). According to UNIDO (2009) and (2011), value chain analysis facilitates understanding of competitive challenges, helps in the identification of relationships and coordination mechanisms, and assists in understanding how chain actors deal with powers and who governs or influences the chain, improving access to markets and ensuring a more efficient product flow while ensuring that all actors in that chain benefit.

Value chain analysis can be done in various ways and one of the methodologies is through a *filiere* approach. The term *filiere* means a “thread” and refers to a value chain, encompassing the stages from the producer of the raw material to the customer (Kaplinsky and Morris, 2000). The methods are used so as to uncover and analyze price information in the flow of a commodity from raw material to final product, through its various stages of physical transformation including processing, manufacturing, transport and storage.

The *filiere* approach specifically addresses social relations, institutional structures and political economy to complement premises of conventional economics (Anyonge *et al.*, 2011). Another approach is “win-win” perspectives, which is working within value chains and develop relationships where trust, knowledge, and benefits are shared among firms, and there is a greater likelihood of generating collective efficiency and scale (Porter, 2008).

Therefore, this study adopted the *filiere* approach because of the nature of the data that was collected which were dimensional and technical, mainly in the operations undertaken at a particular node. The other dimension which cover actors and their relationship were institutional and economic which covered the cost and benefits of operation at each stage of value chain as well as costs and benefits along the whole chain.

2.2 Empirical Studies

2.2.1 Value chain mapping

According to ILO (2009), mapping a chain means creating a visual representation of the connections between businesses in value chains as well as other market players. In its simplest form it is merely a flow diagram (i.e. illustrating the core transactions of value chains). It has a very practical implications for a value chain initiative which are:

- (i) It helps to illustrate and understand the process by which a product goes through several stages until it reaches the final customer (i.e. the core transactions). Knowing about the different levels in a value chain is also a precondition for identifying bottlenecks that are preventing the achievement of certain targets.
- (ii) It serves as a way of identifying and categorizing key market players. Such value chain maps (or inventories) have been used in projects to invite market players to various workshops and events, arrange interview appointments with them or form steering groups comprising key market players.
- (iii) Apart from businesses involved in core transactions, value chain maps can also illustrate which other supporting organizations (government, NGOs, associations, etc.) are available, and which value chain levels they concentrate their services on.

- (iv) If a value chain initiative intends to explore market opportunities, value chain maps can show up differently market channels through which products and services reach the final customer. These maps can also provide additional information on the relevance of individual market channels and the nature of relationships (e.g. number of competitors, size of market, number of workers, value chain governance, etc.).
- (v) Value chain map can help companies investing in emerging markets to orient their activities, i.e. to identify important stakeholders, possible marketing or supplychannels, competitors, weak links in the chain.

2.2.2 Sawn wood production

2.2.2.1 World leading countries in sawn timber production and consumption

According to FAO (2012), global sawnwood production totalled 413 million m³ per annum, and this production has been contributed by the five largest producers of sawn wood which are: United States of America (USA); China; Canada; Russian Federation and Brazil, of which produced half of the world's sawnwood. On the other hand Russia contribute 9%, Brazil 8%, Canada 9% and the USA 20% and China is 6%, while Sweden and the rest of EU-27 contributes about 4% and 18% respectively and the rest of the world including Africa produce a total of 26% of the world sawn wood production.

As well as being the largest producers, China and USA are also the two main consumers of sawnwood in the world, with USA being in the first position (78 million m³) and China in the second position (76 million m³), while the other three main consumers of sawnwood in the World are Brazil, Germany and Canada, followed by Japan, United Kingdom (UK), and Italy (FAO, 2012).

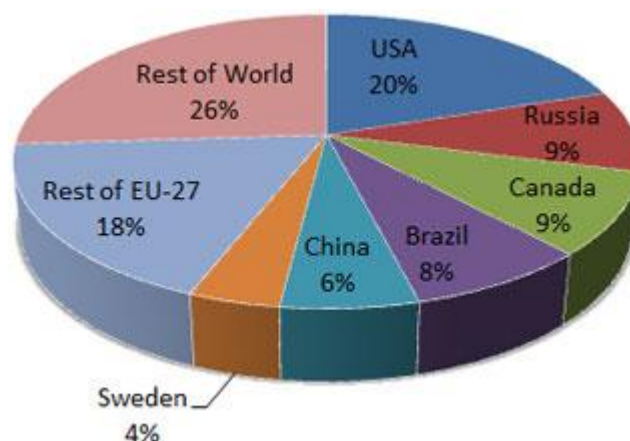


Figure 1: World leading countries in sawnwood production

(Source: adopted from FAO 2012)

2.2.3.2 Sawnwood industries in Tanzania

The industry started more than 100 years ago, when Indian settlers and missionaries owned and operated mills, which mainly utilized hardwoods. Between 1967 and 1990, most of the mills were under state ownership after the nationalization policies of 1967. However, some mills were left under private sectors. In the late 1990's, all the mills under Tanzania Wood Industries Company (TWICO) and National Development Corporation (NDC) had some operational problems and most of the mills halted their operations and finally collapsed. Due to that situation, most of mills were privatized (MNRT, 2002).

The forest industry in Tanzania has traditionally been dominated by sawmilling, and to a lesser degree, fibre board, chipboard and joinery and furniture. Earlier processing capacity of sawmills was 900 000 m³ roundwood in the country of which 33.3% is related to natural forest and 66.7% to plantations (Ngaga, 2001). Among forest industries in the country sawn wood production (saw milling and hand sawing combined) has the biggest share of the capacity standing at more than 71% followed by pulp and paper production having a share 21% and the rest is wood based products, joinery and furniture (MNRT, 2000). Though the sawnwood produced from Tanzania has low quality and quantity and

thus has low share in the international market. However, due to dwindling of common commercially used tree species, the market such as *Brachystegia* species (Wall *et al.*, 2005).

2.2.2.3 Factors influencing sawnwood demand-supply in Tanzania

There are several of factors that influence demand for wood and wood products (Nyamoga *et al.*, 2016). These include, price of the products themselves; price of substitute products; population and income levels; and trends in consumer taste and preferences (Nyamoga *et al.*, 2016). In addition most forest products are intermediate goods. They are used in other industrial processes or commercial activities (e.g. construction). Such that technological changes in these processing or end-use sectors can have a major impact on the demand for forest products through the efficiency with which they are transformed into other products (FAO, 1999). Sawnwood demand is a derived demand because it depends on demands of other goods produced using sawnwood. Therefore, the demand for sawnwood is a function of activities in different sectors that use sawnwood and its utilization intensity (Mgana, 2013).

2.2.2.4 Trees species preferred for sawn wood

Tanzania is a vast country with substantial indigenous forest resources in national parks, game reserves, forest reserves and on public land, as well as a number of industrial forest plantations with reserves that have mature trees. While the indigenous forests contain mostly broad leaved hardwoods, most of the plantations have been stocked with exotic softwoods, conifers mostly pine and cypress (Nyamoga *et al.*, 2016).

According to (MNRT, 2013) various trees species of sawn hardwood commonly found in the market of Morogoro Municipality include lesser known species such as

Pteleopsismyrtifolia (mgoji), *Berchemiadiscolor* (mkenge), *Brachystegiabussei* (msani), *Mimosopsisriparia* (mgama), *Olea europea* (loliondo) and *Albiziaschimperana* (mfuruanji). However, the most preferred trees species are *Pterocarpus angolensis* (Mninga), *Brachystegia speciformis* (Mtundu) and *Afzelia quanzensis* (mkora) (Wall *et al.*, 2005).

2.2.2.5 Trees harvesting regulations in Tanzania

People interested to harvest forest products from the indigenous forest (private or public land) in Tanzania must first be registered and pay fees. At the time of the research the registration fee for pit-sawyers was Tanzanian shillings (TZS) 256 000 per annum, with the application form which cost TZS 50000 making a total of TZS 306000 for registration only. After registering, a license is required to fell trees and royalty has to be paid on the standing volume. The royalty on Mninga and other fine hardwood is very high pegged at TZS 253520 per m³ of standing volume (URT, 2015).

2.3 Sawn wood Harvesting Procedures

2.3.1 Registration

Timber dealers (producers) required to follow procedures to legally harvest hardwood logs from natural forest in public or general land in Tanzania. At the outset, prospective timber buyers need to identify from which District(s) in Tanzania they want to harvest hardwood logs and they must then register with the appropriate District Forest Office (DFO). In order to register, timber buyers must present the DFM/DFO with their business license, TIN number, and (if relevant) company registration (MNRT, 2002), following which they will be provided with a government bills which they are required to pay a total of TZS306000 which comprises of TZS256000 registration fee for certificate of Registration

and TZS 50000 application fee for harvesting (although these cost vary annually) (URT, 2015).

2.3.2 Quotations and harvest permit for the timber

The next step is for the timber dealer to obtain a Harvest Permit. In order to do this, the timber dealer (producers) must first identify which particular village contains adequate stocks of the timber species in which they are interested. The buyer should then write a formal letter of application to the appropriate Village Council, detailing the volume(s) (number of trees he /she needs to harvest) of each timber species they are seeking to harvest. In the village, the buyer will need to fill in an application Form and pay an application form fee of approximately TZS 300000 (the price varies between villages) in cash to the Village Council. The Village Council offered a quote for the requested timber by the Village Council (not necessarily the same amount as requested can be deducted). There after the minutes will be sent to the District Harvesting Committee which then will discuss the request of dealers and then offer the quote according to the Forest Harvesting Plan of the District (URT, 2015).

Thereafter Harvest Permit will be granted and timber buyer will be required to pay for the licence to harvest forest produce based on the measurement done by forest officers which are filled in the form FD 1 attached to the minutes from the Village council. After the payment has been done then the timber harvester is required to present the licence to the village council and left a copy of it then the producer will be escorted with the village natural resources committee (VNRC) to the area for harvesting in which they will be supervising to ensure sustainable harvesting is done (URT, 2015).

2.4 Effects of Sawnwood Production on Forest Resources and Environment

According to Schaafsman *et al.* (2014), wood is the most versatile raw material which human being depends on. Throughout history, people relied on wood for several needs, varying from farming tools to building materials, from fuel to weapons of hunting and warfare.

The indiscriminate logging in the forest and uncontrolled felling of trees for sawnwood are reported to have adverse effect on the environment (Schaafsman *et al.*, 2014). The adverse effect caused by the operations of forest industries include loss of biodiversity, migration of wildlife, ecological imbalance, soil erosion, flooding, desert encroachment and disruption in hydrological cycle of water catchment area.

Tree harvesting adversely affects the population and variety of plant species in the forest especially those which are more preferred (Wall *et al.*, 2005). The removal of forest cover during logging has in some instances resulted in the scarcity or outright extinction of many important plant species. Some wild animals have also been observed to migrate from areas where tree cover was removed to undisturbed vegetation (Wall *et al.*, 2005).

Galbraith (2005) argued that there is a decreasing of valuable indigenous tree species due to logging although the demand continues to increase and the supply from indigenous forests is depleted and increasing scarcity of many of the preferred species. This is due to unsustainable harvesting and lack of the proper afforestation program especially for those preferred species such as *Pterocarpus angolensis*, *Ocotea usambarensis*.

2.5 The Conceptual Framework

Value chain is a concept and a framework for organizing and analysing information on how inputs and services are brought together and then used to grow, transform, or

manufacture a product; how the product then moves physically from the producer to the customer; and how value is increased along the way (Kaplinsky and Morris, 2002). In the chain, there are two types of actors: direct actors, who are the members of the value chain through which the product moves (such as harvesters, traders, manufacturers and consumers) and value addition activities are performed; and indirect actors, who can influence the value of the product (such as policy-makers, technical researchers and environmental advocacy groups) (Kaplinsky and Morris, 2002). Mayeta (2004), describes a conceptual framework as binding facts together which provides guidance towards collection of appropriate data. The conceptual framework of this study is detailed in Figure 2 and assumes that sawnwood value chain connects various nodes from production to consumption. Produced sawnwood are transported to different places where they can be utilized by the end consumers. In each node it is expected that various key actors such as producers, transporters, wholesalers, retailers' consumers and service providers are involved in performing different roles.

It is further claimed that these roles contribute to sawnwood profitability of which may be influenced by different factors like age, education level, Location in which the actor carried out the business, years of experience in sawnwood business, type of customers, price of sawnwood per piece, quality of sawnwood, capital of the actors, transportation cost and production cost. Also, the supporting services such as government influence business by providing necessary document and ensure compliance to rules and regulations.

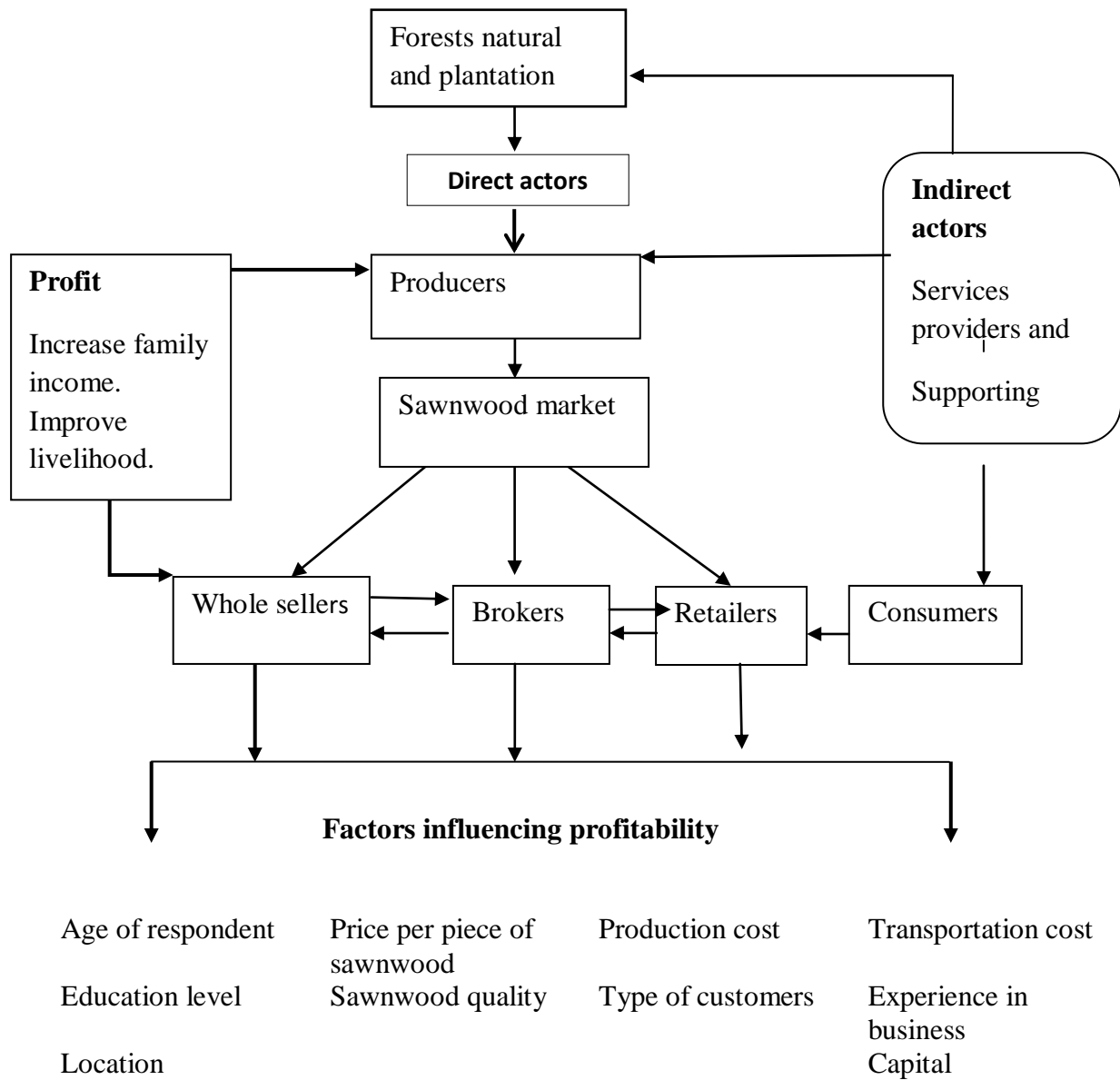


Figure 2: Conceptual framework of the study (Source: Own data)

CHAPTER THREE

3.0 METHODOLOGY

3.1 Selection of the Study Area

The study was conducted in Ulanga District and Morogoro Municipality. The sites were selected because of their close market relationship and the volume of sawnwood traded. Ulanga District is treated as the producer market (supply side), while the demand side is Morogoro Municipality which represents some of the major consumer market of sawnwood product. In addition four wards selected two were from Ulanga and two from Morogoro Municipality, whereby in Ulanga were Mwaya and Ruaha while in Morogoro Municipality were Mkundi and Uwanja wa Ndege.

3.2 Description of the Study Area

3.2.1 Ulanga District

3.2.1.1 Geographical location

Ulanga district is located on the Southwest of Morogoro Region at 35.4° to 38°E Longitudes and 8° to 10°S Latitudes. The District headquarters is Mahenge located at 312km from Morogoro Municipality and 512km west of Dar es Salaam City. It borders Kilombero District to the West and extends to the North, Liwale District to the East and Malinyi District to the South and West (UDC, 2016).

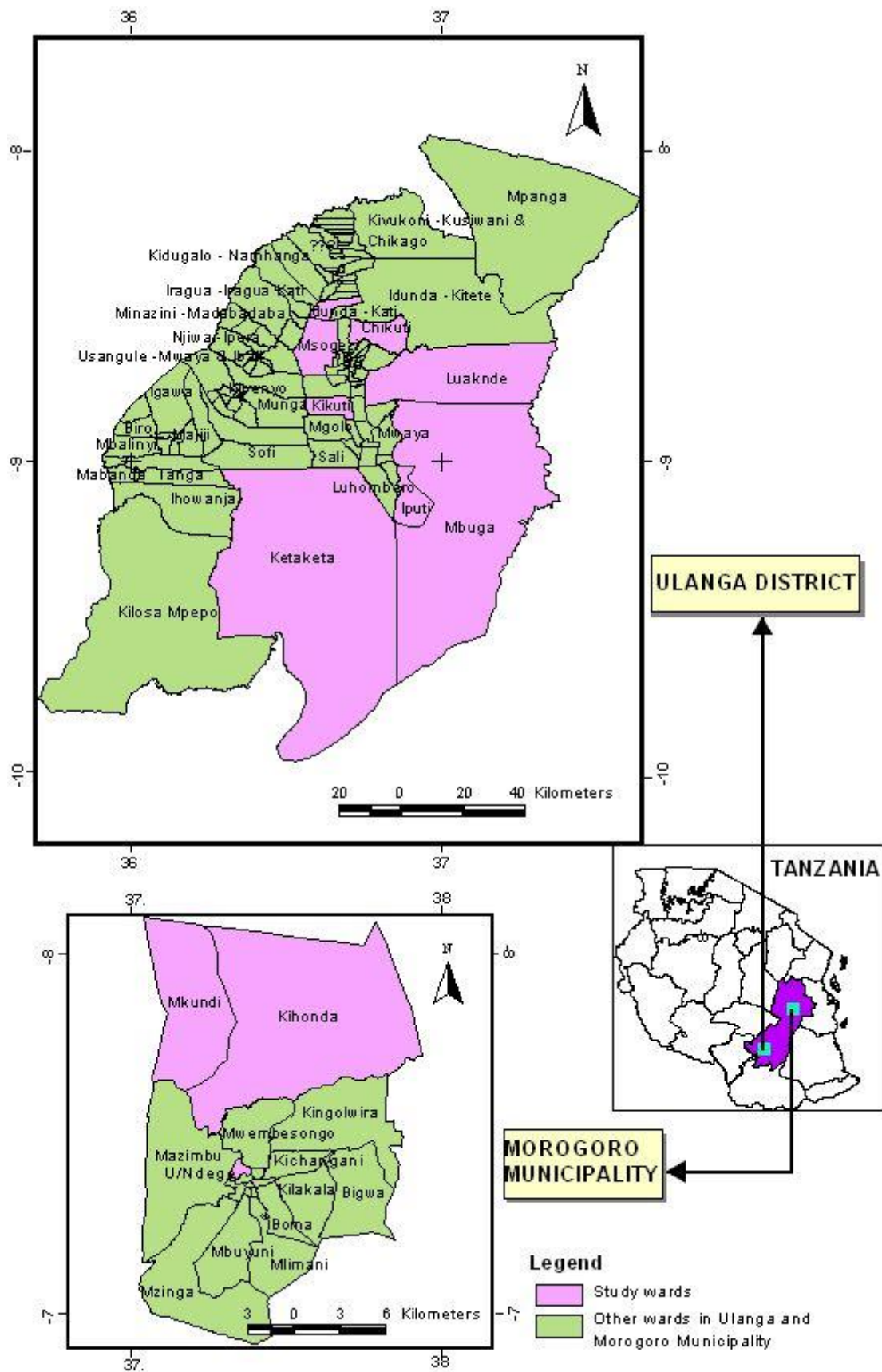


Figure 3: Map of Ulanga District and Morogoro Municipality showing wards involved in the study

3.2.1.2 Land area and administrative units

The Ulanga district has a total area of 14423 km². Seventy five percent of the total area is protected forests and wildlife sanctuaries. These include the famous Selous Game Reserve to the South and East and Kilombero (South) Game controlled area to the North and East. Ulanga District is divided into four Divisions namely; Vigoi, Mwaya, Ruaha and Lupiro. The district has 21 Wards, 59 registered villages and 222 hamlets (UDC, 2016).

3.2.1.3 Climate, soil and topography

Large part of the forest is wilderness comprising of primary submontane forests with some rocky outcrops and rocky vegetation, submontane dry grasslands and submontane wetland area. Grasslands occur on the edges of the most reserves with wetland areas throughout the forests. Vegetation cover is river line lowland and semi- evergreen drier lowland. Altitude range from 500 to 900 m.a.s.l (UDC, 2016).

Under the Indian Ocean climatic regime, the climate is oceanic with continental/oceanic temperatures. Generally the District experiences a bi-modal rainfall pattern with long rains between March and May and short rains between November and January. The average annual rainfall varies between 800 mm and 1600mm every year (UDC, 2016). The daytime temperature ranges from 18 °C min (July) to 26°C max (November). The district has three agro-ecological zones which are highlands, lowlands and the mid altitude areas. In the high land areas the soils are calcimorphic (rendzinal/lithosols) with high in organic matter content and medium in total nitrogen. They have medium levels of calcium and magnesium and low levels of potassium. And in the

mid altitude the soil is very fertile. Major land use in this ecology is crop production which takes place in the depressions with low land rice and maize being the dominant crop (UDC, 2016).

3.2.1.4 Population

According to the 2012 Population and Housing Census, the district had a population of 151001 people (males 75348 and female 75653)(NBS, 2012). The District population growth rate is 2.9% per annum. The indigenous people of Ulanga Region are of Bantu origin. The main ethnic groups in the district are Pogoro, Ndamba, Ndwewe, Yao, Ngindo and Bena. Others are Sukuma, Barbaigi, Masai, Hehe, Nyakyusa, Ha, Mwera, Chaga and Luguru (UDC, 2016).

3.2.1.5 Economic activities in the district

Employment of the people is much diversified. It cuts across from self-employed groups, non-governmental organizations (NGOs) to government employees. Some people are employed in the local and central government while others in local and international non-government organizations. However, about 98% of the district population is self-employed in various activities like farming, fishing, lumbering, mining, trade, small scale industries and charcoal production. Only 1,938 people are formally employed by the district and work in various departments such as health, agriculture, forestry, education, livestock, and community development and have been dispersed in various areas such as divisions, wards and villages (UDC, 2016).

3.2.1.6 Main source of cash income

Ulanga District as a rural district has vast economic opportunities. Agriculture sector ranked first with the selling of annual food crops being reported as the main source of

income of the rural agricultural households in the district. The industry serves 90 % of the District population in income generation for running their day to day activities, followed by other casual cash earnings, and then business income (UDC, 2016).

3.2.2 Morogoro Municipality

3.2.2.1 Geographical location

Morogoro Municipal Council is located North East of Morogoro region and lies between Latitudes 6° and 8° South of Equator and Longitudes 36° and 38° East of Greenwich. The Municipal borders to the East with Bagamoyo and Kisarawe districts (Coast region); Kilombero district to the South and Mvomero district to the North and West. Morogoro Municipality is about 195 kilometers to the West of Dar es Salaam and is situated on the lower slopes of Uluguru Mountains whose peak is about 1,600 feet above sea level. It lies at the crossings of longitudes 37° East of the Greenwich Meridian and Latitude 4.49° South of Equator (MMC, 2016).

3.2.2.2 Administrative boundaries

The Municipality lies within Morogoro district and is one of the seven councils of Morogoro region. Other districts are Kilosa, Kilombero, Ulanga, Gairo, Mvomero and Morogoro District. The Municipality has only one Division which is sub divided into 29 administrative wards and 302 streets (MMC, 2016).

3.2.2.3 Population and ethnicity

According to population and Housing Census of 2012, the population of Morogoro Municipality was 315,866 people on the ratio of 52.15% women (164,166) and 47.85% men (151,170), the growth rate in the Municipality is 4.7% per annum (NBS, 2012) and the majority of the indigenous population belonged to the Luguru tribe (MMC, 2016).

3.2.2.4 Economic activities

Major economic activities include: industries of primary and secondary level, subsistence and commercial farming, small scale enterprises and commercial retail as well as wholesale. However, these sectors are not enough to accommodate all the residents and therefore others are engaged in economic activities such as farming, livestock keeping, forestry, fisheries, manufacturing activities and business; while other people depend on public service employment. The main agricultural cash crops are sisal, rice and maize, which are grown in the neighboring districts and the periphery of the Municipality. Food crops include maize, rice, vegetables, fruits and yams in the agriculture sector which employ and supplement the income of 31.7% of the population (MMC, 2016).

3.2.2.5 Poverty

Poverty is the major challenge to the development of the Municipality (MMC, 2016). This has been attributed by the following factors such as low productivity in economic activities such as agriculture, livestock and business enterprises, diseases such as Malaria and HIV/AIDS, low educational level to the community and lack of entrepreneurship skills among the community member as well as poor infrastructure (MMC, 2016).

3.2.2.6 Climate and topography

Despite the variation of climatic conditions throughout the year, the weather in Municipality is still attractive because of its high altitude. Morogoro experiences average daily temperature of 30 degrees centigrade with a daily range of about 5 degrees centigrade. The highest temperature occurs in November and December, during which the mean maximum temperature is about 33 degrees centigrade. The minimum temperature is in June and August when the temperatures go down to about 16 degrees centigrade. The mean relative

humidity is about 66% and drops down to as far as 37%. The total average annual rainfall ranges between 821mm to 1505mm. Long rains occur between March and May and short rains occur between October and December (MMC, 2016).

3.3 Research Design

Non experimental design was used whereby a cross sectional survey was employed based on the nature of the study in which the data were collected only once at a point (Battaglia, 2011; Kothari 2004; Mugera, 2013). The population of sawnwood value chain actors were stratified and in each stratum the main groups, such as forest owners (private and public) producers, (harvesters) traders (whole seller and retailer), were interviewed. This allows the collection of in depth data on respondents at one point in a time and suitable for description purposes as well as the determination of relationships between actors. Moreover, the design is suitable because it is fast and can accommodate large number of study units at low cost (Casley and Kumar, 1988). In this study, questionnaire was the main tool for data collection and supplementary information were captured by personal observations and checklist during Key Informants Interviews (KII).

3.4 Sampling Techniques and Sample Size

Based on time allocated to conduct the study and resource available; two wards from Ulanga District and two from Morogoro Municipal were purposively selected. These included Mwaya and Ruaha wards in Ulanga District and in Morogoro Municipality were Mkundi and Uwanjawandege wards. The selection of the wards was based mainly on production and marketing of the timber business. The sampling unit for this study was the key actors along the chain (households dealing with the sawnwood business activities). The population of sawnwood value chain actors was stratified and in each stratum random

sampling was employed to select actors such as sawnwood producers and retailers. While purposive sampling technique was used to select whole sellers.

3.5 Sample Size Determination

The sample size of actors was determined by using the following formula as suggested by Lusambo (2009).

$$N = \frac{N_0}{FPCF} \dots\dots\dots(1)$$

$$N_0 = \left(\frac{Z^2 Pq}{e^2} \right) \dots\dots\dots (2)$$

$$FPCF = 1 + \frac{N_0}{N} \dots\dots\dots(3)$$

$$\text{Therefore } n = \frac{\frac{Z^2 pq}{e^2}}{1 + \frac{\left(\frac{Z^2 pq}{e^2} \right)}{N}} \dots\dots\dots(4)$$

Where:

N= is the population size,

Z= Z statistic for a level of confidence, at which the data are going to be tested.

For the level of confidence of 95%, which is conventional, Z value is 1.96

e = Precision or error.

n= is the required (adjusted) sample size i.e. sample size for finite population.

no= is the sample size for infinity population

FPCF=Finite population correction factor

According to Lusambo (2009) it is recommended, that for a finite population (small population) the finite population correction factor (FPCF) should be incorporated in the standard formula in order to reduce standard error. The population is said to be finite if

sample size (n) > 5% of population (N). Table 1 below shows how respondents were selected using the sample size formula in equation 4.

The sample of 66 respondents from different categories was drawn for interview which includes: 26 producers, 29 retailers and 11wholesalers/transporters. The sample size was reasonably large especially in conforming with Bailey's (1994) argument that around 30 cases seems to be the minimum for studies in which statistical data analysis is to be done.

Table 1: Number of respondents selected from each study site

Total number of actors found	Morogoro Municipality	Ulanga district	Sample
Producers	0	30	26
Whole sellers	0	12	11
Retailers	34	0	29
Total respondents	34	42	66

3.6 Data Collection

3.6.1 Primary data

Primary data were collected using five sets of questionnaires (Appendix 1 –5) that were designed with respect to each actor along the chain. The researcher used interview method through questionnaires administered to 66 respondents who were doing different activities along the chain. This method was useful to the researcher since it helped to obtain information even from respondents who have difficulties in reading and writing. These questionnaires were supplemented by personal observation whereby the researcher observed various activities done by actors in the field such as sawnwood producers, transporters, wholesalers and retailers. Also, one checklist (Appendix 5) for Key Informants was designed for the forest officials from TFS agency and district councils, and some highly experienced sawnwood dealers in Ulanga District and Morogoro Municipality. Prior to the main survey, a pre-testing was done in order to test the validity of the questionnaires. A pretesting exercise was done to establish sampling frame, determine approximate time required in completing a questionnaire and conducting situational analysis of the study area.

3.6.2 Secondary data

Secondary data were collected from different sources including books, journals, research studies, office records, published reports/papers, internet and national library which help to draw inference from what has been observed in the field.

3.7 Data Analysis

Qualitative data obtained from interviews, notes from researcher and observation were analysed using content analysis method. Ideas and responses were summarized, synthesized and reviewed against literature accessed to draw inferences on the matters in question. Quantitative data obtained from questionnaires were entered, coded and analysed using Statistical Package for Social Sciences (SPSS) and presented using descriptive statistical tables, percentages, charts and graphs.

3.7.1 Sub-sector mapping analysis

Sub-sector mapping analysis was used to map sawnwood value chain linkages between actors, producers' retailers and whole seller activities in the value chain. The aim was to visualize networks in order to get a better understanding of the connections between actors in a value chain, demonstrate the interdependency between actors and processes in the value chain and create awareness of stakeholders to look beyond their own involvement in the value chain (Michael *et al.*, 2010). The analysis was extended by mapping the specific positions and roles of each actor in value chains and identifying their specific constraints and opportunities. It was important to study the characteristics of chain actors in order to comprehend how they influence the value chain performance.

3.7.2 Analysis of gross margin of actors along the sawn wood value chain

According to Acharya *et al.* (2005) gross margin (GM) is defined as the difference between total revenue and total variable costs. It is used as a measure of enterprise profitability and means of selecting business plans. The size of GM depends on the services provided,

market structure, market price, perishability of the product as well as the distance between producers and consumers and may be influenced by market information especially for short-run margins. According to Eskola (2005) Gross Margin Analysis (GMA) is one of the widely used analytical techniques for planning and analysis of projects by advisors, consultants, researchers and producers.

Therefore, at each node, the profit received by each value chain participant was calculated as the total revenue for each participant minus his/her total variable costs. Variable costs include the purchase of sawnwood, costs associated with production, marketing and transportation, taxes, fees, and vehicle, facility or equipment rental. The gross margin for actor i at node j (PM_{ij}) was calculated as;

$$PM_{ij} = TR_{ij} - TVC_{ij} \dots \dots \dots (5)$$

Whereby:

TR_{ij} = Total revenue obtained by actor i at node j

TVC_{ij} = Total variable cost incurred by actor i at node j

3.7.2.1 Marketing margin analysis

According to Mendoza (1995) and Pheng (1990) a marketing margin is the percentage of the final weighted average selling price taken by each stage of the marketing chain. It is calculated as the difference between producers and retail prices. When there are several participants in the marketing chain, the marketing margin is calculated by finding the price variations at different segments and by comparing them with the final price to the consumer. The consumer price is then the base or the common denominator for all marketing margins. Comparing the total gross marketing margin (TGMM) is always related to the final price or the price paid by the end consumer and then expressed as a

percentage (Acharya *et al.*, 2005).Marketing margins for the various sawnwood traders were estimated using the following formulas.

$$\text{TGMM} = (\text{CP} - \text{PP})/\text{CP} \times 100 \dots\dots\dots (6)$$

$$\text{GMM}_i = (\text{SP}_i - \text{SP}_{(i-1)})/\text{CP} \times 100 \dots\dots\dots (7)$$

$$\text{GMMP} = 100\% - \text{TGMM} \dots\dots\dots (8)$$

$$\text{NMM} = \text{TGMM} - \text{TMC} \dots\dots\dots (9)$$

Whereby:

TGMM = Total Gross Marketing Margin in %;

CP= Consumer Price;

PP = Producer Price;

GMM_i = Gross Marketing Margin of *i*th agent at a given point in the chain;

SP_i = Selling Price by *i*th agent at a given point in the value chain;

SP(*i*-1)= Selling Price by a preceding agent (*i*-1), which is a buying price paid by *i*th agent at a preceding point in the chain;

GMMP= The producer participation margin;

NMM = The Net Marketing Margin; and

TMC = The Total Marketing Charges expressed as percentage of retail price

3.7.3 Analysis of factors influencing sawnwood profitability among chain actors

In determining factors influencing sawnwood profitability, multiple regressions (MR) analysis was used. The MR model was used because of the nature of data in which the dependent variable was measured on a continuous scale, there were more than one independent variables and the relationship between dependent and independent variables was expected to be linear. The MR equation was specified as;

$$Y_i = \alpha + \beta_1 \text{ AGE} + \beta_2 \text{ LCTN} + \beta_3 \text{ EDU} + \beta_4 \text{ EXP} + \beta_5 \text{ PRICE} + \beta_6 \text{ CUSTOMERS} + \beta_7 \text{ PCOST} + \beta_8 \text{ TCOST} + \beta_9 \text{ QUALITY} + \beta_{10} \text{ CAPITAL} + \epsilon \dots \dots \dots (10)$$

Whereby:

Y_i	Sawnwood profitability in TZS measured as a gross profit of the actor;
α	Constant term;
β_1 - β_{10}	Coefficients of the independent variable;
(AGE)	Age of the respondent
(LCTN)	Location in which the respondent carried out the business
(EDU)	Education level
(EXP)	Years of experience in the business
(PRICE)	Price per piece of sawnwood
(CUSTOMERS)	Type of customers
(PCOST),)	Production cost,
(TCOST)	Transportation cost
(QUALITY)	Sawnwood of good quality and
(CAPITAL)	Capital of the actor

3.8 Limitations of the Study

There were various factors that limited this study especially during the data collection:

- (i) Normally there are irregular patrols conducted by forest officers in Ulanga District and Morogoro Municipality in which those timber dealers who are caught doing timber business without legal permission or license are taken to the court for disciplinary action. This made respondents difficult to believe that collected information was for studies or for the government purposes. So they were afraid of being criminalized by providing information. Therefore, the

researcher had to spend a lot of time with respondents to explain the purpose of this particular study.

- (ii) Most of the interviewees had no records of data for their business. A few of them had managed to keep records for a short period of not more than a month. Therefore, most of the information they shared was based on memory and some of them were not willing to release such information as they claimed that business owners were not around and hence they were not allowed to release information. Therefore, it took some time to enlighten respondents about the objective of this study so as to make them willing to provide their business information they had and to give out what they knew or remembered about their business. This situation helped to clear their doubts and hence improve their response rates.

Despite those limitations the researcher has managed to collect the required information.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

This chapter is divided into four sections. The first section outlines the chapter overview. The second section including mapping of actors which describes the sawnwood value chain actors, their roles and socio-economic characteristics. The third and fourth sections deal with sawnwood profitability whereby; the third section covers the profit margin analysis at different nodes of sawnwood value chain while the fourth section deals with factors influencing sawnwood profitability among actors.

4.1 Mapping of Value Chain Actors, their Roles and Socio-economic Characteristics

Sawnwood value chain comprises a range of actors. They include Forest Service Providers, sawnwood producers, transporters/wholesalers and retailers. The number of actors along the value chain is a function of the routes followed by sawnwood from producers to consumers.

4.1.1 Mapping of the actors in timber value chain

Sawnwood value chain is a complex with multiple products and comprises of a number of participant (actors) i.e. producers, transporters, wholesalers, retailers and service providers. This shows high intensity of value addition and complex interactions among actors and chain service providers in Ulanga Districts and Morogoro Municipality.

A range of production and marketing functions are undertaken in the sawnwood value chain including are production, transportation, processing, retailing and consumption (Fig. 4). The actors involved are presented as nodes within the space of the value chain map. Other actors are production and business support services which are service providers,

policy, and security at the market places, financial services and extension services (forest officers).

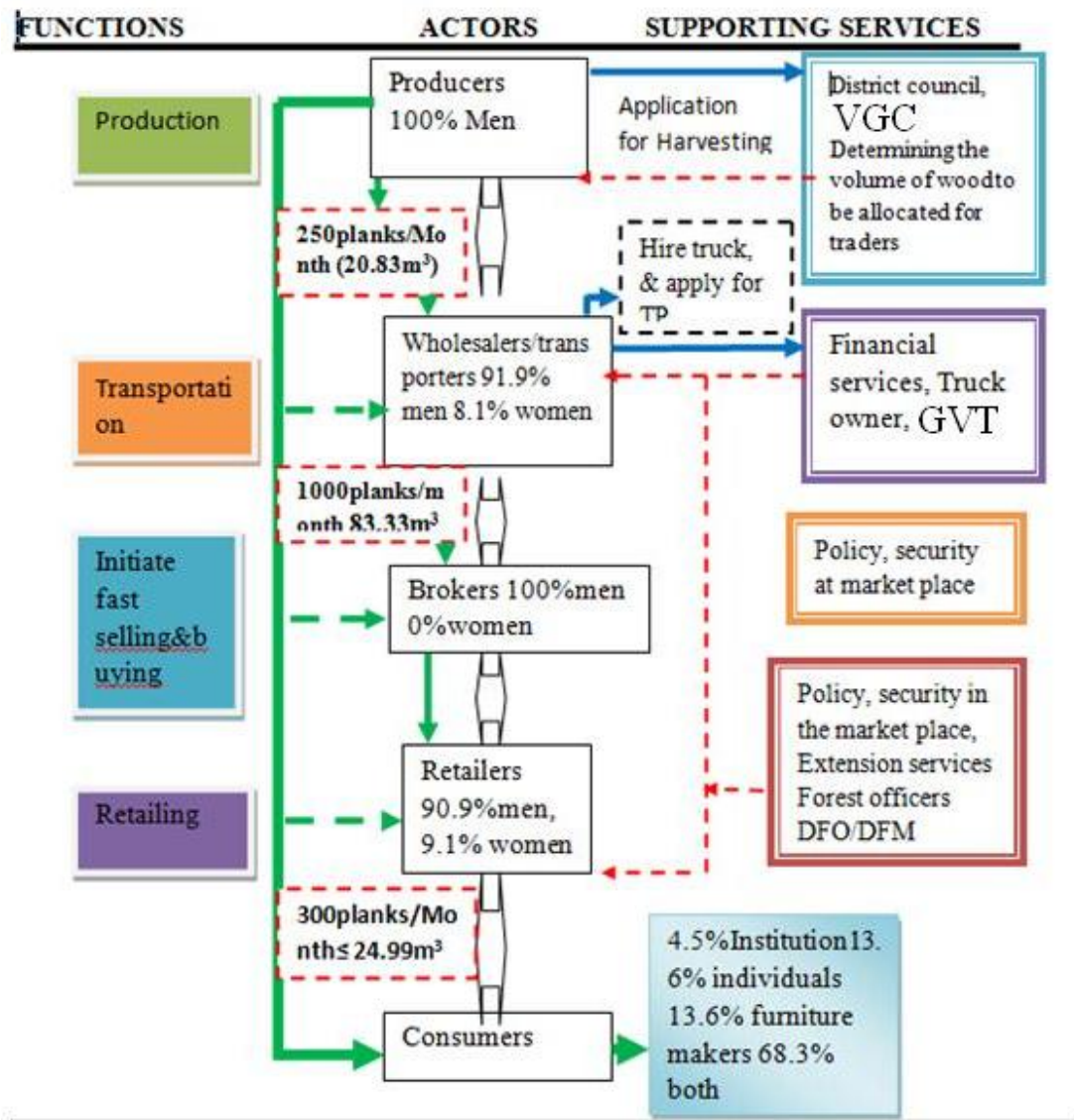


Figure 4: Sawnwood value chain map in Ulanga District and Morogoro Municipality

Key → Sawnwood flow

- - - - - Services flows

→ Service acquired by Actors

4.2 Socio-economic Characteristics of Value Chain Actors

4.2.1 Socio-economic characteristics of producers

The survey results as indicated in Table 2 show that all sampled sawnwood producers

(100%) were males. This suggests that, production activities are gender sensitive, and such a trend could be attributed by the nature of activity as it involves several aspects which include staying at production sites for a month. These production areas are not conducive to women as they exhibit harsh conditions. Most of the production sites are located in remote areas and mainly in thick forest. This is an indication that sawnwood producers have to stay in the forest for a months until the volume paid for harvesting is complete. In addition they are required to stay in that areas to ensure the security for the sawnwood harvested since some sawyers (casual labours hired to saw logs) are unfaithful and can sell the sawnwood to another client without the permission of the owner of the licence for harvesting forest produces.

Table 2: Socio-economic characteristics of sawn wood actors

Furthermore, the results show that a large number of sawn wood producers (61.5%) were aged between 31 and 45 years. Age is a very important variable in production and it is evidently known that young people (30-49) are more energetic than old people (Kitasho,

Actors	Producers	%	Whole	%	Retailers	%
Item	(n=26)		sellers(n=11)		(n=29)	
Age						
18-30	3	11.5	1	9	0	0
31-45	16	61.5	7	63.6	8	27.6
45-60	7	27	2	18.4	19	65.5
>60	0	0	1	9	2	6.9
Gender						
Male	26	100	10	90.9	27	93.1
Female	0	0	1	9.1	2	6.9
Marital status						
Married	23	88.5	10	90.9	28	96.5
Single	3	11.5	1	9.1	1	3.5
Education level						
Primary school	16	61.5	6	54.5	20	68.9
Secondary school	10	38.5	5	45.5	6	20.7
College	0	0	0	0	2	6.9
University	0	0	0	0	1	3.5

2013). These men and young age group domination in sawn wood production may be ascribed by gender roles and responsibility based on the local culture. This evidence supported by Hulusjö, (2012), who argued that sawn wood producers in Vi plantations were all males. In this study, it is worth noting that sawn wood production is a laborious undertaking, hence requiring physically strong and active people and may require putting them away from home over extended period of time, sometimes from one to three months or more.

The findings are similar to that of Anyonge *et al.* (2011) who found that the direct actors along the sawn wood value chain in Kenya were predominantly young male adults. This may partly explain why the active age group of men are more likely to play central role in timber production (timber production here means cutting trees and slice into sawn wood) leaving women at home to take care of the family.

Therefore, it should be noted that men's strength is assumed to be greater than women's in physical work and therefore it determines the tasks carried out in day-to-day activities and directly affecting the specific activities of the sawnwood value chain. Although, it was not established in this study, it can be hypothesized that women are generally excluded from these activities as their being conducted in remote locations and high a number of women in the population was not expected to be involved due to the physical nature of the activity.

Education wise, it was found that 61.5 % of sawnwood producers were attained primary education and 38.5% of producers had attained secondary education (Table 2). The larger number of people with primary education and others having just attained secondary education suggests that sawnwood production has been considered as self-employment by the majorities who have not been employed in the formal sectors and who did not get a chance to advance themselves in education (Kafakoma *et al.*, 2009).

Regarding respondents' marital status the results show that 88.5% were married (Table 2). This suggests that considering the age group and marital status, sawn wood production is largely done by mature people who are more likely to depend on sawn wood production as one of the sources of income to the family.

4.2.2 Socio-economic characteristics of transporters/wholesalers

The results of this show that there was male dominance in wholesalers/transporter's gender composition (Table 2). The proportion of female timber wholesalers/transporters in the study area was only 9.1% while the rest 90.9% were males. This indicates that transportation activity is mostly preferred by men. This job is time consuming because it takes from one day to more than two days on travelling, so it is not convenient to most of the women who have a lot of family engagements. The results are in line with that of Kapinga (2010), who argued that sawn wood transporters from Mufindi spent about two to three days on transit before reaching to the market.

Furthermore this situation could be attributed by the laborious nature of the business, which involves travelling to remote production sites to collect sawnwood and returning back to the town to arrange for the transport and then transporting to the selling points. This result is concurred with previous study done by Anyonge *et al.* (2011) who argued that most transporters of sawnwood are males (91%) and only 14% are females. In addition it was discovered that women are occasionally involved in sawnwood transportation and they only coordinate the contracted transport.

With regard to education half (54.5%) of the sampled wholesalers/transporters had attained primary education and another half (45.5%) secondary education (Table 2). As far as age composition is concerned, it was revealed that 63.6% of sampled wholesalers/transporters were aged between 31 and 45 years and the rest (9%) were aged

between 18 and 30 as well as 18.4% were aged between 46 and 60 while aged above 60 years were only 9% (Table 2).

Like the sawnwood producers whom mostly comprised of married people, 90.1% of the sawnwood wholesalers/transporters were married. This implies that, due to their social and economic commitments which includes ensuring of daily basic needs such as food availability for family members, better housing, education cost for children, clothing and acquisition of better health services, married couples are more likely to engage into sawnwood whole selling/transportation as one of the income generating activities. These observations are likely to translate into inequitable monetary gain in sawn wood value chain based on gender, level of education and marital status in the study area.

4.2.3 Socio-economic characteristics of retailers

The results as presented in the Table 2 show that, there were sex disparities in sawnwood trading activities in the study areas. It was revealed that, there was large number of males 90.9% than female 9.1% who involved in retailing timber business. This result is similar to that of Mgana(2013) which shows that sawnwood trading in Dar es Salaam was male dominated in which out of 51 respondent interviewed 41 respondent were males and only 10 were females. Whereas 95.5% were married and only 4.5% were single this has implication that timber retailing business has much contribution to family income hence married couples involved in the business to generate income which will sustain their family responsibilities.

Furthermore, the results revealed that (65.5%) of sawnwood retailers were aged between 46 and 60 years while 27.6% were aged between 31 and 45 years and 6.9% were age above 60 (Table 2). This implies that sawnwood retail business is dominated by the middle aged people. This is probably because middle aged people are more active and have more

responsibilities and probably at that age people have accumulated more capital enough to deal with sawnwood retailing business which is capital intensive. Similar findings were reported by Azouzi *et al.* (2012).

About 68.9% of sampled timber retailers had attained primary education, 20.7% had attained secondary education and 6.9% had attained college education while 3.5% had attained University education (Table 2). This implies that sawnwood retailing business can be done with people of all levels of education.

4.3 Roles of Value Chain Actors

4.3.1 Sawnwood producers

These are the main key actors within the production section of sawnwood Value Chain in which they provide labour for sawnwood production. The findings show that sawnwood producers can either be contracted by transporters /whole seller or work on their own selling their product individually. Producers either consider sawnwood production as their main economic activity. However, at the outset, prospective sawnwood producer need to identify themselves from which village in the District they want to harvest hardwood logs; they must then register with the appropriate District Forest Office (DFO/ DFM). Before starting harvesting they need to have Certificate of Registration which is compulsory for any one engaged in forest product trade as well as business license, and TIN number as stated by the Forest Act 2002 (MNRT, 2002). The certificate of registration is valid for one financial year that is issued in July and expires end of June the following year. After registering, a license is required to fell trees and royalty has to be paid on the standing volume and valid for thirty days only from the issuing date.

Furthermore results presented in Figure 4 shows that 76.3 % of the producer harvest trees

from government forest which is in public land as their main source for sawnwood production and only 23.7% harvest trees from both sources that is private forest such as own farm and public land. Similar results were reported by Kapinga (2010) who claimed that majority of the producers (49%) were operating in Sao Hill Forest Plantation (SHFP), while private woodlots contributed 35% and only 16 % were producing from both SHFP and private woodlots. This implies that government forests both plantation and natural forests are the main sources of trees for timber production (Wall *et al.*, 2005).

Moreover the study revealed that sawnwood production is mainly done during the dry season in which 76.3% of the respondents are engaged in sawnwood production while only 23.7% of the respondents are engaged in sawnwood production all the time of the year. The production is high from June to December and low is from January to May this is due to nature of the working environment in which during rainy season (January- May) the infrastructure become worse and the work become very tedious and time consuming. Also most producers reported a disruption in sawnwood production due to the shifting of activity of most of their casual labors who shifting from sawnwood production in favour of paddy and maize farming activities during this time.

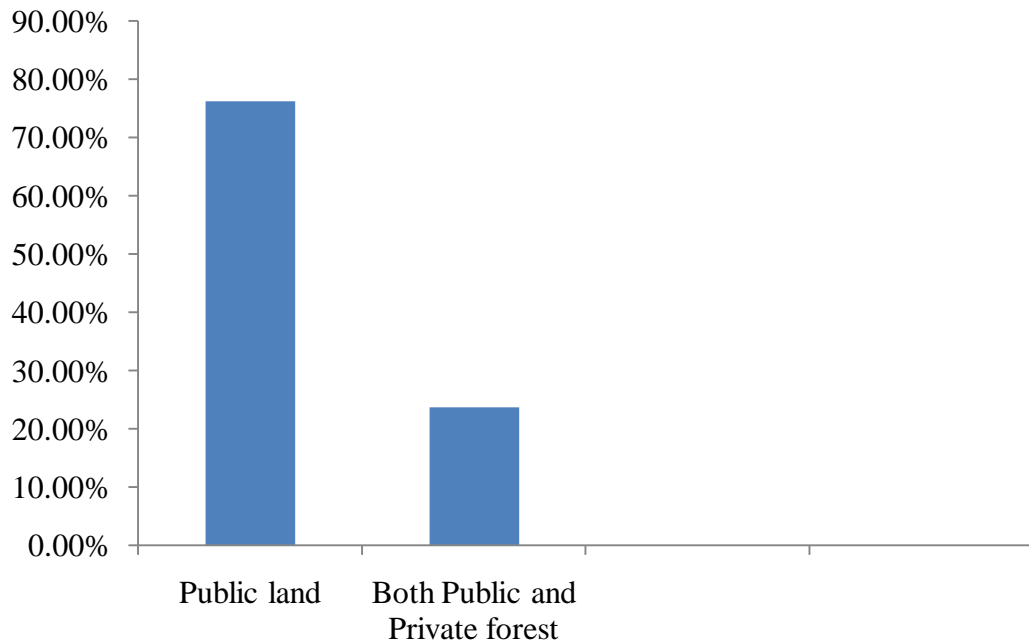


Figure 5: Main sources of trees for timber production

4.3.2 Sawnwood transporters

Vehicles were the main means of transporting sawnwood from the production site to market centres. The vehicles observed were ranged from 3 to 30 tonnes and in rare cases railways were used to transport sawnwood especially during heavy rainy season during when roads were impassable. Other means of transport used include tractors, small vehicles below 3 tonnes, power tillers and on head. These were mainly used in the field for loading sawnwood in one point of which the truck will pick them easily because the production site is not easily accessible with trucks. Findings, from this study concur with that of Hulusjö (2012) as well as that of Kafakoma *et al.* (2009) who argued that the common means of transport are (motorized) lorries and railways.

Furthermore the findings show that most of the large-scale transporters in the study area were also the wholesalers who transport sawnwood for long distances of more than 200 km. these findings are in line with that of Wallet *et al.* (2005) who claimed that logging distances in the natural forest has increased to average proportional of 100 to 150 km due

to over harvesting of the more preferred species for sawnwood and therefore producer has to go far in the forest to look for those species. Sawnwood transporters using vehicles required to have a transit pass (TP) from Tanzania Forest Services (TFS) offices at a fee of TZS 7500 for a vehicle of seven ton or below and TZS 13 000 for a vehicle above seven ton which must have supporting documents such as license for harvesting timber together with the registration for timber business, business license and TIN number (URT, 2015).

4.3.3 Sawnwood wholesalers

It was found that majority of the wholesalers purchased sawnwood mostly from producers and rarely from middlemen or transporters, and resale to either retailers or directly to consumers. However, it was observed that there were very few individuals operating as wholesalers compared to other actors within the chain and normally sale sawnwood in Morogoro Region and occasionally outside Morogoro such as to Dar es Salaam for wholesale. However, very few traders own their own means of transport and many hire trucks once they have bought the goods. It is argued that brokers are needed to link the wholesalers or traders in need of transport to the drivers either within Ulanga or from Ifakara town who are waiting for goods to be transported.

The findings on purchasing and selling of sawnwood for the wholesalers are similar with those of Mgana (2013) who claimed that Dar-es-Salaam city is one of the major consumer markets of sawnwood. Wholesalers in the study area obtain annual business licenses or registration certificates from Tanzania Forest Services (TFS) offices at a fee of TZS 256 000 and trade licenses from Tanzania Revenue Authority (TRA) offices at a fee calculated according to their capital. Plate 1 shows sawnwood which are waiting to be transported to Morogoro.



Plate 1: Sawnwood waiting to be transported to Morogoro

4.3.4 Sawn wood retailers

Majority of the retailers in the study area buying sawnwood from wholesalers/transporters, and sell directly to consumers who were individuals, institutions or government contractors. These findings are similar to that of Nyamoga *et al.* (2016) and Wall *et al.* (2005) who claimed that most of the traders (48%) receive sawnwood from the wholesalers. Thus retailers sell their sawnwood in pieces of various sizes and species and most of them sell sawnwood alone but some are observed to have timber yard and furniture mart in which a customer can buy sawnwood and process in the same place and this was more common in Morogoro Municipality.

Figure 6 shows that 68.2% of the retailers reported that they sell their wood to both individual and institutions, whereas 13.6% they sell their sawnwood to furniture makers, while 13.6% of the respondent sells their sawnwood to individual alone and 4.5% sell their sawnwood to institutions alone. This might probably be due to more substitutes to house furniture and building materials since individuals may opt for sofa instead of wooden coach or aluminum glass window and doors instead of sawnwood products which are seen

to be more expensive (Machumu, 2008). It was discovered that both softwoods from the plantations and hardwoods from the indigenous forests are used in the towns but softwood has been substituted for hardwood as the latter has become more expensive.

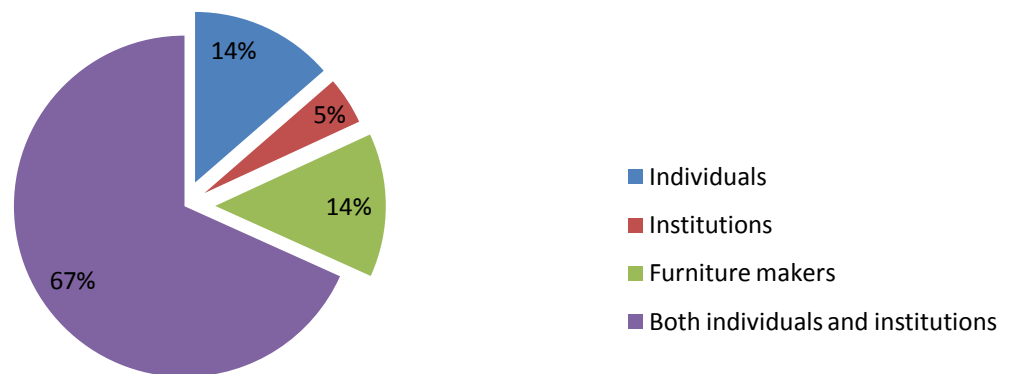


Figure 6: Retailers' main customers for sawnwood

4.4 Value Addition Activities in Sawnwood Value Chain

In any value chain, it is usually common to have value addition activities. In sawnwood value chain as well, there are numbers of value addition activities which are pursued by actors. The main value-adding activities in timber industry include production, in which trees converted to logs then slicing logs to required sawnwood size, packaging, transporting and finally processing. The study revealed that producers undertake most of value addition activities before the products can reach to ultimate consumers. The value addition activities which were reported to be borne by producers are production, grading and skidding timber in the field as well as transporting sawnwood to the landing site ready to be transported by trucks to the markets. On the other hand, grading and transportation of sawnwood from the production area to the town has been reported to be the only value addition activity undertaken by wholesalers/transporters in the chain.

The study findings on value addition activities concur with Kafakoma *et al.* (2009) who claim that in Vipha plantation Malawi, the value-adding activities at the production sites

are the conversion of trees and labour into sawnwood and grading which was done either by the producers or by buyers themselves. The major value-adding activity from production site to market is transportation, as there is little storage.

4.5 Preferred Tree Species for Sawnwood Production and Marketing

Sawnwood producers have strong preference for some trees in the production of sawnwood. The most common and preferred tree species for sawnwood production in the study area are presented in Table 3 whereby respondents reported more preference on some of the species due to their availability and markets as well as competitive price.

Therefore out of six tree species listed, *Pterocarpus angolensis* was ranked first (100%) in which all of the respondents preferred this species followed by *Azizium angolensis* (98.5%) in which 65 respondent out of 66 mentioned to prefer timber from this species. The next mostly preferred timber were from tree species known as *Khaya anthotheca* whereby (75.8%) of the respondent reported to have preference of timber produced from this species. Other species included were *Julbernardia globiflora* (31.8%) *Melicia exelsa* (27.3%) and *Breonardiasalicina* (4.5%). The Sawnwood producers showed less preference to other species listed in Table 3 probably because are lesser known species to the market and less preferable by customers. The implication is that most preferred species are going to be depleted if the future afforestation programmes will not put more emphasis on those species.

These findings are almost similar to those of Schaafsman *et al.* (2014) and Wall *et al.* (2005) who revealed that Mninga (*Pterocarpus angolensis*) is the most preferred species of timber in Tanzania. Although for the time being Mninga has become more difficult to find, and the price has risen and led consumers to turn to other species of hardwood,

particularly mtundu (*Brachystegiaspeciformis*) and mkora (*Afzeliaquanzensis*) as well as to plantation softwood.

Table 3: Preferred tree species used for timber production in study area

Swahili name	Botanical name	Count	% response
Mninga	<i>Pterocarpus angolensis</i>	66	100
Mkongo	<i>Afzeliaquanzensis</i>	65	98.5
Mkangazi	<i>Khayaanthotheca</i>	50	75.8
Mvule	<i>Meliciaexelsa</i>	18	27.3
Mtondolo	<i>Julbernardiaspeciformis</i>	21	31.8
Mgwina	<i>Breonardiasalicina</i>	3	4.5

4.6 Sawnwood Production Technology

Majority of the respondents 46.7% confirmed that most of the sawnwood extracted from natural forests in the study area were using pit-saw. This is a logging system which involves the felling of trees and sawing into planks by human labour alone (Wall *et al.*, 2005). Usually the tree is felled and positioned over a pit (alternatively it may be raised above the ground on a timber scaffold) and is sawn into planks by two men (there are no women involved) using a two-handed saw, one is standing in the pit and the other on the log above. While 43.3% of the respondent reported to produce sawnwood with chainsaw although it is prohibited by the rules and regulation of harvesting forest produce in natural forest but they claimed that chainsaw is a fast production method compared with the pitsaw and produce sawnwood in conformity with the time given for the licence which exist for only 30 days from the issuing date. However if required to extend it cost them about 20% of the total royalty paid and once is extended it expires within 15 days from the issuing date. The extension results on increasing the licence cost by 20% for the same allocated volume, therefore reduces the profit for producers.

4.7 Sawnwood Marketing Channels

From the survey carried out, most of producers supply sawnwood to different stakeholders along the chain before reaching end use manufactures. The producers can sell their products either to the traders (Wholesaler or middlemen) or hire a truck to take the products directly to the market. The results indicate that, most of the traders (63.3%) receive sawnwood from the producers and only (36.7%) of the producer sell their sawnwood to middlemen(Fig. 7).However, before taking the consignment to the markets, the traders (who are either wholesalers or producers) have a tendency of communicating directly with buyers in the marketthrough cellular phones to obtain information on market price of sawnwood. But sometime the traders may contract the producers and finance him with all expenses concerned and orders the amounts of sawnwood needed and the producers prepare the same. There after the producer takes the consignment to him and calculates the cost incurred by trader (which mainly include royalty fee for licence, transport and registration) then the rest amount is given to the producer.

The findings also discovered that the majority of sawnwood traders (75 %) receive market information from buyers.While 20% reported to receive information from friends and only 5% of the respondent reported to visit direct to the market to get the price information before taking their consignment.However, sawnwood trade is dependent upon personal relationships. It was observed that, most of the traders were reluctant to do business with unknown partners because they are afraid of beingfraud their monies.

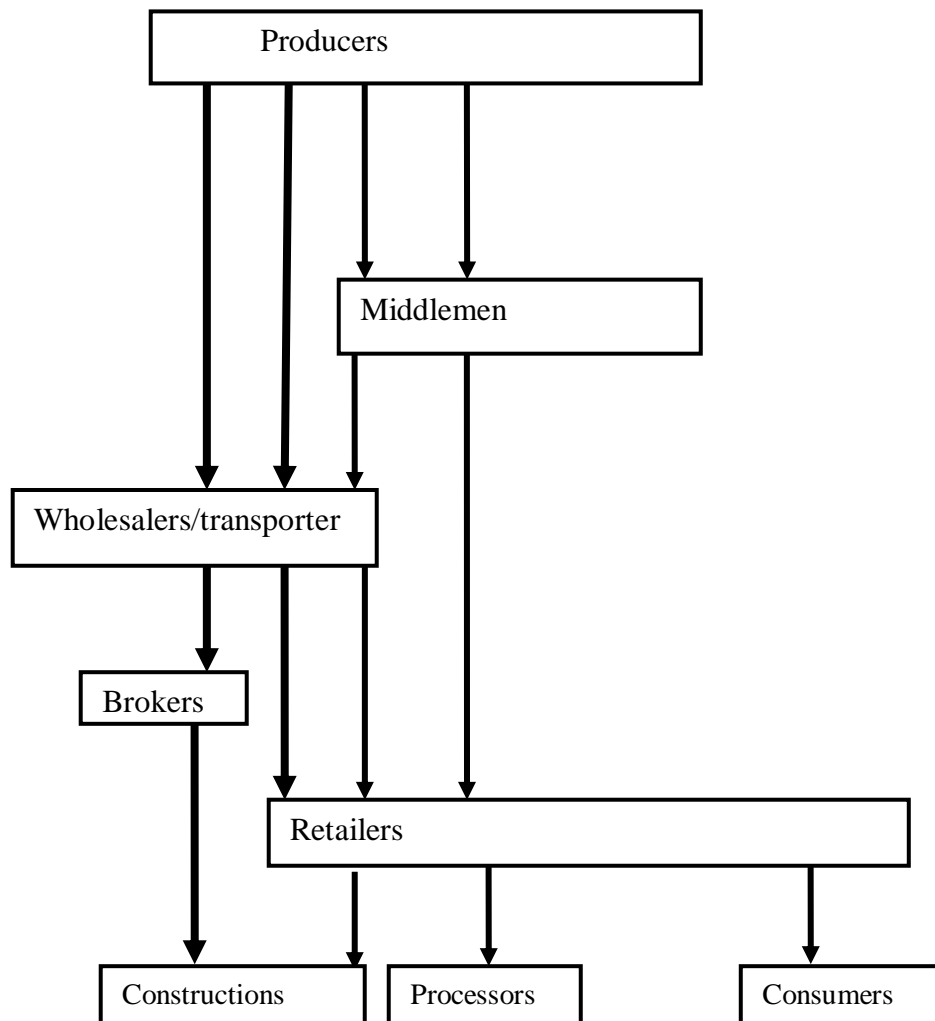


Figure 7: Marketing channel of sawnwood observed in the study area

Channel 1: Producer to wholesaler to retailers to consumers, in this most producers sell their sawnwood directly to the wholesaler/transporter. Since many of them have low financial capital to facilitate all the cost associated from production to transportation so they end up producing and selling to wholesalers who then transport to the distant market such as Morogoro or Dar es Salaam. However, in the study area, it was found that few producers are able to transport sawnwood to traders in Morogoro or Dar es Salaam but most of them are being financed by traders so they transport the consignment to the specific person.

Channel 2: Sawnwood Producer to Wholesaler to Broker to Consumer. In this channel producer sell the sawnwood to wholesalers who take the product to the market. In this channel also brokers are usually connects the wholesaler to buyers and negotiates prices with the buyers as well as with wholesaler to facilitate faster sales. It was reported that this channel exist occasionally especially when there is large construction project in which sawnwood are required in large quantity so the brokers takes the order and starts looking for wholesalers who bring the product in town for the market .

However, something notable for brokers is that they do not have sufficient working capital to act as large scale traders, transporting goods to markets but serve as a link between the traders and customers for a commission which is the amount of money exceeding the actual selling price of the wholesalers and is less price negotiated with buyer. Furthermore, the wholesalers claimed that brokers earn a lot through this channel and most of them discourage this kind of trade business.

Channel 3: Sawnwood producer to middlemen to wholesaler/transporters to retailer to consumer. In this channel sawnwood producer sells sawnwood to wholesalers or transporter. Wholesaler/transporter sells to retailer who then sells to consumers. This is the most common channel in the market with the retailers selling sawnwood to consumers in smaller quantities, usually from a single piece. The compliance levels are high where the transporters and wholesalers secure the transport permits and pay forest royalty and other fees accordingly.

Channel 4: Sawnwood producer to middlemen to retailer to consumer: It was observed that sometimes producer sell their sawnwood to middlemen who are mainly found in Ifakara Town and they normally work to facilitate rapid sales of large quantities of products to the market. They sell the products to wholesalers who are coming from different

markets or transport them directly to retailers in either Morogoro Town or Dar es Salaam city.

Lucky enough even in this channel the compliance levels are high where the transporters and wholesalers secure the transport permits which must have legal supporting documents such as harvesting licence presented to the DFM to clarify for the possession of sawnwood beyond doubt that the sawnwood have being harvested legally and paid forest royalty and other fees accordingly.

4.8 Profit Margins Analysis Along the Sawnwood Value Chain

4.8.1 Profit margin analysis for timber producers

Sawnwood production and selling provide employment opportunities and income generation to a large segment of the rural population in the study area. The costs involved in sawnwood production include licence for harvesting, registration for forest produce, application fee for harvesting forest produce, tree planting contribution which is 5% of the total royalty paid, CESS for District council which is 5% of the total royalty paid, sawing of logs to sawnwood and skidding of sawnwood from production site to the landing site where a truck can pick them easily. This study revealed that a sawnwood producer use a total TZS 27154.40 for producing a plank of 2"x8"x10' or 1"x12"x10' which is equivalent to (0.076m³). This expense includes the cost of purchasing equipment and fees paid as shown in Table 4 and 5.

Table 4: Costs involved in sawn wood production

Item	Cost in TZS(19.23m³) equivalent 250 BF	Average cost per BF(0.076M³) in TZS
Licence for tree harvesting	3925333.30	15701.30
Registration for harvesting forest produce	256000.00	85.00
Application fee for harvesting forest produce	57500.00	19.20
5% Tree planting contribution	392533.30	1570.00
5% District council cess	392533.30	1570.00
Village charge	300000.00	1000.00
Casual labour for sawing timber	750000.00	2500.00
Food and medicines	153500.00	511.60
Skidding of timber from production site to the landing site	750000.00	2500.00
Transit pass	7500.00	30.00
Transportation	450000.00	1500.00
Total	6813899.90	26987.10

Furthermore sawnwood production also involves the cost of buying equipment, though some are used more than once in sawnwood production. These equipment includes saw, axe, machete, hoe and spade. Saw was used in felling and cutting as well as sawing while axe and machete were used in wood cutting for pit digging and average purchasing costs were TZS 40 000 for a saw and 10000 for axe and machete respectively. Since the study revealed that in average sawnwood producers spent a month to produce about 250 pieces (19.23m³), and therefore during the life time in use 250 pieces are produced using these equipment that gives the equipment unit cost of producing one plank to be TZS 160 and TZS 1.70 and TZS 1.70 respectively.

However, hoe and spade are used in pit construction and purchasing costs for this

equipment was TZS 5000 and 6500 and normally are used for a year's respectively. The average total number of sawnwood produced during the life time of the equipment was 3000 planks which make the average equipment unit cost per plank to be TZS 1.70 and TZS 2.20 respectively. Thus, equipment in totality contributed about TZS 167.30 in each board feet of sawnwood produced (Table 5).

Table 5: Costs of equipment in sawnwood production

Type of equipment	Purchasing price in TZS	Life in use /year	Quantity of sawnwood produce/month	Total number of BF produce per equipment/year	Unit cost in TZS per BF
Saw	40000	1	250	3000	160.00
Axe	5000	1	250	3000	1.70
Machete	5000	1	250	3000	1.70
Hoe	5000	1	250	3000	1.70
Spade	6500	1	250	3000	2.20
Total					167.30

Therefore, total cost for sawnwood of (1"x10"x10' or 2"x8"x10') board feet includes TZS 167.30 as equipment cost and TZS 26987.10 as royalty and other production cost. This implies that an average cost of TZS 27154.40 was used to produce a plank. Timber producers normally sell a piece of timber of the size 1"x12"x10' (0.076 m³) on average price of TZS 30000. The timber producer therefore makes a nominal profit of TZS 2845.60 per plank equivalent to TZS 34147.20 per cubic meter the finding are similar to that of Schaafsman *et al.* (2014) who reported that pit sawyers earn a profit of 1.67 USD (equivalent to TZS 3340 by then) per plank. Also, the results are similar to that of Azouz *et al.* (2012) who claimed that timber industry in Canada is characterized by high cost and low profit margins to traders.

4.8.2 Profitmargin analysis for sawnwood transporters/Wholesellers

4.8.2.1 Sawnwood transportation by vehicles

It was revealed that vehicles were commonly used in transporting sawnwood to the markets of sawnwood which are mostly Dar esSalaam and Morogoro. Transporters in the study area buy sawnwood from the producers and resale to retailers or consumers. As discussed earlier that transporters in the study area are also wholesalers. The total variable costs incurred by transporters which include cost of purchasing sawnwood, transporting (hiring a vehicle), transit pass fee, loading and unloading, communication, and contingency was TZS 40000 (Table 6). Wholesale price per board feet in Morogoro or Dar es Salaam is TZS 47000 for sawnwood of size 1”x12”x10’ or 2”x8”x10’. The transporter therefore makes a nominal profit of TZS 7000 per plank equivalent to TZS 84 000 per cubic meter. The finding are online with that of Schaafsman *et al.* (2014) reported that dealer profits excluding payments to forest officials was 3.72 USD per plank (equivalent to TZS 7440 by then). Although all dealers and experts commented that it was hard if not impossible for dealers to make a profit when all required licences were obtained. Even with the right paperwork, transporters and dealers reported that payments to police and forest officers were necessary to continue transport and avoid confiscation.

Table 6: Direct costs incurred by transporters/wholesaler

Cost item	Unit cost in TZS per piece	Total cost in TZS for 250 pieces
Registration for forest produce	85.00	21333.33
Business Licence	33.33	8333.33
Purchasing of 1 piece of sawnwood	30000.00	7500000.00
Loading	500.00	125000.00
Transit Pass fee paid to TFS office	30.00.00	7500.00
Transport to DSM using 4-7 tons vehicle	4800.00	1500000.00
Contingency	2000.00	500000.00
Communication	20.00	5000.00
Unloading of sawnwood when reach to the market	1000.00	250000.00
Total		9912186.66

4.8.2.2 Retailers

The retailers in the study area normally buy their sawnwood mostly from transporters/wholesellers and rarely from producers and sell to consumers in a large or smaller quantity depending with the demand of the customers. The average purchasing price per piece of sawnwood of 1''x12''x10' or 2'x8'x10' is around TZS47 000 (equivalent to TZS 564 000/m³) from transporter or wholesalers who sell the same piece of sawnwood for an average price of TZS57500 (equivalent to TZS690 000/m³). The variable costs which incurred by the retailer includes registration, rent fee, and security.

Table 7: Direct costs incurred by retailers

Cost item	Total cost in TZS per year	Average cost in TZS per month	Average Sell of BFper month (BF)	Average Unit cost in TZS per piece1’’x12’’x10’
Registration fee for forest produce	256000.00	21.30	100	0.21
Security charge	1200000.00	100000.00	100	1000
Rent fee	1200000.00	100000.00	100	1000
Business licence	100000.00	8.33	100	0.08
Total cost incurred	2756000.00	200029.60	100	2000

However, the retailer variable cost for each piece of sawnwood with 2’’x8’’x10’ or 1’’x12’’x10’dimension cost about TZS 49 000 including purchasing cost of sawnwood. Therefore the retailer makes a nominal profit of TZS8 500 per piece of sawnwood equivalent to TZS102 000 per cubic meter.

**Plate 2: Sawnwood being sold in pieces of various size and species**

4.8.2.3 Profit margins distributions among actors in the sawnwood value chain

Table 8 presents the revenue earned per plank, cost incurred, and profit margin per plank at each stage of sawnwood value chain. These values were calculated as described in sections 3.7.1. The findings show that wholesalers and retailers obtained the highest margins. This could be explained by size of the business which were bigger compared to other nodes and also, transport/wholesaling is organised by monopolistic-type of market structures of which one wholesaler can buy sawnwood to more than one producer. Producers earn little profit probably because they have a big burden of legal compliance which requires payments as stated in GN number 324 of August 2015 as well as Forest Act of 2002 as compared with other actors. Similar results were claimed by Pulhin and Ramezi (2016) as well as that of Schaafsman *et al.* (2014) who revealed that sawnwood business provides additional income to the actors involved in the value chain. Unfortunately, overregulation as a result of restrictive policies and informal barriers such as the practice of giving bribes to persons-in-charge and police road blocks threatens to supersede these benefits.

Table 8: Profit margins distributions for sawnwood actors along the chain

Value chain actors	Revenue per BF TZS	Cost incurred per BF in TZS	Profit accrued per BF in TZS	%
Producers	30000.00	27154.65	2845.35	15.51
Wholesalers/transporter	47 000.00	40000.00	7000.00	38.16
Retailers	57500.00	49 000.00	8500.00	46.33

The profit accrued along the value chain is relatively comparable shared between retailers and wholesalers but skewed to producers. However retailers take a relatively big share of total profit (46.33%) followed by wholesalers and transporters (38.16%) while producers

accrue only 15% of the total profit. This implies that, despite being a considerable source of income for hundreds of rural people, sawnwood producers receive only a small share of the total revenues as compared to the retailers and wholesalers and/or transporters. The findings are also similar to those of Schaafsman *et al.* (2014), who argued that the profit margins of sawnwood producer who undertake legal trade in East Arc Mountains of Tanzania are low or negative. The findings are also similar to that of Kafakoma *et al.* (2009) who claimed that in Viphya plantation sawnwood business is scarcely unprofitable for pit sawyers and scarcely profitable for saw millers. This is due to the fact that large profits are being made by traders who transport sawnwood to the distance markets within Malawi and those who export sawnwood to the markets of East Africa countries like Kenya and Tanzania.

4.8.2.4 Marketing margins analysis along sawnwood value chain

The results in Table 9 show the gross marketing margins for different actors in sawnwood value chain. The large gross marketing margin for the producers could be explained by the associated costs incurred such as production costs, transportation, forest royalty and other contingency. On the other hand, wholesalers had relatively lower margin probably because they incurred only cost for purchasing sawnwood, transportation cost as well as contingency. Whereas the lowest marketing margin were observed for the retailers which could be attributed to the fact that they do not incur many other costs apart from security, rent, registration, labour, and purchasing sawnwood from suppliers.

Table 9: Gross marketing margins analysis along sawnwood value chain

Price at various levels of distribution channel	In Dar-es salaam Price in TZS /piece	Gross marketing margins	In Morogoro Price in TZS/piece	Gross marketing margins
Average farm price	30 000.00	-	30 000.00	-
Average wholesale price	47 000.00	-	47 000.00	-
Average retailing price	60 000.00	-	57 500.00	-
TGMM	-	50%	-	47.8%
GMM _W	-	28.33%	-	29.5%
GMM _R	-	21.6%	-	18.2%
GMM _P	-	50%	-	52.2%

TGMM = the percentage of the total gross marketing margin

GMM_W = the percentage of the total gross marketing margin received by the wholesaler

GMM_R = the percentage of the total gross marketing margin received by the retailer

GMM_P = the producer participation margin

4.9 Price Determination

One of the most difficult but most important aspect of marketing product effectively is setting the price correctly to ensure that it is proportional to meet expenses incurred (Eskola, 2005). The price set should also allow the business to grow without compromising consumers expectations. Prices, whether those received by producers or charged to wholesaler /transporters, retailers, processors and final consumers are the most important elements in the marketing system in influencing the contribution of agriculture or any other products to economic development (Quaye and Kanda, 2004).

The findings showed that at all levels; price determination is highly negotiated between sellers and buyers as 46.7% of the producer reported that set price through negotiations,

with cost based pricing, the producer tries to recover all the expenses of bringing the product to the market including labour costs, delivery costs and profit. However about 36.7% reported to sell their consignment at the price fixed by buyers. While only 16.6% claimed to sell according to the price fixed by sellers (producers) who produce sawnwood at their own cost so when they reach to the market they have power to sell according to their incurred costs.

On the other hand 83.3% of the wholesaler sells their sawnwood by negotiation whereas 16.7% sell their sawnwood with the price fixed by buyers this may probably due to financial support they got from buyers so when they reach to the market they have no power to negotiate but take the price given by them. This result concurred with that of Mendoza, (1995) who discovered that most of the producers are price takers because of their limited information on the existing sawnwood markets. Furthermore, Nyange (2000) and Kitule (1999) claim that producers are mostly price takers because the middlemen have greater power of negotiating for prices and can easily secure means of transport, Table 10 present mode of price determination.

Table 10: Mode of price determination in each actor

Mode	Producers response		Wholesalers response		Retailer response	
	Frequency	%	Frequency	%	Frequency	%
Negotiations	12	46.1	9	81.8	13	44.9
Price fixed by buyers	10	38.5	2	18.2	0	0
Price fixed by sellers	4	15.4	-		7	24.1
Taking market price	-	-	-		9	31.
Total	26	100	11	100	29	100

4.10 Factors Considered by Value Chain Actors in Setting up the Price for Sawnwood when Selling

4.10.1 Factors considered by sawnwood producer in setting up the price for sawnwood when selling

The major factors considered in setting up the price for sawnwood at producer level is the quality of sawnwood of which 100% of the producer reported to sell their sawnwood according to their quality, required size, with no creak, and that with no sapwood were treated as quality sawnwood and ranked as grade one. Secondly production cost were the next factor to be considered of which only 26.7% of the respondent reported to sell their sawnwood based on the production cost incurred.

While other factor such as transport cost and royalty paid are less considered in setting up the price these findings are similar to that of Kapinga (2010) who revealed that traders bought sawnwood according to their quality attributes with respect to their customers' needs. Moreover about 40 % of the surveyed traders reported to supply to their customers sawnwood of good quality and those of low quality were termed as rejects and for producer it was difficult to sell them.

Furthermore during the study, some rejects of sawnwood were found out in some visited production site. These included sawnwood which were of undersize and were easily bending. When asked about the size, they claimed that sawnwood with size up to 2"x8"x10' long was most preferred by customers. The implication is that if the wood is undersize, it is difficult to get customers.

Table 11: Sawnwood quality attributes

Quality attributes	Producer response	Percentage agreed	Wholesale response	Percentage agreed	Retailers response	% agreed
Sawnwood dimension	26	100	11	100	29	100
Tree species	22	84.6	7	63.6	9	31
Sapwood	23	88.5	8	72.7	19	65.5
Sawnwood with no creak	23	88.5	7	63.6	19	65.5
Method used in sawnwood production	-	-	-	-	3	10.3

4.10.2 Factors considered in setting up the price for sawnwood at traders level (wholesaler and retailers)

With regard to sawn wood traders, the survey result highlighted that, 100% 100%, 55%,41.7% of wholesaler and retailers respectively reported that the primary criteria considered in set up the price are the quality of sawnwood, and cost incurred respectively, whereas other factors such as, type of customers and supply and demand forces are considered next mainly for retailers as shown in the Table 12.

Table 12: Factors considered by traders in setting up the price for sawnwood

Factors	Wholesalers % response	Retailers% response
Quality grade sawnwood	100	100
Cost incurred	55	41.7
Supply and demand forces	45	31.8
Type of customer	-	59.1

4.10.3 Factors influencing sawnwood profitability among actors in the study area

Sawn wood business profitability was thought to be influenced by a number of factors and

thus Multiple Regression (MR) model was employed to examine the contribution of each selected explanatory variable, to test their influence on net sawnwood business profitability. A number of socio-economic variables were selected as predictors of actor's net profit per plank in the study area. There were ten (10) selected predictor variables. The following results were obtained from the model.

Table 13: Factors influencing sawnwood profitability among actors in the study area

Model	Standardized coefficients			T	Sig.
	B	Std. Error	Beta		
(constant)	82.890	25.739		3.220	.002
Age of respondent	-10.556	5.612	-.265	-1.881	.066
Location where the respondent found	-6.650	5.490	-.152	-1.211	.231
Education level	2.340	5.814	.062	.402	.689
Experience of the respondent	-1.335	5.344	-.034	-.250	.804
Price per piece of sawnwood	19.521	6.204	.522	3.147	.003*
Type of customers	.224	5.003	.006	.045	.964
Sawnwood of good quality	-15.872	6.687	-.429	-2.374	.021*
Production cost	-6.381	4.700	-.173	-1.358	.181
Transportation cost	-3.503	4.884	-.094	-.717	.476
Capital	14.371	7.80	.511	3.032	.003*

R = 0.583, R² = 0.573, Adjusted R² 0.52, F = 9.0, * significantly at p ≤ 0.05

The Results presented in Table 13, indicated that the predicted model was statistically significant at $p \leq 0.05$ with an F-value 9.0. As shown in Table 13 the selected predictors were able to explain the model by 52%, (with an adjusted $R^2 = 0.52$) of the variation observed in profitability of sawn wood business.

This implies that, the selected socio-economic factors were important in determining sawnwood profitability within the study area, and the obtained coefficient of determination indicates that 48% of the variation in sawn wood profitability could be explained by other

factors which were excluded in determining sawnwood profitability. However, according to Toole (2007) an adjusted R squared above 0.25 is considered typically meaningful in social science research. The predicted regression equation is given as;

The regression results summarized in equation 10 shows that, each factor had its own influence on the net profit generated from sawnwood, however only three factors (Price per piece of sawnwood, quality of sawnwood and capital) had been statistically significantly at ($p \leq 0.05$) linked to the net profit.

Results in Table 13 indicate that the positive coefficient of price implies that a unit increase in price of sawnwood there is significantly increases of the net profit by a factor of 19.521. The credible explanation on this is that; increase in price tends to increase profit for the timber dealers. Therefore, the respondents who sell sawnwood in high price per board feet would be able to notice the profit of sawn wood business. Similar to the findings of Schaafsman *et al.* (2014) who argued that, prices increase with distance to urban areas reflecting costs of carrying planks out of the forest, fuel costs for transport to urban areas and various bribes that have to be paid along the way.

Also the quality of sawnwood had influence on net profit. Results showed that if the sawnwood are of low quality the profit will be reduced by a factor of 15.872%. The findings are similar to those of Azouz *et al.* (2012) who reported that sawnwood of low quality were easily bending and was termed as rejects so were not sold hence reduce the profit for traders. And also concurred to that of Machumu (2008), who found that planks of class I quality grade are sold at significantly higher prices than that of lower quality grade.

Furthermore the results in Table 13 indicate that, capital has positive influence on net profit to sawnwood traders, the plausible explanations is that the ones who has large

capital will manage to have a large quantity of sawnwood which will results to the increasing of the profit by a factor of 14.371 more to compare with that with low capital. Moreover education level increased actor's profit generated from sawnwood by 23 % above actors who are not educated. This implies that, education level was an important factor which determined sawnwood profitability in the study area. However, the effect of education level on the sawnwoodprofitability was not statistically significant ($p>0.05$) though show positive relationship.

In addition the findings in Table 13further show thattype of customers in sawnwood business increased actor's profit generated from sawnwood by 2% although the factor had no influence at ($p>0.05$).

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

The study analysed sawnwood value chain in the Ulanga District and Morogoro Municipality. The conclusion and recommendations are based on issues that revealed from the major findings of the study. The whole study is built on three specific objectives which are: mapping of actors, determination of profit of various actors along the value chain and finally determination of the factors influencing sawnwood profitability among actors in the study area.

5.1 Conclusion

5.1.1 To map the key actors in the sawnwood value chain in the study area

The sawnwood value chain in the study areas involved different actors which includes producers, transporters, wholesalers, retailers and consumers as well as service providers. Although these actors perform different activities, but the activities performed by one actor improve the efficiency of other actors, hence business proceeding.

5.1.2 Profitability in each node along the sawnwood value chain

The profit accrued along the value chain is comparable shared among retailers and wholesalers. Although retailers' takes relatively a big share of total profit followed by wholesalers/transporters while producers are the least beneficiaries of the total profit, this could be explained by size of the business which was bigger compared to other nodes and transport/wholesaling is organised by cartel or monopolistic-type market structures. However, the producers bear much of the costs with comparison of the other actors which are wholesalers/transporters and retailers.

5.1.3 To investigate factors influencing profitability of the key actors

The selected predictors were able to explain approximately 60%, of the total variation this implies that, the selected factors were important in determining sawnwood profitability within the study area, and the obtained coefficient of determination indicates that 40% of the variation in sawnwood profitability could be explained by other factors which were excluded in the model when determining profitability of sawnwood.

5.2 Recommendations

With regards to the results obtained from the study and the conclusion made, the following recommendations are put forward:

5.2.1 To map the key actors in the sawnwood value chain in the study area

It is recommended that sawnwood producers should organized themselves in groups and share their capital so as to be in a position to search for the market and transport consignment to the distant market such as Morogoro, instead of selling within the district which will help them to have negotiation leverage to wholesalers and hence maximize their profit.

5.2.2 Profitability in each node along the sawnwood value chain

TFS as the government authority should establish and work hand to hand with NGOs in developing new initiative to promote use of 'rejects' sawnwood and other off take from the remaining of cut off trees which are left in the forest to produce other products such as pellets and briquette so as to increase conversion efficiencies and government revenue as well as improve profitability of actors.

5.2.3 Areas for further research

The study recommends that research on the comparison of the effect of using pitsaw in natural forest and chain saw to the environment and the sustainability of biodiversity should be undertaken because those pits are left without any management and for a single pit almost eight growing trees should be cutting down so as to construct a pit. As well in the skidding of logs from felling site to the pit it cost live of some trees which are cut off to construct a route pass.

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APPENDICES

Appendix 1: Questionnaire for timber producers

Questionnaire Number.....

Date of interview.....

Ward.....District.....

Section A: Personal information of a respondent:

1. Mobile contacts.....

2. Age in years: 1 = 18-30 [], 2 = 31-45 [], 3 = 46-60 [], 4 = above 60 []

3. Gender: 1 = male [], 2 = female []

4. Marital status:

1= Married [], 2= Single [], 3= Divorced [], 4= Widowed [], 5= Separated []

5. Level of education: 1 = Illiterate [], 2 = Primary school [], 3 = Secondary school []

4 = College [], 5 = University [], 6 = others [] (specify)...

Section B: Information on sources of trees/wood and method for timber production

6. Sawn wood production is your main economic activity? 1 = Yes [] 2 = No []

7. Experience of working with timber production: 1 = Not at all [], 2 = Less than 5 years [], 3 = between 5 – 10 years [], 4 = more than 10 years []

8. Have you got any technical training concerning your business? 1=YES [] 2= []

9. Where do you get trees for timber production? Please tick

1 = government forest [], 2 = private forest [], 3 = from own land [], 4 = others []

specify...

10. What are the preferred tree species for timber production? Please list

Tree species	Preference	Product produce

11. What methods do you use for timber production? 1 = pit sawing

[], 2 = sawmill [], 3 = mobile saw [], 4 = others (specify).....

12. Which of the above in question 11 above is most preferred and

why?.....

.....

13. In comparing with the past 5 years, how can you consider the availability of trees for timber production? 1= increasing [] 2=decreasing [] 3= constant 4=I don't know [].

Section C: Information on costs incurred in production and marketing

14. Which equipment/materials did you purchase during the preparation period?

S/NO	Type of equipment	Life time in use	Purchasing price TAS
1	Saws		
2	Tape measure		
3	Axes		
4	Hoe/spade		
5	Others specify		

15. Please indicate the costs involved in timber processing before selling:

S/No	Activity/item	Time/days spent	Cost (TAS)
1	License		
2	Tree felling		
3	Sawing logs		
4	Others specify		

16. How much do you pay the following items when marketing your produce?

Item	Costs (TAS)	Total cost
Transportation		
Labour, Loading Unloading		
Forest royalty fees		
CESS fees		
Market charges		
Hidden cost eg waiting time etc		
Others specify		

Section C: Information on welfare issues relating to timber production

17. Do you think timber production business contributes to your welfare? 1 = Yes [] 2 = No []

18. If yes to question 17 above, in what ways does it support you? Please mention.

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

19. How many pieces of timber you usually harvest from a single harvesting permit?

1= Less than 100 pieces [], 2 = between 100-200 pieces [], 3 = more than 200 pieces []

20. Do you sell sawn wood you produce? Please tick , YES [] NO []

If yes to whom do you sale? 1 = consumers [], 2 = middlemen [],

3 = wholesalers [], 4 = retailers [], 5 = others [] (specify)...

21. If no how do you use these products (sawn wood).....

22. How do you sell sawn wood products

1= taking them to the market [], 2=onsite [] 3=others specify.....

23. How much do you sell for a piece of timber?

Timber species	Size	Quantity	Price	Revenue

24. Who are your customers 1=individuals [], 2=institutions [], 3= Private company []

25. What benefit do you gain from the business.....

26. At what season of a year do you engage in timber production?

1 = Dry season [], 2 = When in need of money [], 3 = All the time []

27. How do you get market information?

1 = friends [], 2 = from media [], 3 = direct visit to the markets [], 4 = others []

specify...

28. Who sets the price for timber when selling?

1 = buyer [], 2 = seller (producer) [], 3 = others [] (specify)....

29. How do you arrive to the final price per unit?

1= negotiations [], 2= price fixed by a buyer [], 3 = price fixed by a seller [], 4 = take market prices [], 5 = calculate cost involved [], 6 = others [] (specify)...

30. What factors are considered in setting up the price of timber? (Please rank)

1 = production costs [], 2= transportation costs [], 3 = royalty/cess[], 4 = quality [], 5 = seasonality [], 6= others [] (specify).....

31. Are you satisfied with the current timber prices? 1 = yes [], 2 = no []

32. If no why? 1 = price is low [], 2 = operational costs are very high [], 3 = no unit of measure the quality of timber [], 4 = buyers offer price which are in their favour [], 5 = others [] (specify)....

Section D: Information on timber value chain

33. How do you assess the linkage between you and other actors in the value chain?

1 = very strong [], 2 = strong [], 3 = weak [], 4 = very weak [], 5 = none []

34. Who set the quality of timber to be produced?

1=producer [] 2=traders [] 3=consumers [] 4= others specify.....

35. What factor are considered in setting up the quality of timber? Please rank

1= timber dimensions [] 2=tree species [] 3= Method used to produce timber? []

4=others specify.....

36.What factors influencing you to produce more quality timber?

1=Skilled labour [] 2=Price [] 3= availability of modern equipment[] 4 others

specify.....

37.What factors hindering you to produce more quality timber?

1= unskilled labour [] 2= type of customer [] 3= production cost [] 4= others

specify.....

38. Who do you perceive as having greater power in the timber value chain? Why?

1 = producers [], 2 = traders [], 3 = consumer [], 4 = none []

39. How much do you trust other stakeholders in timber value chain? 1 = very much [], 2

= much [], 3 = little [], 4 = very little [] Why?

40. How do you assess the current performance of the timber value chain?.....

Section E: General information

41. Do you face any challenges while undertaking the timber production work?

1= YES [] 2=NO []

42. If yes list the main challenges you face during your work

1.....2.....3.....4.....5

43. What should be done to make your work easier?.....

“THANK YOU FOR YOUR TIME ATTENTION”

Appendix 2: Questionnaire for timber retailers

Questionnaire Number.....Date of interview.....

Ward.....District.....

Section A: Personal information of a respondent:

1. Mobile contacts.....
2. Age in years: 1 = 18-30 [], 2 = 31-45 [], 3 = 46-60 [], 4 = above 60 []
3. Gender: 1 = male [], 2 = female []
4. Marital status: 1= Married [], 2= Single [], 3= Divorced [], 4= Widowed [], 5= Separated []
5. Level of education: 1 = Illiterate [], 2 = Primary school [], 3 = Secondary school []
4 = College [], 5 = University [], 6 = others [] (specify)...
6. Occupation.....

Section B: Information on sources and scale of operation

7. Type of retailer: 1 = private [], 2 = group/organization [], 3 = others [] (specify)...
8. What was your opening capital and source?
9. For how long have you been doing this business? 1 = Not at all [], 2 = Less than 5 years [], 3 = between 5 – 10 years [], 4 = more than 10 years []
10. Have you received any business or technical training? 1 = yes [], 0 = no []
11. Do you prefer timber from any particular tree species? 1= yes [] 2= no []
12. If yes to question 12 above, which tree(s)? Please list
13. Where do you get timber for sale?
1 = producers [], 2 = transporters [], 3 = wholesalers [], 4 = others [] (specify).....
14. What are the points of purchases in these sources? 1=on site [] 2 =production areas [],
3 = others [] (specify)...

15. Why do you prefer this source(s)? 1 =cheaper buying price[], 2 =proximity to the market[], 3 = homeland[], 4 = other reason[] (specify)...
16. What is the average distance from the area where you buy timber?
17. How many pieces of timber do you purchase, and for how much?.....
18. What is the average amount of timber do you buy on monthly basis?
19. Is the supply from the source(s) uniform over the years? 1 = yes [], 2 = no[]
20. If no to question 19 above, which month do you buy more or less quantity of timber?
- More timber quantity (months)Less timber quantity (months).....
21. What do you think are the causes of these changes in supply?

Section C: Information on markets

22. Do you know price in advance before selling your timber?
- 1 = yes [], 0 = no []
23. If yes to question 22 above, how do you obtain such pieces of information?
- 1 = through agents [], 2 = through own investigation/visits [], 3 = other [] (specify)...
24. Who is your main customer (please tick) 1 = individuals [], 2 = commercial [], 3 = institutions [], 4 = furniture makers [], 5 = other [] (specify)...
25. At what price and in what quantities do you sell to them?
26. Do you charge different prices to different buyers?
- 1 = yes [], 2 = no []
27. If yes in question 26 above, please give reasons.
28. Who set price for timber?
- 1 = producers [], 2 = wholesalers [], 3 = retailers [], 4 = other [] (specify)...
29. What factors are considered in setting the price? (Rank)1 = costs incurred [], 2 = supply and demand forces [], 3 = quality grades [], 4 = other [] (specify)...

30. How do you arrive to the final price per unit? 1= negotiations [], 2= price fixed by a buyer [], 3 = price fixed by a seller [], 4 = take market prices [], 5 = calculate cost involved [], 6 = others [] (specify)...

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

32. What is the average quantity of piece of timber you sold per day? (number of piece per day)

33. Do you pay any fees or licenses for selling your timber?

1 = yes, 0 = no []

34. If yes to question 32 above, how much and to whom?

1 = TFS agency, 2 = municipal council, 3 = district council [] 4=others [] (specify)...

35. Please provide details of your costs you have incurred in your business last year 2014

Item	Frequency	Cost/unit	Total	
Grading				
Registration				
Loading and unloading				
Transportation				
Communication				
Royalty and Cess fees				
Markets				
Meals				
Others				

Section D: Information on timber value chain

36. How do you assess the linkage between you and other actors in the value chain?

1 = very strong [], 2 = strong [], 3 = weak [], 4 = very weak [], 5 = none []

37. Who set the quality of timber to be produced?

1=producer [] 2=traders [] 3=consumers [] 4= others specify.....

38. What factor are considered in setting up the quality of timber? Please rank

1= timber dimensions [] 2=tree species [] 3= Method used to produce timber? []

4=others specify.....

39. What factors influencing you to buy more quality timber?

1=Type of customers [] 2=Price [] 3= site where I sell timber [] 4 others

specify.....

40. Whom do you perceive as having greater power in the timber value chain? Why?

1 = producers [], 2 = traders [], 3 = consumer [], 4 = none []

41. How much do you trust other stakeholders in the timber value chain? Why?

1 = very much [], 2 = much [], 3 = little [], 4 = very little []

42. How do you assess the current performance of the timber value chain?

1 = best [], 2 = good [], 3 = worse [], 4 = worst []

43. How do you think the performance of the value chain can be improved?

Section E: General information

44. What are the main challenges while undertaking your timber business?

45. What do you think should be done to improve the situation in question 42above?

“THANK YOU FOR TIME AND ATTENTION”

Appendix 3: Questionnaire for timber transporters

Questionnaire Number..... Date of interview.....

Ward.....District.....

Section A: Personal information of a respondent:

1. Mobile contacts.....
2. Age in years: 1 = 18-30 [], 2 = 31-45 [], 3 = 46-60 [], 4 = above 60 []
3. Gender: 1 = male [], 2 = female []
4. Marital status: 1= Married [], 2= Single [], 3= Divorced [], 4= Widowed [], 5= Separated []
5. Level of education: 1 = Illiterate [], 2 = Primary school [], 3 = Secondary school [] 4 = College [], 5 = University [], 6 = others [] (specify)...

Section B: Information on transportation sources, costs and pricing

6. Is timber transportation your main economic activity? 1 = Yes [] 2 = No []
7. For how long have you been doing this business? 1 = Not at all [], 2 = Less than 5 years [], 3 = between 5 – 10 years [], 4 = more than 10 years []
8. Do you think timber transportation business contributes to your welfare? 1 = Yes [] 2 = No []
9. What are the means of transport do you use? (please tick)
1 = Lorry [], 2 = cart [], 3 = cycle [], 4 = others [] (specify)...
10. Where do you get timber for transport?
1 = producers [], 2 = other transporters [], 3 = wholesalers [], 4 = others [] (specify)...
11. What are the points of loading in these sources?
1 = timber yard [], 2= production areas [], 3 = whole seller [], 4 = others [] (specify)

.....

12. Why do you prefer this loading point? 1 = cheaper labour for loading [],
 2 = Accessible [], 3 = proximity to the market [], 3 = others [] (specify)

13. What is the average distance from the loading points to unloading/destination point?
14. In transportation do you use your own truck? 1= Yes () 2= No ()
15. Do you share the transport with other transporters or traders? 1 = yes [], 2 = no []
15. If yes in question 14 above, how do you share the costs? 1 = by quantity of piece of timber [],
 2 = per trip [], 3 = equally [], 4 = per distance [], 5 = other [] (Specify)....
16. What is the average transport cost per piece /m³/ of or trip of timber?
17. How much income do you generate per trip or transport? Tsh.....
18. How many times do you engage in timber transportation in a year?
 1= less than 5 trip 2=5-10 trips 3=more than 10 trips
19. At which season of the year you transport more trip of timber?
 1 = Dry season [], 2 = Wet season [], 3 = All the time []
20. Who set the cost for the timber transported?
 1 = transporter [], 2 = customer [], 3 = others [] (specify)....
21. How do you charge the transport cost of timber?
 1=per piece of timber [] 2=per trip [] 3=per m³[]
22. How do you arrive to final cost per unit? 1 = negotiations [], 2 = price fixed by transporter [], 3 = price fixed by customer [], 4=others [] (specify)...
23. What factors are considered in setting up the cost of transporting timber? (rank)
 1 = considering existing fuel prices [] 2 = quantity of piece of timber [], 3 = wet or dry season [], 4 = accessibility [], 5 = per m³ [], 6 = others [] (specify)...
24. Are you satisfied with the current timber transportation costs paid?
 1 = yes [], 2 = no []

25. If no, why? 1 = cost paid is low [], 2 = operational costs are very high [], 3 = no unit of measure the value of timber [], 4 = customers' offers price which are in their favour [], 5 = others [] (specify)...
26. What was the mode of the trade? 1 = Contract [], 2 = first come / first served [], 3 = others [] (specify).....
27. What was the mode of payment? 1 = cash [], 2 = credit [], 3 = other [] (specify)...

Section C: Information on timber value chain

28. How do you assess the linkage between you and other actors in the value chain?
1 = very strong [], 2 = strong [], 3 = weak [], 4 = very weak [], 5 = none []
29. Who set the quality of timber to be produced?
1=producer [] 2=traders [] 3=consumers [] 4= others specify.....
30. What factors are considered in setting up the quality of timber? Please rank
1= timber dimensions [] 2=tree species [] 3= Method used to produce timber? []
4=others specify.....
31. Who do you perceive as having greater power in the timber value chain? Why?
1 = producers [], 2 = traders [], 3 = consumer [], 4 = none []
32. How much do you trust other stakeholders in the timber value chain? Why?
1 = very much [], 2 = much [], 3 = little [], 4 = very little []
33. How do you assess the current performance of the timber value chain?
1 = best [], 2 = better [], 3 = good [], 4 = worst []
34. How do you think the performance of the value chain can be improved?

Section D: General information

35. If you compare the availability of timber for the last 5 years what can you say?
1=increasing [] 2=decreasing [] 3=constant [] 4 I don't know

36. What are the main challenges while undertaking your timber business?
37. What do you think should be done to improve the situation in question 35 above?

“THANK YOU FOR TIME AND ATTENTION”

Appendix 4: Questionnaire for timber whole seller

Questionnaire Number..... Date of interview.....

Ward..... District.....

Section A: Personal information of a respondent:

1. Mobile contacts.....
2. Age in years: 1 = 18-30 [], 2 = 31-45 [], 3 = 46-60 [], 4 = above 60 []
3. Gender: 1 = male [], 2 = female []
4. Marital status: 1= Married [], 2= Single [], 3= Divorced [], 4= Widowed [],
5= Separated []
5. Level of education: 1 = Illiterate [], 2 = Primary school [], 3 = Secondary school []
4 = College [], 5 = University [], 6 = others [] (specify)...
6. Occupation.....

Section B: Information on sources and scale of operation

7. Type of wholesale: 1 = private [], 2 = organization [], 3 = others [] (specify)...
8. What was your opening capital and source?
9. For how long have you been doing this business? 1 = Not at all [], 2 = Less than 5 years
[], 3 = between 5 – 10 years [], 4 = more than 10 years []
10. Have you received any business or technical training? 1 = yes [], 2 = no []
11. Do you prefer timber from any particular tree species? 1= yes [] 2= no []
12. If yes to question 12 above, which tree(s)? please list
1.....2.....3.....4.....5
13. Where do you get timber for sale?
1 = producers [], 2 = transporters [], 3 = wholesalers [], 4 = others [] (specify)...

14. What are the points of purchases in these sources? 1=onsite of production []
 2= Transporters [] 3=others specify.....
15. Why do you prefer this source(s)? 1= cheaper buying price [], 2= proximity to the market [], 3 = homeland[], 4 = other reason[] (specify)...
16. What is the average distance from the area where you buy your timber?
17. How many pieces of timber do you purchase, and for how much?.....
18. What is the average amount of timber do you buy on monthly basis?
19. Is the supply from the source(s) uniform over the years? 1 = yes [], 2 = no []
20. If no to question 20 above, which month does you buy more or less quantity of timber?
 More timber quantity (months) Less timber quantity (months).....
21. What do you think are the causes of these changes in supply?

Section C: Information on markets

22. Do you know price in advance before taking your consignment to the market?
 1 = yes [], 0 = no []
23. If yes to question 22 above, how do you obtain such pieces of information?
 1 = through agents [], 2 = through own investigation/visits [], 3 = other [](specify).....
24. To whom do you sell the produce? (rank)1 = households [], 2 = commercial [],
 3 = institutions [], 4 = industrial [], 5=furniture manufactures [], 6= other []
 (specify)...
25. At what price and in what quantities do you sell to them?
26. Do you charge different prices to different buyers?
 1 = yes [], 2 = no []
27. If yes in question 26 above, please give reasons.

28. Who set price for timber?

1 = producers [], 2 = wholesalers [], 3 = retailers [], 4 = other [] (specify)... 98

29. What factors are considered in setting the price? (Rank) 1 = costs incurred [],

2 = supply and demand forces [], 3 = quality grades [], 4 = other [] (specify)...

30. How do reach to final price 1= negotiation[] price set by seller [] based on market price []

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

32. What is the average quantity of timber sold per day? (Number of pieces per day)

33. Please provide details of your costs you have incurred in your business last year 2014

Item	Frequency	Unit Cost	Total Cost
Registration			
Grading			
loading and unloading			
Transportation			
Communication			
Royalty and cess fees			
Market charges			
Meals			
Rent fee			
Others (specify)			

GROSS MARGIN ANALYSIS

Timber species	Buying price per piece in TAS	Selling price per piece in TAS

Section D: Information on timber value chain

34. How do you assess the linkage between you and other actors in the value chain?

1 = very strong [], 2 = strong [], 3 = weak [], 4 = very weak [], 5 = none []

35. Who set the quality of timber to be produced?

1=producer [] 2=traders [] 3=consumers [] 4= others specify.....

36. What factors are considered in setting up the quality of timber? Please rank

1= timber dimensions [] 2=tree species [] 3= Method used to produce timber? []

4=others specify.....

37. What factors influencing you to buy more quality timber?

1=Type of customers [] 2=Price [] 3= site where I sell timber [] 4 others specify.....

38. Who do you perceive as having greater power in the timber value chain? Why?

1 = producers [], 2 = traders [], 3 = consumer [], 4 = none []

39. How much do you trust other stakeholders in timber value chain? Why?

1 = very much [], 2 = much [], 3 = little [], 4 = very little []

40. How much do you trust other stakeholders in timber value chain? Why?

41. How do you assess the current performance of the timber value chain?

1 = best [], 2 = good [], 3 = worse [], 4 = worst []

42. If you compare the availability of timber for the last 5 years what can you say?

1=increasing [] 2=decreasing [] 3=constant [] 4 I don't know

43. How do you think the performance of the timber value chain can be improved?

Section E: General questions

44. As timber wholesalers, do you have any association in your area/district?

1 = yes [], 2 = no []

45. If yes, to question 43 above, what are the benefits of the association/organization?

46. What are the main challenges while undertaking your timber business?

47. What do you think should be done to improve the situation above?

“THA NK YOU FOR YOUR ATTENTION AND TIME”

Appendix 5: Checklist for key informants

Checklist Number.....Date of interview.....

Ward.....District.....

SECTION A: RESPONDENT'S CHARACTERISTICS:

1. Mobile contacts of key informant.....
2. Title/position (eg DFM,DFO, Timber dealer)

Section B: Information on timber industry

1. Which forest products are being traded in your District or municipal?
2. Which stakeholders are involved in sawnwood trade?
3. What are their role in sawnwood trade
4. What opportunities are there regarding policy instruments on trade of sawn wood in the district?

Section C: Information on timber value chain

3. Who are the key actors along the timber value chain?
4. How can you describe the structure, linkage and performance of timber value chain?
5. Who do you perceive as having greater power and share in the timber value chain?
Why?
6. How many timber dealers have been registered in your district in year 2014/15?
7. How much do they pay as registration fees for their business?

Type of timber business	Registration fee

8. How much do you charge them as royalty and cess/levy for a piece of timber or m³?

If for piece of timber in 8 above please fill the following table.

Timber species	Size/m ³	Cess/levy charged	

9. What other charges do you collect from timber dealers/traders?

10. What strategies/programs/policies/incentives by government or development partners if put in place would enable growth in the timber business and improve chain value addition?

11. Is the trade of forest products legally and illegally conducted?.....

12. What are penalties/fines/regulations for illegal harvesting?

13. List forest products which are need permits and those which do not need permits inHarvesting.

Type of forest product	Permit required/ not required

14. Do stakeholders dealing with sawnwood trade know policies and legislations supporting or hindering this trade.

15. Is there any training and seminar conducted on policy related Issues to the stakeholder involved in sawnwood trade?

“THANK YOU FOR YOUR TIME AND ATTENTION”