VALUE CHAIN ANALYSIS OF FARMEDNILE TILAPIA IN SELECTED AREAS, TANZANIA

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ABSTRACT

Recently there was decline in fish volume captured from natural resources including Nile tilapia from Lake Victoria, which eventually created the opportunity for Nile tilapia farmers to venture in covering the gap. The study aimed to analyze the value chain of Farmed Nile tilapia in Coast, Dar es Salaam, Mwanza and Geita Regions. The regions were purposive selected due to their potential in fish farming and fishing activities of communities in those areas.The overall objective was to characterize and identify areas of improvement in value chain of farmed Nile tilapia in order to upgrade the chain in Tanzania. The specific objectives were: to identify and map various actors currently involved in the value chain and their functions; to analyze marketing margins of the different sub-sectors of the value chain from Nile tilapia farmers to consumers; and to identify the key constraints affecting different actors in the value-chain. Data were analyzed by using statistical package for social science (SPSS) and excel program. Financial data were analyzed by using the formulas for finding margin and profit in each actor. The overall sample size was one hundred and thirteen farmers, thirty seven marketers, eight distributors, forty one restaurants and eight inputs suppliers.Farmers face constrains such asshortage of water for ponds, fish culture inputs too costly/not available locally, low knowledge on fish farming, shortage of feed for ponds, difficult to trade fish at profitable price, small growth rate, shortage of fingerling/fry to stock ponds, shortage of fertilizer for ponds and low security. The study concludes that farmers should be trained on how to produce their own fish feed from locally and easily available ingredients, fish inputs suppliers must be approved by the Government, actors at each level in chain should form groups in order to access loans and farmers should be given financial capital assistance for starting the business to increase their production.

DECLARATION

I, Shabani Ayubu, 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.

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LIST OF ABBREVIATIONS AND SYMBOLS

Dar	Dar es Salaam
DRC	The Democratic Republic of Congo
EU	European Union
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
MC	Marketing Cost
MM	Marketing Margin
MP	Marketing profit
M4P	Making value chain working better for the poor
MSc	Masters in Science
N/A	Not Applicable
NGOs	None Government Organizations
%	Percentage
PP	Purchase Price
SACCOs	Savings and credit cooperative Organizations
SUA	Sokoine University of Agriculture
SP	Sales Price
SPSS	Statistical Package for Social science
TZS	Tanzania Shilling
UN	United Nations
VCA	Value Chain Analysis

CHAPTER ONE

1.0 INTRODUCTION

1.1Background of Fish Farming

Fish farming is the raising of fish in ponds, tanks, net enclosures, cages, or raceways. Usually the goal is to grow the fish as fast and economically as possible to a harvestable size. Some of the factors that farmers manipulate to influence growth rate include pond environment, type and density of fish, food, fertilizer, water quality, and growth period (Murnyak, 2010).

According to Ansah *et al*. (2014) Tilapias (Family: Cichlidae) are suitable for various aquaculture systems due to easiness of propagation, tolerance to handling, fast growth on both natural and manufactured feeds, tolerance of a wide range of environmental conditions, and high palatability, marketability and nutrient content.

Research done by Mwaijande and Lugendo (2015) showed that, keeping fish of both sexes increases reproduction which creates high competition for space, air and food. According to extension services and best practice management, mono-sex fish-farming is more profitable as fish can be harvested at 1.5kg in 6 months. Mono-sex fish farming technology has been used for the purpose of increasing the productivity of fish farmers in many places.Murnyak (2010) pointed out that, tilapia is a commonly raised fish throughout the world, second only to Carp where in 2009 more than 3 million metric tons of tilapia were raised.

Aquaculture, especially of tilapia, has the potential to play a leading role in the fight against food insecurity, malnutrition and poverty in Africa. Also it is widely accepted that

successful aquaculture development in Africa requires improvements in feed quality and availability, business and marketing models, and local technical capacity (Ansah *et al*., 2014).

1.1.1 Fish farming in the world

According to FAO (2011) global production of fish from aquaculture has grown substantially in the past decade, reaching 52.5 million tonnes in 2008, compared with 32.4 million tonnes in 2000. Aquaculture continues to be the fastest-growing animal food producing sector and currently accounts for nearly half (45.6 percent) of the world's food fish consumption, compared to 33.8 percent in 2000. Therefore with stagnating global capture fishery production and an increasing population, aquaculture is perceived as having the greatest potential to produce more fish in the future to meet the growing demand for safe and quality aquatic food. As reported by FAO (2012), more than 50 percent of global food fish consumption will originate from aquaculture. It is acknowledged that, with growth in volume and value of aquaculture production in the past decade, aquaculture has made a positive contribution to national, regional and global economies, poverty reduction and food security.

The State of World Fisheries and Aquaculture report 2012, shows that, captured fisheries and aquaculture supplied the world with about 148 million tonnes of fish in 2010 (with a total value of US$217.5 billion), of which about 128 million tonnes were utilized as food for people, and preliminary data for 2011 indicate increased production of 154 million tonnes, of which 131 million tonnes were destined as food.

Allison (2011) pointed out that, aquaculture continues to be the fastest-growing animal-food-producing sector and to outpace population growth, with per capita supply from aquaculture increasing from 0.7 kg in 1970 to 7.8 kg in 2008, an average annual growth

rate of 6.6 percent with poultry showing the next largest rate of increase over this period at 5 percent. However, Bauer (2014) reported that, Aquaculture and culture-based fisheries had an overall growth rate of 11 percent since 1984, making them the world's fastest growing food-producing sector for 20 years, where in 1999, 42.77 million metric tons of aquatic products were produced with a value of $53 billion.

Anshan *et al.* (2014) reported that, global aquaculture production of Tilapias increased from 28000 tonnes to over 3 million tonnes from 1970 to 2010. Globally, the Tilapias were the dominant species group caught in inland fisheries between 2000 and 2005. In terms of aquaculture production, the Tilapias comprise approximately five percent of total global fish farming, second to the carps, which account for more than 70 percent. However, aquaculture of Tilapia in Africa constitutes only approximately 19% of the world's Tilapia production.

Morgan (2013) reported that, overall aquaculture industry produces about 51.7 million tons a year, but in order to maintain the current per capita consumption level and account for the increase in population, the global aquaculture production needs to be around 80 million tons by 2050. Therefore aquaculture will have to grow in untouched regions, such as Sub-Saharan Africa, in order to continue meet the growing world fish demand.

Approximately 90 percent of the total aquaculture production is produced in developing countries, making it one of the most common global trades that flow heavily from developing to developed countries. A large proportion of the fish is produced by small-scale fish farmers with low-income or food deficit countries throughout Africa, Asia and Latin America (Bauer, 2014).

The State of World Fisheries and Aquaculture (2012) reported that, World per capita food fish supply increased from an average of 9.9 kg (live weight equivalent) in the 1960s to 18.4 kg in 2009, and preliminary estimates for 2010 point to a further increase in fish consumption to 18.6 kg of the 126 million tonnes available for human consumption in 2009. Fish consumption was lowest in Africa (9.1 million tonnes, with 9.1 kg per capita), while Asia accounted for two-thirds of total consumption, with 85.4 million tonnes (20.7 kg per capita), of which 42.8 million tonnes was consumed outside China (15.4 kg per capita).

UN (2014) reported that a new United Nations report highlights, the growing role of fish and aquaculture in feeding the world and providing a source of income, and calls for the sustainable and responsible management of the so-called 'blue world'. Global fisheries and aquaculture production totaled 158 million tonnes in 2012 around 10 million tonnes more than 2010.

1.1.2 Fish farming in Africa

Aquaculture was introduced to Sub-Saharan Africa in the 1950s with the main objectives of improved nutrition in rural areas, generation of additional income, diversification of activities to reduce risk of crop failures and the creation of employment in rural areas. About 43% of the African continent is assessed as having the potential for farming Tilapia, African catfish and Carp, of which 15% is considered most suitable, with the potential for yield of up to 2 crops/year for Nile tilapia and 1.7 crops/year for African catfish (Asmah, 2008). However Morgan (2013) found that, aquaculture is growing in many regions of Africa, but Sub-Saharan Africa has remained almost untouched and the production from capture fisheries has leveled off.

Most African Aqua culturists are using culture technology imported from Asia, Europe and North America as part of rural development projects, most of these are based on earthen ponds (Jamu and Brummett, 2000), where over 90 per cent of cultured fish in Sub-Saharan Africa come from earthen ponds of 200 to 500 m^2 fed with locally available low-cost agricultural by-products. In general, the production from these ponds is input-limited, both in terms of quality and quantity resulting in yields of 1 000 to 2 000 kg/ha/year.

Simpson (2012), found that fish farming in Ghana has become an enterprise acknowledged by both urban and rural communities, the sector employs 10% of the population from both urban and rural, the forms of aquaculture in Ghana are basically pond and cage cultures. Catfish and Tilapia were the two main fishes cultivated in Ghana where Tilapia comprises over 80% whilst Catfish account for 20% of aquaculture.

Farmed Nile tilapia production in Ghana was about 28 000 tonnes in 2012 representing about 90% of total aquaculture production in Ghana. Cages, ponds and dugouts made 85%, 8% and 7% of the total production, respectively. There are about 3000 fish farms, but over 90% are non-commercial ponds. With respect to the culturing system, floating cages make about 3% whilst ponds make over 90% by number (Asiedu *et al.*, 2015). Moreover, the report of South Africa Agriculture, Forest and Fisheries (2012) shows that, in South Africa production of aquaculture has been fluctuating during the periods 2002 to 2011 and aquaculture production reached the peak in 2008. There was an increase of 46% of aquaculture products produced during 2011 compared to 2002, but it decreased by 3% in2008 which was the highest and the slight decrease in 2009 which was due to the non-operational of finfish and prawns farms.

1.1.3 Fish farming in Tanzania

Aquaculture in Tanzania began in the 1950s with the pond culture of Tilapia species native to the region including Mozambique (oreochromis, mossambicus), Nile tilapia (Oreochromis niloticus) and Zanzibar tilapia (o.urolepis hornorun). In Tanzania fish farming was not introduced by force, but was promoted without the necessary technical support and training. In addition, inappropriate fish species were often distributed which did not perform well resulting in stunting, poor pond production, and discouraged fish farmers (Michael *et al.*, 2006).

FAO (2012) reported that, the United Republic of Tanzania was currently estimated to have a total of 14 100 freshwater fishponds scattered across the mainland. In addition, there was a large rainbow trout (Oncorhynchus mykiss) farm with an area of 25 m x 25 m situated in Arusha. Report pointed out that, the United Republic of Tanzania fish farming is almost totally dominated by the Tilapias and species belonging to the genus Oreochromis and Oreochromis niloticus has become the predominant culture species due to its proven superior growth compared to the other species.

Tanzania knowledge network (2014) stated that, fish farming was one of the new initiatives that have been implemented in various regions in Tanzania. Fish farming was carried out through fish ponds and was mainly practiced by farmers in the rural communities as a source of food and income, the response had been positive and extremely high as evidenced by a large number of individual farmers and famers' groups specialized in fish farming.

As the communities around the water bodies were trying to increase fish production to overcome the scarcity. The study done by Sobo *et al.* (2015), reported that, due to water

hyacinth in Lake Jipe, fishing was done at very subsistence level and the species caught were so small that they are below table size, which resulted into rehabilitation program of changing from fishing to fish farming. Mwanga District Authority and Jipe community were sensitized, and they were involved in the manual removal process of water hyacinth and cage culture was introduced. Three pilot net cages of 5m x 15m were installed stocked with monosex species of *Orechromis niloticus* (Tilapia**)** stocking density of 10 fishes /square meters promising growth rate of 2.5 gms/day, expecting to change them from fishing juvenile to table size fish.

The Tanzania government aims to enhance commercial fish farming in order to benefit nearly four million people in Tanzania who engage in fishing related activities. As reported by Lazaro on 19 July 2012 in The Citizen Newspaper that, Mr. Benedict Ole Nangoro, who by then was the Deputy Minister for Livestock and Fisheries Development, said that the revenue from the sector in the past five years, from 2005 to 2010 was TZS 5. 866 billion according to official records and the fishing industry in the country is yet to contribute adequately to the national economy, given that its annual contribution is 1.5 per cent of the GDP. The government aims to enhance commercial fish farming in order to benefit nearly four million people in Tanzania who engage in fishing related activities, the deputy minister assured.

Recently fish farming is becoming the source of food and income to Tanzanian. Fish farmers in Iringa and Tanga regions have increased their income since they started floating cages aquaculture as a way of adapting to the changing environment. The two regions have ventured into other related activities albeit on the sidelines of aquaculture to make money from services such as feed and fingerling production and equipment supply (Mubiru, 2013).

Mulisa of Tanzania Daily News reported in January 2015 that, aquaculture accounts for only 13.71 per cent of the nation fish production. The remaining production comes from fresh waters, covering a total area of 58000 square kilometers which includes three big lakes, namely lakes Victoria, Tanganyika and Nyasa, as well as major reservoirs, small water bodies, rivers and ponds. Therefore over 120 farmers at Ruhanga village in Muleba District, Kagera Region, have been given soft loans amounting to 9m/- to enable them to improve aquaculture activities because the region had a big potential in the subsector as declared by Deputy Minister for Livestock and Fisheries Development, Mr. Kaiko Telele.

Mwaijande and Lugendo (2015) found that, among the constraints which fish farmers were facing in Tanzania was obtaining quality fingerlings. About 30% of the surveyed farmers obtain fingerlings from rivers or ponds and 28% of thefarmers raise their own fingerlings. They also found out that, other constraints of fish-farming value chain were lack of marketing and access to capital. Most fish-farmers sell their farm outputs to neighborhoods and local markets at the farm gates and they do not have the access to capital from financial institution.

1.2 Problem Statement and Justification

The global capture production of fish has declining for the two decades, from approximately 87 million tons in 1997 to 79 million tons in 2010 as reported by Morgan (2013).In Tanzania with 49% of Lake Victoria, Nile tilapia stock decline from 402.2thousandtonnes of fishable biomass in 1994 to 339.4 thousands in 2004 (Sanga, 2009).Nile perch stocks in the Lake Victoria dropped from 750000 tonnes in 2005 to 337000 tonnes in 2008 and Tilapia dropped from 27 061 tonnes to 24,811 tonens over the same period due to indiscriminate fishing and environmental degradation. Generally fish

stocks in many African water bodies are declining through a combination of over-fishing invasive species and habitat degradation (Corporate Digest, 2015).

However, while fish stock and production are declining, Njiru *et al.* (2010) reported that, human population around the Lake Victoria grows at around 3% per annual, rainfall is erratic and agriculture is poorly developed, leaving the lake as the main source of livelihood for the surrounding communities. In order to meet increased fish demand for food and export, the number of fishermen, fishing crafts and gears has increased in the lake over the years. Fishermen are increasingly using more efficient and illegal fishing gears in the lake. Increased overexploitation could have affected the recruitment process by the capture of immature fish subsequently leading to decline in catches. World per capita apparent fish consumption increased from an average of 9.9 kg in the 1960s to 19.2 kg in 2012. The impressive development has been driven by a combination of population growth, rising incomes and urbanization, and facilitated by the strong expansion of fish production and more efficient distribution channels (FAO, 2014). However, in the report of United Republic of Tanzania (May 2014) in Fisheries Statistics section, in 2013 Tanzania per capita consumption was estimated about 7.7 kg/capita. While fishes are an important source of nutrition for rural coastal communities in the region, particularly those with the lowest incomes who rely on fish as a major source of animal protein. Consumption of fish among coastal communities is mostly of low value species while high value seafood products generally are exported (Evans, 2015).

Therefore to reduce pressure of this over exploitation of fish from natural sources and increasing the per capita fish consumption, among other methods is to increase Nile tilapia farming production as the substitute for wild fish captured, also as other source of income to communities in these areas in order to improve life standard and poverty alleviation as

well. Increasing production can be done by improving (upgrading) the value chain of farmed Nile tilapia for the benefits of small scale farmers. This will make communities in these areas to shift from depending on fishing to fish farming to improve their economic income hence poverty alleviation.

Fish farmers as other farming producers are not enjoying the benefits of their products due to inadequacy of inputs and markets. Rota and Sperandini (2010) pointed out that, value chain analysis is essential to an understanding of markets, their relationships, the participation of different actors, and the critical constraints that limit the growth of livestock production and consequently the competitiveness of smallholder farmers. These farmers currently receive only a small fraction of the ultimate value of their output, even through in value chain theory, risk and rewards should be shared down the chain. The potential exists for an improved and well-functioning market will enable smallholder producers to derive greater benefits from their production activities.

Tanzania as among the Sub-Sahara countries, fish farmers in those countries produce mainly for the local market, there are limited opportunities to export fishes produced in one country to another. If fish farming will develop beyond its present state, there must be room for international market opportunities created through international trade agreement between countries (Abiodun, 2016).Value chain approach is widely used as a tool to facilitate this process of market integration. Unlike the traditional approaches to enterprise development, the value chain development emphasizes on facilitating market linkages, developing business services market and improving the environment in which enterprises operate. It is alsoargued that, adopting a value chain approach could help the small producers to benefit from integration into high value markets and improving their

competitiveness (Reji, 2013). Therefore, the result of this study will provide the information which will facilitate on improving production and linking to the market.

It observed that value chain analysis in Tanzania is not much done. Therefore the result of this study will provide information on the importance of aquaculture to small-scale farmers and the country's economy to form the basis for formulation of aquaculture development project and policy. The findings are important to the stakeholders and farmers for making proper decision with regards to investment in various sub-sectors of aquaculture for the purpose of increasing fish farming production.Moreover the study will provide information that will help to identify policy issues that may be hindering or enhancing the functioning of the chain and also the areas that need improvement in the chain. In this way aquaculture production can be improved and contribute to poverty alleviation and food security effectively. In addition, the study will examine the contribution of small-scale aquaculture enterprises to income and food security of households in rural areas. This information will help in developing appropriate improvement programmes aiming at improving the productivity of fish farming in rural areas.

1.3 Objectives

1.3.1 Overall objective of the study

The overall objective of this study is to characterize and identify areas of improvement in value chain of farmed Nile tilapia in order to upgrade the chain in Tanzania.

1.3.2 Specific objectives of the study

i. To identify and map various actors currently involved in farmed Nile tilapia value chain and their functions.

ii. To analyze marketing margins of the different sub-sectors of farmed Nile tilapia chain from producers to the consumer.

iii. To identify the key constraints affecting different actors in the value-chain.

1.3.3 Research questions

i. Who are the main actors and their activities in the farmed Nile tilapia value chain and its map?

ii. What are the marketing margins and marketing profit of the sub sectors (actors) of the farmed Nile tilapia value chain?

iii. What are the key constraints affecting different actors in the farmed Nile tilapia value chains?

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Theoretical Framework

The concept value chain analysis was introduced by Michael Porter in 1985; it has significance and relevance to strategic management and marketing. Value chain analysis relies on the basic economic principle of advantage. Companies are best served by operating in sectors where they have a relative productive advantage compared to their competitors. To conduct a value chain analysis, the company begins by identifying each part of its production process and identifying where steps can be eliminated or improvements can be made. These improvements can result in either cost savings or improved productive capacity. As far as the production theory is concerned production always aims at the minimum cost and maximizing the output at each level or link. Therefore, business actors in the chain can improve performance by reducing costs, increasing outputs, and/or increasing the prices of their products.

2.2 Conceptual Framework

The conceptual framework of agricultural value chains includes a sequence of value adding activities, from production to consumption, through processing and marketing. Each segment of a chain has one or more backward and forward linkages. A value chain in agriculture identifies the set of actors and activities that bring a basic agricultural product from production in the field to final consumption, where at each stage value is added to the product. The framework divides activities that generate value into two categories primary activities and support activities. Primary activities comprise a set of activities that contribute to the creation of value in a direct manner. Support activities consist of functions and tasks that are intended to support primary activities.

In order to calculate margins along the value chain the financial data for each actor (market) which includes all costs of activities involved in each actor, selling prices at each level of the chain and the consumer price was identified. Figure 1 below shows the conceptual framework diagram for value chain of farmed Nile tilapia.

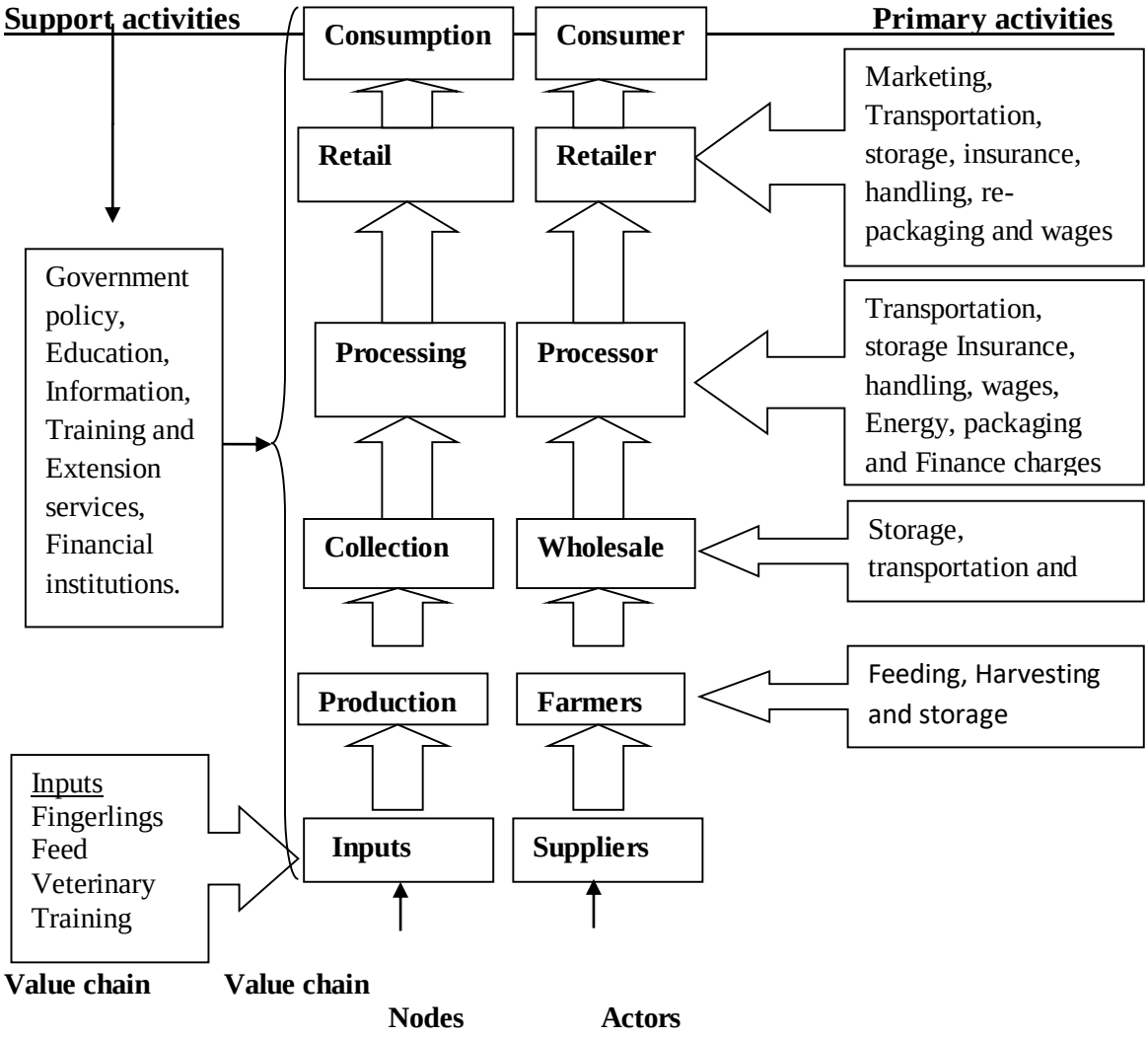

Figure 1: Conceptual framework for farmed Nile tilapia value chain.

2.3 Importance of Value Chain Analysis in Upgrading Value Added

Value chain analysis is the key entry point to poverty alleviation and achieving pro-poor outcomes. It is usually aimed at increasing the total amount and value of products that the

poor can sell in the value chain (Hempel, 2010). This, in turn, results in higher absolute incomes for the poor as well as for the other actors in the value chain. The objective of improving value chains for the poor are two-fold as reported by M4P(2008). First is to increase the total amount and value of products that the poor sell in the value chain. This results in higher absolute incomes for the poor as well as for other actors in the chain. The second is to sustain the share of the poor in the sector or increase the margins per products, so that the poor do not only gain more absolute income but also relative income compared to the other actors in the value chain.

Value chain analysis involved a sequence of steps, from identification of actors through chain actor mapping, linkages, and quantification of earnings into rewards by various actors using information gathered from observation, rapid appraisals, and the quantitative and qualitative surveys augmented by secondary data (Chagomoka *et al*.,2014).

Upgrading is defined as a desirable change in chain's participation that enhances rewards and reduces exposure to risks and means of acquiring capabilities and accessing new market segments through participating in particular chains.Kilelu *et al.* (2017) pointed out that, upgrading concept describes how firms and sectors shift towards making better products, making them more efficiently or moving into more skilled activities and improving their performance and rewards in high-value markets. Upgrading in agriculture value chains relates to changes in production processes to improve productivity and products that are increasingly defined by domestic and international quality standards and food safety measures

GIGA Working Papers (2007) state that, value chain describe the full range of activities that are required to bring a product from its conception to its end use and beyond. This

includes activities such as design, production, marketing, distribution and support to the final consumer. These activities can take place within a firm or among different firms in one or several geographical locations.

The concept value chain analysis as introduced by Michael Porter was useful in production company production and management. However, El-Sayed (2015) reported that, the prominence of VCA as a useful tool of analysis in the fisheries, aquaculture and aqua feed sectors has increased during recent years. Value-chain analysis (VCA) has been proved to be a useful means to assess performance in different systems including; distributional issues and pro-poor and gender equitable growth, the relative importance of factors affecting competitiveness, and the costs and earnings of each cycle of the value chain, identifying and analyzing gaps and weaknesses in value chain performance, and identifying and suggesting appropriate upgrading, management and development strategies to improve value chain performance.

In the recent years value chain it becomes very important in agriculture. Asiedu *et al.* (2015) itemized that, value chain in fisheries and aquaculture has a number of benefits such as providing policymakers and fishing company management with a systematic tool which allows them to understand the processes in the industry. Also value addition seemed to be important concept in fisheries and aquaculture as it promotes better profit, more stable market conditions, job opportunities and product diversification.

Mitchell *et al*. (2009) pointed out that, upgrading refers to the acquisition of technological capabilities and market linkages that enable firms to improve their competitiveness and move into higher-value activities. The value chain analysis has given development economics a tool to understand why the weak, poor and dis-organized are unlikely to

benefit from trade, and also a series of practical strategies to empower poor people to change the terms of their engagement in global trade by overcoming barriers to entry or creating barriers to entry of their own. Upgrading in firms can take place in the form of process upgrading, product upgrading and functional upgrading. Process upgrading involves increasing the efficiency of internal processes such that these are significantly better than those of rivals, both within individual links in the chain, and between the links in the chain. Product upgrading involves introducing new products or improving old products faster than rivals. This involves changing new product development processes both within individual links in the value chain and in the relationship between different chain links. Functional upgrading involves increasing value added by changing the mix of activities conducted within the firm or moving the locus of activities to different links in the value chain.

2.4Empirical Studies on Value Chain for Fish or Related Products

As reported by Alagoa *et al.* (2011), aquaculture fish value chain in Nigeria was fairly simple and short, with wholesalers and traders buying at the farm-gate and reselling either directly to restaurants or market women who retail fresh or smoked fish directly to consumers in the county's various markets. While the consumer preference is for large fish at soup bars/joints and restaurants, the small and odd-sized fish also find a ready market with wholesaling market women who specialize in smoking fish. Domestic smoked fish demand in Nigeria is estimated to be as large as the fresh fish market, and increasing in markets far away from the coast. Smoked fish markets were generally controlled by fish market women who by tradition, smoke fish and sell at a margin to mostly traders and retailers, and sometimes to consumers as well.

In Uganda, fish farming become very popular in recently years; Maurice (2010) found that African catfish value chain in Uganda, to a large extent not governed by middlemen;

rather lost value and bargaining power are a result of size and scale of production. Therefore he pointed out two relevant value chains which can be defined for Uganda's grow-out farmed African catfish. The regional export market chain and the domestic market chain.

The regional export market chain:

Grow-out farmer → coop → processor → regional exports.

The domestic market chain:

Grow-out farmer → middleman → processors/retailers → consumer.

The study done by Ferdous *et al.* (2012) found that, in Bangladesh farmers' share of the consumers' prices for different fishes, seem to be reasonable except for hilsha fish. Farmer received 67%, 72% and 76% share of the consumer's Taka for major carp-pangas-tilapia, shrimp (overseas value chain) and shrimp(domestic value chain) respectively. For major carp, pangas and tilapia, major cost is borne by *paikers* (32.03% of total cost) and major net profit is earned by retailers (51.98% of total net profit). However, when fish moves through value chains, every intermediary adds some extra costs with the purchase price as part of their involvement or profit. But farmers receive relatively higher share (approximately 70%) of the retail value for all species under study except for hilsha.

Phiri *et al*. (2013) pointed out that, the retailers had slightly lower total fish volume than wholesalers and the net income for the retailers was the highest since their total costs were lower than those of wholesalers, by computation of profitability indices, marketing margins and inequality indices. Then he concluded that, reducing of costs by all actors in the chain could help to narrow the income inequality gap among different actors, also he noted that fishers had the highest wage bill which also affected their profits, retailers were

also reaping more of the consumer' price than the rest of the actors (fishers and wholesalers) and wholesalers had the second largest share of the consumer's price. Fishers and fish retailers since they had lower marketing costs than wholesalers resulted in having comparatively better marketing profits.

Farmed fish value chain it seem to be very short, Macfadyen *et al*. (2011) found that, the value-chain for farmed fish in Egypt was comprised by three main stakeholder groups before fish reaches the consumer. There were virtually no exports of farmed fish, and so the value-chain is short and simple compared to aquaculture value-chains in some other countries. This is especially true given that there is no processing at all of farmed fish i.e. all fish is sold in whole form (either live, fresh on ice, or fresh without ice), and there is no value-addition either through primary processing into fillets or into other secondary processed products (e.g. ready meals, etc.).Chanyambuga *et al.* (2012) did mapping of value chain of farmed Nile tilapia in Morogoro region. The study found that Nile tilapia value chain was very short; it involves few actors fingerlings producer, Nile tilapia farmers and consumers. Shaheen (2013) found that, in Egypt there were no exports of farmed fish, and so the value-chain was very short and simple one compared to aquaculture value-chains in some other countries. Also fish farmers obtain a high percentage (72%) of the final consumer price, due to the lack of any exports, the short-supply chain, and the lack of value-addition in the value-chain. Feed costs represent a very high percentage in all governorates of operational costs for the farming subsector (67% of operational costs).

While value chain of farmed fish seem to be short, that of wild fish is long with some value addition. Kadigi *et al.* (2007) did Nile perch value chain and other fishery chains of artisanal fisheries and other jobs created by fisheries in Mwanza and Mara regions. From

the study, the complete Nile perch value chain extended from Lake Victoria to industrial processors to exporters. The Nile perch value chain in Tanzania was characterized by a complex system of supply chain that operate at three main levels. Production and localized trading within the lake zone and markets in the other regions within Tanzania, cross-border trade between Tanzania and neighboaring countries of Kenya, Uganda Zambia, The Democratic Republic of Congo (DRC) and International exports to the EU and other developed countries' markets.

Value addition to farmed fish is very little, Macfadyen*et al.* (2012) found that, farmed fish in Egypt was being sold as a low-value bulk commodity product with virtually no value-addition, results decline in real prices for farmed fish, and coupled with rises in production costs in recent years, with increasing pressure on the profitability of the fish farming sector. The project also reported that market for farmed fish in Egypt is not at all well understood, particularly in terms of the presence, size and demand requirements of different market segments. There is also no understanding of the relative margins and value-added in the different market segments. Rutaisire *et al.* (2009) found that, Cost-benefit ratios will depend on the species being cultured, the availability of quality feeds, and other input costs and it is not possible to predict probable profit margins for all production systems.

Phiri *et al*. (2013) found that, marketing margins for retailers almost double those of the wholesalers though the marketing costs for retailers are lower than those by wholesalers. Wholesalers incur high marketing costs in terms of fish transportation to markets and fish preservation using ice relative to fish retailers. Sharing of risks between a wholesaler and a retailer may be achieved only if transportation costs were shared and this could be achieved through construction of cold chain facilities half way close to where Chambo

was caught.The chain was found to be inefficient due to high marketing costs and increased marketing margins. Moreover Phiri *et al.* (2015) found that, fish retailers were able to rip more benefits than the rest of the chain actors (fishers and wholesalers) while fish wholesalers were second to rip more of the chain's benefits and fishers were the least. Also fish retailers had control over the chain basing on the benefits that they were able to enjoy and apart from this they could not allow fish wholesalers to have stalls from where wholesalers could directly sell their fish to consumers. Fisher's marketing margin was the same as fisher's marketing profit and this was due to the fact that fishers were selling fish at the beach and could not incur marketing costs as was the case with fish retailers and wholesalers.

The project report by Chiwaula *et al.* (2012) in Malawi found that, the actors in value chain of fish from Lake Chilwa were fishers, processors, retailers, and wholesalers. Fish processors have the highest average marketing margin among the three professions because they were involved in transforming the fish thereby adding significant value to the fish unlike wholesalers and retailers who mainly buy fish from one point and sell it at another. Other factors for margin reported was in the factor that; The farther or more remote an area was, the lower the marketing margin and also dependent on the pricing mechanisms used for the sale of the fish such as either the buyer or seller. In most cases (68%) fishers were found to set the sale price of the fish, while about 23% of the fishers reported that the buyer would set the price. Therefore technically in price setting and more value addition will end up in high marketing margin.

Apu (2014) reports that, fish farmers harvest and sell at the pond site to fish traders or use professional fisher teams to harvest on cash payment or against 15–20% of the harvest. The report defined market chain for freshwater prawn from producer to consumer was the

field workers, prawn traders, agents and processing companies. A fish farmer receives 56% of the price paid by the final consumer; in other words44% of the retail price is taken by the various intermediaries. Also the retail price of Silver carp and Nile tilapia was only 14% higher than the wholesale price, the profit rate is low but their high volume sale means they generate most earnings of the day, and most buyers of these fish were the vast low-income households.

Mwaijande and Lugendo (2015) pointed out that, constrains affecting the farmed fish value chain in Tanzania such as input, production, post-harvest and marketing factors. Critical input factors include non-availability of quality fish feeds, poor quality of fish breeding, poor water quality of water, feeds, and technology, limited best management practice for growing Tilapia, farm layout and design about feed use and fish health management.

Chagomoka *et al.* (2014) found that, in the value chain of tradition vegetables in Malawi and Mozambique, the main constraints regarding input supply were low input demand, lack of access to farm inputs, and lack of good quality seed. These constraints offer opportunity for various interventions such as: alternatives for development of input markets, provision of good quality seed, and input price regulation and control to guarantee fair prices for quality seed. Lack of marketing services such as processing and packaging were also seen as major constraints in the chain.

In calculating the margin for each actor in the value chain Ferdous *et al. (*2012)pointed out that, the margin must cover the costs involved in transferring produce from one stage to the next and provide a reasonable return to those doing the marketing activities. The marketing margin is the price of all utility adding activities and functions that are

performed by the intermediaries. A marketing margin is the percentage of the final weighted average selling price taken by each stage of the marketing chain. It is also termed as price spread as it represents the difference between the buying and selling price. Total marketing margin is the difference between the price received by the fish Farmers and the price paid by the final consumers. Moreover Omowa (2016) defined marketing margin as the difference in the value of physical qualities at the various levels of the marketing process. He further explained that, it represents the difference between farm gate and wholesale prices, or between wholesale and retail prices. Therefore marketing margin shows the value added and profit through the chain.

CHAPTER THREE

3.0 STUDY METHODOLOGY

3.1Study Area and Location

The study was conducted in the two main areas, Lake Victoria Regions (Mwanza and Geita Regions) and Coastal regions (Dar es Salaam and Coast Regions). These areas were purposive selected, due to their high potential in fish farm, and communities are depending in fishing activities for their income. Mwanza is located in the extreme northern part of Tanzania Mainland dominated by Africa's largest lake - Lake Victoria. Located at -2.51667 latitude, and 32.9 longitudes, while the Latitude and Longitude of Geita Region is -3.2 and 31.9 respectively. The Latitude and Longitude of Coast Region is -7 and 39 respectively. Dar es Salaam is located at 6°48' South, 39°17' East (−6.8000, 39.2833), on a natural harbour on the eastern coast of Africa, with sandy beaches in some areas. Annual rainfall is approximately 1,100 mm (43 inch), and in a normal year there are two rainy seasons: "the long rains" in April and May and "the short rains" in November and December.

3.2Research Design

The study employed a cross section research design. The design is appropriate to the study since groups identified for study are purposely selected based upon existing differences in the sample rather than seeking random sampling. Also this design is capable of using data from a large number of subjects and, unlike observational studies, is not geographically bound. Primary data were obtained from farmers, wholesalers (Distributors) and retailers, while the secondary data were obtained from key informant such as extension officers, district and region fisheries officers. Also field observations were considered to each level (actor) in the core process.

3.3 Sampling Design and Sample Size

Sampling was designed to reflect all the value chain links and cover factors that might affect value chain performance of all actors along the chain. In each actor's node where possible sample were taken from the respondents at different levels of scale of production and financial status, purposively to acknowledge contribution of each member in the chain.

The non-probability sampling technique was employed in this study. Snowball sampling technique was used to identify actors in the chain such as processor/distributors (Wholesalers), Retailers/trader (Marketers) and Restaurants/chop bar/food vendors, starting from Nile tilapia farmers. This method was useful where the sample space is not well known. The study was expecting to do random sampling on the village with fish farmers, but the situation in the field showed that there was no enough fish farmers when it comes to the village level.

Therefore purposive sampling was done on selecting the district with good number of fish farmers. Mwanza region districts selected were Ilemela, Sengerema and Misungwi, Dar es salaam wereKinondoni, Ilalala and Temeke and Coast wereKibaha and Bagamoyo and Geita region were Chato and Geita. For inputs suppliers the number were very limited, therefore purposive sampling was employed and eight suppliers were captured, two in Mwanza, one Chato, two in Dar es salaam and three in coast region. Also it was not easy to get Processor/ Distributor but eight distributors were obtained, five in Mwanza, two of them in Dar es Salaam and one from coast region. And thirty seven Retailers/Marketers were interviewed, twelve from Coast region, ten from Dar es Salaam and fifteen from Geita. Restaurant/Hotels information was obtained from fourteen respondents in Geita,

seven respondents from Mwanza, ten were obtained from Dar es Salaam and from Coast region ten respondents were obtained with the total of forty one.

Sample size was estimated by expectation of available respondents in the study area and amount of information need by the study. The target was one hundred and twenty farmers, ten distributors, forty marketers, forty restaurants and ten inputs suppliers, which is the suitable number for survey studies. However due to unavailability of respondents one hundred and thirteen farmers, eight distributors, forty marketers, forty one restaurants and eight input suppliers were interviewed.

3.4Methods of Data Collection

Data were collected by structured questionnaires from the respondents, closed and open questions were used to farmers, distributors/processors, input suppliers, restaurants/chop bar/ fish vendor and Marketers/Retailers to get primary data which include: Age, education level, experience in the industry, activities performed, source of funds, value added process, prices, marketing, production costs. Also the observations around some ponds were done to observe the size as well as number of ponds.

3.5Data Processing and Analysis

The qualitative and quantitative data were analyzed by using Statistical Package for Social Science (SPSS) and excel program. Financial data were analyzed using the formulas of finding Marketing Margin (MM) and Marketing Profit (MP) among the links in the value chain. All the costs at each stage along the value chain were identified. For other actors the margins were calculated by the formula below, however farmers marketing margin was calculated by the difference between what consumers pays and the farmer price per Kg.

Marketing Margin (MM) = Sales Price (SP) minus Purchase Price (PP)

$$MM = SP - PP$$

Marketing Profit (MP) = Marketing Margin (MM) minus Marketing Cost (MC)

$$MP = MM - MC$$

3.6Mapping the Value Chain

According to M4P (2008), the book proposed eleven steps on mapping the value chain. Therefore on mapping the value chain for this study, those steps were considered. The steps were; mapping core processes, mapping main actors involved in the core processes and mapping flow of Nile tilapia from the Farmers/fishermen to the final consumers. Other steps were; mapping knowledge and flow of information, mapping volume (percentage) of fish. Mapping relationships and linkages between value chain actors that are between different preceding actors and mapping services that feed into the value chain. Constraints exist in all process levels of value chain, and finally, the study showed the value chain map matrix by using table.

3.7Analytical Framework

1. The first specific objective was determined by Value chain mapping which identified the number of actors (participants) in the value chain and the activities performed in value addition.
2. The second specific objective was determined by calculating the marketing margins and marketing profits.
3. The third objective was determined by identification of constrains and problems faced by each actor in the two value chains.

CHAPTER FOUR

4.0 RESULT AND DISCUSSION

The core actors in the value chain were Nile tilapia farmers, Distributors/Processor, Marketer/Retailer/Traders and Restaurants/ bar chop will be discussed in this chapter and results from inputs suppliers will also be considered to see their impact on the value chain. The social-economic factors of each actor, activities performed in the chain, cost incurred, revenues and margins will be discussed for the core actor separately, and comparisons on the margins will be discussed for the core actors.

4.1 Nile Tilapia Farmers

4.1.1 Overview

The sample of fish farmers were taken from selected four Regions Geita, Mwanza, Coast and Dar es Salaam, the respondent were of different status within the same region as well as different Regions. The analysis was made for different regions and then generalized in some variables and some variable were done in general. Respondents were 32 (28.3%) from Geita, 28 (24.8%) from Mwanza, 30 (26.5%) from coast and 23 (20.4%) from Dar es Salaam.

4.1.2 Social characteristics of Nile tilapia farmers

4.1.2.1 Age and gender

The interviewed fisher farmers' age ranged between 21 years and 68 years with the mean of 40.65 years which according to Tanzania policy is the working age. The results show that the sector is dominated by males who were 90.3% of the total sample and 9.7% of respondents were female (Table 1); this was also observed by Chanyambuga *et al.* (2011) in Morogoro and Mwaijande and Lugendo (2015), this is due to the fact that the business

needs huge financial capital and assets like land which according to Tanzanian culture is owned by men.

4.1.2.2 Education and marital status

In education, the respondents ranged from primary education to university degree, the distributions differed from one region to another as showed in Table 1, but in general, 62.8% of the respondents have primary Education level while secondary education was 24.8%, 8% have Technical education and graduates were 0.9%, with bachelor degree were 3.5%. This shows the employment creation within the fish farming industry crosscut all education levels. Most of respondents (92%) were married, single were 7.1% and divorced were 0.9%. This indicates the potential of this business, the married people depend on it for their economic stability, and thus improving the farming industry will improve income of these families.

Table 1: Social characteristics of respondents by region

Highest education attained	**Region**				**Total**
	Geita (n=32)	**Mwanza (n=28)**	**Coast (n=30)**	**Dar (n=23)**	**(N=113)**
Primary	78.1%	85.7%	56.7%	21.7%	62.8%
Secondary	15.6%	14.3%	23.3%	52.2%	24.8%
Adult education/Technical education	3.1%	0.0%	13.3%	17.4%	8.0%
Bachelor of degree	3.1%	0.0%	6.7%	4.3%	3.5%
Graduate Degree	0.0%	0.0%	0.0%	4.3%	0.9%
Marital status					
Single	0.0%	10.7%	6.7%	13.0%	7.1%
Married	100.0%	85.7%	93.3%	87.0%	92.0%
Divorced	0.0%	3.6%	0.0%	0.0%	0.9%
Sex					
Male	90.6%	89.3%	90.0%	91.3%	90.3%
Female	9.4%	10.7%	10.0%	8.7%	9.7%

4.1.3 Farm managements and ownership

The respondents were directors 24 (21.2%), farm managers 61 (54%) and caretakers 28 (24.8%) of the total respondents. This depended on their availability during the visit. The ownership of the farm was by private farmers 75 (66.4%), household 30 (26.5%), formal groups 6 (5.3%), informal groups and government each 1 (0.9%). Therefore majority of the farms were privately owned, the group farms were only 6.2%. Therefore there is a need to organize formal groups, which will help learning and access to loans from the financial institutions.

4.1.4 Ponds statistics and size

The production system used by farmers were fish pond production, farmers owned from 1 to more than ten ponds, the average ponds owned by each farmer in each region is as shown in the Table 2, but in general the average was two ponds per farmer, Coast and Dar es Salaam Regions were leading with average of 2.5 and 3 respectively. The average total pond area by Region as shown in the Table 2, Mwanza was leading with 13093m^2 but on average the total pond area was 8745.991m^2. The pond sizes were different depending on the scale of production and availability of space. The average pond size was 598.3m^2 which was easy for management, with large average pond size of 690.7m^2 in Coast Region and average small size of 514.3m^2 in Dar es Salaam Region.

Table 2: Ponds statistics and size

Variables	Geita	Mwanza	Coast	Dar	All
How many ponds you have?	2.06	1.79	2.52	3.04	2.33
Total area of ponds (square meter)	9764.563	13093.250	8061.323	3458.826	8745.991
What is the average pond size?	615.2812	556.3036	690.7742	514.3478	598.3142

4.1.5 Fish species stocked by farmers

Fish farmers stocked tilapia, catfish and mixed, the species stocking was based on the availability of fingerlings, some farmers were ready to stock catfish but they were not able to assess the catfish fingerlings, but Nile tilapia fingerlings were easy to get even from other aquacultures. In general 100% of the respondents' stocked Nile tilapia. However, in Geita 30 (93.8%) and Mwanza 27 (96.4%) stocked Catfish. This shows that catfish is highly farmed in Lake Victoria zone relative to Coast zone (Coast 17 (56.7%) and Dar es salaam 13 (56.5%)) Table 3 This shows that Nile tilapia was mostly farmed followed by catfish; therefore investing in the business will help those farmers who already show the interest in production.

Table 3: Fish stocked by farmers by region

Variables	Categories		Region				Total
			Geita	Mwanza	Coast	Dar es salaam	
Tilapia	Yes	Count	32	28	30	23	113
		% within Region	100.0%	100.0%	100.0%	100.0%	100.0%
Total		**Count**	**32**	**28**	**30**	**23**	**113**
		% within Region	100.0%	100.0%	100.0%	100.0%	100.0%
Catfish	No	Count	30	27	17	13	87
		% within Region	93.8%	96.4%	56.7%	56.5%	77.0%
	Yes	Count	2	1	13	10	26
		% within Region	6.2%	3.6%	43.3%	43.5%	23.0%
Total		**Count**	**32**	**28**	**30**	**23**	**113**
		% within Region	100.0%	100.0%	100.0%	100.0%	100.0%
Mixed fishes	No	Count	32	28	28	23	111
		% within Region	100.0%	100.0%	93.3%	100.0%	98.2%
	Yes	Count	0	0	2	0	2
		% within Region	0.0%	0.0%	6.7%	0.0%	1.8%
Total	**Count**	**Count**	**32**	**28**	**30**	**23**	**113**
	% within Region	% within Region	100.0%	100.0%	100.0%	100.0%	100.0%

4.1.6 Contract with suppliers and payment

The inputs supplied to farmers were; fingerlings, fish feed and organic fertilizers, 100% of respondents agree on cash and delivery payment to their inputs suppliers in all the regions (Table 4). This shows that there are no credits to farmers from suppliers. The farmers who have contract with suppliers were only 7.1% of the respondent in all the Regions. Moreover, the contracts are informal, which seem to have no impact in the industry.

Table 4: Contract with suppliers and nature of payment by region

Category	Variables		Region				Total
			Geita (n=32)	Mwanza (n=28)	Coast (n=30)	Dar (n=23)	(N=113)
Contract with suppliers	Yes	Count	1	5	1	1	8
		% within Region	3.1%	17.9%	3.3%	4.3%	7.1%
	No	Count	31	23	29	22	105
		% within Region	96.9%	82.1%	96.7%	95.7%	92.9%
	Total	**Count**	**32**	**28**	**30**	**23**	**113**
		% within Region	100.0%	100.0%	100.0%	100.0%	100.0%
Nature of payment	Cash and delivery	Count	32	28	30	23	113
		% within Region	100.0%	100.0%	100.0%	100.0%	100.0%
	Total	**Count**	**32**	**28**	**30**	**23**	**113**
		% within Region	100.0%	100.0%	100.0%	100.0%	100.0%

4.1.7 Land ownership

The fish farming business needs an individual to have land for pond building and other infrastructure. Farmers were interviewed on the possession of the land for farming; the results are shown in Table 5 below. From the results, 95.5% of the respondents in Dar es Salaam and 76.7% of the respondents in Coast were having title deed, this indicate that farmer in coast region are more aware of land ownership. The overall shows that 58% of the respondents they have titles deed for the used land, while 18.8% have customary law land and 23.2% have the squatting land. The ownership makes them to have the power on land so that they can even use them for accessing loan from financial institutions.

4.1.8 Assets in the production economic unit

Farmers owned assets in their production economic units such as; buildings, mechanizing equipment, vehicles and livestock as shown in (Appendix 1). In general the results show

that farmers have ponds near their houses, others far from home. However, 43 (38.1%) of the respondents have the permanent building in their production units, while 21 (18.6%) have the mechanized farm equipment and vehicle 14 (12.4%). Also, the results shows that 60 (53.1%) of the respondents owned livestock in the economic units, either as the source of fertilizer or as source of income. Coastal zone was leading with respondents who own the livestock/farm animal, Coast region 73.3% of the respondents and Dar es Salaam with 65.2% of the respondents.

4.1.9 Source of inputs

The inputs supplied to farmers were feeds, fingerlings, organic fertilizers, associated animals and labour for operation. They were obtained either from other aquacultures, Governments or owner of the farm as showed in Appendix 2**.** The result in Dar es Salaam and Coast regions shows that, majority of farmers have their own organic fertilizer relative to Geita and Mwanza. For fingerlings Dar es Salaam 82.6% of respondents gets from other aquacultures. But in general, fingerlings were obtained from three sources. However, 58 (51.3%) of the respondents get them from other aquacultures while those who were producing their own fingerlings were 19 (16.8%) and from the Government's institutions were 36 (31.9%). The results show that majority get fingerling from other aquacultures whose credibility was questionable. The sources of feed for the fish were basically from the farm owners either by preparing themselves or buying from feed suppliers. Coast with the highest percentage, 89.7% of the respondents has their own feed. In general 64 (58.7%) of the respondents have their own feed, while 35 (32.5%) get from other aqua culturists and only 10 (9.2%) get from the government as just a supplement. The organic fertilizers were available to the farmers since they have the livestock/associated animals. 61 (71.8%) of the respondents have own organic fertilizer, 21 (24.7%) from other aquacultures and 3 (3.5%). Associated animals were very common to fish farmers, where

68 (93.2%) of the respondents have their own animals and only 5 (6.8%) of the respondents get associated animals from other aquacultures. For the case of labour available for operations such as pond managements and harvesting 71 (97.5%) of the respondents use their own labour while only 2 (2.7%) requested labour from other aquacultures.

Water as another important input in fish production, its source was depending on the environmental condition of production site with the available source. The sources were: Spring, Seepage from water table, River, Reservoir/dam and Lake. The regions distribution of respondents is shown in the Table 5 below where one respondent can have more than one source. However, 70.8% of the respondents use spring, 18.6% of the respondents use seepage from water table, 4.4% use river water, 9.7% use reservoir/dam and 9.7% use water from the lake. However 82.1% of the respondents Mwanza region use spring with the highest percentage followed by Coast 60.9% of the respondents.

Table 5: Land ownership and Source of water for ponds by Regions

Ownership type	Region				Total n=113
	Geita (n=32)	Mwanza (n=28)	Coast (n=30)	Dar (n=23)	
Title deed	34.4%	35.7%	76.7%	95.5%	58.0%
customary law	34.4%	14.3%	16.7%	4.5%	18.8%
Squatting	31.2%	50.0%	6.7%	0.0%	23.2%
Source of water					
Spring	68.8%	82.1%	70.0%	60.9%	70.8%
Seepage from water table	6.2%	0.0%	23.3%	52.2%	18.6%
River	6.2%	3.6%	6.7%	0.0%	4.4%
Reservoir/dam	6.2%	0.0%	16.7%	17.4%	9.7%
Lake	18.8%	17.9%	0.0%	0.0%	9.7%

4.1.10 Control over water supply

For security of availability of water supply, fish farmers have the control over water supply. Water supply control was not uniform in all regions as shown in the Table 6 but in general 54.9% of the respondents have exclusive rights on the water, 18.6% have right over water through customary law, and rights from individual or corporate owner and rights from government were 5.3% and 2.7% respectively. This means that majority have exclusive rights of water supply. But Coast region shows the highest percentage of 63.3% of respondents with exclusive rights relative to other regions with average of 50% of respondents with exclusive rights. Some of respondents were not responding to any of the variables, thus this leads to less percentage especially for Coast and Dar es Salaam regions.

Table 6: Control over water supply

Control type	Region				Total
	Geita (n=32)	Mwanza (n=28)	Coast (n=30)	Dar (n=23)	n=113
Have exclusive rights	53.1%	50.0%	63.3%	52.2%	54.9%
Rights through customary law	28.1%	39.3%	0.0%	4.3%	18.6%
Rights from individual or corporate owner	12.5%	7.1%	0.0%	0.0%	5.3%
Rights from government	3.1%	3.6%	3.3%	0.0%	2.7%

4.1.11 Source of financial capital for starting farm

The source of fund for starting a business is very important any business need enough capital, the sources differ from Region to Region as showed in Table 7, depending on scale of production and government assistance in a particular Region. The result shows that, there are multiple responses which results to high percentage. But in general the sources were almost from farmers own savings resources, since 94.7% of the respondents started fish farming from their own savings, only 2.7% started by borrowing from friends,

3.5% borrowed from credit institution, 0.9% were sponsored by friends, 1.8% were sponsored by the Government and 0.9% were sponsored by NGOs. While 100% of the respondents in Geita used their own savings to start the business. This is the indicator that, Government play very little role financing in fish farming industry.

Table 7: Source of resources used to start the farm by Regions

Source of resources	Region				Total
	Geita (n=32)	Mwanza (n=28)	Coast (n=30)	Dar (n=23)	N=113
Own resources	100.0%	96.4%	90.0%	91.3%	94.7%
Borrowed from friends	6.2%	3.6%	0.0%	0.0%	2.7%
Borrowed from credit institutions	0.0%	3.6%	6.7%	4.3%	3.5%
Sponsored by friends	3.1%	0.0%	0.0%	0.0%	0.9%
Sponsored by government	0.0%	7.1%	0.0%	0.0%	1.8%
Sponsored by NGOs	0.0%	0.0%	3.3%	0.0%	0.9%

4.1.12 Source of knowledge on starting the business

Respondents were asked on the knowledge of fish farming and how they developed interest and skills on Nile tilapia fish farming. The result shows that, there are multiple responses which results to high percentage. However, the results show that there were different sources of skills and knowledge on Nile tilapia farming as showed in the Table 8, and it differs from region to region, but on average 18.6 % got from those who worked on a similar unit owned by an individual/group, 7.1% of the respondents got by working on a similar unit on a Government fish farm unit which involved Nile tilapia farming. Other farmers got skills by participating in fish culture training courses (3.5%), while 77.9% of the respondents got by observing a private fish culturists; this indicates that, demonstration farms/ results can help to influence more fish farmers to be attracted since a large percentage got through observation. Others got through reading appropriate

documents on fish farming technology (23.9%), others got skills through visit, observation and/or discussion at a Government fish farm (37.2%). The 19.5% of the respondents got information/training from District aquaculture officer; therefore investing in District aquaculture officer will also help to sensitize fish farming knowledge. In Geita region was leading by 25% of the respondents assisted by district aquaculture officers on fish farming knowledge, while Dar es Salaam is the least by 8.7% of the respondents who received the knowledge from aquaculture district officers.

Table 8: Sources of knowledge for starting Fish farming

Source of knowledge	Region				Total
	Geita (n=32)	Mwanza (n=28)	Coast (n=30)	Dar (n=23)	N=113
Worked on a similar unit owned by an individual/group	15.6%	25.0%	23.3%	8.7%	18.6%
Worked on a similar unit on a government fish farm	9.4%	3.6%	13.3%	0.0%	7.1%
Participated in a fish culture training course	3.1%	0.0%	3.3%	8.7%	3.5%
Observed a private fish culturist	81.2%	75.0%	70.0%	87.0%	77.9%
Read appropriate documents	15.6%	17.9%	30.0%	34.8%	23.9%
Visited, observed and/or discussed at a government fish farm	40.6%	32.1%	36.7%	39.1%	37.2%
Information from District Aquaculture officer	25.0%	21.4%	20.0%	8.7%	19.5%

4.1.13 Assistance requested on the running the farm

Farmers were asked if they asked for assistance in the production process. The results show that some got assistance either from district experts on fish farming or from other aquacultures, depending on the availability and assistance requested. The results show different accessibility of assistance in the Regions as showed Table 9 with highest in Dar es Salaam 65.2%, Mwanza 57.1% Coast 56.7% and last Geita with 37.5% of the respondents. But in general 53.1% of the respondents get assistance which shows the

positive motivation for the fish farmers in seeking the assistance from the expertise in fish farming.

Table 9: Assistance requested for fish farm by Regions

Variable	Region				Total (n=113)
	Geita (n=32)	Mwanza (n=28)	Coast (n=30)	Dar (n=23)	
Yes	37.5%	57.1%	56.7%	65.2%	53.1%
No	62.5%	42.9%	43.3%	34.7%	46.9%

4.1.14 Kind of assistance requested by fish farmers

Running any business needs some financial assistance and technical assistance; farmers were asked whether they requested some assistance from other sources**.** The assistance were such as opinions on whether or not to start, evaluation of location/site/water, choice of fish species, choice of fish culture method, credit, borrow equipment, supply of operating inputs, labour, diagnosis of problem, marketing information/access, access to inputs for operating culture unit, access to means of acquiring technical know-how. The result shows that, there are multiple responses which results to high percentage as shown in Table 10.

4.1.14.1 Opinion on starting the business and site evaluation

Starting fish farming needs perfect selection of the area to build the ponds; otherwise it can be risky when wrong selection is done. Farmers were asked on the evaluation of the area for starting production and opinion on whether to start production or not. Overall 33.6% of the respondents requested opinion whether to start or not, while 40.7% asked assistance on the site evaluation (Table 10). This result shows that many farmers were just taking the risk on this basic situation since more than half of them just started without making critical analysis on the location.

4.1.14.2 Choice of fish species and culture method

Species were the main factor for production. The species which grow faster within a short time with good management is the advised one, and the fish culture method also has the effect on the production. In general, 49.6% of the respondents requested on the choice of fish species. However farmers in Dar es Salaam and coast were mostly requesting on species choice by 60.9% and 50% respectively. Also in overall 28.3% of the respondents requested assistance on the fish culture method (Table 10). Even though the number of farmers requesting assistance was adequate, but the education on these skills are required since farmers still ignore them.

4.1.14.3 Other assistances requested

Another assistance request was credit, where only 4.4% of the respondents asked for it, 0.9% of the respondents requested assistance on information on borrowing equipment, 2.7% supply of operating inputs, 3.5% requesting for labour assistance and 3.5% diagnosis of problems they face. Marketing information as the tool in any business, only 7.1% of respondents asked for this information. 7.1% of respondents asked assistance on access to inputs for operating culture unit, and 6.2% requested assistance on access to means of acquiring technical know-how (Table 10). Generally farmers do not access assistances; something must be done to help them so that they can compete in business.

Table 10: Kind of assistance requested by fish farmers by Region

Assistance requested	Region				Total
	Geita (n=32)	Mwanza (n=28)	Coast (n=30)	Dar (n=23)	(N=113)
Opinions on whether or not to start	40.6%	39.3%	30.0%	21.7%	33.6%
Evaluation of location/site/water	40.6%	50.0%	36.7%	34.8%	40.7%
Choice of fish species	43.8%	46.4%	50.0%	60.9%	49.6%
Choice of fish culture method	31.2%	25.0%	20.0%	39.1%	28.3%
Credit	6.2%	3.6%	3.3%	4.3%	4.4%
Borrow equipment	3.1%	0.0%	0.0%	0.0%	0.9%
Supply of operating inputs	6.2%	0.0%	3.3%	0.0%	2.7%
Labour	0.0%	10.7%	0.0%	4.3%	3.5%
Diagnosis of problem	6.2%	3.6%	3.3%	0.0%	3.5%
Marketing information/access	6.2%	3.6%	6.7%	13.0%	7.1%
Access to inputs for operating culture unit	6.2%	0.0%	6.7%	17.4%	7.1%
Access to means of acquiring technical know-how	3.1%	0.0%	6.7%	17.4%	6.2%

4.1.15 Challenges faced by fish farmers on production

Fish farming as any other business faces some challenges; the main challenges were: shortage of water for ponds, fish culture inputs too costly/not available locally, low knowledge on fish farming, shortage of feed for ponds, not possible to trade fish at a profitable price, small growth rate, shortage of fingerling/fry to stock ponds, shortage of fertilizer for ponds and low security. The result shows that, there are multiple responses which results to high percentage as shown in Table 11.

4.1.15.1 Fingerlings and water supply

Shortage of fingerlings was a challenge especially quality species which can grow faster. 16.8% of the respondents face this challenge, mainly by buying the fingerlings from incredible source just from normal aqua culturists. The shortage of fingerling observed most in Geita and Coast with 25% and 20% of the respondents respectively. Although before starting the production farmers tried to check constrains and risk factors, but 41.6%

of respondents had water shortage for ponds especially during drought season. This challenge most observed in Dar es Salaam and coast with 73.9% and 53.3% of respondents respectively (Table 11). This calls for site evaluation assistance to ensure availability of water throughout the year.

4.1.15.2 Availability of feeds and Organic fertilizer for ponds

The important input with high variable cost in the fish production is feed, the huge variable cost fall in the feed, and the other input was organic fertilizer which does not cost much but it is important. From the sample, in average 13.3% of the respondents faced the organic fertilizer shortage. 26.5% of the respondents faced the shortage of feed with the highest in Geita where 31.2% of respondents reported this challenge (Table 11). The shortage of feed was due to few feed producers, suppliers and high feed price, which caused other farmers to buy the locally made feed which is not assured of its quality nutrient contents. This creates the room for recognized fish feed producer, who now are emerging in the industry according to this research.

4.1.15.3 Low growth rate and unprofitable price challenges

The low growth rate is a challenge reported by farmers, which end up on high feeding cost. In general 22.1% of the sample faced the challenge, it is highest reported in Mwanza by 39.3% of the respondents. This makes the farmers to end up on trading the fish at unprofitable price, since the fish will be harvested at small size with high feeding cost, also small size fish is a challenge in the market. The report shows that 23% of the respondents were facing the challenge of price which is unprofitable especial in coast region where 30% of respondents reported the challenge (Table 11); this scares even other farmers to quite the business. It is very important to develop species which can grow faster to cover out these challenges. One of the fingerlings supplier in Dar es salaam has

introduced the Nile tilapia which can grow to 0.5Kilogram within the eight months, “It seem to be differ from the normal six months harvesting but the selling price of it will give the farmer profit and easy marketing of the product” commented the fingerlings supplier manager.

4.1.15.4 Feed cost and fish farming knowledge

The cost of feeding fish from fingerlings to harvesting weight needs enough financial capital. Farmers reported that it was hard for them to manage the cost. In general 38.9% of the respondents were reported this challenge. However Coast zone was more affected (Coast and Dar es Salaam 50% and 47.8% of respondents reported this challenge respectively). Fish farming knowledge also is huge challenge which included the pond managements and species selection. 35.4% of the respondents reported to face the challenge (Table 11); the education and any means for the knowledge dissemination is needed to insure good production.

4.1.15.5 Lack/low security

Security was reported as the challenge, other farms were far away from residences and there were no any security around them, so thief stole fish during the night; this was reported by 10.6% of the respondents as shown in Table 11.

Table 11: Main challenges to fish farming by Regions

Main challenges	Region				Total (N=113)
	Geita (n=32)	Mwanza (n=28)	Coast (n=30)	Dar (n=23)	
Shortage of water for ponds	21.9%	25.0%	53.3%	73.9%	41.6%
Fish culture inputs too costly/not available locally	31.2%	28.6%	50.0%	47.8%	38.9%
Low knowledge on fish farming	50.0%	50.0%	20.0%	17.4%	35.4%
Shortage of feed for ponds	31.2%	25.0%	26.7%	21.7%	26.5%
Not possible to trade fish at profitable price	15.6%	28.6%	30.0%	17.4%	23.0%
Small growth rate	15.6%	39.3%	13.3%	21.7%	22.1%
Shortage of fingerling/fry to stock ponds	25.0%	14.3%	20.0%	4.3%	16.8%
Shortage of fertilizer for ponds	15.6%	10.7%	13.3%	13.0%	13.3%
Low Security	9.4%	0.0%	23.3%	8.7%	10.6%

4.1.16 Assistance and source of assistance to Nile tilapia farmers

Farmers need some assistance in some activities which needs high capital or technical know-how which will help them to have high production. Farmers asked some assistance from government, other aquacultures and own resource. The assistances obtained were fingerling/fry, associated animals, organic fertilizer, feed, labour for construction and labour for operations. Results from the regions are shown in the Appendix 3. Overall results show that for fingerlings assistance 46.9% of the respondents have own sources, 24.8% got government assistance and 28.3% were assisted by other aquacultures. However Lake Victoria zone was assisted by Government compared to coast zone; Geita 40.6% of the respondent and 39.3% of the respondents. Organic fertilizer assistance from own source was 89.2% of the respondents, governments' assistance were only 4.5% and assistance from other aquacultures was 6.3%. Other assistance was on feed, own a source was 61.1% of the respondents, government assistance was 21.1% and assistance from other aquacultures was 17.7%. Associated animals own source was 93.8% of the respondents, this is because majority of the farmers keep associated animal in their

production units, and assistance from government was 4.4%, while assistance from other aquacultures was only 1.8%. Labour for construction assistance was 89.4% of the respondents use own source; only 3.5% get assistance from Government and 7.1% was assisted by other aquacultures. The last assistance was on labour for operations, where 92.9% of the respondents used own source, Government assistance only 1.8% and assistance from other aquacultures was 5.3%. From these results farmers get very little assistance either from the Government or other aquacultures. This result shows that, Governments is not full involving in the fish farming business.

4.1.17 Proportional Nile tilapia sold at each selling point and gross profit

The interviewed farmers were asked at which point they sell their fish. Pre identified selling points were farm gate, customer distribution/delivery, market place, neighbouring customers, fish distributors, restaurants, traders and distribution point. The sell point results as shown in Table 12, leads to higher percentage due multiple responses. However, overall results show that at the farm gate 38.73% of the Nile tilapia was sold.This reported mostly in coastal zone by 55.33% and 55% of respondents in Coast and Dar es Salaam regions respectively. This was done by informing customers on the day of harvest either by putting posters or giving the call to potential customers. 30.31% was sold at the distribution points, this reported mostly in Mwanza and Geita with 39.64% and 37.66% respectively.The customer delivery/ distribution method which was done by taking orders from them and delivering after harvesting where only 5.96% was sold by this method. The normal market place was also used by farmers for selling where Nile tilapia were sold with other products. Only 2.08% were sold at the market. Another sale was done to neighbouring customers, where 21.76% were sold at this points which is very potential since there was no transports cost. This was mostly reported in coast and Dar es Salaam by 39.17% and 36.11% of the respondent respectively.Fish distributors were also the

customers of fish farmers where overall 17.74% were sold to distributors. Restaurants were another selling point for fish farmers where 9.74% was sold at this point and also fish traders were among of customers where farmers sold their fish 26.86% was sold to traders. Generally farm gate point was the point where large sales were done 38.73% sold, followed by distribution point with 30.31%; other closer to these were fish traders and neighbouring customers with 26.86% and 21.76% respectively.

Gross profit also differs from the regions, Coast Region with the highest average of 3 328 522.73TZS per year, and the last was Mwanza with average of 17 368.42TZS per year, but the overall gross profit was 1 195 719.51TZS per year (Table 12). This shows that production in the coastal Regions is more profitable relative to production in Lake Victoria Regions.

Table 12: Proportional Nile tilapia sold at each point and Gross profit by region

Selling point /	**Region**				**All**
gross profit	Geita	Mwanza	Coast	Dar	
Sold at farm gate	26.19	21.04	55.33	55.00	38.73
Distribution point	37.66	39.64	18.67	30.56	30.31
Customer delivery	4.13	3.25	9.33	9.44	5.96
Sold at market	3.91	3.93	.00	.00	2.08
Neighbouring customers	7.97	7.11	39.17	36.11	21.76
Fish distributors	21.09	28.21	13.67	7.22	17.74
Restaurants	4.03	.79	12.83	26.39	9.74
Fish traders	35.66	31.75	17.67	24.72	26.86
Gross Profit (TZS/year)	232045.45	17368.42	3328522.73	1077441.18	1195719.51

4.1.18 Payment for Nile tilapia sales

Fish farmers were all sell their fish by cash as reported by 100% of respondents who sold their fish as shown in Table 13 below, where 77% of the respondents sold the amount of

their fish and 23% did not sell their fish, either they used all for home consumption or they were new in the business so they were waiting for harvesting.

Table 13: Payment for Nile tilapia sells by Regions

Payment		Region				Total
		Geita	Mwanza	Coast	Dar es Salaam	
Cash	Count	23	19	25	20	87
	% within Region	100.0%	100.0%	100.0%	100.0%	100.0%
Total	Count	23	19	25	20	87
	% within Region	100.0%	100.0%	100.0%	100.0%	100.0%

4.1.19 Price determination for fish

The pricing method used by farmers was majority market price, it was difficult to sell the product in the market by having the different price, and therefore 85.4% use the market price. Cost plus method also was used. This method is advised since profit is pre-determined; therefore 44.2% of the respondents in average use this method, however this method was mostly reported in Geita by 64% of the respondents. The markup method and target return method were not popularly used by the famers only 6.2% and 2.1% of the respondents respectively use these methods (Table 14).

Table 14: Methods of price determination by Regions

Method	Region				Total
	Geita (n=32)	Mwanza (n=28)	Coast (n=30)	Dar (n=23)	(n=113)
Market price	76.0%	78.3%	92.6%	95.2%	85.4%
Costs Plus	64.0%	43.5%	26.9%	42.9%	44.2%
Markup	8.0%	4.3%	0.0%	14.3%	6.2%
Target Return Method	4.0%	0.0%	0.0%	4.8%	2.1%

4.1.20 Trading with fish Traders

The results show that some farmers sell their Nile tilapia to traders. 47.7% of the respondents sell to traders with high percentage of respondents in Geita, were 69.6% of

respondents reported to trade with traders, the rest 52.3% do not sell to traders (Table 15). The reasons for not selling to traders were different from one region to another, but taking the overall results, 5.7% of the respondents do not want to trade with fish traders while 44.3% sell to traders with them but Nile tilapia farmers were not informed where to get the traders. They need to be directed to traders so that they can sell their fish to the traders. Others were willing to sell to them but traders do not want to come to their ponds 40% of the respondents. Therefore these indicated farmers need assistance of facilities which will enable them to send their fish to trader or traders must be informed about fish production in those areas. The last group of farmers sells their fish to traders but they do not have enough fish remaining after their own use. These were only 2.9% of the respondents; therefore these need assistance so that they can produce large amount for selling as showed in Table 15.

Table 15: Trading with traders and reasons for not trading by Regions

Variable	**Region**				**Total**
Trading with traders	**Geita (n=32)**	**Mwanza (n=28)**	**Coast (n=30)**	**Dar (n=23)**	**N=113**
Yes	69.6%	52.6%	37.0%	31.6%	47.7%
No	30.4%	47.4%	63.0%	68.4%	52.3%
Reasons for not trading					
I do not want to	0.0%	0.0%	9.1%	14.3%	5.7%
I want to but don't know any such traders	31.6%	33.3%	45.5%	71.4%	44.3%
I want to but the traders do not (will not) come to my ponds	21.1%	26.7%	40.9%	78.6%	40.0%
I want to but I don't have enough fish remaining after my own use	0.0%	0.0%	9.1%	0.0%	2.9%

4.1.21 Contribution of fish farming in household cash income

The fish farming is taken as the main economic activity by the farmers, but also farmers have other economic activities which also contribute to their income. The proportion of

household cash income derived from the sale of fish from the farm was different from individual which leads to differences across the regions (Table 16). However taking overall contribution proportion of fish sales to income of the household, 46.4% of the respondents getsbetween one half and one quarter of their income from fish sales. Those one who get less than a quarter of their household income from fish sales were 20.6% of the respondents, and 10.3% get more than half of their income from fish sales. At the same time 22.7% of the respondents do not get any (Table 16). This means that they do not sell their fish, either because they do not have enough fish for sale or they are new in the business so they did not harvest yet. Therefore fish farming has contribution to the income of household when they have enough amounts for consumption and sale. Assisting them to harvest more will contribute in increasing their income.

Table 16: Proportion of household cash income derived from the sales of Nile tilapia by Regions

Proportion	Region				Total
	Geita (n=32)	Mwanza (n=28)	Coast (n=30)	Dar (n=23)	(N=113)
Between one half and one quarter	75.0%	56.5%	31.0%	23.8%	46.4%
None	8.3%	17.4%	31.0%	33.3%	22.7%
Less than a Quarter	8.3%	13.0%	27.6%	33.3%	20.6%
More than Half	8.3%	13.0%	10.3%	9.5%	10.3%

4.1.22 Future plans for Nile tilapia farmers

Nile tilapia farming business is developing; farmers have different plans with the business. Plans are different due to individual interest, surrounding environment and how they benefit from the business. The plans for farmers also differ from region to region as shown in Table 17. The result shows that farmers were having more than one plan in the production, this leads to more than hundred percentages. However, taking the overall

results, 56.6% of the respondents have the plans to produce more Nile tilapia by building more ponds, and these are possible because they have enough land to do so. The plan of building increasing the ponds observed highly in Lake Victoria zone by Mwanza 71.4% and Geita 65.6%. However other farmers plan to reduce number of ponds; these were only 0.9%. They plan so because of low yield and high cost of production which makes it impossible to sell fish at profitable price as well as low growth rate of Nile tilapia. Majority of the farmers still use ponds for fish culture in spite of the challenges they faced, but 1.8 % of the respondents plan not to use ponds for fish culture. On changing fish culture technology, 8.8% of the respondents have such plan so that they can improve production efficiency. The production efficiency of some Nile tilapia is not good in some of the surveyed areas that lead to 15.9% of the respondents to plan to replace the fish species being cultured with other species with better performance in those areas. Some of them have the plans of not replacing the current species but rather adding other species (to make polyculture), and these were 37.2% of the respondents. For the case of selling plan, 2.7% of the respondents have the option of changing the way in which they dispose their Nile tilapia. The cost of inputs is very high especially feed, so 3.5% of the respondents have plans to change the source of inputs with reasonable price and the species which can grow faster to reach the required market size and finding the source of feed with quality ingredients and proportional feed size related to fish age and size which will make fish to grow faster.

The results shows that, Nile tilapia farming is growing more in Lake Victoria zone relative to Coast zone since 71.4% and 65.6% of the respondents Mwanza and Geita respectively, were planning to build more ponds compared to 47.8% and 46.7% of the respondents for Dar es Salaam and Coast regions respectively.

Table 17: Types of modifications made/planned to be made to fish farm by Regions with multiple responses

Planned to be made to fish farm	Region				Total (n=113)
	Geita (n=32)	Mwanza (n=28)	Coast (n=30)	Dar (n=23)	
None	9.4%	10.7%	46.7%	43.5%	26.5%
Building more ponds	65.6%	71.4%	40.0%	47.8%	56.6%
Reducing use of ponds	0.0%	0.0%	3.3%	0.0%	0.9%
Not using the ponds for fish culture	0.0%	0.0%	6.7%	0.0%	1.8%
Changing the fish culture technology used	15.6%	3.6%	10.0%	4.3%	8.8%
Replacing the fish species being cultured	21.9%	10.7%	10.0%	21.7%	15.9%
Adding fish species (to make polyculture)	53.1%	50.0%	30.0%	8.7%	37.2%
Changing the way of dispose of fish produced	3.1%	0.0%	6.7%	0.0%	2.7%
Changing source of inputs purchase, rent, or hire	3.1%	10.7%	0.0%	0.0%	3.5%

4.2 Nile Tilapia Distributors

The distributors/processors were among the actors in the Nile tilapia value chain. Activities performed are preserving the fish in cooled containers or cooled room waiting for customer or transporting them. Cleaning and dressing of fish is rarely done, just by order of the customer. In this node actors own the business in the different ownership structures. 75% of the respondents have independent store while family business and group ownership is 12.5% each. The interviewed respondents, apart from selling Nile tilapia also sell other fresh fish where 6 (75.0%) sell Nile tilapia while 2 (25.0%) sell other fresh fish.

4.2.1 Social characteristics of distributors

The respondents' gender, age, marital status, education level were used to describe the characteristics of the sample. The maximum age was 52 years and minimum of 21 years,

with the mean of 39.4 years (Table 18). This shows that the majority of the distributors were within the active working age group and they have enough time to make changes within the sector. The maximum age was 52 years with the average of 39 years which seems to be active age. The sample shows that, there are 50% for both sexes. However, observation from the field shows that men were in a position of heading the organization or family companies than women.

The results show that all respondents have attended formal education, but the 4 (50%) finished primary level education which enables them to manage well their business. 3 (37.5%) attained adult education which included college education. Secondary level was 1 (12.5%) of the sample. The results show that 5 (62.5%) of the respondents are married, while 2 (25%) separated and 1 (12.5%) divorced. This result means that any person can run this business; it is just a matter of capital and interesting in the business.

4.2.2 Status of employment in the business

The maximum number of permanent employees created by the business was 64 workers with a mean of 10 workers with Standard deviation of 22.5 and maximum number of temporary employees was 102 with a mean of 13 workers (Table 18). This also justify the employment creation due to good number of workers employed.

Table 18: Age characteristics of respondents and Status of employment in the business

Variable	n	Minimum	Maximum	Mean	Std. Deviation
Age	8	25.00	52.00	39.3750	8.84691
Temporal workers	8	0.00	102	13.5	35.77709
Paid workers	8	0.00	20.00	3.3750	6.80205
Unpaid workers	8	0.00	00.00	0.0000	0.0000

4.2.3 Types of fish sold by distributors

Distributors were doing their business based on the Tilapia 6 (75%) and other fresh fish 2 (25%). Respondents sell large amount of Nile tilapia since there is high demand for this specie.

4.2.4 Source of Nile tilapia to distributors

Nile tilapias as distributed were from Lake Victoria or from farmers' ponds. They buy fish either from Traders or direct from Nile tilapia farmers, where 5 (62.5%) of the distributors get the wild Nile tilapia from traders and 3 (37.5%) from Nile tilapia farmers. In the case of farmers, they were required to have a minimum of three tons of good size and quality fish, as reported by the processing manager in one of the buying transporting industry. On other hand one distributor bought any amount from farmers and preserved them while looking for market, as reported by one of the managers. Therefore due to this, either the fish farmer must increase their production or organize themselves to harvest that amount at the same time, so that distributors/ processors may provide facilities for taking the fish in good quality.

4.2.5 Problems facing distributors and their solutions

Distributors faced some problems, and this depends on the distribution level. The main problem was scarcity of fish, which leads to either low amount on delivery or late delivery. Another problem was electricity outage, which leads to high cost either of using generators or getting loss of rotten fish. Also some workers are not faithful; they steal from stores leading to recruiting new employees who may have less experience. Generally the report shows that, these actors at this level face problems such as: late delivery of fish, low amount of fish delivery, unfaithful customers and workers and getting loss over rotten fish due to electricity outage (Table 19). These problems are solved by waiting for

delivery for the delaying delivery, replacing unfaithful worker with a faithful ones, and for the customer, they have to pay before sending fish stock. Also making follow-up of stock from source to know the problems involved in the delivery process. Another solution was to sell the little amount available and find substitute type of fish. The problems of procurement were cooling, storing and price fluctuation which was difficult to be handled by distributors.

Table 19: Problems facing Distributors and their solutions

Variables	Frequency	Percentage
Problem in business		
N/A	1	12.5
Late delivery of fish	3	37.5
Low amount of fish delivery	1	12.5
Theft	1	12.5
Unfaithful customers	1	12.5
Fish sometimes go rotten	1	12.5
Total	**8**	**100.0**
Solutions to problems		
N/A	2	25.0
Waiting	2	25.0
Replacing responsible labour with a faithful one	1	12.5
They have to pay me before I send fish stock to them	1	12.5
Making follow-up of stock from source.	1	12.5
Selling the little amount available	1	12.5
Total	**8**	**100.0**

4.2.6 Source of finance used by distributors in their business

Among the factors of production is capital which was mostly needed by distributors. Actors in this node do not get enough financial assistance from the financial institutions or Government; some of them organized themselves in SACCOS where they get the loan support. Only 1 (12.5%) got loan from the bank and 37.5% from SACCOS. While

4 (50%) have no accesses to financial institution or any organized group. There are short term and long term assistance; those who get assistance from the bank have long term loan assistance with high interest rate, while those who get loan from SACCOS get short term loan with low interest rate.

4.2.7 Payment modalities and contracts with suppliers

Distributors/Processors (Wholesalers) were interviewed to find out the mode of transaction with the suppliers in the chain. Results show that purchasing is done either from fish traders or fish farmers or from both, depending on the available source of Nile tilapia and other fish types. They are allocated along the Lake Victoria shore and in other towns. They buy either direct from fisher/farmer or traders; the payment mode with the supplier was cash on delivery 7 (87.5%) and 1-7 days after delivery 1 (12.5%). Also the results show that, only 2 (25%) have contracts with their suppliers which were informal/ verbal, while 75% have no contract with their suppliers.

4.2.8 Contract, pricing and customers' payment modalities

Contract with customers is very important to ensure higher sales; the results show that, only 2 (25%) of the respondents have contract with customers which was informal/verbal while 5 (75%) wait for the customers to come without any contract. The only advantage they have for not having contract with customers is that, there is high demand of Nile tilapia which ensures the market for their fish. Nature of pricing arrangement with customer was found to be of two modes: pre-determined prices 3 (37.5%) while the second was current market price which counted 5 (62.5%) of the respondents. The two have both negative and positive effect to customers and distributors. During the scarcity of Nile tilapia customers are on the positive since they get fish at the pre-determine price while distributors purchase fish at high price from the source. During high season when

fish availability was high, customers are in disadvantage since they buy in the pre-determined price which will be higher than the current market price. The mode of current market price makes the balance between the customers and distributor since price depends on the prevailing market price. The payment mode by customer is cash on delivery.

4.2.9 Nature of payment and target customer

Payment by customers is cash on delivery/cash. Distributors get cash money on the spot, this makes their capital grow very fast since they can increase the amount of fish on purchasing. The main target customers for the Nile tilapia are traders/retailers as reported by all respondents. There are customers who always buy from the same distributor as a loyal customer but other customers depend on the quality of the products on a particular day from any of distributors.

4.2.10 Competition in the business industry

The business seems to be dominated by few participants at this level, but still there is competition in and out of business; these including nearby stores where they sell fish as reported by 6 (75%) of the respondents, while 2 (25%) reported no competition in the business. The observation on the effect of competition shows that, there were decreases in their sales in the business 50%, while 25% reported that sales remained the same regardless of competition. Observation on the effect of competition on pricing is different, 3 (37.5%) reported a decreased on price and 1 (12.5%) reported the increase on price while 2 (25 %) reported that there were no changes on price.

4.2.11 Price determination methods

Price is based on different technique approaches. Respondents use more than one technique depending on the time, 4 (50%) use market price, and 4 (50%) also use cost plus

method. The cost plus is the advised relative to market price since market price may sometimes not cover the cost of production so ending up in loss. Another method used is profit maximization where 1 (25%) of the respondents use this method.

4.2.12 Business income, cost and gross profit per month

Majority of Distributors do business throughout the month. Sales differ due to capital size and location of the business. The maximum monthly income for the business was 86 400 000TZS with the average of 13 848 750TZS and standard deviation of 30 086 667TZS. The cost for doing the business was maximum 15 510 000TZS with average of 2 422 000TZS; therefore an individual can start the business with such average amount as a capital. For the gross profit maximum gross was 84 220 000TZS, with average of 11 426 750TZS (Table 20), this shows that with the average capital an individual can have that average gross profit.

Table 20: Income, cost and gross profit per month TZS

Variable	n	Minimum	Maximum	Mean	Std. Deviation
Average monthly income	8	500 000.00	86 400 000.00	13 848 750.13	30 086 667.81
Total cost doing business	8	20 000.00	15 510 000.00	2 422 000.13	5 333 844.65
Gross profit	8	300 999.00	84 220 000.00	11 426 750.003	29 450 914.76

4.2.13 Performance and importance of marketing mix

Knowing the importance and practicing the marketing mix is a tool for making high sales of any business. The importance of marketing mix which includes; Price, Place, Product, Promotion and Sourcing is really understood by the actors. 5 (62.5%) of the respondents agreed that Place was very important while 1 (12.5%) also agreed that it is just important. For the price as one of marketing mix 4 (50%) of the respondents agreed that it is

important at the same time 3 (37.5%) said it is very important. Product seems to be very important by 62.5% of the respondents and important by 2 (25%). Another mix which is promotion 50% of the respondents said it is very important while 3 (37.5%) agreed that promotion is an important marketing mix. And the sourcing of product was agreed by 5 (62.5%) to be very important (Appendix 4).

Respondents also responded to self-evaluation on how they practice those marketing mix, 4 (50%) of the respondents said their place was very good while 4 (25%) said their place were excellent, while 1 (12.5%) said their place was poor. The price evaluation also was very good as pointed by 4 (50%) of respondents and only 1 (12.5%) said price mechanism was excellently performed. On promotion results show that 4 (50%) of the respondents agreed that it was very good performed and 12.5% agreed it was excellently performance. The procurement was very good performed by 3 (37.5%) of the respondents, 2 (25%) said it was good and 1 (12.5%) said it was excellently (Appendix 5).

4.2.14 Procurement problems

The Nile tilapia business is growing even though there is decline of production from Lake Victoria; market for Nile tilapia is rapidly growing. Distributors have high expectation on their business despite some challenges facing the business. Procurement problem such as cooling and storing was reported by 1 (12.5%) of the respondents and price fluctuation reported by 1 (12.5%), while 5 (62.5%) did not face any problem, and 1 (12.5%) did not respond to the question. This shows that these problems are not very serious to them, since just a few respondents face them.

4.2.15 Expectation of the business in five years to come

Future plans for fish distributors showed that, 5 (62.5%) of the respondents expect to increase capital and 25% expected an increase in their profit, while1 (12.5%) did not

respond to the question. Therefore to achieve their expectation while there was decline in the lake Victoria Nile tilapia, gives the chance for fish farming sector to cover the gap of the Nile tilapia scarcity in quality and quantity.

4.3 Nile Tilapia Marketers/Retailers

Other actors in the value chain are Retailers (Marketers). These sell fish directly to retailers, consumers or to restaurants and food venders. They get fish from fishermen, traders or fish farmers. Respondents interviewed include; directors (21.6%) caretakers (45.9%) and Managers (32.4%) of the respondents. The businesses carried by the marketer are retailer (94.6%), wholesalers and processors with (2.7%) each (Table 21).The latter two performs the role of wholesalers and processing apart from their core role of marketer. This shows that in order to increase profit in the chain, actors of one level can perform the role of another actor in the next level.

Table 21: Role and business function in the industry by Regions

Variable	Category		Region			Total
			Costal	Dar es Salaam	Geita	
Role	Director	Count in region	1	1	6	8
		% in region	8.3%	10.0%	40.0%	21.6%
	Caretaker	Count in region	7	8	2	17
		% in region	58.3%	80.0%	13.3%	45.9%
	Manager	Count in region	4	1	7	12
		% in region	33.3%	10.0%	46.7%	32.4%
	Total	Count in region	12	10	15	37
		% in region	100.0%	100.0%	100.0%	100.0%
Business	Wholesaler	Count in region	0	0	1	1
function		% in region	0.0%	0.0%	6.7%	2.7%
	Retailer	Count in region	12	10	13	35
		% in region	100.0%	100.0%	86.7%	94.6%
	Processor	Count in region	0	0	1	1
		% in region	0.0%	0.0%	6.7%	2.7%
	Total	Count in region	12	10	15	37
		% in region	100.0%	100.0%	100.0%	100.0%

4.3.1 Social characteristics of retailers (Marketers)

4.3.1.1 Age and sex of Retailers

The marketers were adult in different age categories. Majorities are from 21-40years old 33 (52.1%) of the respondents; 41 to 50years were 10 (27%) while from 18 to 20 years were only 4 (10.8%). The management in this business is dominated by males (89.2%) of the respondents, while the rest 10.8% of respondents were female (Table 22). This indicate the need of sensitize on the women to join the business.

4.3.1.2 Education level and marital status

On the part of marital status, majorities were married which accounts 56.8% of the respondents and single were 40.5% while widows were 2.7%. Majority of the respondents have primary education which was 73% of the respondents while secondary level was 24.3% and 2.7% had none formal educated (Table 22). This shows that running this business does not need very high level of education. Therefore investing in this will take many Tanzanian since majority of them have primary education.

4.3.2 Value addition activities

The marketers perform many activities either to add value to their fish or promotion to attract more customers. Activities differ from one area to another, due opportunities available in a particular area and the nature of customer available (Appendix 6). Other activities increase price of the products others increase the attractiveness of the fish. In general results, the activities are; cutting 13 (35.1%) of respondents, packing in plastics bags 3 (8.1%), cleaning 19 (51.4%) and dressing 9 (24.3%). Activities which add more values are filleting 4 (10.8%), frying 1 (2.7%), smoking 3 (8.1%) and drying 4 (10.8%). Smoking and drying are mostly done to other species than Nile tilapia especially catfish.

Table 22: Social characteristics of respondents by Regions

Variable			Region			Total
	Category		Coastal	Dar	Geita	
Gender	Male	Count	10	10	13	33
		%	83.3%	100.0%	86.7%	89.2%
	Female	count	2	0	2	4
		%	16.7%	0.0%	13.3%	10.8%
Total		count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Marital status	Single	count	6	8	1	15
		%	50.0%	80.0%	6.7%	40.5%
	Married	count	6	2	13	21
		%	50.0%	20.0%	86.7%	56.8%
	Widowed	count	0	0	1	1
		%	0.0%	0.0%	6.7%	2.7%
Total		count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Highest education	Primary	count	10	7	10	27
		%	83.3%	70.0%	66.7%	73.0%
	Secondary	count	2	3	4	9
		%	16.7%	30.0%	26.7%	24.3%
	None	count	0	0	1	1
		%	0.0%	0.0%	6.7%	2.7%
		count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

4.3.3 Business growth

Business started many years ago, but due to high consumption of fish as a result of health issues, this lead to many people diverting from eating red meat, thus business grew very fast from 2011 to 2015 where 20 (54.1%) of the marketers ventured into the business compared to 2006 to 2010 where only 8 (21.6%) entered in the business and 1990 to 2000 the interval of ten years only 7 (18.9%) entered the business.

4.3.4 Business structures and ownership structures

The business included the marketers with varying capital from low to large capital. Those with butcher shops and those who use table with ice block, icing the fish on the table. The results show that 51.4% of the respondents use table with the median capital, where handling seems to be not very good, thus giving them a loan to increase their capital will make them improves their business. Stores count for 29.7% of the respondents, stalls (13.5%) and other establishments were 5.4% of the respondents. Business ownership structures are based on the independent store/stall 56.8% of respondents, as business (29.7%) while family and group account for 10.8% and 2.7% of the respondents respectively (Table 23). This is an indicator that the sector makes individuals to employ themselves, investing on this will make people participate in the business and increase their income.

Table 23: Establishment structure and ownership structure

Variable	Category	Frequency	Percentage
Business structure	Table	19	51.4
	Store	11	29.7
	Stall	5	13.5
	others	2	5.4
	Total	**37**	**100.0**
Ownership structure	Independent store/stall	21	56.8
	Business	11	29.7
	Family	4	10.8
	Group	1	2.7
	Total	**37**	**100.0**

4.3.5 Promotion and sales

The main technique to increase sales is promotion and advertisements to make people aware of the business. Promotions done in the business were verbal 17 (45.9%) of the respondents, visual display of the fish 18 (48.6%) and sales discount 2 (5.4%). On

increasing sales more than one technique are used to make more sales, where quality of the products is used 23 (62.2%) of the respondents, low price relative to competitors' 13 (35.1%), convenient to get customers 3 (8.1%), good behavior of sales personnel 10 (27%) and one stop shop to insure sales 5 (13.5%) (Appendix7). Otherwise the main customers for the fish products were consumers as reported by 86.5% of the respondents. Other customers were Retailers (70.3%) (Table 24).

Table 24: Targets Retailers for fish by Regions

Variable	Category		Region			Total
			Coastal	Dar es salaam	Geita	
Consumer	Yes	Count	12	8	12	32
		%	100.0%	80.0%	80.0%	86.5%
	No	Count	0	2	3	5
		%	0.0%	20.0%	20.0%	13.5%
	Total	Count	12	10	15	37
	Total	%	100.0%	100.0%	100.0%	100.0%
Retailers/ Traders	Yes	Count	7	6	13	26
		%	58.3%	60.0%	86.7%	70.3%
	No	Count	5	4	2	11
		%	41.7%	40.0%	13.3%	29.7%
	Total	Count	12	10	15	37
	Total	%	100.0%	100.0%	100.0%	100.0%

4.3.6 Contract and price arrangement with customers

Contract is a way of reducing the risk. Having contract with customers ensures sales. Interviewed marketers' results by regions are shown in the Appendix 8which shows differences across the regions, but the overall result shows that, 5 (13.5%) of the respondents have contracts with customers where 4 (10.8%) was informal and 2 (5.4 %) were both formal and informal contracts. The contracts were irregularly reviewed 4 (10.8 %) agreed on this. This shows that there were limited contracts between the marketer and customers. This indicates that where demand is high there was no need for

contract. In the case of price determination in contract, 2.7% of the respondents have informal price setting in their contract.

4.3.7 Pricing arrangement with customers

Price arrangements with customers are done using market price (59.5%) of the respondents while contractual pricing is used by 5.4% of the respondents. This shows that there are limited contract with customers. Some of marketers do auction pricing (10.8%) (Table 25).

Table 25: Price agreement with customers by Regions

Variable	Category		Region			
			Coastal	Dar	Geita	Total
Market Pricing	Yes	Count	8	5	9	22
		%	66.7%	50.0%	60.0%	59.5%
	No	Count	4	5	6	15
		%	33.3%	50.0%	40.0%	40.5%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Contractual Pricing	Yes	Count	2	0	0	2
		%	16.7%	0.0%	0.0%	5.4%
	No	Count	10	10	15	35
		%	83.3%	100.0%	100.0%	94.6%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Auction pricing	Yes	Count	2	1	1	4
		%	16.7%	10.0%	6.7%	10.8%
	No	Count	10	9	14	33
		%	83.3%	90.0%	93.3%	89.2%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

4.3.8 Competition in the business

The business has competition on sales as other business; there were different levels of competitors as shown in the Appendix 9. Generally the results show that main competitors were traders 31 (83.8%), wholesalers 4 (10.8%) and no competition 2 (5.4%). Another seriousness competitors were traders 11 (29.7%), wholesaler 3 (8.1%) no competitors 23 (62.2%). In addition 2 (5.4%) of the respondents face minor competition from wholesalers while 35 (94.6%) of them face none competition. On other hand supermarkets and wholesalers seem to be none competitors 4 (10.8%) and 3 (8.1%) of respondents respectively. This shows that the business competition is not tough; there is good environment for business investments.

4.3.8.1Effect of competition

The competition in the business was observed to have effect in the sales, 27% of the respondents said their sales were decreasing, while 13.5% their sales were increasing due to the competition in the business. While some respondents experience the effect on their sales, 59.5% of them they observed no changes in their sale (Table 26), so the competition in this business it showed minor effect on sales. Therefore for those observed the competition effect it was positive to some of them and negative to others.

Table 26: The effect of main competition on sales by Regions

Variable		Region			
		Coastal	**Dar**	**Geita**	**Total**
Increased	Count	2	0	3	5
	%	16.7%	0.0%	20.0%	13.5%
Decreased	Count	5	1	4	10
	%	41.7%	10.0%	26.7%	27.0%
No changes	Count	5	9	8	22
	%	41.7%	90.0%	53.3%	59.5%
Total	Count	12	10	15	37
	%	100.0%	100.0%	100.0%	100.0%

4.3.9 Time of high sales

Timing for good high sales is very important in the business, this may include be day, week, monthly or season of the year.

4.3.9.1 Time of higher sales within the day

Good time for high sales is very important in the business; hours with high sales are different from region to region as shown in the Appendix 10. Taking the overall, respondents reported that, they make high sales in the morning 24 (64.9%). This was followed by mid-morning 9 (24.3%) and 8.1% high sales in the afternoon, and late afternoon were 1 (2.7%). While sales were found to be high in the evening by 6 (16.2%) of the respondents, 3 (8.1%) indicated high sales at night. This shows that the right time for this business is in the morning especially in Dar es Salaam 80% and Geita 73.3% of the respondents.

4.3.9.2 Week days with high sales

Observations on the days with high sales for each region are shown in the Appendix 11. But overall results show that the highest sales are done at the end of the week 21 (56.8%) and 19 (51.4%) of the respondents respectively with highest on Sunday in Dar es Salaam 70% of the respondents reported. Friday and Tuesday show that 14 (37.8%) of respondents had the highest sales. Monday and Thursday 16 (43.2%) and 10 (27%) respectively agreed to have high sales, while only 8 (21.6%) of respondents had high sales on Wednesday.

4.3.9.3 Time in month with high sales

High sales were observed at the beginning and end of the month (48.6% and 86.5% respectively) (Table 27). This shows on that the main consumers of fish are employees

who depend on their salary at the end of the month. A mid-month high sale was only 13.5%. Therefore good timing for high sales was at the beginning and end of month especially in Dar es Salaam with 90% both at the beginning and end of month.

Table 27: The monthly time with highest sales by Regions

Variable	Category		Region			
			Coast	Dar	Geita	Total
Early monthly	Yes	count	4	9	5	18
		%	33.3%	90.0%	33.3%	48.6%
	No	count	8	1	10	19
		%	66.7%	10.0%	66.7%	51.4%
	Total	count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Mid-month	Yes	count	4	1	0	5
		%	33.3%	10.0%	0.0%	13.5%
	No	count	8	9	15	32
		%	66.7%	90.0%	100.0%	86.5%
	Total	count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
End of Month	Yes	count	9	9	14	32
		%	75.0%	90.0%	93.3%	86.5%
	No	count	3	1	1	5
		%	25.0%	10.0%	6.7%	13.5%
	Total	count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

4.3.9.4 Months with high sales

High sales were observed from September to December. The highest sales were from November to December (73%), September to October with (64.9%). Other categories were January to February (40.5%), March to April (29.7%), May (32.4%), June to July (45.9%) and August (51.4%) (Appendix12). The high sales were observed in November and December in Dar es Salaam 90% of the respondents reported.

4.3.10 Pricing methods

Pricing methods used to determine price of fish are shown in Appendix 13whichshows different methods used in the regions. Market price method was mainly used by 30 (81.1%) of the respondents and cost plus method 19 (51.4%).Another method used is target return method where 5 (13.5%) of the respondents. Other methods which were not familiar to marketers were profit maximization, breakeven analysis and flexible/season methods were not used by any of respondents.

4.3.11 Suppliers of Nile tilapia and Catfish

Respondents sell different types of fish depending on the availability of the fish and customers of particular type; the suppliers of the fish also depend on the availability and type of fish with high demand in different regions (Appendix 14). The overall results show that main suppliers of Nile tilapia were fishermen 19 (51.4%), traders 11 (29.7%).

Only 7 (18.9%) of the respondents get from fish farmers. This shows that the supply of Nile Tilapia from farmers is still very little, therefore effort should be made to encourage fish farming by making it more profitable to farmers. As observed on the supply of Nile Tilapia, also suppliers of Catfish were mostly from the fishermen where 18 (48.6%) of the respondents get them from. This is followed by fish farmers 10 (27%) and finally traders 9 (24.3%). This was also observed by Alagoa *et al*. (2011) in Nigeria that, value chain of farmed fish fairly simple and short where farmers sales to wholesalers and traders at farm-gate.

4.3.12 Price arrangements with fish suppliers

Pricing arrangements with suppliers were different across the regions as shown in Table 28 below. These are market price, contractual delivery and action delivery. Overall results

show that 94.6% of the respondents use market price while only 2.7% used contractual delivery and auction delivery each. This shows that it was difficult for farmer to avoid using the market price.

Table 28: Price arrangements with fish suppliers by Regions

Variable		Region			
		Coastal	**Dar es Salaam**	**Geita**	**Total**
Market price (Delivery)	Count	12	10	13	35
	% in region	100.0%	100.0%	86.7%	94.6%
Contractual delivery	Count	0	0	1	1
	% in region	0.0%	0.0%	6.7%	2.7%
Auction Delivery	Count	0	0	1	1
	% in region	0.0%	0.0%	6.7%	2.7%
Total	Count	12	10	15	37
	% in region	100.0%	100.0%	100.0%	100.0%

4.3.13 Contract with suppliers

To make sure that marketers get Nile tilapia they make the contracts with suppliers. This is important when there is limited supply of products. Overall results show that only 16.2% of the respondents use contracts with suppliers, 5.4% have informal contracts and 5.4% have both formal and informal contracts (Table 29). However 83.8% of the respondents have no contract with suppliers this leads to use the market price with their suppliers.

Table 29: Contract with fish suppliers by Regions

Variable	Category		Region			
			Coast	Dar	Geita	Total
Contract with suppliers	Yes	Count	2	0	4	6
		%	16.7%	0.0%	26.7%	16.2%
	No	Count	10	10	11	31
		%	83.3%	100.0%	73.3%	83.8%
	Total	**Count**	**12**	**10**	**15**	**37**
		%	100.0%	100.0%	100.0%	100.0%
Type of contract	Informal	Count	0	0	2	2
		%	0.0%	0.0%	13.3%	5.4%
	Both	Count	0	0	2	2
		%	0.0%	0.0%	13.3%	5.4%
	N/A	Count	12	10	11	33
		%	100.0%	100.0%	73.3%	89.2%
	Total	**Count**	**12**	**10**	**15**	**37**
		%	100.0%	100.0%	100.0%	100.0%

4.3.14 Other sources of income

Respondents involved in this business have other sources of income to back up their business. 18.9% of the marketers have other sources of income such as; agricultural activities 10.8% and restaurants 8.1% (Table 30).

Table 30: Other sources of income by Regions

Variable			Region			
	Category		Coastal	Dar	Geita	Total
Other sources	Yes	count	3	2	2	7
		%	25.0%	20.0%	13.3%	18.9%
	No	count	9	8	13	30
		%	75.0%	80.0%	86.7%	81.1%
	Total	count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Type of other source	Agriculture	count	4	0	0	4
		%	33.3%	0.0%	0.0%	10.8%
	N/A	count	8	9	15	32
		%	66.7%	90.0%	100.0%	86.5%
	Restaurant	count	0	1	0	1
		%	0.0%	10.0%	0.0%	2.7%
	Total	count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

4.3.15 Financial assistance received

The respondents were asked to explain where they receive financial assistances to start or running their businesses. Results show that they get limited financial and information assistance. 2.7% of the respondents get short term loans from NGOs and 2.7% from bank (Table 31). Also 13.5% of the respondents get long term loans for microfinance such as Pride. This result shows that, financial institutions are no well supporting fish farming, the respondents received financial were from Geita region. There are few 6.7% of respondents who supported by NGOs and Bank.

Table 31: Financial assistance received by Regions

Variable	Category		Region			
			Coastal	Dar	Geita	Total
Short term loan	From NGOs	Count	0	0	1	1
		%	0.0%	0.0%	6.7%	2.7%
	From Bank	Count	0	0	1	1
		%	0.0%	0.0%	6.7%	2.7%
	N/A	Count	12	10	13	35
		%	100.0%	100.0%	86.7%	94.6%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Long term loan	Microfinance(Pride)	Count	0	0	5	5
		%	0.0%	0.0%	33.3%	13.5%
	N/A	Count	12	10	10	32
		%	100.0%	100.0%	66.7%	86.5%
		Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

4.3.16 Information and labour assistance

In the case of information assistance, 1 (2.7%) of the respondents get information assistance from suppliers and 1 (2.7%) from NGOs. Information assistance is about availability of products, time of getting the product and buying price. The information is a

two ways process in the chain as recommended: the respondents provide information to suppliers. Labour assistance is received by only 1 (2.7%) of the respondents from NGOs.

4.3.17 Assistance given to suppliers and customers by retailers (marketers)

In order to have good relationship between marketers and their fish suppliers/ customers, marketers give assistance to both fish suppliers and customers. Very few marketers provided assistance to their suppliers and customers. Assistance provided by marketers is short term financing and information. Short term financing is given by only 10.8% of the respondents and information assistance is provided by only 5.4% while 83.8% do not give any assistance to their clients (Table 32). This result indicates limited assistance to suppliers/customers from the marketers.

Table 32: Assistance given to supplier and customer by retailers (marketer) by Regions

Variable		Region			
		Coastal	**Dar**	**Geita**	**Total**
None	Count	12	10	9	31
	%	100.0%	100.0%	60.0%	83.8%
Short term financing	Count	0	0	4	4
	%	0.0%	0.0%	26.7%	10.8%
Information	Count	0	0	2	2
	%	0.0%	0.0%	13.3%	5.4%
Total	Count	12	10	15	37
	%	100.0%	100.0%	100.0%	100.0%

4.3.18 Opportunities in the business

Fish consumption by the society is rapidly increasing. Many people go for fish relatively to red meat due health problems or preference, and therefore the opportunities are arising in the business as shown in Appendix 15. General result shows that, 12 (32.4%) of the respondents agreed that there were opportunities in different hotels and restaurants and

6 (16.2%) agreed there are opportunities in the export market. There are new traders in the business who create more opportunities to do the business 3 (8.1%) of the respondents agree that there are new traders in the business, 14 (37.8%) agreed on the increasing their capital, which will make the business to expand and 24 (64.9%) said that market improvement will make to increase their sales. Market improvements is the cut cross the all regions marketers were highly responded to this opportunity, Dar es salaam 100% and Coast 83.3% of respondents, however in Geita is 26.7% of the respondents. Therefore the opportunity is mostly observed in coastal region.

4.3.19 Business challenges

The business faces some challenges in the regions as reported in details Appendix 16. The overall results had shown that, 3 (8.1%) of the respondents face transport challenges in getting the fish from the source. Another challenge is low capital as reported by 10 (27%) of the respondents. Lack/ poor infrastructure which leads to the loss was reported by 15 (40.5%). Also fish scarcity 5 (13.5%) during the low season is another challenge. Lack of fish farming education is another challenge as reported by 1 (2.7%) of the respondents. If there are enough fish farmers there would be little fish scarcity, since there would be good supply of fish. Law and regulation on fish farming and source of water management are other challenges as reported by 3 (8.1%) of the respondents.

4.3.20 Coping strategies

The coping strategies for the challenges in the business depend on the nature of the challenge itself (Appendix16). There are no general solutions to them. However, 4 (10.8%) of the respondents pay penalties when they break the laws. The current solution on transport challenge is reduced by hiring motorcycle 1 (2.7%). During scarcity traders borrow fish from their neighbours so that their can attend their customers, as reported by 8

(21.6%) of the respondents. Also, 4 (10.8%) of the respondents buy other species with low demand as alternative to their customers.

4.3.21 Changes noted within last five years in the business

The fish marketer business has recently grown very fast due to a nutrition factor as substitute for red meat but also the source of income as the business changes from not depending only on wild fish but also from farmed fish. The changes noted by the marketer in their business differ from region to region (Appendix 17).In general the changes noted are increase in income 21 (56.8%), age dynamic 18 (48.6%), gender 11 (29.7%), institutional and crime 2 (5.4%).

4.3.22 Important of marketing mix

Marketers were interviewed on the importance and evaluations on their performance in marketing mix. Responses differ according to the understanding of marketing mix (Appendix18). On average marketers are aware of the important of marketing mix, since 19 (51.4%) of them agreed that the place is moderately important and for price 17 (45.9%) agreed that it is very important while 19 (51.4%) of the respondents agreed that it is moderate important. On the importance of product also respondents are aware since 16 (43.2%) reported that it was very important and 12 (56.8%) agreed that it was moderately important. On promotion 19 (51.4%) and 17 (45.9%) of the respondents agreed that it was moderately important and very important respectively. Sourcing was reported to be very important by 13 (35.1%) of the respondents and moderately important by 22 (59.5%).

4.3.23 Performance evaluation on marketing mix

Understanding the importance of marketing mix is not useful if it does not operate in the business. Respondents were asked on how they perform in their business. They are able to

evaluate themselves on their performance; the performance evaluation on marketing mix is different from one area to another, there are some who are poor on applying them and others were good (Appendix 19). On average, in all regions the performance evaluation is very good 24 (69.9%) and excellent 6 (16.2%), while for price based on pricing it is very good 26 (70.3%) of the respondents and excellent 5 (13.3%). For the case of product as components of marketing mix which involves quality good size among other factors, the performance 26 (70.3%) of the respondents was very good while 4 (10.8%) it was excellent. Performance on promotion even though 21 (56.8%) of the respondents were very good performing, 2 (5.4%) and 4 (10.8%) had very poor and poor in performance respectively. In procurement 22 (59.5 %) performed very good and 5 (13.5%) excellent.

4.4 Restaurants/Chop Bar/ Food Vendors Operators

Among the actors in the chain were restaurants/ food vendors/chop bar services. Findings show that 14.6% of the respondents were directors, 24.4% caretakers and 61% managers of the business (Table 33). The huge problem was on the cost of running the business, where it was difficult to categorize wage to fit with part of the business which was Nile tilapia.

Table 33: Roles of respondents by Regions

Role	Region				Total
	Geita n=14	Mwanza n=7	Coast n=10	Dar n=10	n=41
Director	28.6%	28.6%	0.0%	0.0%	14.6%
Caretaker	14.3%	14.3%	40.0%	30.0%	24.4%
Manager	57.1%	57.1%	60.0%	70.0%	61.0%

4.4.1 Social characteristics of respondents

4.4.1.1Age and sex

Age of respondents ranged from 21 to more than 51 years, the average was 35 years (Table 38). This is good indication for the young age employments, which seems to be a current problem in Tanzania. The sex pattern of the respondents shows that 36.6% were females and 63.4% male (Table 34). This shows that a good number of women are involved in this business.

Table 34: Gender of respondents by regions

Sex	Region				Total
	Geita (n=14)	Mwanza (n=7)	Coast (n=10)	Dar (n=10)	(N=41)
Female	50.0%	28.6%	40.0%	20.0%	36.6%
Male	50.0%	71.4%	60.0%	80.0%	63.4%

4.4.1.2 Education and Marital status

Respondents have formal education, however their levels of education differ from region to region (Appendix 20). On average, 14 (34.1%) of them have primary education, while 20 (48.8%) have secondary level, 6 (14.6%) have adult education and only 1 (2.4%) was college graduated. The results show that the business provides opportunities in business to all levels of education. Marital status in each region is showed in Appendix 20. However taking the overall respondents 11 (26.8%) of them are single, while 29 (70.7%) are married and the rest 1 (2.4%) divorced.

4.4.2 Types and sales of Nile Tilapia

The results shows that, 95.1% of the respondents sell wild Nile tilapia in restaurants because of the availability and good size needed by consumers, while only 4.9% of respondents sell both farmed and wild caught Nile tilapia (Table 35). Therefore it is the

challenge for the fish farmers to attain good size of at least 500gm. ”Wild Nile Tilapia are the one found in the butcher and in the market compared to farmed Nile tilapia” said one of the restaurant manager in Kibaha town.

Table 35: Type of fish sold by Regions

Type of fish	Region				Total
	Geita (n=14)	Mwanza (n=7)	coast (n=10)	Dar (n=10)	(n=41)
Wild caught Nile tilapia	100.0%	85.7%	90.0%	100.0%	95.1%
Both(farmed and caught)	0.0%	14.3%	10.0%	0.0%	4.9%

4.4.3 Value added activities performed

Value adding activities were more advanced, although they differ from one business to another as well as from one region to another. The result shows more than one hundred percentages since respondents were performing more than one activities. However, respondents performed the following activities were: cleaning (70.7%), dressing (31.7%), Cutting (19.5%) and packing (9.8%). Other activities are filleting done by 7.3% of the respondents, drying the fish (24.6%), frying (97.6%) and smoking (4.9%) (Table 36). On average, each kilogram ends up on earning between 9 000TZS to 12 000TZS selling price, depending on the area and value added; also dried/fried fish was sold to 10 000TZS per kg. Frying and cleaning were the mostly activities performed in all regions. Therefore these activities are very important in increasing value of Nile tilapia.

Table 36: Value adding activities by Regions with multiple resonses

Activities	Region				Total
	Geita) (n=14	Mwanza) (n=7	Coast (n=10)	Dar (n=10)	(N=41)
Cleaning	78.6%	85.7%	60.0%	60.0%	70.7%
Dressing	42.9%	28.6%	30.0%	20.0%	31.7%
Smoking	0.0%	0.0%	10.0%	10.0%	4.9%
Frying	100.0%	100.0%	100.0%	90.0%	97.6%
Drying	28.6%	14.3%	10.0%	40.0%	24.4%
Filleting	0.0%	0.0%	0.0%	30.0%	7.3%
Cutting	35.7%	0.0%	0.0%	30.0%	19.5%
Packaging	21.4%	14.3%	0.0%	0.0%	9.8%

4.4.4 Ownership structure of the business

The nature of business ownership was based mostly as independent stores which were owned by individual (53.7%), while group business and family restaurants were 24.4% each (Table 37). This indicates the opportunity in this business that it can be easy handled even by the individuals.

Table 37: Ownership structure of the business by Regions

Ownership structure	Region				Total
	Geita (n=14)	Mwanza (n=7)	Coast (n=10)	Dar (n=10)	(n=41)
Independent	50.0%	42.9%	60.0%	60.0%	53.7%
Family	28.6%	28.6%	30.0%	10.0%	24.4%
Business	21.4%	28.6%	10.0%	30.0%	22.0%

4.4.5 Days of operating business in a week

It was found that sales differ on different days of the week and time of the day; operating days range from 5 to 7 days per week, that is to say some restaurant operate from Monday to Friday, with majority operating the whole week (Table 38), this implies that is the good business for investment.

Table 38: Age of respondents and Days of operating business in a week

n		Minimum	Maximum	Mean	Std. Deviation
41	Age	21	21	35.44	7.868
41	Days	5	7	6.88	.400

4.4.6 Weekly revenue

The average weekly revenue made from the Nile Tilapia sales depends on business size and location, the larger the business and in good location leads to high sales. Other factors include number of operating days (Table 39).The revenue was ranging from 30 000 TZS to 1 260 000 TZS per week, with mean of 479 000 TZS and standard deviation of 332 123.634.

Table 39: Weekly revenue TZS

Year of business initiation	n	Minimum	Maximum	Mean	Std. Deviation
Average weekly revenue from fish	41	30 000	1 260 000	479 000.00	332 123.634

4.4.7 Highest selling season and Time

Other factors which determine high sales of products in general included time within a day, month and season of the year. During the day time the sales were reported to be highest in the evening (56.1%), in afternoon (46.3%), night (39%) and mid-morning (36.6%). In the morning sales were 22%, the least was in the late afternoon which was 17.1%. The sales within days in the week were almost constant with exception of Fridays, Saturdays and Sundays which showed high sales relative to other days with 73.2%, 75.6% and 56.1% of the respondents respectively. End of the month was observed to have high sales (82.9%) followed by early of the month (51.2%). Also it was observed that there were high sales in some months of the year; from September to October (58.5%), and November to December (61%) (Appendix 21**)**. Therefore in the case of Nile tilapia,

farmers must be informed of the best timing to harvest within times of high sales in the week, month or year.

4.4.8 Pricing mechanism

Price setting by the restaurant/chop bar was based on the market price and cost plus methods. Methods of application differs from region to region as showed Table 79 below, which shows that 65.9 % of the respondents charge price based on either using the market price or cost plus system to determine good profit. Other methods used are markup pricing (17.1%); profit maximizing (12.2%) and flexible/ seasonal 2.4% of the respondents (Table 40).

Table 40: Method of price determination by Regions

Method	Region				Total
	Geita (n=14)	Mwanza (n=7)	Coast (n=10)	Dar (n=10)	(n=41)
Market price	57.1%	71.4%	70.0%	70.0%	65.9%
Costs Plus	64.3%	85.7%	60.0%	60.0%	65.9%
Mark up	21.4%	0.0%	10.0%	30.0%	17.1%
Profit Maximizing	28.6%	14.3%	0.0%	0.0%	12.2%
Flexible or Seasonal	0.0%	14.3%	0.0%	0.0%	2.4%

4.4.9 Contract with supplier

There were no real contracts with the fish suppliers, only 17.9% had contract with their suppliers which were verbal/ informal (Table 41).

Table 41: Contract with fish suppliers by Regions

Variable	Region				Total
	Geita (n=14)	Mwanza (n=7)	Coast (n=10)	Dar es salaam (n=10)	(n=41)
Yes	42.9%	14.3%	0.0%	0.0%	17.9%
No	57.1%	85.7%	100.0%	100.0%	82.1%

4.4.10 Assistance given to customers/suppliers

The assistance given to consumers/suppliers was on information (12.2%) while 80.5 % of the respondents did not give any assistance. Other assistances were short term financing (4.9%) and long term loans (2.4%). Short term loan was repaid within one week while the long term was repaid within six months. Generally the report shows that, information assistance given to suppliers or consumers was very limited, (12.2%) of the respondents provided information assistance (Table 42)**.**This shows limitation of flow of information in the chain.

Table 42: Assistance given to suppliers or customers by Regions

Assistance given	**Region**				**Total**
	Geita (n=14)	**Mwanza (n=7)**	**Coast (n=10)**	**Dar (n=10)**	**(n=41)**
None	64.3%	71.4%	90.0%	100.0%	80.5%
Short term Financing	7.1%	0.0%	10.0%	0.0%	4.9%
Long term loans	7.1%	0.0%	0.0%	0.0%	2.4%
Information	21.4%	28.6%	0.0%	0.0%	12.2%

4.4.11Fish product sold

The businesses visited include hotels, restaurants and food vendors. The main fish sold was Nile tilapia (85%) and catfish (15%) (Table 43). This shows there is high market for Nile tilapia in the community.

Table 43: Fish product sold by Regions

Type of fish	**Region**				**Total**
	Geita (n=14)	**Mwanza (n=7)**	**Coast (n=10)**	**Dar (n=10)**	**(n=41)**
Tilapia	85.7%	71.4%	88.9%	90.0%	85.0%
catfish	14.3%	28.6%	11.1%	10.0%	15.0%

4.4.12 Major fish suppliers

Main fish suppliers differ from one area to another (Table 44). But generally, main fish suppliers in this business were fish traders as reported (77.5%) of the respondents, other suppliers were fish farmers (12.5%) and fish butcher shops (10%). Therefore there are opportunities in investing in fish butcher shops and fish farming where there are few in the industry to supply fish products.

Table 44: Major suppliers of fish to business by Regions

Suppliers of fish	Region				Total
	Geita (n=14)	Mwanza (n=7)	Coast (n=10)	Dar (n=10)	(n=41)
Fish farmer	14.3%	14.3%	22.2%	0.0%	12.5%
Fish traders	85.7%	85.7%	55.6%	80.0%	77.5%
Butcher shop	0.0%	0.0%	22.2%	20.0%	10.0%

4.4.13 Reasons for fish source preference

Business owners were get fish from different sources, and they are able to switch from one supplier to another. The respondents agree to prefer one source from the other, their preference reasons differ from one another, also from one region to another region as shown in Table 45. Generally, 53.8% of the respondents preferred a source due to quality of their products whether it was fish trader or butcher shop. 30.8% of the respondents based their preference on the availability of the fish at the time of the need, while 15.4% preferred the source due to close proximity to their business.

Table 45: Reasons for preference of fish source by Regions

Reason	Region				Total
	Geita (n=14)	Mwanza (n=7)	Coast (n=10)	Dar (n=10)	(n=41)
Quality	55.6%	40.0%	57.1%	60.0%	53.8%
Availability	22.2%	20.0%	42.9%	40.0%	30.8%
Close proximity to business	22.2%	40.0%	0.0%	0.0%	15.4%

4.4.14 Payment to fish suppliers

The fish products suppliers were fish farmers, traders and butcher shops. They were paid on two main models; cash and carry 97.5% and daily payment model 2.5% (Table 46).

Table 46: Time it takes to pay suppliers by Regions

Time	Region				Total
	Geita (n=14)	Mwanza (n=7)	Coast (n=10)	Dar (n=10)	(n=41)
Cash on delivery	92.9%	100.0%	100.0%	100.0%	97.5%
Daily	7.1%	0.0%	0.0%	0.0%	2.5%

4.4.15 Factors cause customers to buy fish from the business

The business industry has the competition; therefore it is very important to use various techniques in order to attract customers to buy product. The respondents use different strategies to insure high number of customers which differ from one region to another show in Table 47. Generally, respondents agree on the quality of their product to be the cause of attracting more customers (80.5%), personnel habit 46.3%, and good treatment to customers make them to enjoy the services from the business. Other common methods include convenience (31.7%) convenience includes: along the road, near the offices (working areas) and bus stands, where customers can buy from the available business. Low price and food safety (7.3%) was another reason for customers to buy fish product from their business Table 47. The percentages exceed one hundred since respondents were allowed to respond to more than one variable.

Table 47: Factors cause customers to buy fish from the business by Regions

Factor	Region				Total
	Geita (n=14)	Mwanza (n=7)	Coast (n=10)	Dar (n=10)	(n=41)
Quality	64.3%	100.0%	90.0%	80.0%	80.5%
Habit	35.7%	57.1%	50.0%	50.0%	46.3%
Convenience	28.6%	14.3%	40.0%	40.0%	31.7%
Low Price	14.3%	14.3%	0.0%	0.0%	7.3%
Food Safety	14.3%	0.0%	10.0%	0.0%	7.3%

4.4.16 Proportion fish sales contribution in business

The business involving Nile tilapia sales is combined with other products; for example in the restaurants and food vendors do not sell fish products only, the fish is accompanied by other foods. The minimum contribution is 5% with maximum of 100% for those who sales fish only, with average contribution of 32.05% (Table 48).

Table 48: Proportion fish sales contribution in business (%)

N	Minimum	Maximum	Mean	Std. Deviation
38	5	100	32.05	24.751

4.4.17 Cost and Gross profit of the business

Business needs capital for running costs; the cost depends on the size and structure of the business. Maximum cost for doing the business was 728 000TZS, an average 140 378 TZS, this shows that even an individual with a small capital can venture in the business. The maximum profit which the business can generate from the fish sales was 1 170 000 TZS, with the average of 328 210 TZS as shown in Table 49 below. This indicates that the business pays, an individual can generate profit from the business.

Table 49: Cost and gross profit of the business TZS

	N	Minimum	Maximum	Mean	Std. Deviation
Total cost of doing business	41	0.00	728 000.00	140 378.0488	195 342.48067
Gross Profit	38	0.00	1 170 000.00	328 210.5263	404 356.02174

4.4.18 Promotions and advertisement

Among the promotions and advertisement technique used were visual, verbal and sales discount/ price reduction; the techniques differ across the regions as shown in Table 50, and its percentage exceed one hundred since respondents uses more than one technique.

But the overall results show; visual were used by 82.9% of the respondents and verbal by 34.1%, while sales discount/price reduction was 4.9% of the respondents.

Table 50: Methods used for promotion and advertisement by Regions

Promotion and Advertising	Region				Total (n=41)
	Geita (n=14)	Mwanza (n=7)	Coast (n=10)	Dar (n=10)	
Verbal (e.g. beckoning)	57.1%	57.1%	10.0%	10.0%	34.1%
Visual (e.g. display)	78.6%	85.7%	90.0%	80.0%	82.9%
Sales discounts/ Price reductions	7.1%	14.3%	0.0%	0.0%	4.9%

4.4.19 Opportunities exist in the industry business

The fish consumption by the society is rapid increasing, many people opt taking fish relative to red meet due health problems or preference, therefore there are opportunities arising in the business, since more customers emerge every day. The opportunities observed by respondents were; cooking different fish foods in order to capture different customer preference, increasing customers by using different strategies. Other opportunities were increasing Capital in order to earn high profit, to have smoked fish, expansion of fish industry, good business location which is accessible, availability of demand due to many people preference on white meat, entertainment and promotions, through fish keeping(farming), business marketing (promotions), own source of fish and selling quality fish. On the other hand some of the respondents are not aware with any opportunity (Table 51). Therefore education here is needed to increase awareness of the opportunities in this fish business.

Table 51: Opportunities exist in the industry business by Regions

Opportunities exist	Region				Total
	Geita (n=14)	Mwanza (n=7)	Coast (n=9)	Dar (n=10)	(n=40)
N/A	28.6%	0.0%	22.2%	10.0%	17.5%
Not Aware	7.1%	14.3%	11.1%	20.0%	12.5%
Cooking Different Fish foods	0.0%	14.3%	22.2%	20.0%	12.5%
increasing customers	7.1%	14.3%	11.1%	10.0%	10.0%
Increase of Capital	7.1%	14.3%	0.0%	10.0%	7.5%
To have smoked Fish	7.1%	14.3%	11.1%	0.0%	7.5%
Expansion of Fish Industry	14.3%	0.0%	0.0%	10.0%	7.5%
Business Location	0.0%	14.3%	11.1%	0.0%	5.0%
Availability of Demand	7.1%	0.0%	0.0%	10.0%	5.0%
Entertainment and Promotions	14.3%	0.0%	0.0%	0.0%	5.0%
Through Fish Keeping	0.0%	0.0%	0.0%	10.0%	2.5%
Business Marketing	0.0%	0.0%	11.1%	0.0%	2.5%
Own Source	7.1%	0.0%	0.0%	0.0%	2.5%
Quality Fish	0.0%	14.3%	0.0%	0.0%	2.5%

4.4.20 Problems and risks in the business

The respondents face some of problems on running the business, the problems were not even to all regions. Respondents have the different opinion of the problems they face and copying strategies differs. Problems include fish scarcity, low capital, shortage of power, high purchasing price, unfaithful traders, high spoilage, shortage of customers, low income, bureaucracy in fish business and poor services as shown in Table 52. The biggest problem observed which cut across the all regions is fish scarcity (29.3%). This indicates an opportunity to increase fish through fish farming to cover the gap. On the other hand, 14.6% of the respondents in all regions did not respond to the question.

Table 52: Problems and risks faced by business by Regions

Problems and risks	Region				Total
	Geita (n=14)	Mwanza (n=7)	Coast (n=9)	Dar (n=10)	(n=40)
Fish scarcity	28.6%	28.6%	40.0%	20.0%	29.3%
N/A	7.1%	0.0%	20.0%	30.0%	14.6%
Low capital	14.3%	14.3%	10.0%	10.0%	12.2%
Shortage of power	7.1%	14.3%	0.0%	10.0%	7.3%
High purchasing price	7.1%	28.6%	0.0%	0.0%	7.3%
Unfaithful traders	7.1%	0.0%	10.0%	10.0%	7.3%
High spoilage	7.1%	0.0%	10.0%	10.0%	7.3%
Shortage of customers	7.1%	14.3%	0.0%	10.0%	7.3%
Low income	7.1%	0.0%	0.0%	0.0%	2.4%
Bureaucracy in fish business	0.0%	0.0%	10.0%	0.0%	2.4%
Poor Services	7.1%	0.0%	0.0%	0.0%	2.4%

4.4.21 Current problems coping strategies

The respondents take action to overcome problems faced in Nile tilapia business. Coping strategies include buying alternative fish varieties during scarcity, increase capital through loans, cooking/frying fish before they are spoiled, when there was shortage of customers or no cold facilities. Other strategies used are informing suppliers earlier before finishing the fish in stoke, using generator to supply power and ice block when electricity goes off and negotiation with suppliers when they increase selling price. A Service improvement to attract more customers is shown in Table 53 with their percentage. But while other respondents use these current solutions, generally 41.5% of all the respondents were having no any strategy solution to any of those problems; therefore there is the need for the government in ministry concerned wish fisheries to have strategies to solve these problems.

Table 53: Current problem coping strategies by Regions

Coping strategies	Region				Total
	Geita (n=14)	Mwanza (n=7)	Coast (n=10)	Dar (n=10)	(n=41)
I do not have means	35.7%	28.6%	60.0%	40.0%	41.5%
N/A	14.3%	0.0%	20.0%	30.0%	17.1%
Buying alternative fish varieties	14.3%	28.6%	10.0%	10.0%	14.6%
Through loan	7.1%	14.3%	0.0%	10.0%	7.3%
Cooking before spoiled	7.1%	0.0%	0.0%	10.0%	4.9%
Inform supplier earlier	0.0%	0.0%	10.0%	0.0%	2.4%
Using generator power	7.1%	0.0%	0.0%	0.0%	2.4%
Negotiation	0.0%	14.3%	0.0%	0.0%	2.4%
Increase selling price	7.1%	0.0%	0.0%	0.0%	2.4%
Service improvements	7.1%	0.0%	0.0%	0.0%	2.4%
Using ice block	0.0%	14.3%	0.0%	0.0%	2.4%

4.4.22 Competition in business

Competition is not high among the restaurant due to fact that they purchase almost at the same price, with exception of other factors such as quality of their products, convenience to customer such as stop and buy restaurants and good personnel of waiters which includes goo habit. The competitors are not the same in all regions as shown in Table 54.Generally 56.1% of the respondents agreed that main competitors were Hotels, other restaurants (19.5%) and no competition (14.6%). Other competitors observed are café and other food vendors (2.4%).

Table 54: Main Competitors in business by Regions

Competitor	Region				Total
	Geita (n=14)	Mwanza (n=7)	Coast (n=10)	Dar (n=10)	(n=41)
Hotels	50.0%	85.7%	70.0%	30.0%	56.1%
Other restaurants	21.4%	0.0%	20.0%	30.0%	19.5%
No competitor	21.4%	14.3%	10.0%	10.0%	14.6%
Bar	0.0%	0.0%	0.0%	20.0%	4.9%
Cafe	7.1%	0.0%	0.0%	0.0%	2.4%
Other food vendors	0.0%	0.0%	0.0%	10.0%	2.4%

4.4.23 Effect of competition on sales

The effect of competition in the business was observed to have some effect in the sales. The effects are different from one region to another as shown in Table 55. Generally 58.5% of the respondents observed no changes caused by competition, while 34.1% said their sales decreases and 7.4% said their sales were increased due to the competition in the business.

Table 55: Effect of competition on business by Regions

Competitor impact	Region				Total
	Geita (n=14)	Mwanza (n=7)	Coast (n=10)	Dar (n=10)	(n=41)
No change	71.4%	42.9%	40.0%	70.0%	58.5%
Decreased	28.6%	42.9%	40.0%	30.0%	34.1%
Increased	0.0%	14.3%	20.0%	0.0%	7.4%

4.4.24 Impact of competition on pricing

Pricing as process whereby a business sets the price at which it will sell its products and services, and may be part of the business marketing plan. The result of impact of competition on pricing as shown in (Table 56) shows that it is not uniform in the regions. The competition has very little impact in the process; in general 14.6% of the respondents agreed that competition caused decrease in pricing while 85.4% said pricing remained the same. This shows that competition has no huge impact on pricing.

Table 56: Impact of competition on pricing by Regions

Impacts	Region				Total
	Geita (n=14)	Mwanza (n=7)	Coast (n=10)	Dar (n=10)	(n=41)
Decreased	7.1%	28.6%	20.0%	10.0%	14.6%
Remained the same	92.9%	71.4%	80.0%	90.0%	85.4%

4.4.25 Pricing arrangements

Pricing arrangement is done in the common system of predetermined market price, 100% of the respondents agreed on using the pricing method. The predetermined market price is mostly used because it gives the manager to know if he/she will make the profit. Therefore he/she will be in a position to adjust the price if necessary relative to auction delivery which the profit depends on the situation on the delivery day.

4.4.26 Rating performance on the marketing mix in the business

The respondents were interviewed on their performance in operating their business by combining the place, price, product, promotion and procurement in their business. The report shows that, respondents who were familiar with the mix in place performance were generally as follows: excellent (37.5%), Very good (50%) and good (12.5%) as shown in Table 57.

Table 57: Opinion on the business performance based marketing mix elements

Strategic issue (n=41)	Performance				
	Poor	Fair	Good	Very good	Excellent
Place (e.g. location in market, distance to source)	0	0	12.5%	50.0%	37.5%
Price (e.g. market determined price, price instability, seasonal price)	2.5%	0	7.5%	60.0%	30.0%
Product (e.g. highly perishable, homogenous, good quality)	2.6%	7.9%	10.5%	50.0%	28.9%
Promotion (e.g. inter-personal skills, display array)	2.6%	7.7%	20.5%	56.4%	12.8%
Procurement (e.g. transportation, cooling, bad road systems, delivery)	2.6%	7.7%	20.5%	51.3%	17.9%

4.4.27 Importance of marketing mix in the business

To know respondents' understanding of the importance of place, price, product, promotion and sourcing in the marketing mix in their business, the results in Table 58 shows that, there were somehow aware of it, since majority were moderately important and extremely

important. On the importance of place 37.5% and 62.5% of the respondents indicated moderate important and extremely important respectively. For the price as another mix element 55% and 40% of the respondents agreed that it is moderately important and extremely important respectively. This shows that for place and price almost 100% and 95% of the respondents agreed on the importance of place and price. Also the importance of product was admitted by respondents to be moderately and extremely important by 40.5% and 56.8% respectively and product was 47.5% and 35% respectively. Sourcing was somehow not recognized as important: 20% were neutral 45% and 30% were agreed that it was moderate and extremely important respectively. The general results show that the respondents are aware of the importance of marketing mix.

Table 58: Opinion on the importance of marketing mix elements to business

Strategic issue (n=41)	**Performance**				
	Not Important	**Slight important**	**Neutral**	**Moderately important**	**Extremely important**
Place				37.5%	62.5%
Price			5.0%	55.0%	40.0%
Product			2.7%	40.5%	56.8%
Promotion			17.5%	47.5%	35.0%
Sourcing		5.0%	20.0%	45.0%	30.0%

4.4.28 Changes noted within last five years in the business

The fish food business has recently grown faster due to factor of nutrition as substitute for red meat but also the source of income as the fish business changes from not depending only on fishing but also in fish farming which recently developed faster in Tanzania. The changes noted by respondents in their business differ from region to another that is from Lake Victoria zone to coastal zone as showed in the Table 59. In general the changes noted were increases in income of participants as agreed by 73.2% of the respondents,

17% did not notice any change in the case of income. In age dynamic generally 63.4% of the respondents did not notice any changes, while 9.8% of respondents noticed more youth joining the business and all age groups and 14.6% of the respondents noticed the more adult joining the business. In gender perspective 63.4% of the respondents did not notice any change while 14.6% noticed more male joining the business and 22% of the respondent agreed on both gender changes in joining the business. The results shown that there is a need to sensitize age and gender especially to encourage women to involve in the fish business even in small level of fish vendors who sell the fried fish to increases their ability in income generation to reduce their poverty.

Table 59: Changes noticed in business in the last 5 years by Regions

Changes noticed	Variable	Region				Total (n=41)
		Geita (n=14)	Mwanza (n=7)	Coast (n=10)	Dar (n=10)	
Income	Increased	78.6%	85.7%	60.0%	70.0%	73.2%
	Decreased	7.1%	0.0%	10.0%	0.0%	4.9%
	No change	0.0%	14.3%	30.0%	30.0%	17.0%
	Fluctuating	14.3%	0.0%	0.0%	0.0%	4.9%
Age Dynamic	More Youth	7.1%	14.3%	20.0%	0.0%	9.8%
	More Adult	0.0%	0.0%	30.0%	30.0%	14.6%
	No Change	78.6%	71.4%	50.0%	60.0%	65.8%
	All Age Groups	14.3%	14.3%	0.0%	10.0%	9.8%
Gender dynamics	More Males	7.1%	28.6%	20.0%	10.0%	14.6%
	No Change	78.6%	57.2%	50.0%	60.0%	63.4%
	Both Gender	14.3%	14.3%	30.0%	30.0%	22.0%

4.4.29 Expectation in next five years to come

Every businessman in any industry has goals; the expectation of any business is to grow and earn more profit. The respondents have different expectations in this industry from one region to another and different among the individuals as Table 60 shows. Taking the overall expectation in regions, 48.8% of the respondents were planning to expand their

business while 26.8% have no plan in five years to come. Other expectation from the respondents were to change the business which is agreed by 4.9% of the respondents who want to get capital and start other businesses which they think are more profitable relative to the current one, at the same time 2.4% of the respondents expectation to open new fish business in another area to capture more customers.

Table 60: Expectation in next five years by Regions

Expectations	**Region**				**Total**
	Geita (n=14)	**Mwanza (n=7)**	**Coast (n=10)**	**Dar (n=10)**	**(n=41)**
Expand business	57.1%	42.9%	50.0%	40.0%	48.8%
More fish selling	14.3%	42.9%	20.0%	0.0%	17.1%
Changing business	7.1%	14.3%	0.0%	0.0%	4.9%
Open new business	7.1%	0.0%	0.0%	0.0%	2.4%
No change expected	14.3%	0.0%	30.0%	60.0%	26.8%

4.5 Nile Tilapia Input Suppliers

4.5.1Overview on inputs suppliers

The number of fish inputs suppliers was very limited in the past, but due to the fish farming industry development in Tanzania, the number of inputs suppliers is increasing. From the sample 4 (50%) started their business between 2011 and 2015.Each input supplier supplied more than one input, from 2 to 4 inputs. Moreover 3 (37.5%) supplied 2 to 4 inputs while 2 (25.5%) supplied 3 inputs and 3 (37.5%) supplied four inputs. Types of inputs supplied and their respondents were; 5 (62.5%) supply feeds, 100% supplied fingerlings, while 7 (87.5%) offer training and 3 (37.5%) offering information to customers (Table 61). Information given was based on the market information such as price and demand as well as information on types of feed and fingerlings which can give

out marketable fish size. Other inputs supplied were providing the handling of fingerlings up to three monthly monitoring to reduce mortality from transporting and early stage managements which seems to be difficult stage for majority of fish farmers to handle it. This creates credibility of the suppliers to fish farmers. Other feed suppliers were advanced and manufacture different feed size and ingredient to the different age and size of the fish. Training was done according to the capacity of the institution or business size. Short and long courses were provided and consultancies on some problems also were given to farmers. University students from SUA and other colleges dealing in fisheries attend field practical in one of the suppliers who supplied fingerlings and feeds to fish farmers in Pugu and Kigamboni at Dar es Salaam.

Table 61: Types of inputs supplied

Variable	Category	Frequency	Percentage
Training	No	1	12.5
	Yes	7	87.5
	Total	**8**	**100.0**
Feed	No	3	37.5
	Yes	5	62.5
	Total	**8**	**100.0**
Fingerling	No	0	0.0
	Yes	8	100.0
	Total	**8**	**100.0**
Production information	No	5	62.5
	Yes	3	37.5
	Total	**8**	**100.0**

4.5.2 Social characteristics of respondents

4.5.2.1 Sex and Age of respondents

The respondents were all men these were managers and directors of the organization. The organizations were government, groups and family owned business. Their age ranged

from 18 to 60 years where majority (50%) was between 31-40 years, and only 12.5% were above 50 years (Table 62). Unfortunate all were males here there is gender problem showing that women do not get the opportunities to manage business/organizations.

Table 62: Social characteristics of respondents

Variable	Variable category	Frequency	Percentage
Sex	Male	8	100.0
Age	18-30	1	12.5
	31-40	4	50.0
	41-50	2	25.0
	Older than 50	1	12.5
	Total	**8**	**100.0**
Marital status	Single	2	25.0
	Married	6	75.0
	Total	**8**	**100.0**
Highest Education level	Secondary	2	25.0
	Adult education	1	12.5
	Graduate	5	62.5
	Total	**8**	**100.0**

4.5.2.2 Marital status and Education level

About 75% of businessmen are married while 25% are single. This shows that there were good enough to run the business assuming that people who are married have settled mind. In the case of education level no doubt since 62.5% are graduated 25% are secondary level while 12.5% are adult college education (Table 62 above). This shows that inputs fish supply business is run by educated management, actors were serious with the business, and also this shows that government investment in this sector may provide employments to university graduates.

4.5.3 Business ownership

The business ownership of the inputs suppliers were in the different ownership, majority of businesses were based on the government institutions, but in recently private sectors

have joined the business. The result shows that 62.5% of them were the government oriented, 25% were group owner while 12.5% were independent store (Table 63).

Table 63: Business ownership

Variable	Frequency	Percentage
Independent store	1	12.5
Government institution	5	62.5
Group ownership	2	25.0
Total	**8**	**100.0**

4.5.4 Inputs supply business development

The fish inputs supply has developed fast recently; 50% of the inputs supplier started their business between 2011 and 2015. From 1967 to 2010 50% of the inputs suppliers started their business (Table 64). This shows increase in investment in this business which seems to grow so fast. This can be good business opportunity to venture. One of the inputs suppliers in Dar es Salaam declared that the business is growing; therefore the business vision was to expand their services by opening a branch in Lake Victoria Regions where they get many customers especially those seeking catfish fingerlings.

Table 64: Inputs supply sector development

Variable(Interval years)	Frequency	Percentage
1967-1980	2	25.0
2001-2010	2	25.0
2011-2015	4	50.0
Total	**8**	**100.0**

4.5.5 Target market for the products

The targeted market for the products supplied 100% of sample were supplying to fish farmers, 25% to other fish inputs suppliers and 37.5% to traders (Table 65). Therefore as the number of fish farmers increase inputs suppliers increase their sales. The inputs bought either by other inputs suppliers and traders were mostly feed. An input like training

customers was done to students from different colleges and universities as well as fish farmers had no formal education. Colleges provide diploma in marine fisheries and also get students from universities for field practical.

Table 65: Market for inputs supplied

Variable	Variable category	Frequency	Percentage
Fish Farmers	Yes	8	100.0
	No	0	0.0
	Total	**8**	**100.0**
Inputs suppliers	No	6	75.0
	Yes	2	25.0
	Total	**8**	**100.0**
Traders/Retailers	No	5	62.5
	Yes	3	37.5
	Total	**8**	**100.0**

4.5.6 Mode of payment with customers and price determination

The mode of payment was either cash on delivery/cash where 100% of the respondents charge cash on selling the products, while price agreement with customers was pre-determined (Table 66). This supports the cost plus method where the price was pre-determined taking consideration of cost production.

Table 66: Table Price determination

Variable	Frequency	Percentage
Predetermined	7	87.5
Current market	1	12.5
Total	**8**	**100.0**

4.5.7 Contracts with consumers

The contract with customer is very limited 25% of the respondents have contracts with customers which are formally written. This shows that there are no guarantees on selling the product, but due to limited number of suppliers in the industry and since fish farming

industry is rapidly growing, then they have assured of customers. The review of the contract was done regularly depending on the situation. 12.5% of the respondents review with no specific time while 12.5% review annually (Table 67).

Table 67: Contracts with consumers

Variable	Variable Category	Frequency	Percentage
Contract with customers	No	6	75.0
	Yes	2	25.0
	Total	**8**	**100.0**
Type of contract	Formal written	2	25.0
	N/A	6	75.0
	Total	**8**	**100.0**
Contract Review	No specific time frame	1	12.5
	One Year	1	12.5
	N/A	6	75.0
	Total	**8**	**100.0**

4.5.8 Payments and contract with suppliers

Inputs suppliers buy raw materials for production of feed and hormones for catfish breeding. Payment to raw material suppliers is cash on delivery 100% of the respondents agreed with 1 (12.5%) of respondents having formal contracts with raw material suppliers. Ingredient for feed production is purchased from the local markets. For example, one of the feed suppliers in Bagamoyo takes ingredients from Tandale market in Dar es Salaam. Hormones for catfish fingerlings production is bought from Nairobi.

4.5.9 Procurement problems and solution

Price of raw materials such as ingredients for feed processing fluctuates. 25% of the respondents observed so. Among the solution taken was to buy other substitute of ingredients or suddenly increase the price of feeds. 25% of respondents reported so while 75% did not respond to the question (Table 68).

Table 68: Procurement problems and solutions

Variable	Variable category	Frequency	Category
Procurement	N/A	6	75.0
	Price fluctuation	2	25.0
	Total	**8**	**100.0**
Solution to problem	N/A	6	75.0
	Shifting to substitute product	2	25.0
	Total	**8**	**100.0**

4.5.10 Financial assistance and sources to inputs suppliers

Generally starting or running business needs capital which includes financial capital among others. Therefore inputs suppliers get some financial assistance as a loan from the financial institutions, government and NGOs. 50% of the respondents get assistance from government which includes information (37.5%) and labour (12.5%) while those getting assistances from NGOs and banks were 25% of the respondents, which includes short term loan from NGOs (25%) and long term loan from bank 25% of respondents as shown in Table 69 below.

Table 69: Financial assistance and sources

Assistance received	Category	Frequency	Percentage
Short term financing	N/A	6	75.5
	NGOs	2	25.0
	Total	**8**	**100.0**
Long term loans	N/A	6	75.0
	Bank	2	25.0
	Total	**8**	**100.0**
Information	N/A	5	62.5
	Government	3	37.5
	Total	**8**	**100.0**
Labour	N/A	7	87.5
	Government	1	12.5
	Total	**8**	**100.0**
Source of assistance	Government	4	50.0
	NGO	2	25.0
	Banks	2	25.0
	Total	**8**	**100.0**

4.5.11 Sales point of products

The market for the products is done in the production area to farmers or traders such as fingerling, feed as well as training. Selling points for the products was mostly done on delivery and at the farm gate. Selling of fingerlings was mostly done at the production point or sending them to the customers in specific order. 7 (87.5%) of the respondents sell by delivering to customers with cash on delivery, while other methods such as Market place, store/supermarkets and online/ export each was used by only 1 (12.5%) of the respondents for sales of some of their products (Table 70).

Table 70: Selling points for the products

Variable	Variable category	Frequency	Percentage
Customer delivery	No	1	12.5
	Yes	7	87.5
	Total	**8**	**100.0**
Market place	No	7	87.5
	Yes	1	12.5
	Total	**8**	**100.0**
Store/ Supermarket	No	7	87.5
	Yes	1	12.5
	Total	**8**	**100.0**
Online/export	No	7	87.5
	Yes	1	12.5
	Total	**8**	**100**

4.5.12 The impact of competition in business

The competition on inputs supplying business is still very low because they are scattered, although recently there is an increase in the number of suppliers. The competition has very little effect on the sales. The result shows that, 50% of the sample did not respond, 37.5% said there is competition but no effect on their sales while 12.5% declared little competition which leads to increase in the sales due to improving their products quality. For the case of pricing 50%, of the respondents did not respond, 12.5% observed increases

in pricing while 37.5% of the respondents said that the little competition makes no change in pricing (Table 71).

Table 71: The impact of competition in business

Variable	Category	Frequency	Percentage
Competition in business	Increased	1	12.5
	Remained the same	3	37.5
	N/A	4	50.0
	Total	**8**	**100.0**
Competition in pricing	Increased	1	12.5
	Remained the same	3	37.5
	N/A	4	50.0
	Total	**8**	**100.0**

4.5.13 Price determination with customers

The common method used to determine price was cost plus method, where 87.5% of the respondents use this method (Table 72). Generally it is very rare to get loss in business when this method is used. Example one feed supplier in Bagamoyo said that, cost of production of feed was about 2 200TZS/kg to 2 300TZS/kg and the selling price to customer at farm gate was 2 500TZS/kg. Other methods such as market price, profit maximization and flexible or seasonal each was used by 12.5% of the respondent, the rest such as markup price, target return method and breakeven analysis were not familiar to suppliers therefore were not used at all.

Table 72: Price determination

Variable	Category	Frequency	Percentage
Cost plus	No	1	12.5
	Yes	7	87.5
	Total	**8**	**100.0**
Market price	No	7	87.5
	Yes	1	12.5
	Total	**8**	**100.0**
Profit maximization	No	7	87.5
	Yes	1	12.5
	Total	**8**	**100.0**
Flexible or Seasonal	No	7	87.5
	Yes	1	12.5
	Total	**8**	**100.0**

4.5.14 Nature of payment and pricing with customers

The mode of payment with the customer was either cash on delivery/cash (100%) on taking the product), and the price agreement with customers were pre-determined price 7 (87.5%), which supports the cost plus method where the price is pre-determined taking consideration of cost of production, and 1 (12.5%)use current market price.

4.5.15 Contracts with customers

Contracts with customer is limited, 25% only have contracts with customers which are formally written (Table 73). The purpose of contract is to ensure market for the product, since suppliers were few in the industry and the fish farming industry is rapidly growing with high demand for fish farming inputs, and then they are assured to meet demand.

Table 73: Contract with customer

Variable	Variable category	Frequency	Percentage
Contract	No	6	75.0
	Yes	2	25.0
	Total	**8**	**100.0**
Contracts type	Formal written	2	25.0
	N/A	6	75.0
	Total	**8**	**100.0**
Contract review	No specific time frame	1	12.5
	One Year	1	12.5
	N/A	6	75.0
	Total	**8**	**100.0**

4.5.16 Changes occurring in the business

Fish farming inputs supply business have made changes recently in supply of feed, fingerlings and training. 37.5% of the inputs suppliers noted changes in age dynamic of the customers from fish farming education demand and other inputs. Short and long courses were offered in the fisheries institutions, farmers' short courses as well as field practical students. 12.5% of the respondents noted institutional changes (Table 74). The government has also noted importance of the fish farming sectors thus subsidizing price of feed in some of the regions. This helps input supplies to increase their sales.

Table 74: Changes in the business for five years ago

Variable	Category	Frequency	Percentage
Demographic changes	Age dynamics	3	37.5
	NIL	5	62.5
	Total	**8**	**100.0**
Institutional changes	Policies are under preparations	1	12.5
	NIL	7	87.5
	Total	**8**	**100.0**

4.5.17 Plan of inputs suppliers

Since fish farming industry is still new in Tanzania, but fast growing, inputs suppliers' owners have high ambitions in the business aiming at; increasing and improving their production, supplying in their local areas and opening new selling points in other areas either by opening plants or by supplying inputs in those areas. Results show that 25% of the respondents have plans to improve by building more ponds, 50% plan to increase production and 25% have plan to increase more training on fish farming especial on the training institutions to make more promotion of the fish farming sector in order to create more customers (Table 75).

Table 75: Plan for the five years to come

Variable	Frequency	Percentage
Improving by building more ponds	2	25.0
To increase production	4	50.0
To increase more training on fish farming	2	25.0
Total	**8**	**100.0**

4.5.18 Importance and rating performance of inputs suppliers

It is important to know and apply the market mix to insure high sales in the market, the respondents were interviewed how do they know and apply them. The results of importance of marketing mix as shown in Table 76, indicates that 25% of respondents agreed that place was more important while 50% agreed that was very important and 25% were not familiar with marketing mix. The important of price in the market mix was agreed by 75% of respondent 25% were agreed to more important and 50% agreed it to be very important.

Table 76: Important of marketing mix

Variable	Category	Frequency	Percentage
Place	More important	2	25.0
	Very important	4	50.0
	N/A	2	25.0
	Total	**8**	**100.0**
Price	More important	2	25.0
	Very important	4	50.0
	N/A	2	25.0
	Total	**8**	**100.0**

On rating their performance in applying market mix 87.5% of the respondents agreed where 50% of respondents were excellent, 25% were very good and 12.5% were good in place application. On evaluation on rating performance on price also 87.5% agreed and rate themselves, 50% excellent, and 25% very good while 12.5% good. Promotion as market mix, 87.5% was agreed on performance where 37.5% are very good on doing promotion and 50% excellent. On procurement, 75% are agreed on where 25% are excellent, 37.5%very good while 12.5% were satisfied. Generally the respondents were familiar with the market mix as well as procurement (Table 77).

Table 77: Rating performance

Variable	Category	Frequency	Percentage
Place	Good	1	12.5
	Very good	2	25.0
	Excellent	4	50.0
	N/A	1	12.5
	Total	**8**	**100.0**
Price	Good	1	12.5
	Very good	2	25.0
	Excellent	4	50.0
	N/A	1	12.5
	Total	**8**	**100.0**
Promotion	Very good	4	50.0
	Excellent	3	37.5
	N/A	1	12.5
	Total	**8**	**100.0**
Procurement	Satisfied	1	12.5
	Very good	3	37.5
	Excellent	2	25.0
	N/A	2	25.0
	Total	**8**	**100.0**

4.6 Margins

4.6.1 Overview on margins

Actors in the chain have the different margin values. The margin values are calculated depending on the availability of data. For the Nile tilapia farmers' margin was calculated by using the total cost of production which includes the cost of fingerlings, feeds, hired labor and transport, (family labour was not able to be quantified) and the revenue received. For other actors such as Distributors, Restaurant and Marketer buying price, selling price per kilogram is used to calculate marketing margin, and the average of marketing margin is taken as general marketing margin. Marketing cost is calculated by using the difference between revenue and total variable cost divide by number of kilograms of Nile tilapia.

Marketing margins and marketing profit in each actor are calculated by using excel formula,

MM= Revenue-Stocking cost/Unit sold (kg)

MP= Revenue-Total variable cost/ unit sold (kg)

NB: Where there were purchasing price and sales price MM is calculated by using the difference between sales price and purchase price.

4.6.2 Marketing margins, marketing cost and marketing profit of actors

4.6.2.1 Distributors/Processors

Distributors buy fish from farmers and fishermen; the buying and sales price depend on the size of the fish and location of the distributor/processor, majority buy fish from fishermen, and very few from Nile tilapia farmers. Price is low since they buy in large quantity and sell to marketers, restaurants, and direct to consumers. The average buying price was 6 000TZS and average selling price was 6 750TZS. The average estimated MM, MC and MP were 750TZS, 441TZS and 309TZS respectively as shown in Table 83.

4.6.2.2 Retailers/Marketers

These buy Nile Tilapia from farmers, distributors, and fishermen. Buying and selling price depend on the source and cost involved in the process, estimated average prices are taken in both selling and buying prices. Average buying price was 6 304TZS and average selling price was 7 375 TZS. The average marketing margin was 1 071 TZS and marketing cost was 240 TZS which result in the average marketing profit of 831TZS (Table 83). Marketing cost and margin are calculated by using the revenue, stocking cost and variable cost for individuals, then the average margins are taken from the result.

4.6.2.3 Restaurant/chop Bar

These get the Nile Tilapia from marketers, distributors and few from Nile Tilapia farmers depending on the location of the restaurant. Buying price depends on the source and also selling price depends the location and state of product. The average buying price and selling price are calculated by excel, which were 7 080 TZS and 9 240 TZS respectively. MC was calculated by using total variable costs and number of kilograms of Nile tilapia which was 228 TZS and MP was 1 932 TZS as calculated by total using revenue, total cost and kilograms of Nile Tilapia while MM was 2 160 TZS, which is calculated by using the revenue, stocking cost and kilograms stocked, all these were done by using excel (Table 83).

4.6.2.4 Nile tilapia Farmers

Nile tilapia farmers use the inputs to produce Nile tilapia. They use fixed and variable costs on the production. Consideration is on the variable cost of inputs which is the costs of fingerlings, feeds, hired labour, and transport to estimate the total variable cost. The MM, MC and MP are calculated by using excel which were 3 169 TZS, 2 327 TZS and 842 TZS respectively (Table 78). MM is calculated for the individual farmer then the average MM is calculated as well as MC is calculated for the individual then averages are taken.

Table 78: Average purchasing and selling prices and average Marketing margin, marketing cost and marketing profit of main actors in the chain in TZS

Actor	Buying price	Selling price	Marketing margin(MM)	Marketing cost (MC)	Marketing profit(MP)
Farmers	3343	6060	3169	2327	842
Wholesale	6000	6750	750	441	309
Marketers	6304	7375	1071	240	831
Restaurant	7080	9240	2160	228	1932

4.6.3 Marketing margins

Marketing margin of farmers is high (3 169 TZS) compared to other actors since they perform many activities and they take higher duration in the production process, from fingerling to harvested fish. This is followed by restaurants by 2 160 TZS who perform a lot of activities which add value to fish, but also the cost of those added activities are very little due to advantage of having a good number of restaurant workers who do other activities apart from Nile tilapia value addition activities. Restaurant prices differ from other actors. They charge high price due to the fact that they change the form of the product, and they make high profit since they sell their products within a short time. Retailers and Wholesalers have almost the same activities and in some areas. They get their products from the same source but in some areas marketers get their product form distributors, so this makes their average sales price to be high than distributors at the end. Marketing margin of marketers are high than that of Distributors. Also Marketers penetrate to larger parts of the country than distributors.

4.6.4 Marketing cost

Marketing costs are incurred when commodities move from the source to the final market, where they are moved by farmers, traders, cooperatives, retailers or exporters. The cost incurred to move the product from producers to consumers is ordinarily known as marketing cost. Marketing cost includes the cost of various services delivered by different actors in the process of marketing of Nile tilapia fish. The marketing cost represents the cost of performing the various values adding activities and marketing functions involved in the marketing process. Marketing margin cost of farmers were very high (2 327 TZS), and this was due to the fact that they have high production cost especially on the cost of feed and pond management labour for the whole time of more than six months. This is followed by distributor with 441 TZS who incur high cost in transport and electricity,

marketers and restaurants have lower marketing margin cost 240TZSand 228TZS respectively. Marketers have few adding values activities while restaurants have the advantage of having employees who performed other activities which end up on reducing the operational costs on Nile tilapia.

4.6.5 Marketing profit

Marketing margin (Profit margin) can be used to compare a company with its competitors. More efficient firms will usually see a higher margin. Also, it provides clues about company's pricing, cost structure and production efficiency. Therefore, gross profit margin can be used to compare company's activity over time. High profit margin is a good indicator for the company that can make a reasonable profit if a company can control cost or manage to minimize it. Low profit margin indicates that the business is unable to control its production cost. Marketing profit for restaurants (1 932TZS) was high followed by the Nile tilapia farmers 842TZS. Restaurants were having such margin profit due to the ability to control costs even though the purchase the fish in high price, but also they sell it at the high since they were able to change their form and gain high price. Also Retailers/Marketers have good marketing margin (831TZS) due to less value adding activities and high sales price. The distributors were the least in the chain with 309TZS, but still were making good profit since they sell huge amount of Nile tilapia.

4.7 Value Chain of Farmed Nile Tilapia

Nile tilapia farmers sell their product in the same market as the wild Nile tilapia; therefore it follows the same channel as wild Nile tilapia. The value chain of farmed Nile tilapia is geographically short due to quantity produced by farmers which is little in quantity. The amount produced locally joins the wild Nile tilapia which seems to cover larger geographical area. The farmers who produce Nile tilapia take advantage of selling their

product with wild Nile tilapia. Therefore it follows the Lake Victoria Nile tilapia value chain where actors are distributors, marketer/traders/retailers, restaurants and consumers around their production area (Figure 2). Therefore actors in the farmed Nile tilapia are the same actors involved in the wild Nile tilapia who are distributors, marketers/ traders/retailers and restaurants. The last two actors sell direct to consumers while the first one sell to the last two actors and very few consumers.

The geographical flow of farmed Nile tilapia is local which differs from wild Nile tilapia which almost covers the entire country all the way from Lake Victoria.

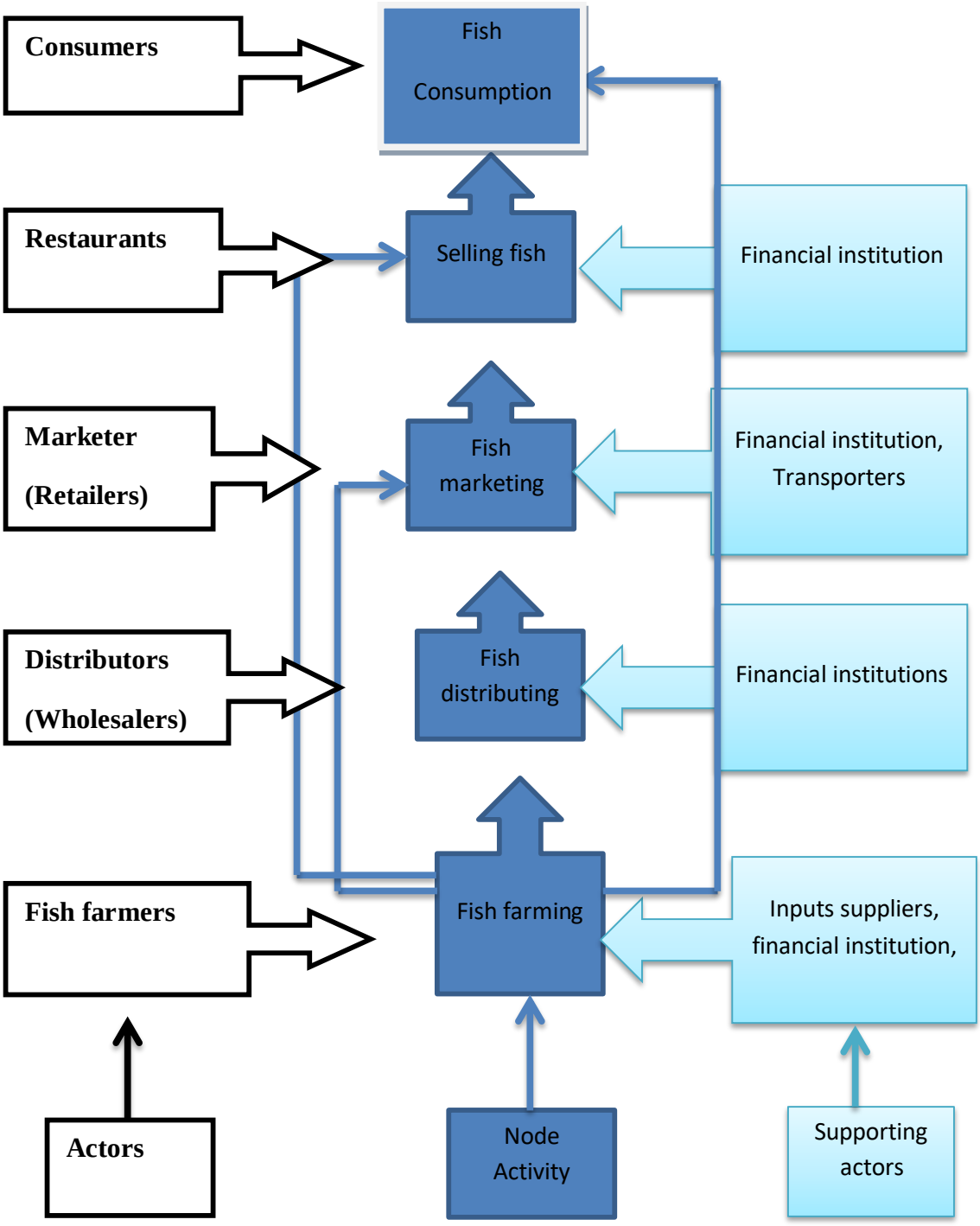

Figure 2: Farmed Nile Tilapia value chain map

Source: (Modified from Chiwaula *et al.*, 2012)

4.8 Sales of Farmed Nile tilapia

The sale of harvested Nile tilapia is done in the main four markets depending on the amount of the harvested product. At the farm gate the average of 51% of the produced Nile tilapia is sold, 25% is sold at the distribution point, 6% is marketed to customer delivery while 18% is marketed at the market place area (Table 79).

Table 79: Percentage farmed Nile tilapia marketed at each selling point

Variable	Farm gate	Distribution point	Customer delivery	Market place
Valid	92	92	92	92
Missing	21	21	21	21
Mean	50.82	24.73	6.25	18.21

The amount produced by farmers on average 31% is sold to customer/consumers around production area, 13% to wholesalers, 33% to restaurants and 23% to retailers as shown in Figure 3. Therefore the results show that the main customers for the farmed Nile tilapia are restaurants and customers around the production area. This is due to amount which is produced by farmers which cannot be moved to other geographical areas due to small amount produced and high consumption in their local areas. The marketing information is not well organized; farmers do not get information from the market such as size of the fish required by customers neither from restaurants nor marketers.

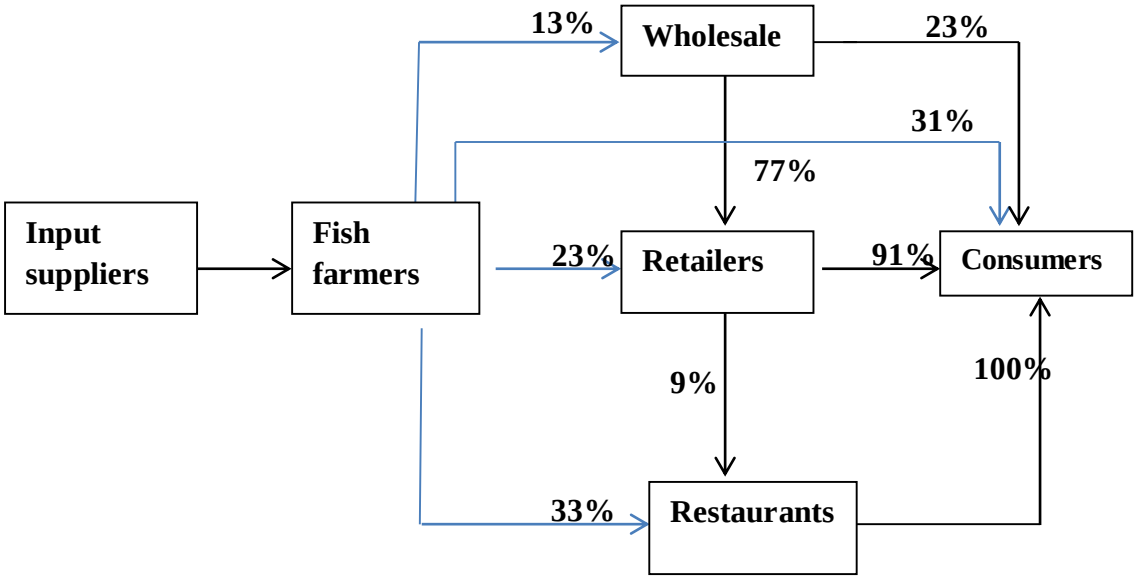

Figure 3: Value chain supply of farmed Nile tilapia

4.9 Information Flow and Relationship between Actors in the Value Chain

For every business information makes it grow, besides physical activities, the value chain includes all the information that flows within a chain and its suppliers, distributors and consumers. Therefore information is at the heart of contemporary business processes.

The actors in farmed Nile tilapia value chain shared the information and building the relationship among the intermediate actors. These includes training, price, required size and volume, quality of inputs, quality and quantity of products(Nile tilapia), time of harvesting and time with high sales.

Input suppliers and Nile tilapia famers share information such as quality of inputs (species which grow fast to reach the consumers requirement and feed with all required ingredients for Nile tilapia). Price setting by suppliers with on spot exchange. Training of fingerlings handling and uses of others inputs are provided. The relationships persist when the information provided are correct. Between Nile tilapia farmers and Distributors/

Wholesalers the relationship and information shared were, quantity for distributors' economic scale and quality required by distributors to buy from farmers. However farmer set the price for their product on spot exchange.

Nile tilapia farmers and retailers shared the information such as price which sets by farmers, size and quality which sets by retailers considering the consumer preference. Also retailers inform farmers on the right time to harvest when there is high demand. Between Nile tilapia farmers and restaurants/food vendors, information flows are size and quality required by restaurant/food vendor and selling price sets by fish farmers with on spot exchange. Between Nile tilapia farmers and consumer, information is size and quality of fish required by consumers and price information from farmers. So farmers produce the consumer requirements to retain them. Price sets by farmers with on spot exchange between them.

Retailers and consumer shares the information such as price which sets by retailers with on spot exchange, while size and quality sets by consumers. Retailers and restaurant/food vendors, information flows are quality and size required by restaurants owners, with on spot exchange with price sets by retailers. However some food vendors are paying after reselling their fish. Distributors/wholesalers and retailers relationship and information flow shows on spot exchange with few informal contracts between them. No customer loyalty, customer change from one wholesaler to another, depending on quality and the price of products on particular day.

Distributors/Wholesalers and consumers have on spot exchange with price sets by wholesalers. No customer loyalty, customer change from one wholesaler to another depending on quality and the price of products on particular day.

Restaurants and consumers have on spot exchange between them with price sets by restaurants owners. No customer loyalty, customer change from one restaurant to another depending on quality and the price of products on particular day.

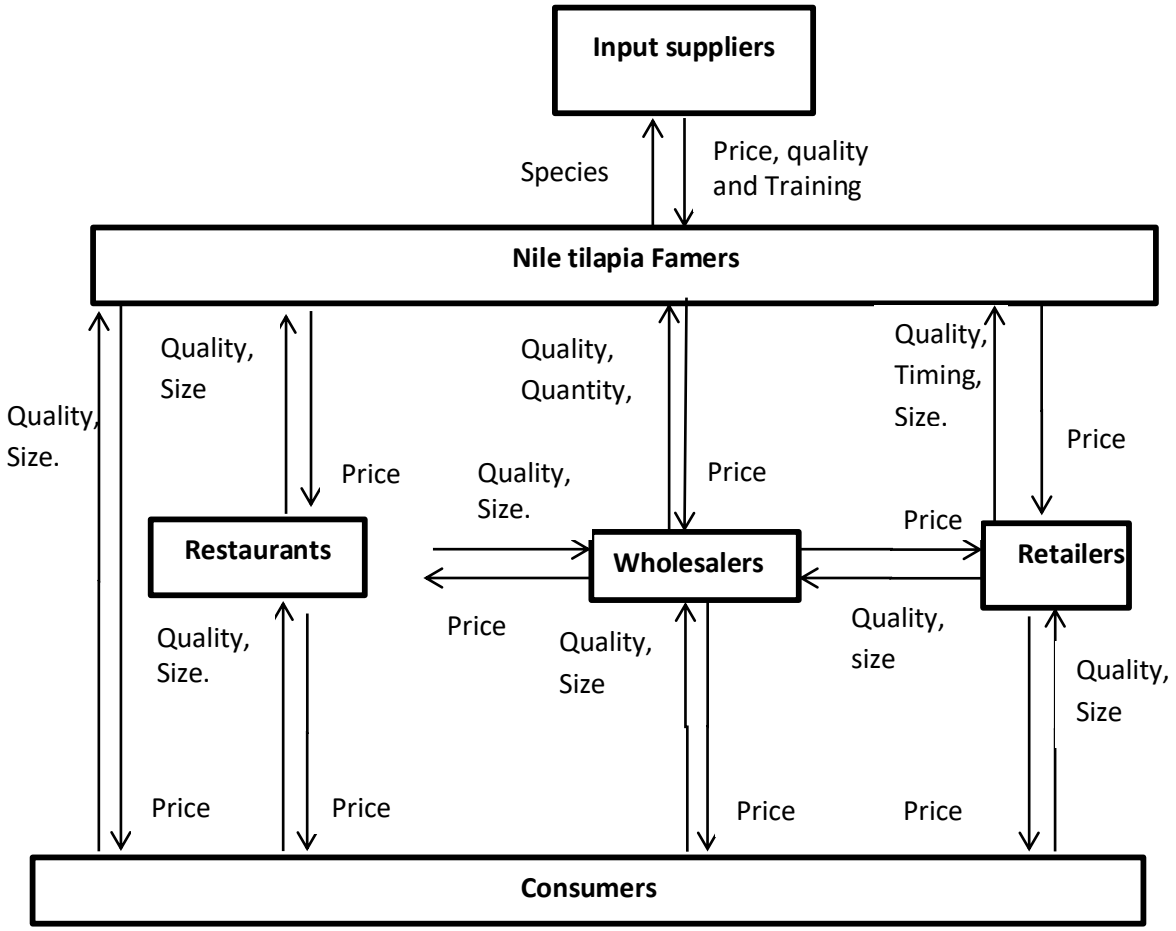

Figure 4: Information flow and relationship between actors in farmed Nile tilapia

4.10 Farmed Nile tilapia Value Chain Map Matrix

Farmed Nile tilapia from production to consumption involves several actors such as: Input suppliers, Nile tilapia farmers, wholesalers, Marketers/Retailer and Restaurant owners, also these works together to ensure consumer satisfaction. Marketing chain actors' linkage matrix shows interaction among players, describing the five categories studied, which are input suppliers, Nile tilapia farmers, wholesalers, Marketer/Retailers and Restaurant owners as summarized in Table 80. The added values in other actors are time, position and packing except in the restaurant where the form of Nile tilapia is changed ready for consumption.

Table 80: Farmed Nile tilapia value chain map matrix

	Inputs	Production	Distribution	Marketing	Processing
Inputs		Fingerlings, feeds, Fertilizer, water, financial capital, Land	Ice, store, containers, freezer stall	Financial capital Packing material Ice, electricity	Financial capital, Packing materials,
Actors	Inputs suppliers, Extension officers, Government institutions, Suppliers, Traders	Fish farmers producers	Wholesalers Processors (Wholesalers)	Marketers Traders Retailers	Restaurants owners
Activities		Pond managements, Feeding, harvesting Grading, sales	Cleaning Preservation Icing	Cleaning, Dressing, Filleting, Frying Packing,	Cleaning, Dressing, Soup Frying, Filleting Transport, Cutting, Packaging
Outputs	Feeds, Fingerlings Labour,	Fresh Fish	Fresh Fish		Fish ready for consumption
Challenges		Low fish growth rate, Trading the fish at unprofitable price, Shortage of feed, Shortage of quality fingerlings	Late delivery of fish, Low amount of fish delivery, Some labour were theft, Unfaithful customers, Fish sometimes go rotten due to power shortage.	Transport, Low capital, Police(Law and regulations) No appropriate infrastructure, Lack of fish from fishers/Farmers	Nile Tilapia scarcity Shortage of power high purchasing price unfaithful workers Spoiled

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Overview

The study was about promoting fish farming due to decline of wild captured fish from Lake Victoria and low per capita fish consumption, which led to Lake Victoria society to involve in the fish farming to overcome the problem. The subject targeted to promote income of Nile tilapia fish farmers in Lake Victoria regions and coastal region communities by improving the Nile tilapia value chain and Nile tilapia farming production, so that they can reduce poverty in the community. The study concentrated on the farmed Nile tilapia value chain analysis, so that it can be upgraded for the benefit of all actors in the chain particularly the poor Nile tilapia farmers. Therefore the specific objectives of the study were: to identify and map various actors currently involved in farmed Nile Tilapia value chain with their functions, to analyze the marketing margins and marketing profits of the different sub-sectors and to identify the key constraints affecting different actors in the value-chain.

5.2 Conclusion

Farmed Nile tilapia can be used to reduce poverty, hunger, unemployment and create economic opportunities in the value chain in Tanzania. The main actors in the chain are Nile tilapia farmers, distributors/processors, marketer/retailers and restaurants/fish vendors/bar chop, and the fish input suppliers. Institutions are also accounted as supporting actors.

Result shows that farmers get the same price as the Marketer/retails depending on the location; farmers sell their fish at the same price even at the farm gate as the price in the market.

The production system used by farmers is pond production, with majority of the farmers depending on the fingerlings from own source or other aquacultures but whose quality is questionable. The main activities performed by farmers are pond management which includes feeding, water changing, cleaning and security of the pond area.

Its own food preparation as source of feed with few farmers using special feed prepared by feed suppliers but with high feeding cost due to high price. Starting fish farming needs huge capital especial in the pond construction, but capital for starting the business is limited to farmers. Almost all farmers use their own resources with few farmers who receive a little amount from NGOs or relatives to top-up in their own resources.

Knowledge of fish farming is mostly obtained through individual observation in other farms. Observation develops interest to individuals especially result demonstration, majority of farmers get the fish farming through observing a private fish culturist and the government institution farms.

Farmers' income obtained from fish farming is not encouraging due to challenges they face such as fish not growing to good marketable size among other challenges. For farmers to sell their Nile tilapia to distributors/processors it needs them to produce quality fish, larger size and enough amounts of at least three tons. Therefore farmers must be organized in groups and be trained on good pond management to achieve this.

Farmers' gross profit is high in the Coast Region followed by Dar es Salaam Region. Therefore producing Nile tilapia in coastal regions is more profitable due to the nature of chain relative to Lake Victoria region.

Farmers face many problems in the whole production process such as: shortage of water for ponds; fish culture inputs are too costly and not available locally; farmers are having low knowledge on fish farming; there is shortage of feed for ponds; it is not possible to trade fish at profitable price due to high production cost; farmed Nile tilapia have slow growth rate; there is shortage of fingerling/fry to stock ponds and are not of good quality; shortage of fertilizers for ponds and unreliable security in the production economic unity.

Wholesalers/Distributors are among the actors in the value chain. Their main activities are purchasing fish from fishers, traders or fish farmers. The value addition activities are cooling/storing of fish, transporting when needed, dressing and cleaning for special order. Cleaning and dressing are done to customers by additional charge per fish/kilogram.

Wholesaler/Distributors as the actor in the value chain, face the problems in their daily operation which including: late delivery of fish by fish suppliers, low amount of fish delivery by fish suppliers, theft from suppliers/customer, unfaithful customers and fish sometimes go rotten due to power outage. But in spite of these problems distributors have a good sales and gross profit in the business which makes them to stay in the business.

The results also show that, Wholesalers/distributors face financial problem on capital assistance either from the government or financial institutions. Very few get assistance from financial institutions such as banks and SACCOs. This may be caused by lack of groups business which can enable them to access loans from the Government and financial institutions.

Generally Wholesalers/distributors have plan of expanding their business, which gives opportunity to fish farmers to produce more since there is available market, the business

expansion of distributors will have positive sales for farmers since farmers are among distributors' suppliers.

Retailers/Marketers as another Nile tilapia value chain actor, their activities are; cutting, packaging, cleaning, dressing, filleting, frying, smoking, and drying. The number of activities performed differs from one marketer to another depending on the level of operation which includes table, store/stall or butcher shop.

Retailers/Marketers' business ownership structure is mostly independent stall/store, there is very limited group business which could help them to get loan from financial institutions where very few marketers get financial assistance from banks and NGOs.

The results show the timing for marketers with high sales, which are: in morning and mid-morning, on Saturdays and Sunday, beginning of the month and end of month and the months with high sales from September to December.

Retailers/Marketers face some challenges such as: fish scarcity and delay in delivery, therefore this is an opportunity for farmers to produce more Nile tilapia to cover problem of scarcity.

Restaurants/ Bar chop are actors in Nile tilapia value chain with the value adding activities such as cleaning, dressing, smoking, frying, drying, filleting, cutting and packaging. As applied to other actors in the chain, the number of activities performed by restaurant/bar chop depend on the scale of operation and the location of business, for example at high way restaurant/bar chop the activities are different from restaurant/bar chop in the town center.

Restaurants in Coast and Dar es Salaam regions sell mostly Lake Victoria Nile tilapia, relative to farmed Nile tilapia due to good size of those from Lake Victoria. Farmers must produce Nile tilapia to large size to have the quality and size required by restaurant owners.

Restaurants owners buy fish by considering the quality, size, availability and from the sellers close to their business to reduce transport cost. Therefore for the farmers or marketers to capture them it is important to produce or sale to nearby restaurants. Farmers must produce Nile tilapia with high quality, taste and good size preferred by restaurant customers.

The restaurants/ bar chops face problems in this business such as fish scarcity, low capital, power outage, high purchasing price, unfaithful traders, high spoilage, low income, bureaucracy in fish business and poor services. These problems make business to grow too slowly, but they are taking possible action to overcome the situation to some of these problems where possible.

Other actors in the chain are input suppliers; these are not direct actors in the chain, but they support the chain by providing inputs to farmers as supporting institution. They are very important in this industry. The inputs supplied include training, feeds, fingerlings/fry and information services. The scales or number of inputs supplied differ from one supplier to another depending on the scale of operation.

The input suppliers face some problems such as price fluctuations for raw material and their availability, for example, hormones for catfish fingerlings production are not available in Tanzania, are imported from Nairobi Kenya. However there are plans to

increase business operations and production by opening new branches all over the country and the campaign for fish farming knowledge dissemination.

Marketing margin for Nile tilapia farmers is very high followed by restaurants, then marketers and lastly distributors. This is due to value added including time of staying with the fish. Farmers have very high due to high cost of production and time from fingerlings to consumable fish size while restaurants have the next marketing margin value due to many value addition activities and minimized cost for the activities. Wholesalers/Distributors are the last in the marketing margins but still they make profit due to high volume of fish they are sell.

5.3 Recommendations

The main objective is to help Nile tilapia farmers to make Nile tilapia farming more productive business to alleviate poverty of poor fish farmers and increase production hence per capita consumption. In order to make the business productive to farmers, the following recommendations are made.

i. Due to high cost and availability of manufactured feed, farmers should be trained how to produce their own fish feed from local and easily available ingredients.
ii. Feed and fingerlings suppliers must improve their products quality and government should approve quality of the feed and fingerling which can grow fast to marketable size.
iii. Fish farmers should be encouraged to form groups, to become members of cooperatives, to improve communication and get information among fish farmers. This will be helpful in solving problems and getting loans easily from the government and other financial institutions.

iv. Farmers should arrange the stocking time together, so that they end up on harvesting at the same time, this will help them to have large amount of fish which will attract distributors/processors and traders who need quality and large quantity.

v. Other actors such as distributors and marketers should form groups (SACCOS), this will help them to access loans from financial institutions in order to increase their capital.

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APPENDICES

Appendix 1: Farmers' assets within production economic unit by Regions

Category	Variables	Region					Total
			Geita	Mwanza	Coast	Dar	
Permanent building	Yes	Count	14	8	12	9	43
		Percentage	43.8%	28.6%	40.0%	39.1%	38.1%
	No	Count	18	20	18	14	70
		Percentage	56.2%	71.4%	60.0%	60.9%	61.9%
	Total	**Count**	**32**	**28**	**30**	**23**	**113**
		Percentage	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Mechanized farm equipment	Yes	Count	6	4	9	2	21
		Percentage	18.8%	14.3%	30.0%	8.7%	18.6%
	No	Count	26	24	21	21	92
		Percentage	81.2%	85.7%	70.0%	91.3%	81.4%
	Total	**Count**	**32**	**28**	**30**	**23**	**113**
		Percentage	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Vehicles in unit	Yes	Count	4	1	6	3	14
		Percentage	12.5%	3.6%	20.0%	13.0%	12.4%
	No	Count	28	27	24	20	99
		Percentage	87.5%	96.4%	80.0%	87.0%	87.6%
	Total	**Count**	**32**	**28**	**30**	**23**	**113**
		Percentage	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Livestock/ Farm animals	Yes	Count	11	12	22	15	60
		Percentage	34.4%	42.9%	73.3%	65.2%	53.1%
	No	Count	21	16	8	8	53
		Percentage	65.6%	57.1%	26.7%	34.8%	46.9%
	Total	**Count**	**32**	**28**	**30**	**23**	**113**
		Percentage	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Appendix 2: Sources of inputs for farm production by regions

Inputs	Source		Region				
			Geita	**Mwanza**	**Coast**	**Dar**	**Total**
Fingerlings	Own	Count	7	1	7	4	19
		Percentage	21.9%	3.6%	23.3%	17.4%	16.8%
	Government	Count	16	14	6	0	36
		Percentage	50.0%	50.0%	20.0%	0.0%	31.9%
	Other Aquacultures	Count	9	13	17	19	58
		Percentage	28.1%	46.4%	56.7%	82.6%	51.3%
	Total	**Count**	**32**	**28**	**30**	**23**	**113**
		Percentage	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Organic fertilizer	Own	Count	11	14	19	17	61
		Percentage	64.7%	60.9%	76.0%	85.0%	71.8%
	Government	Count	2	0	0	1	3
		Percentage	11.8%	0.0%	0.0%	5.0%	3.5%
	Other Aquacultures	Count	4	9	6	2	21
		Percentage	23.5%	39.1%	24.0%	10.0%	24.7%
	Total	**Count**	**17**	**23**	**25**	**20**	**85**
		Percentage	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Feed	Own	Count	15	11	26	12	64
		Percentage	50.0%	40.7%	89.7%	52.2%	58.7%
	Government	Count	6	4	0	0	10
		Percentage	20.0%	14.8%	0.0%	0.0%	9.2%
	Other Aquacultures	Count	9	12	3	11	35
		Percentage	30.0%	44.4%	10.3%	47.8%	32.1%
	Total	**Count**	**30**	**27**	**29**	**23**	**109**
		Percentage	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Associated animals	Own	Count	11	13	24	20	68
		Percentage	84.6%	81.2%	100.0%	100.0%	93.2%
	Other Aquacultures	Count	2	3	0	0	5
		Percentage	15.4%	18.8%	0.0%	0.0%	6.8%
	Total	**Count**	**13**	**16**	**24**	**20**	**73**
		Percentage	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Labour for operation	Own	Count	13	17	22	19	71
		Percentage	92.9%	100.0%	100.0%	95.0%	97.3%
	Other Aquacultures	Count	1	0	0	1	2
		Percentage	7.1%	0.0%	0.0%	5.0%	2.7%
	Total	**Count**	**14**	**17**	**22**	**20**	**73**
		Percentage	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Appendix 3:Farmers' assistance and source of assistance by Regions

Assistance	Source	Region					
			Geita	Mwanza	Coast	Dar	Total
Fingerling/Fry assistance	Own	Count	13	11	18	11	53
		Percentage	40.6%	39.3%	60.0%	47.8%	46.9%
	Government	Count	13	11	3	1	28
		Percentage	40.6%	39.3%	10.0%	4.3%	24.8%
	Other Aquacultures	Count	6	6	9	11	32
		Percentage	18.8%	21.4%	30.0%	47.8%	28.3%
	Total	**Count**	**32**	**28**	**30**	**23**	**113**
		Percentage	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Organic Fertilizerassistance	Own	Count	27	24	28	20	99
		Percentage	87.1%	88.9%	93.3%	87.0%	89.2%
	Government	Count	2	0	0	3	5
		Percentage	6.5%	0.0%	0.0%	13.0%	4.5%
	Other Aquacultures	Count	2	3	2	0	7
		Percentage	6.5%	11.1%	6.7%	0.0%	6.3%
	Total	**Count**	**31**	**27**	**30**	**23**	**111**
		Percentage	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Feed assistance	Own	Count	16	9	26	18	69
		Percentage	50.0%	32.1%	86.7%	78.3%	61.1%
	Government	Count	11	12	0	1	24
		Percentage	34.4%	42.9%	0.0%	4.3%	21.2%
	Other aquacultures	Count	5	7	4	4	20
		Percentage	15.6%	25.0%	13.3%	17.4%	17.7%
	Total	**Count**	**32**	**28**	**30**	**23**	**113**
		Percentage	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Associated animals assistance	Own	Count	30	28	27	21	106
		Percentage	93.8%	100.0%	90.0%	91.3%	93.8%
	Government	Count	2	0	1	2	5
		Percentage	6.2%	0.0%	3.3%	8.7%	4.4%
	Other Aquacultures	Count	0	0	2	0	2
		Percentage	0.0%	0.0%	6.7%	0.0%	1.8%
	Total	**Count**	**32**	**28**	**30**	**23**	**113**
		Percentage	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Labour for	Own	Count	30	26	27	18	101

construction assistance		Percentage	93.8%	92.9%	90.0%	78.3%	89.4%
	Government	Count	1	1	0	2	4
		Percentage	3.1%	3.6%	0.0%	8.7%	3.5%
	Other Aquacultures	Count	1	1	3	3	8
		Percentage	3.1%	3.6%	10.0%	13.0%	7.1%
	Total	**Count**	**32**	**28**	**30**	**23**	**113**
		Percentage	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Labour for operations assistance	Own	Count	31	27	28	19	105
		Percentage	96.9%	96.4%	93.3%	82.6%	92.9%
	Government	Count	1	0	0	1	2
		Percentage	3.1%	0.0%	0.0%	4.3%	1.8%
	Other Aquacultures	Count	0	1	2	3	6
		Percentage	0.0%	3.6%	6.7%	13.0%	5.3%
	Total	**Count**	**32**	**28**	**30**	**23**	**113**
		Percentage	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Labour for harvesting assistance	Own	Count	31	25	27	20	103
		Percentage	96.9%	89.3%	93.1%	87.0%	92.0%
	Government	Count	1	0	0	1	2
		Percentage	3.1%	0.0%	0.0%	4.3%	1.8%
	Other Aquacultures	Count	0	3	2	2	7
		Percentage	0.0%	10.7%	6.9%	8.7%	6.2%
	Total	**Count**	**32**	**28**	**29**	**23**	**112**
		Percentage	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Appendix 4: Importance of the Marketing mix in distributor business

Variable	Category	Frequency	Percentage
Place	Less important	1	12.5
	Important	1	12.5
	Very important	5	62.5
	N/A	1	12.5
	Total	**8**	**100.0**
Price	Important	4	50.0
	Very important	3	37.5
	N/A	1	12.5
	Total	**8**	**100.0**
Product	Important	2	25.0
	Very important	5	62.5
	N/A	1	12.5
	Total	8	100.0
Promotion	Important	3	37.5
	Very important	4	50.0
	N/A	1	12.5
	Total	**8**	**100.0**
Source	Important	2	25.0
	Very important	5	62.5
	N/A	1	12.5
	Total	**8**	**100.0**

Appendix 5: Distributors rating individual performance of marketing mix

Variable	Category	Frequency	Percentage
Place	Good	1	12.5
	Very good	4	50.0
	Excellent	2	25.0
	N/A	1	12.5
	Total	**8**	**100.0**
Price	Poor	1	12.5
	Good	1	12.5
	Very good	4	50.0
	Excellent	1	12.5
	N/A	1	12.5
	Total	**8**	**100.0**
Promotion	Poor	1	12.5
	Satisfied	1	12.5
	Very good	4	50.0
	Excellent	1	12.5
	N/A	1	12.5
	Total	**8**	**100.0**
Procurement	Good	2	25.0
	Very good	3	37.5
	Excellent	1	12.5
	N/A	2	25.0
	Total	**8**	**100.0**

Appendix 6: Marketers value addition activities performed by marketers by regions

Variable	Category	Region				
			Coastal	Dar	Geita	Total
Cleaning	Yes	Count	2	2	15	19
		Percentage	16.7%	20.0%	100.0%	51.4%
	No	Count	10	8	0	18
		Percentage	83.3%	80.0%	0.0%	48.6%
	Total	Count	12	10	15	37
		Percentage	100.0%	100.0%	100.0%	100.0%
Dressing	Yes	Count	3	0	6	9
		Percentage	25.0%	0.0%	40.0%	24.3%
	No	Count	9	10	9	28
		Percentage	75.0%	100.0%	60.0%	75.7%
	Total	Count	12	10	15	37
		Percentage	100.0%	100.0%	100.0%	100.0%
Smoking	Yes	Count	1	2	0	3
		Percentage	8.3%	20.0%	0.0%	8.1%
	No	Count	11	8	15	34
		Percentage	91.7%	80.0%	100.0%	91.9%
	Total	Count	12	10	15	37
		Percentage	100.0%	100.0%	100.0%	100.0%
Frying	Yes	Count	1	0	0	1
		Percentage	8.3%	0.0%	0.0%	2.7%
	No	Count	11	10	15	36
		Percentage	91.7%	100.0%	100.0%	97.3%
	Total	Count	12	10	15	37
		Percentage	100.0%	100.0%	100.0%	100.0%
Drying	Yes	Count	4	0	0	4
		Percentage	33.3%	0.0%	0.0%	10.8%
	No	Count	8	10	15	33
		Percentage	66.7%	100.0%	100.0%	89.2%
	Total	Count	12	10	15	37
		Percentage	100.0%	100.0%	100.0%	100.0%
Filleting	Yes	Count	1	3	0	4
		Percentage	8.3%	30.0%	0.0%	10.8%
	No	Count	11	7	15	33
		Percentage	91.7%	70.0%	100.0%	89.2%
	Total	Count	12	10	15	37
		Percentage	100.0%	100.0%	100.0%	100.0%

Cutting	Yes	Count	3	5	5	13
		Percentage	25.0%	50.0%	33.3%	35.1%
	No	Count	9	5	10	24
		Percentage	75.0%	50.0%	66.7%	64.9%
	Total	Count	12	10	15	37
		Percentage	100.0%	100.0%	100.0%	100.0%
Packaging	Yes	Count	1	0	2	3
		Percentage	8.3%	0.0%	13.3%	8.1%
	No	Count	11	10	13	34
		Percentage	91.7%	100.0%	86.7%	91.9%
	Total	Count	12	10	15	37
		Percentage	100.0%	100.0%	100.0%	100.0%

Appendix 7: Retailers/Marketers' promotion to make costumers to buy fish from the business by regions

	Region					
Variable	Category		Coastal	Dar	Geita	Total
Quality	Yes	count	10	4	9	23
		%	83.3%	40.0%	60.0%	62.2%
	No	Count	2	6	6	14
		%	16.7%	60.0%	40.0%	37.8%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Low price	Yes	count	3	0	10	13
		%	25.0%	0.0%	66.7%	35.1%
	No	Count	9	10	5	24
		%	75.0%	100.0%	33.3%	64.9%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Convenient	Yes	count	3	0	0	3
		%	25.0%	0.0%	0.0%	8.1%
	No	Count	9	10	15	34
		%	75.0%	100.0%	100.0%	91.9%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Good Habit	Yes	count	6	3	1	10
		%	50.0%	30.0%	6.7%	27.0%
	No	Count	6	7	14	27
		%	50.0%	70.0%	93.3%	73.0%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
One stop shop	Yes	count	1	4	0	5
		%	8.3%	40.0%	0.0%	13.5%
	No	Count	11	6	15	32
		%	91.7%	60.0%	100.0%	86.5%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

Appendix 8: Retailers/Marketers Contract with customers by regions

Variable	Category	Region				
			Coastal	Dar	Geita	**Total**
Contract with customer	yes	Count	0	0	5	5
		%	0.0%	0.0%	33.3%	13.5%
	No	Count	12	10	10	32
		%	100.0%	100.0%	66.7%	86.5%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Type of contract	Informal	Count	0	0	4	4
		%	0.0%	0.0%	26.7%	10.8%
	Both	Count	0	0	2	2
		%	0.0%	0.0%	13.3%	5.4%
	N/A	Count	12	10	9	31
		%	100.0%	100.0%	60.0%	83.8%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Contract review	Irregularly	Count	0	0	4	4
		%	0.0%	0.0%	26.7%	10.8%
	N/A	Count	12	10	11	33
		%	100.0%	100.0%	73.3%	89.2%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Price in contract	Yes	Count	0	0	1	1
		%	0.0%	0.0%	6.7%	2.7%
	No	Count	0	0	3	3
		%	0.0%	0.0%	20.0%	8.1%
	N/A	Count	12	10	11	33
		%	100.0%	100.0%	73.3%	89.2%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Determination of price in contract	Informal	Count	0	0	1	1
		%	0.0%	0.0%	6.7%	2.7%
	N/A	Count	12	10	14	36
		%	100.0%	100.0%	93.3%	97.3%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

Appendix 9: Competition in the Retailers/Marketers business by regions

Variable	Category	Region				
			Coastal	Dar	Geita	Total
Main competitors	Traders	Count	10	6	15	31
		%	83.3%	60.0%	100.0%	83.8%
	Wholesalers	Count	2	2	0	4
		%	16.7%	20.0%	0.0%	10.8%
	No one	Count	0	2	0	2
		%	0.0%	20.0%	0.0%	5.4%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Serious competitors Total	Traders	Count	6	0	5	11
		%	50.0%	0.0%	33.3%	29.7%
	Wholesalers	Count	0	2	1	3
		%	0.0%	20.0%	6.7%	8.1%
	No one	Count	6	8	9	23
		%	50.0%	80.0%	60.0%	62.2%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Minor competitors Total	Wholesaler	Count	0	2	0	2
		%	0.0%	20.0%	0.0%	5.4%
	No one	Count	12	8	15	35
		%	100.0%	80.0%	100.0%	94.6%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
None competitors	Supermarkets	Count	2	2	0	4
		%	16.7%	20.0%	0.0%	10.8%
	Wholesaler	Count	2	1	0	3
		%	16.7%	10.0%	0.0%	8.1%
	No one	Count	8	7	15	30
		%	66.7%	70.0%	100.0%	81.1%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

Appendix 10: Time for Retailers/marketers making highest sales in the day by Regions

Variable	Category		Region			
			Coast	Dar	Geita	Total
Morning	Yes	Count	5	8	11	24
		%	41.7%	80.0%	73.3%	64.9%
	No	Count	7	2	4	13
		%	58.3%	20.0%	26.7%	35.1%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Mid-morning	Yes	Count	1	6	2	9
		%	8.3%	60.0%	13.3%	24.3%
	No	Count	11	4	13	28
		%	91.7%	40.0%	86.7%	75.7%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Afternoon	Yes	Count	0	1	2	3
		%	0.0%	10.0%	13.3%	8.1%
	No	Count	12	9	13	34
		%	100.0%	90.0%	86.7%	91.9%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Late afternoon	Yes	Count	0	1	0	1
		%	0.0%	10.0%	0.0%	2.7%
	No	Count	12	9	15	36
		%	100.0%	90.0%	100.0%	97.3%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Evening	Yes	Count	1	4	1	6
		%	8.3%	40.0%	6.7%	16.2%
	No	Count	11	6	14	31
		%	91.7%	60.0%	93.3%	83.8%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Night	Yes	Count	0	3	0	3
		%	0.0%	30.0%	0.0%	8.1%
	No	Count	12	7	15	34
		%	100.0%	70.0%	100.0%	91.9%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Late night	Yes	Count	4	5	0	9
		%	33.3%	50.0%	0.0%	24.3%
	No	Count	8	5	15	28
		%	66.7%	50.0%	100.0%	75.7%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

Appendix 11: The day with Retailers/marketers' highest sales in the week by Regions

Variable	Category		Region			Total
			Coast	Dar	Geita	
Monday	Yes	Count	4	1	11	16
		%	33.3%	10.0%	73.3%	43.2%
	No	Count	8	9	4	21
		%	66.7%	90.0%	26.7%	56.8%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Tuesday	Yes	Count	2	3	9	14
		%	16.7%	30.0%	60.0%	37.8%
	No	Count	10	7	6	23
		%	83.3%	70.0%	40.0%	62.2%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Wednesday	Yes	Count	0	1	7	8
		%	0.0%	10.0%	46.7%	21.6%
	No	Count	12	9	8	29
		%	100.0%	90.0%	53.3%	78.4%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Thursday	Yes	Count	2	4	4	10
		%	16.7%	40.0%	26.7%	27.0%
	No	Count	10	6	11	27
		%	83.3%	60.0%	73.3%	73.0%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Friday	Yes	Count	5	2	7	14
		%	41.7%	20.0%	46.7%	37.8%
	No	Count	7	8	8	23
		%	58.3%	80.0%	53.3%	62.2%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Saturday	Yes	Count	10	5	6	21
		%	83.3%	50.0%	40.0%	56.8%
	No	Count	2	5	9	16
		%	16.7%	50.0%	60.0%	43.2%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Sunday	Yes	Count	6	7	6	19
		%	50.0%	70.0%	40.0%	51.4%
	No	Count	6	3	9	18
		%	50.0%	30.0%	60.0%	48.6%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

Appendix 12: Months with highest sales by Regions

Variable	Category	Region				Total
			Coastal	Dar	Geita	
Jan-February	Yes	Count	4	6	5	15
		%	33.3%	60.0%	33.3%	40.5%
	No	Count	8	4	10	22
		%	66.7%	40.0%	66.7%	59.5%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
March-Aprl	Yes	Count	4	2	5	11
		%	33.3%	20.0%	33.3%	29.7%
	No	Count	8	8	10	26
		%	66.7%	80.0%	66.7%	70.3%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
May	Yes	Count	4	0	8	12
		%	33.3%	0.0%	53.3%	32.4%
	No	Count	8	10	7	25
		%	66.7%	100.0%	46.7%	67.6%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
June-July	Yes	Count	4	4	9	17
		%	33.3%	40.0%	60.0%	45.9%
	No	Count	8	6	6	20
		%	66.7%	60.0%	40.0%	54.1%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
August	Yes	Count	6	4	9	19
		%	50.0%	40.0%	60.0%	51.4%
	No	Count	6	6	6	18
		%	50.0%	60.0%	40.0%	48.6%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Sept-October	Yes	Count	8	7	9	24
		%	66.7%	70.0%	60.0%	64.9%
	No	Count	4	3	6	13
		%	33.3%	30.0%	40.0%	35.1%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Nove-December	Yes	Count	10	9	8	27
		%	83.3%	90.0%	53.3%	73.0%
	No	Count	2	1	7	10
		%	16.7%	10.0%	46.7%	27.0%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

Appendix 13: Price determination by Retailers (marketers) by Regions

Variable	Category		Region			Total
			Coastal	Dar	Geita	
Market price	Yes	Count	7	10	13	30
		%	58.3%	100.0%	86.7%	81.1%
	No	Count	5	0	2	7
		%	41.7%	0.0%	13.3%	18.9%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Cost Plus	Yes	Count	4	4	11	19
		%	33.3%	40.0%	73.3%	51.4%
	No	Count	8	6	4	18
		%	66.7%	60.0%	26.7%	48.6%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Target return	Yes	Count	1	2	2	5
		%	8.3%	20.0%	13.3%	13.5%
	No	Count	11	8	13	32
		%	91.7%	80.0%	86.7%	86.5%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Profit maximizing	No	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Break even analysis	No	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Flexible/seasonal	No	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

Appendix 14: Suppliers of Nile tilapia and catfish by Regions

Type of fish	variable		Region			Total
			Coastal	Dar	Geita	
Nile tilapia	Fish farmers	count	2	0	5	7
		%	16.7%	0.0%	33.3%	18.9%
	Traders	count	4	5	2	11
		%	33.3%	50.0%	13.3%	29.7%
	Fisherman	count	6	5	8	19
		%	50.0%	50.0%	53.3%	51.4%
	Total	count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Catfish	Fish farmers	count	4	0	6	10
		%	33.3%	0.0%	40.0%	27.0%
	Traders	count	3	6	0	9
		%	25.0%	60.0%	0.0%	24.3%
	Fisherman	count	5	4	9	18
		%	41.7%	40.0%	60.0%	48.6%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

Appendix 15: The existing opportunities to Retailers/marketers for the business by Regions

Variable	Category		Region			Total
			Coast	Dar	Geita	
Tender in hotels	Yes	Count	5	4	3	12
		%	41.7%	40.0%	20.0%	32.4%
	No	Count	7	6	12	25
		%	58.3%	60.0%	80.0%	67.6%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Export market	Yes	Count	5	0	1	6
		%	41.7%	0.0%	6.7%	16.2%
	No	Count	7	10	14	31
		%	58.3%	100.0%	93.3%	83.8%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
New Traders	Yes	Count	0	2	1	3
		%	0.0%	20.0%	6.7%	8.1%
	No	Count	12	8	14	34
		%	100.0%	80.0%	93.3%	91.9%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Increasing capital	Yes	Count	7	5	2	14
		%	58.3%	50.0%	13.3%	37.8%
	No	Count	5	5	13	23
		%	41.7%	50.0%	86.7%	62.2%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Market improvement	Yes	Count	10	10	4	24
		%	83.3%	100.0%	26.7%	64.9%
	No	Count	2	0	11	13
		%	16.7%	0.0%	73.3%	35.1%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

Appendix 16i): Business challenges to Retailers/marketers by Regions

Variable		Region			Total
		Coast	Dar	Geita	
Transport	count	0	0	3	3
	%	0.0%	0.0%	20.0%	8.1%
Low capital	count	6	2	2	10
	%	50.0%	20.0%	13.3%	27.0%
Police(Law and regulations)	count	2	0	1	3
	%	16.7%	0.0%	6.7%	8.1%
No appropriate infrastructure	count	3	8	4	15
	%	25.0%	80.0%	26.7%	40.5%
Lack of fish from fishers	count	1	0	4	5
	%	8.3%	0.0%	26.7%	13.5%
Education on fish farming	count	0	0	1	1
	%	0.0%	0.0%	6.7%	2.7%
Total	count	12	10	15	37
	%	100.0%	100.0%	100.0%	100.0%

Appendix ii) Retailers/Marketers copying strategies for threats by Regions

Variable		Region			Total
		Coast	Dar	Geita	
Paying penalties	Count	2	0	2	4
	%	16.7%	0.0%	13.3%	10.8%
Motorcycle	Count	0	0	1	1
	%	0.0%	0.0%	6.7%	2.7%
Borrowing from the neighbour	Count	4	2	2	8
	%	33.3%	20.0%	13.3%	21.6%
Buying other fish	Count	0	0	4	4
	%	0.0%	0.0%	26.7%	10.8%
None	Count	6	8	6	20
	%	50.0%	80.0%	40.0%	54.1%
Total	Count	12	10	15	37
	%	100.0%	100.0%	100.0%	100.0%

Appendix 17: Changes noted by Retailers/marketers within last five years in the business by Regions

Variable	Category		Region			Total
			Coast	Dar	Geita	
Income increase	Yes	Count	4	8	9	21
		%	33.3%	80.0%	60.0%	56.8%
	No	Count	8	2	6	16
		%	66.7%	20.0%	40.0%	43.2%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Age dynamic	Yes	Count	1	8	9	18
		%	8.3%	80.0%	60.0%	48.6%
	No	Count	11	2	6	19
		%	91.7%	20.0%	40.0%	51.4%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Gender dynamic	Yes	Count	1	2	8	11
		%	8.3%	20.0%	53.3%	29.7%
	No	Count	11	8	7	26
		%	91.7%	80.0%	46.7%	70.3%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Institution change	Yes	Count	2	0	0	2
		%	16.7%	0.0%	0.0%	5.4%
	No	Count	10	10	15	35
		%	83.3%	100.0%	100.0%	94.6%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Crime noted	Yes	Count	0	1	1	2
		%	0.0%	10.0%	6.7%	5.4%
	No	Count	12	9	14	35
		%	100.0%	90.0%	93.3%	94.6%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

Appendix 18: Retailers/Marketers important of marketing mix in business by regions

Variable	Category		Region			Total
			Coastal	Dar	Geita	
Place	Slightly important	Count	5	4	9	18
		%	41.7%	40.0%	60.0%	48.6%
	Moderately Important	Count	7	6	6	19
		%	58.3%	60.0%	40.0%	51.4%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Price	Neutral	Count	0	0	1	1
		%	0.0%	0.0%	6.7%	2.7%
	Moderately Important	Count	5	6	8	19
		%	41.7%	60.0%	53.3%	51.4%
	Very important	Count	7	4	6	17
		%	58.3%	40.0%	40.0%	45.9%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Product	Moderately Important	Count	6	6	9	21
		%	50.0%	60.0%	60.0%	56.8%
	Very important	Count	6	4	6	16
		%	50.0%	40.0%	40.0%	43.2%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Promotion	Neutral	Count	0	0	1	1
		%	0.0%	0.0%	6.7%	2.7%
	Moderately Important	Count	6	9	4	19
		%	50.0%	90.0%	26.7%	51.4%
	Very important	Count	6	1	10	17
		%	50.0%	10.0%	66.7%	45.9%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Sourcing	Slightly important	Count	0	0	2	2
		%	0.0%	0.0%	13.3%	5.4%
	Moderately Important	Count	8	9	5	22
		%	66.7%	90.0%	33.3%	59.5%
	Very important	Count	4	1	8	13
		%	33.3%	10.0%	53.3%	35.1%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

Appendix 19:Retaiers/Marketers' performance of marketing mix in business by Regions

Variable	Category		Region			Total
			Coastal	Dar	Geita	
Place	Very poor	Count	0	0	1	1
		%	0.0%	0.0%	6.7%	2.7%
	Poor	Count	0	0	2	2
		%	0.0%	0.0%	13.3%	5.4%
	Good	Count	3	0	1	4
		%	25.0%	0.0%	6.7%	10.8%
	Very good	Count	9	7	8	24
		%	75.0%	70.0%	53.3%	64.9%
	Excellent	Count	0	3	3	6
		%	0.0%	30.0%	20.0%	16.2%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Price	Poor	Count	1	0	1	2
		%	8.3%	0.0%	6.7%	5.4%
	Good	Count	0	3	1	4
		%	0.0%	30.0%	6.7%	10.8%
	Very good	Count	11	6	9	26
		%	91.7%	60.0%	60.0%	70.3%
	Excellent	Count	0	1	4	5
		%	0.0%	10.0%	26.7%	13.5%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Product	Very poor	Count	0	0	1	1
		%	0.0%	0.0%	6.7%	2.7%
	Poor	Count	1	0	0	1
		%	8.3%	0.0%	0.0%	2.7%
	Good	Count	4	0	1	5
		%	33.3%	0.0%	6.7%	13.5%
	Very good	Count	7	8	11	26
		%	58.3%	80.0%	73.3%	70.3%
	Excellent	Count	0	2	2	4
		%	0.0%	20.0%	13.3%	10.8%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Promotion	Very poor	Count	0	0	2	2
		%	0.0%	0.0%	13.3%	5.4%

	Poor	Count	1	1	2	4
		%	8.3%	10.0%	13.3%	10.8%
	Good	Count	4	0	4	8
		%	33.3%	0.0%	26.7%	21.6%
	Very good	Count	7	8	6	21
		%	58.3%	80.0%	40.0%	56.8%
	Excellent	Count	0	1	1	2
		%	0.0%	10.0%	6.7%	5.4%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%
Procurement	Very poor	Count	0	0	1	1
		%	0.0%	0.0%	6.7%	2.7%
	Poor	Count	1	1	1	3
		%	8.3%	10.0%	6.7%	8.1%
	Good	Count	0	2	4	6
		%	0.0%	20.0%	26.7%	16.2%
	Very good	Count	7	6	9	22
		%	58.3%	60.0%	60.0%	59.5%
	Excellent	Count	4	1	0	5
		%	33.3%	10.0%	0.0%	13.5%
	Total	Count	12	10	15	37
		%	100.0%	100.0%	100.0%	100.0%

Appendix 20: Education level and marital status of restaurants /vendors by Regions

Characteristics	Category		Region				Total N=41
			Geita (n=14)	Mwanza (n=7)	Coast (n=10)	Dar (n=10)	
Education level	Primary	Count	5	2	4	3	14
		%	35.7%	28.6%	40.0%	30.0%	34.1%
	Secondary	Count	6	5	5	4	20
		%	42.9%	71.4%	50.0%	40.0%	48.8%
	Adult education	Count	2	0	1	3	6
		%	14.3%	0.0%	10.0%	30.0%	14.6%
	Graduate	Count	1	0	0	0	1
		%	7.1%	0.0%	0.0%	0.0%	2.4%
	Total	Count	14	7	10	10	41
		%	100.0%	100.0%	100.0%	100.0%	100.0%
Marital status	Single	Count	2	2	4	3	11
		%	14.3%	28.6%	40.0%	30.0%	26.8%
	Married	Count	12	5	5	7	29
		%	85.7%	71.4%	50.0%	70.0%	70.7%
	Divorced	Count	0	0	1	0	1
		%	0.0%	0.0%	10.0%	0.0%	2.4%
	Total	Count	14	7	10	10	41
		%	100.0%	100.0%	100.0%	100.0%	100.0%

Appendix 21: Restaurants/ vendors time with high fish sales by Regions

Variable	Category	Region				Total N=41
		Geita (n=14)	Mwanza (n=7)	Coast (n=10)	Dar (n=10)	
High sales hours	Mornings	28.6%	42.9%	20.0%	0.0%	22.0%
	Mid-morning	21.4%	14.3%	50.0%	60.0%	36.6%
	Afternoons	57.1%	57.1%	50.0%	20.0%	46.3%
	Late Afternoon	7.1%	14.3%	10.0%	40.0%	17.1%
	Evening	35.7%	100.0%	40.0%	70.0%	56.1%
	Night	35.7%	42.9%	20.0%	60.0%	39.0%
High Sales days	Monday	50.0%	57.1%	70.0%	10.0%	46.3%
	Tuesday	50.0%	57.1%	50.0%	10.0%	41.5%
	Wednesday	57.1%	42.9%	40.0%	20.0%	41.5%
	Thursday	50.0%	42.9%	60.0%	20.0%	43.9%
	Friday	57.1%	71.4%	70.0%	100.0%	73.2%
	Saturday	64.3%	85.7%	70.0%	90.0%	75.6%
	Sunday	50.0%	57.1%	40.0%	80.0%	56.1%
High Sales in Month	Early	57.1%	42.9%	40.0%	60.0%	51.2%
	Mid-Month	0.0%	0.0%	30.0%	0.0%	7.3%
	Month end	78.6%	100.0%	60.0%	100.0%	82.9%
Months With High sales	Jan-Feb	28.6%	42.9%	20.0%	30.0%	29.3%
	March-Apr	14.3%	42.9%	10.0%	10.0%	17.1%
	May	7.1%	28.6%	0.0%	0.0%	7.3%
	June -July	57.1%	42.9%	50.0%	10.0%	41.5%
	August	57.1%	42.9%	40.0%	30.0%	43.9%
	Sept-Oct	28.6%	85.7%	60.0%	80.0%	58.5%
	Nov-Dec	28.6%	85.7%	70.0%	80.0%	61.0%

Appendix 22: Fish farmers' questionnaire

Region_____District_____ Date_____

Hello, my name is_____.I am undertaking a study of activities that characterized the movement of tilapia from the farm to consumers. You have been identified as playing a major role at stage in the movement of tilapia products to consumers. You have participate in the study if you are 18 years old and above and participation is voluntary. We will appreciate you taking some time to respond to some questions that will help to improve the efficiency of movement of tilapia products through the various channels.

You do not have to give us the name as your responses to the questionnaire are treated as confidential. Information and data obtained from all respondents will be combined for analyses. Combining the data will ensure the confidentiality of your individual responses.

Thank you.

Enumerator_____

A. BUSINESS INFORMATION

1. What is your role in the business

Director	Caretaker	Farm manager	Other(specify)

2. Who owns the fish farm?

Yourself only		A formal group(cluster or cooperative)	
Your household		An informal group(e.g friends or family member	
Other(specify)			

3. How many ponds do you have?_____
4. What is the total area of your ponds(m^2)_____
5. What is average pond size?_____
6. How many cages do you have?_____
7. What is the average cage size(m^3)_____
8. What fish species do you stock? (check all that apply)

Tilapia		Mixed	
Catfish		Other:	

9. How much fish do you harvest in a year(kg or other)
   Tilapia_____Catfish_____Other_____
10. How many years have you been practicing fish production?_____
11. What is the total revenue from sales for the farm per year? _____

12. What are your main costs of doing business?

Item	Cost(Specify units e.g TZS/kg)
Fingerlings	
Feed	
Labour(hired)	
Labour(own and family)	
Electricity	
Taxes	
Licensing costs(including environmental assessment, diving etc)	
Rentals	
Transport	
Other(specify)	
Total	

B. PAYMENTS AND CONTRACTS

13. What is the Nature of payment transaction with your suppliers?

Cash and carry		1-7 days credit		8-14 days credit	
14-30 days credit		Over 30days		In-kind payment	
Other(specify)					

14. Do you have contracts with suppliers? Yes _____No_____

    i. If yes, what type of contracts are they? Formal(written)____Informal(verbal)
    Other(specify)_____

    ii. How often are contracts reviewed_____

C. ACCESS TO RESOURCES

15. What assets are owned by the economic unit?

Land (hectares=)	
Permanent Buildings	
Mechanized Farm equipment	
Vehicles	
Livestock/farm Animals	
Other (specify)	

16. What is the source of the following inputs? (check all that apply)

	Own	Government	Other Aquaculturist	Other (specify)
Fingerlings				
Organic fertilizer				
Feed				
Associeted animals				
Labour for operations				

D. WATER

17. What is the source of water for the pond(s)? (Check all that apply)

Spring	Seepage from water table	River	Reservoir/Dam	Other

18. What arrangements have you made to ensure that water is available to your ponds?

Have exclusive control over the water supply	
Obtained rights through customary law	
Obtained rights from individual or corporate owner	
Obtained rights from Government	
Other (specify)	

19. If you have an arrangement for water supply, what is the duration of the agreement ensuring availability of water?_____

E. LAND

20. What is the ownership arrangement for the land presently occupied by the pond?

Tittle deed	
Customary law	
Leased from individual or company	
Squatting	
Other (specify)	

21. If rights are by LEASE, What is the duration of the lease?_____

FINANCES

22. Where did you get the resource to start this farm? (Check all that apply)

Own sources only (savings, current income, labour)	
Borrowed resources from friends	
Borrowed resources from local money lenders	
Borrowed resources from credit institutions	
Borrowed resources from (specify)	
Sponsored by friends	
Sponsored by Government	
Sponsored by non-Government organizations	
Sponsored by (specify)	

23. If BORROWED RESOURCES, What form did the borrowed resources have? (Check all that apply)

	Yes/No	How much
Loan/cash in advance of expenditure (TZS)		
Payment of certified invoices		
In-kind resources (equipment, inputs)		
Labor (man days)		
Other (specify)		

24. Did you use the entire loan for the fish farm? Yes_____No_____
25. What is the nature of the payment of this credit/loan?

Cash	
Fish	
Return of borrowed equipment	
In-kind resources(other than fish)	
Labour	
Other (specify)	

F. KNOWLEDGE AND INFORMATION

26. How did you obtain the knowledge needed to start the farming? (Check all that apply)

Worked on the similar unit owned by an individual/group	
Work on the similar unit on a government fish farm	
Participating the fish culture training course	
Observing a private fish culturist	
Read appropriate documents	
Visited, observed and/or discussed at a government fish farm	
Other (specify)	

G. ASSISTANCE

27. Have ever requested assistance for your fish farm? Yes_____ No_____

If Yes What kind of assistance was requested? (check all that apply)

Opinion on whether or not to start	
Evaluation of location/site/water	
Choice of fish species	
Choice of fish cultured method	
Funds of finance construction (specify)	
Credit	
Partnership	
Gift	
Borrow equipment	
Supply of operating inputs	
Labour	
Diagnosis of problem	
Demonstration of solution	
Marketing information/access	
Access to inputs for operating culture unit	
Access to means of acquiring techinichal know-how	
Other(specify)	

28. Who provided this assistance?

	Own	Government	Other aquaculturist	Other (Specify)
Fingerling/Fry				
Organic Fertilizer				
Feed				
Associated animals				
Labor for constraction				
Labour for operations				
Labour for harvesting				

H. PROBLEMS AND CHALLENGES

29. What are the main challenges you faced? (check all that apply)

Shortage of water for ponds	
Shortage of fingerling/fry to stock ponds	
Shortage of fertilizer for ponds	
Shortage of feed for ponds	
Fish culture inputs too costly/not available locally	
Not possible to trade fish at profitable price	
Other:_____ _____ _____	

I. SALES AND INCOME

30. On average, what is the distribution of fish from your farm? (Must add to 100%)
    a. House hold use _____
    b. Fish to sell_____
    c. Recreational purpose_____
    d. Other:_____
    Total: _____
31. How do you market your fish?(Check all that apply)
    Farm gate: _____ Distribution point: ____Customer delivery:___ _____
    Other, specify _____
32. What proportion of the fish sold was through these marketing chains? (Must add to 100%)
    a. Farm gate:_____
    b. Distribution point:_____
    c. Customer delivery_____
    d. Other:_____
    Total:_____
33. What is the sales price per Kg _____ or Per fish_____
34. What proportion of the fish sold was sold to the following (Must add to 100%)

Neighboring customers	Fish distribution	Restaurants	Fish traders	Other(specify)

35. What is the average size of tilapia required by your customers

Neighboring customers	Fish distributors	Restaurants	Fish traders	Other (specify)

36. For fish produced for sale, what did you receive as payment?

Cash	In-Kind Goods	In-kind services	Other(specify)

37. If fish were sold for cash, what method of price determination do you use?

Market price	
Cost plus(calculate the cost and increase price for the specific profit)	
Markup(Price based on cost increased from amount of the specific markup percentage	
Target return method(Calculate the required markup, in order to achieve return on investment)	
Profit maximizing (price where the marginal profit equals marginal cost)	
Break even analysis (the number of units sold that generates profit that can cover cost; the point does not have profit or loss)	
Flexible or seasonal (explain)	
Other (explain)	

38. Do you sell fish to traders who then resell the fish in the market? Yes____ No___
If No why do you not sell your fish to traders?

I do not want to	
I want to but don't know any such traders	
I want to but traders do not(will not) come to my ponds	
I want to but I would have to bring the fish to traders and I am unable to do so	
I want to but I don't have enough fish remain after my own use	
Other(specify):	

39. What proportion of your household cash income is derived from the sale of fish produced from your fish farm?

Less than a quarter	Between on half and one quarter	More than half	A specific quantity(specify	None

J. OUTLOOK

40. What types of modifications are you making/ planning to make to your fish farm?(check all that apply)

None	
Building more ponds	
Reducing use of ponds	
Not using the ponds for fish culture	
Changing the fish culture technology used	
Replacing the fish species being cultured	
Adding fish species (to make polyculture)	
Changing the way I dispose of fish produced	
Change the source of inputs I purchase, rent, or hire	
Other (Specify):	

K. DEMOGRAPHICS

41. Gender: Male: _____Female:_____

42. Age: Years

43. Marital status: Single: _____ Married: _____Divorced/Separated:_____

Widowed:_____

44. Highest educational attainment

Primary	Secondary	Adult education/technical diploma	Bachelor degree	Graduate degree	Other(Specify)

THANK YOU FOR YOUR TIME

Appendix 23: Wholesalers/Distributor/Processor questionnaire

Region_____District_____ Date_____

Hello, my name is_____.I am undertaking a study of activities that characterized the movement of tilapia from the farm to consumers. You have been identified as playing a major role at stage in the movement of tilapia products to consumers. You have participate in the study if you are 18 years old and above and participation is voluntary. We will appreciate you taking some time to respond to some questions that will help to improve the efficiency of movement of tilapia products through the various channels.

You do not have to give us the name as your responses to the questionnaire are treated as confidential. Information and data obtained from all respondents will be combined for analyses. Combining the data will ensure the confidentiality of your individual responses.

Thank you.

Enumerator_____

A. Business Information

1. List the products that you sell
   i. _____
   ii. _____
   iii. _____
   iv. _____

2. What year did you start your business?_____
3. How many employees does your business employ?
   Permanent _____Temporary_____ Paid _____Unpaid_____
4. What is the ownership structure of this business? Check all that apply

Independent store		Family business		Government	
Part of chain		Franchise		Group ownership	
Other(specify)					

5. What is your average monthly revenue?_____
6. What is the target market for your product? Check all that apply

Fish farmers		Other inputs suppliers		Government	
Traders		Other(specify)			

7. Where do you sell your products? Check all that apply

Store/supermarket		Delivery		Markets	
Online/exports		Other9specify			

8. Where do most of your products' customers come from? Please specify location e.g town or region.

Product	Customer source	% from the source

B. Price- determination and Margins

9. Who are your competitors in this market? Please rank (1=main competitor; 2= serious competitor; 3= minor competitor; 4=not competitor
   i. _____
   ii. _____
   iii. _____
   iv. _____
10. What has been the effect of competition on your sales? (Tick)
    Increase _____Decreased_____No change_____
    Explain: _____
11. What has been the effect of competition on your pricing? (Tick)
    Increasing_____Decreasing_____No change_____
12. What is the buying price of fish(Nile tilapia)_____per Kgor__ _ Per Fish
13. What method of pricing determination do you use?(Tick all apply)

Market price	
Cost plus(calculate the cost and increase price for the specific profit)	
Markup(Price based on cost increased from amount of the specific markup percentage	
Target return method(Calculate the required markup, in order to achieve return on investment)	
Profit maximizing (price where the marginal profit equals marginal cost)	
Break even analysis (the number of units sold that generates profit that can cover cost; the point does not have profit or loss)	
Flexible or seasonal (explain)	
Other (explain)	

14. What is the Nature of payment transaction with your customer?

Cash and carry		1-7 days credit		8-14 days credit	
14-30 days credit		Over 30days		In-kind payment	
Other(specify)					

15. What is the sales price (Nile tilapia)_____ per Kg or_____ Per fish
16. What pricing arrangements do you make with your customers? (tick)

predetermined		Current market price		Action	
Other(specify)					

17. Do you have contract with customers? Yes_____No_____
    i. If Yes, what type of contracts are they? Formal(written)_____
    Informal(Verbal)_____
    Other(Specify)_____
    ii. How often are contracts reviewed?_____

C. Problems, risks and coping

18. What sale problem do you face? (eg. Delivery, cooling, pricing)

_____

_____

19. How do you resolve these problems?

_____

_____

What proportional of business/sales goes to the fish farming sector?___%

20. Where do you obtain your product?

Product	source		Why buy from these sources? (e.g. quality, delivered to market)
	Supplier e.g. fish farmer, other traders	Location e.g. town or region	

21. What is the nature of payment transaction with suppliers?

Cash and carry		1-7 days credit		8-14 days credit	
14-30 days credit		Over 30days		In-kind payment	
Other(specify)					

22. Do you have contract with suppliers? Yes_____ No_____
    i. If yes, what type of contracts are they? Formal(written)___Informal(Verbal)_____
    Other (Specify)_____
    ii. How often are contracts reviewed?_____

23. What procurement problem do you face? (e.g. Transportation, cooling, pricing)

_____

_____

24. How do you resolve them?

_____

_____

_____

25. What are your main costs of doing business?

Item	Cost(specify units eg TZS/Kg	Percentage of total of cost
Stock		
Transport		
Rental		
Packaging		
Electricity		
Staff/labour(including own, hired and familywages		
Feed		
Taxes		
Other(specify)		
Total		

26. What kinds of assistance do you receive for your business and its source

	Suppliers	Government	NGOs	Banks	Others(specify)
Short term financing					
Long term loans					
Information					
Labour					
Other(specify)					

27. What changes have you noticed in your business in the last 5 years? E.g. in terms of income, demographics, crime, etc

Income	
Demographics -Age dynamics -Gender	
Institutional changes(e.g. Government initiatives)	
Crime	
Other(specify)	

28. What is your outlook for your business in the next 5 years?

_____

_____

_____

29. Rate your performance for the following marketing mix elements from 1-5(1=Poor and 5 Excellent)

strategic	1 (Poor)	2	3	4	5 (Excellent)
Place(e.g. location in market, distance to source					
Price(e.g. market determine price, price instability, season price)					
Product (e.g. highly perishable, homogenous, good quality)					
Promotion (e.g. inter-personal skills, display array					
Procurement(e.g. transportation, cooling, bad road systems, delivery					

30. How important are the following marketing mix elements to your business? (1= not important and 5= very important)

Strategic issues	1 Not important	2	3	4	5 Very important
Place					
Price					
Product					
Promotion					
Source					

D. <u>Demographics</u>

31. Gender: Male: _____Female:_____

32. Age: Years_____

33. Marital status: Single: _____Married:_____Divorced/Separated: _____ Widowed:_____

34. Highest educational attainment

Primary	Secondary	Adult education/technical diploma	Bachelor degree	Graduate degree	Other(Specify)

THANK YOU FOR YOUR TIME

Appendix 24: Input suppliers Questionnaire

Region_____District_____ Date_____

Hello, my name is_____.I am undertaking a study of activities that characterized the movement of tilapia from the farm to consumers. You have been identified as playing a major role at stage in the movement of tilapia products to consumers. You have participate in the study if you are 18 years old and above and participation is voluntary. We will appreciate you taking some time to respond to some questions that will help to improve the efficiency of movement of tilapia products through the various channels.

You do not have to give us the name as your responses to the questionnaire are treated as confidential. Information and data obtained from all respondents will be combined for analyses. Combining the data will ensure the confidentiality of your individual responses.

Thank you.

Enumerator_____

A. <u>Business information</u>

1. What fish inputs do you supply? (Check all that apply)

Labour		Capital-long term loan(e.g. investment financing longer than 60days)	
Feed		Credit-short term finances(less than 60days)	
Fingerlings		Marketing information	
Production information		Other(specify)	
Training			

2. What year did you start your business?_____
3. How many employees does your business employ?
   Permanent_____Temporary_____ Paid _____ Unpaid _____
4. What is the ownership structure of this business? Check all that apply

Independent store		Family business		Government	
Part of chain		Franchise		Group ownership	
Other(specify)					

5. What is your average monthly revenue?_____
6. What is the target market for your product? Check all that apply

Fish farmers		Other inputs suppliers		Government	
Traders		Other(specify)			

7. Where do you sell your products? Check all that apply

Store/supermarket		Delivery		Markets	
Online/exports		Other9specify			

8. Where do most of your products' customers come from? Please specify location e.g town or region.

Product	Customer source	% from the source

B. <u>Price- determination and Margins</u>

9. Who are your competitors in this market? Please rank (1=main competitor; 2= serious competitor; 3= minor competitor; 4=not competitor

i. _____
ii. _____
iii. _____
iv. _____

10. What has been the effect of competition on your sales? (Tick)
    Increase _____Decreased_____No change_____
    Explain: _____
11. What has been the effect of competition on your pricing? (Tick)
    Increasing_____Decreasing_____No change_____
    Explain: _____

12. What method of pricing determination do you use?(Tick all apply)

Market price	
Cost plus(calculate the cost and increase price for the specific profit)	
Markup(Price based on cost increased from amount of the specific markup percentage	
Target return method(Calculate the required markup, in order to achieve return on investment)	
Profit maximizing (price where the marginal profit equals marginal cost)	
Break even analysis (the number of units sold that generates profit that can cover cost; the point does not have profit or loss)	
Flexible or seasonal (explain)	
Other (explain)	

13. What is the Nature of payment transaction with your customer?

Cash and carry		1-7 days credit		8-14 days credit	
14-30 days credit		Over 30days		In-kind payment	
Other(specify)					

14. What pricing arrangements do you make with your customers? (tick)

Predetermined		Current market price		Action	
Other(specify)					

15. Do you have contract with customers? Yes__No_____

i. If Yes, what type of contracts are they? Formal(written)_____
Informal(Verbal)_____
Other(Specify)_____

ii. How often are contracts reviewed? _____

C. <u>Problems, Risks and Coping</u>

16. What sale problem do you face? (eg. Delivery, cooling, pricing)

_____

_____

17. How do you resolve these problems?

_____

_____

_____

18. What proportional of business/sales goes to the fish farming sector?_____

_____%

19. Where do you obtain your product?

Product	source		Why buy from these sources? (e.g. quality, delivered to market)
	Supplier e.g. fish farmer, other traders	Location e.g. town or region	

20. What is the nature of payment transaction with suppliers?

Cash and carry		1-7 days credit		8-14 days credit	
14-30 days credit		Over 30days		In-kind payment	
Other(specify)					

21. Do you have contract with customers? Yes__ No_____
    i. If yes, what type of contracts are they? Formal(written) ——— Informal(Verbal)_____
    Other (Specify)_____
    ii. How often are contracts reviewed?_____
22. What procurement problem do you face? (e.g. Transportation, cooling, pricing)

    _____

    _____
23. How do you resolve them?

    _____

    _____

    _____
24. What are your main costs of doing business?

Item	Cost(specify units eg TZS/Kg	Percentage of total of cost
Stock		
Transport		
Rental		
Packaging		
Electricity		
Staff/labour(including own, hired and familywages		
Feed		
Taxes		
Other(specify)		
Total		

25. What kinds of assistance do you receive for your business

	Suppliers	Government	NGOs	Banks	Others(specify)
Short term financing					
Long term loans					
Information					
Labour					
Other(specify)					

26. What changes have you noticed in your business in the last 5 years? E.g. in terms of income, demographics, crime, etc

Income	
Demographics -Age dynamics -Gender	
Institutional changes(e.g. Government initiatives)	
Crime	
Other(specify)	

27. What is your outlook for your business in the next 5 years?

_____

_____

_____

28. Rate your performance for the following marketing mix elements from 1-5(1=Poor and 5 Excellent)

strategic	1 (Poor)	2	3	4	5 (Excellent)
Place(e.g. location in market, distance to source					
Price(e.g. market determine price, price instability, season price)					
Product (e.g. highly perishable, homogenous, good quality)					
Promotion (e.g. inter-personal skills, display array					
Procurement(e.g. transportation, cooling, bad road systems, delivery					

29. How important are the following marketing mix elements to your business? (1= not important and 5= very important)

Strategic issues	1 Not important	2	3	4	5 Very important
Place					
Price					
Product					
Promotion					
Source					

D. <u>Demographics</u>

30. Gender: Male: _____Female:_____

31. Age (years) 18-30___ 31-40 _ 41-50 _____ older than 50 _____

32. Marital status: Single: _____Married:_____Divorced/Separated: _____ Widowed:_____

33. Highest educational attainment

Primary	Secondary	Adult education/technical diploma	Bachelor degree	Graduate degree	Other(Specify)

THANK YOU FOR YOUR TIME

Appendix 25: Retailers / Marketers/ Questionnaire

Region_____District_____ Date_____

Hello, my name is_____.I am undertaking a study of activities that characterized the movement of tilapia from the farm to consumers. You have been identified as playing a major role at stage in the movement of tilapia products to consumers. You have participate in the study if you are 18 years old and above and participation is voluntary. We will appreciate you taking some time to respond to some questions that will help to improve the efficiency of movement of tilapia products through the various channels.

You do not have to give us the name as your responses to the questionnaire are treated as confidential. Information and data obtained from all respondents will be combined for analyses. Combining the data will ensure the confidentiality of your individual responses.

Thank you.

Enumerator_____

A. <u>Business Information</u>

1. What is your role in the business

Director	Caretaker	Farm manager	Other(specify)

2. What is your Main business function?

Wholesaler	Retailer	processor	Other(Specify)

3. What are value additional activities do you perform? (check all that apply)
   Cleaning_____, dressing_____, smoking_____, frying_____, drying_____,
   Filleting_____, cutting_____, packing_____, others (specify)_____.
4. What type of fish do you sell?

Farmed fish	wild caught fish	Both,	other(specify)

5. What year did you start your business?_____
6. Average weekly revenue_____
7. What is the business establishment type?

Store	Stall	Table	other(specify)

8. What is the ownership structure of the business?

Independent store/stall		Family business		Group	
Part of chain		Franchise		Other(specify)	

9. What is target market for your product?

Consumer		Traders		Processors	
Others(specify)					

10. What makes/ reasons for customer to buy from your business?(Tick all that apply)

Quality,		Low price		Convenient bulk sales	
Habit		One stop shop		Other(specify)	

11. What pricing arrangements do you make with your customers? (tick)

Current market price		Contractual		Auction	
Other(specify)					

12. Do you have contract with customers? Yes_____ No_____
    i. If Yes, what type of contracts are they? Formal(written)_____
    Informal(Verbal)_____
    Other (Specify)_____

    ii. How often are contract reviewed? (Tick)

Monthly		Quarterly		Semi-annually	
Annually		Irregularly			

    iii. Is price set in the contract? Yes _____No____
    iv. How do you determine price in the contract? Formal___, Informal____ other (specify)_____

13. What is your Nile tilapia sales price _____ Per Kg or _____ per fish?
14. Who are your competitors in this market? Please rank (1=main competitor; 2= serious competitor; 3= minor competitor; 4=not competitor)
    i. _____
    ii. _____
    iii. _____
    iv. _____
15. What has been the effect of competition on your sales? (Tick)
    Increase _____ Decreased_____ No change_____
    Explain: _____
16. i. The time of the day at which there is highest fish sales (tick)

Morning		Mid- morning		Afternoon		Late night	
Late afternoon		Evening		Night			

ii. When do you make highest sales in the week? (Tick all apply)

Monday		Tuesday		Wednesday		Sunday	
Thursday		Friday		Saturday			

iii. When do you make highest sales within monthly?

Early		Mid-month		End of month	

iv. When do you make high sales within the year? (Tick all apply)

Jan-February		March-April		May		June –July	
August		September-October		November-December			

17. How many days do you operate per week_____
18. What is the effect of competition in pricing? Increase_____, Decrease____, No change
    Explain_____
19. What method of pricing determination do you use?(Tick all apply)

Market price	
Cost plus(calculate the cost and increase price for the specific profit)	
Markup(Price based on cost increased from amount of the specific markup percentage	
Target return method(Calculate the required markup, in order to achieve return on investment)	
Profit maximizing (price where the marginal profit equals marginal cost)	
Break even analysis (the number of units sold that generates profit that can cover cost; the point does not have profit or loss)	
Flexible or seasonal (explain)	
Other (explain)	

20. What percentage proportion contribution of fish sales in the business?____ _____%
21. Where do you obtain your products?

Product	source		Why buy from these sources? (e.g. quality, delivered to market)
	Supplier e.g. fish farmer, other traders	Location e.g. town or region	

22. What is the nature of payment transaction with suppliers? (Tick)

Cash on delivery		Daily		Up to 10days	
Tender		Other(specify)	In-kind payment		

23. What pricing arrangements do you make with your supplier? (Tick)

Market price		Contractual delivery		Auction delivery	
Other(specify)					

24. Do you have contract with suppliers? Yes_____ No_____

i. If yes, what type of contracts are they? Formal(written)_____ Informal(Verbal)_____ Both_____

Other (Specify)_____

ii. How often are contract reviewed? (Tick)

Monthly		Quarterly		Semi-annually	
Annually		Irregularly			

iii. Is price set in the contract? Yes _____No____

iv. How do you determine price in the contract? Formal___, Informal__

Other (specify)_____

25. What is the purchasing price of Nile tilapia? _____ Kg or _____ Fish

26. What are your main costs of doing business?

Item	Cost(specify units eg TZS/Kg	Percentage of total of cost
Stock		
Transport		
Rental		
Packaging		
Electricity		
Staff/labour (including own, hired and family wages		
Feed		
Taxes		
Other(specify)		
Total		

27. What technique do you use to getting people to buy from you? (Tick) Verbal_____ Visual_____ sales discount/Price reduction_____, other (specify)_____.

28. How many employees does your business employ?

Permanent _____ Temporary _____ Paid _____Unpaid_____

29. Do you have other source of income? Yes_____ No _____

Explain _____

30. Do you received any assistance in conduction the business? Yes___ No___
    If Yes what kinds of assistance do you receive for your business and its source?

	Suppliers	Government	NGOs	Banks	Others(specify)
Short term financing					
Long term loans					
Information					
Labour					
Other (specify)					

31. What assistance do you give to your supplier? (Tick all apply)

short term financing		Labour		Information	
Long term financing		None		Other(specify)	

32. What changes have you noticed in your business in the last 5 years? E.g. in terms of income, demographics, crime, etc

Income	
Demographics -Age dynamics -Gender	
Institutional changes(e.g. Government initiatives)	
Crime	
Other(specify)	

33. What is your outlook for your business in the next 5 years?

    _____

    _____

34. Rate your performance for the following marketing mix elements from 1-5(1=Poor and 5 Excellent)

strategic	1 (Poor)	2	3	4	5 (Excellent)
Place(e.g. location in market, distance to source					
Price(e.g. market determine price, price instability, season price)					
Product (e.g. highly perishable, homogenous, good quality)					
Promotion (e.g. inter-personal skills, display array					
Procurement(e.g. transportation, cooling, bad road systems, delivery					

35. How important are the following marketing mix elements to your business? (1= not important and 5= very important)

Strategic issues	1 Not important	2	3	4	5 Very important
Place					
Price					
Product					
Promotion					
Source					

36. What are the opportunities existing in the industry of the business?

_____

_____

_____

37. What are the problem/risks existing in your business and current coping strategy?

Problem/Risk	Coping strategy

B. Demographics

38. Gender: Male: _____ Female: _____

39. Age: Years_____

40. Marital status: Single: _____Married:_____ Divorced/Separated: _____ Widowed:_____

41. Highest educational attainment

Primary	Secondary	Adult education/technical diploma	Bachelor degree	Graduate degree	Other(Specify)

THANK YOU FOR YOUR TIME

Appendix 26: Restaurant/ chop bar/food vendor Questionnaire

Region_____District_____ Date_____

Hello, my name is_____.I am undertaking a study of activities that characterized the movement of tilapia from the farm to consumers. You have been identified as playing a major role at stage in the movement of tilapia products to consumers. You have participate in the study if you are 18 years old and above and participation is voluntary. We will appreciate you taking some time to respond to some questions that will help to improve the efficiency of movement of tilapia products through the various channels.

You do not have to give us the name as your responses to the questionnaire are treated as confidential. Information and data obtained from all respondents will be combined for analyses. Combining the data will ensure the confidentiality of your individual responses.

Thank you.

Enumerator_____

A. <u>Business information</u>

1. What is your role in the business

Director	Caretaker	Farm manager	Other(specify)

2. What are value additional activities do you perform? (check all that apply)
   Cleaning_____, dressing_____, smoking_____, frying_____, drying_____,
   Filleting_____, cutting_____, packing_____, others (specify)_____.
3. What type of fish do you sell?

Farmed fish	wild caught fish	Both,	other(specify)

4. What year did you start your business?_____
5. Average weekly revenue from fish?_____
6. What is the ownership structure of the business?

Independent store/stall		Family business		Group	
Part of chain		Franchise		Other(specify)	

7. What is your Nile tilapia sales price _____ Per Kg or _____ Per fish
8. What makes/ reasons for customer to buy from your business?(Tick all that apply)

Quality,		Low price		Convenience	
Habit		Other(specify)			

9. Who are your competitors in this market? Please rank (1=main competitor; 2= serious competitor; 3= minor competitor; 4=not competitor.
   i. _____
   ii. _____

iii. _____

iv. _____

10. How is your main competitor affecting your sales? (Tick)

Increase _____ Decreased_____ No change_____

Explain: _____

11. i. The time of the day at which there is highest fish sales (tick)

Morning		Mid- morning		Afternoon		Late night	
Late afternoon		Evening		Night			

ii. When do you make highest sales in the week? (Tick all apply)

Monday		Tuesday		Wednesday		Sunday	
Thursday		Friday		Saturday			

iii. When do you make highest sales within monthly?

Early		Mid-month		End of month	

iv. When do you make high sales within the year? (Tick all apply)

Jan-February		March-April		May		June –July	
August		September-October		November-December			

12. How many days do you operate per week_____

13. What is the effect of competition in pricing? Increase_____, Decrease____, No change

Explain_____

14. What method of pricing determination do you use?(Tick all apply)

Market price	
Cost plus(calculate the cost and increase price for the specific profit)	
Markup(Price based on cost increased from amount of the specific markup percentage	
Target return method(Calculate the required markup, in order to achieve return on investment)	
Profit maximizing (price where the marginal profit equals marginal cost)	
Break even analysis (the number of units sold that generates profit that can cover cost; the point does not have profit or loss)	
Flexible or seasonal (explain)	
Other (explain)	

15. What percentage proportion contribution of fish sales in the business?____

_____%

16. Where do you obtain your products?

Product	source		Why buy from these sources? (e.g. quality, delivered to market)
	Supplier e.g. fish farmer, other traders	Location e.g. town or region	

17. What is the nature of payment transaction with suppliers? (Tick)

Cash on delivery		Daily		Up to 10days	
Tender		Other(specify)	In-kind payment		

18. What pricing arrangements do you make with your supplier? (Tick)

Market price		Contractual delivery		Auction delivery	
Other(specify)					

19. Do you have contract with suppliers? Yes_____ No_____

iii. If yes, what type of contracts are they? Formal(written)_____ Informal(Verbal)_____ Both_____

Other (Specify)_____

iv. How often are contract reviewed? (Tick)

Monthly		Quarterly		Semi-annually	
Annually		Irregularly			

v. Is price set in the contract? Yes _____No____

vi. How do you determine price in the contract? Formal___, Informal__

Other (specify)_____

20. What is the purchasing price of Nile tilapia? _____ Kg or _____ Fish

21. What are your main costs of doing business?

Item	Cost(specify units eg TZS/Kg	Percentage of total of cost
Stock		
Transport		
Rental		
Packaging		
Electricity		
Staff/labour(including own, hired and familywages		
Taxes		
Other(specify)		
Total		

22. What technique do you use to getting people to buy from you? (Tick) Verbal_____ Visual_____ sales discount_____, other (specify)_____
23. How many employees does your business employ?
    Permanent _____ Temporary _____ Paid _____Unpaid_____

24. What assistance do you give to your supplier? (Tick all apply)

short term financing		Labour		Information	
Long term financing		None		Other(specify)	

25. What changes have you noticed in your business in the last 5 years? E.g. in terms of income, demographics, crime, etc

Income	
Demographics -Age dynamics -Gender	
Institutional changes(e.g. Government initiatives)	
Crime	
Other(specify)	

26. What is your outlook for your business in the next 5 years?

    _____
    _____
    _____
    _____

27. Rate your performance for the following marketing mix elements from 1-5(1=Poor and 5 Excellent)

strategic	1 (Poor)	2	3	4	5 (Excellent)
Place(e.g. location in market, distance to source					
Price(e.g. market determine price, price instability, season price)					
Product (e.g. highly perishable, homogenous, good quality)					
Promotion (e.g. inter-personal skills, display array					
Procurement(e.g. transportation, cooling, bad road systems, delivery					

28. How important are the following marketing mix elements to your business? (1= not important and 5= very important)

Strategic issues	1 Not important	2	3	4	5 Very important
Place					
Price					
Product					
Promotion					
Source					

29. What are the opportunities existing in the industry of the business?

_____

_____

28. What are the problem/risks existing in your business and current coping strategy?

Problem/Risk	Coping strategy

1. <u>Demographics</u>

29. Gender: Male: _____ Female: _____

30. Age: Years_____

31. Marital status: Single: _____Married:_____ Divorced/Separated: _____ Widowed:_____

32. Highest educational attainment

Primary	Secondary	Adult education/technical diploma	Bachelor degree	Graduate degree	Other(Specify)

THANK YOU FOR YOUR TIME