ECONOMIC COORDINATION OF URBAN MILK VALUE CHAIN: THE CASE OF TANGA CITY

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ABSTRACT

This study was conducted to examine coordination of milk value chain in Tanga City. Specifically the study (i) characterizes the milk value chain in the Tanga City (ii) examines existing governance structures in the milk value chain in the Tanga City (iii) examines chain efficiency and competitiveness in Tanga City and (iv) carries out the institutional review of Tanga urban dairying. Cross-sectional research design was used to collect primary data from 80 dairy farmers, 30 milk traders and 15 consumers. The data were analyzed using SPSS and STATA. The findings show that the key players in the milk value chain in Tanga City were producers, cooperatives, processors, input suppliers, traders and retailers. Five major milk marketing channels were identified. Urban dairying was observed to be governed by institutional arrangements embedded in the national Urban Farming Regulation of 1992 (revision 2003) and City by-laws and regulations on livestock keeping. The analysis of chain governance structures indicated incidences of contract failure between primary dairy cooperatives and the Tanga Dairy Cooperative Union (TDCU) and between TDCU and the major processor Tanga Fresh Ltd. Basing on the Herfindahl–Hirschman Index, the dairy industry in Tanga City was found to be highly concentrated making it inefficient and uncompetitive. The Gini coefficient for market share between the actors was 75.43% indicating a high level of inequality. GM analysis indicates that producers in the formal channel are less profitable than those in the informal channel, though the difference is not statistically significant. It is recommended that the concerned governmental and non-governmental bodies review the price setting mechanisms in the industry to make ensure that offered producer price is cost-effective, an intervention that will also enhance competitiveness of milk marketing in the city and in other urban dairying centres countrywide.

DECLARATION

I, GRACE RONALD MAKOYE, 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.

11/21/2013

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The above declaration is confirmed.

11/11/2013

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DEDICATION

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LIST OF ACRONYMS AND ABBREVIATIONS

AECF	The Africa Enterprise Challenge Fund
CALDO	City Agricultural and Livestock Officers
CBOs	Community Based Organizations
CGIAR	Consultative Group on International Agricultural Research
CIAT	International Centre for Tropical Agriculture
CME	Coordinated Market Economy
DAFCO	Dairy farming company Ltd
DPCS	Dairy Primary Cooperative Societies
DFID	Department for International Development
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product.
GMA	Gross Margin Analysis
HHI	Herfindahl–Hirschman Index
IAD	Institutional Analysis and Development
ICARDA	International Center for Agricultural Research in the Dry Areas
IDRC	International Development Research Centre
IFPRI	International Food Policy Research Institute
IFAD	International Fund for Agricultural Development
ILRI	International Livestock Research Institute.
KALIDEP	Kagera Livestock Development Project.
KSHDEP	Kagera Smallholder Dairy Extension Project.
MAFSC	Ministry of Agriculture and Food Security and Cooperatives
MMAs	Milk Marketing Agents
MLFD	Ministry of Livestock and Fisheries Development
MMA	Match Maker Associates Limited

NAFCO	National Food Cooperation
NBS	National Bureau of Statistic offices
NGOs	Non-Govemmental Organizations
OSHA	Occupational Safety and Health Authority
PDCs	Primary Dairy Co-operatives
PRA	Participatory Rural Appraisal
RLDC	Rural Livelihood Development Company
SPSS	Statistical Package for Social Sciences
TAMPA	Tanzania Milk Processor Association
TAMPRODA	Tanzania Milk Producers Association
TBS	Tanzania Bureau of Standards.
TCC	Tanga City Council
TDL	Tanzania Dairies Ltd
TDB	Tanzania Dairy Board
TSDDP	Tanga Small Holder Dairy Development Programme
TDCU	Tanga Dairy Cooperative Union
TFDA	Tanzania Food and Drugs Authority
TCE	Transaction Costs Economics
TFL	Tanga Fresh Limited
TR	Total Revenue
TVC	Total Variable Cost
UNIDO	United Nations Industrial Development Organization
URL	Uniform Resource Locator
URT	United Republic of Tanzania
UVIWAKAPI	Umoja wa Vijana wafugaji Pingoni
UWAPOMA	Umoja wa wafugaji Pongwe na Marungu
UWATA	Tanga Livestock Keepers Co-operative Society Ltd

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Dairy farming is practiced all over the world. There are around 245 million dairy cows producing milk across the world (URL, 2012).World milk production in 2012 was estimated to grow by 2.7 % to 750 million metric tons. Asia is expected to account for most of the increase, with output in India forecast to rise by 5.2 million metric tons to 127 million metric tons (FAO, 2012). Statistics further show that in 2009 milk production in the world was over 5.83 billion litres.

Currently, the United States of America (USA) being the largest cow milk producer which accounts for 14.7 % of world production, produced over 8.5 billion litres, followed by India with over 4.5 billion litres of milk annually which accounts for 7.7 % of world production (FAO, 2011). During 2004, total cow milk production in Africa was 21 244 474 litres produced from a total of 46 million dairy cows giving an annual average of 0.461 litres of milk per cow, which is only one fifth of world average yield (Ndambi *et al.*, 2007).

1.2 Dairy Industry in Africa

In recent years, dairy industry in Africa has shown a tremendous growth. This is evidenced by the growing number of cattle kept in the continent and their contribution to respective countries' GDP. According to FAO (2010) about 20 % of the estimated 17.9 million litres of milk in Africa come from Sub-Saharan Africa. Hence one can conclude that approximately one cow produce only 4 litres of milk. It is estimated that Sub-Saharan Africa has 164.2 million cattle producing an estimate of 1.198 billion litres of milk annually (MLFD, 2011).Within Sub-Saharan Africa, East Africa has the highest number of traditional and improved cattle. For example Kenya has 2.7 million of improved cattle which accounts for about 75 % of improved cattle in Eastern and Southern Africa producing about 5 million litres per year. The presence of higher numbers of traditional and improved cattle in East Africa as compared to other African countries makes the dairy industry to contribute 3 % of Kenya's GDP, 5 % of Tanzania's GDP and 8 % of Uganda's GDP (FAO, 2011).

Dairy production systems are significantly influenced by policy environment. For example in Kenya, the small-scale dairying system has grown due to adoption of policies which favoured the small scale dairying (Thorpe *et al.,* 2000). The policies include genetic improvement of dairy animals, provision of appropriate veterinary and extension services, provision of credit and farm inputs, milk import policies, institutional support to the dairy sector and promotion of the marketing and consumption of milk and dairy products. These policies have been established to support development of dairy sector in different parts of the value chain (Ndambi *et al.*, 2007).

Although there are wide and good potential regional markets for milk and dairy products in African countries, there are a number of key constraints impeding further development of the dairy value chain. These include seasonality of production and lack of data for effective planning and management of the different links in the value chain. Neither bottleneck is limited capacity and coverage of dairy producer, processor as well as marketing cooperatives (World Bank, 2008).

1.3 Historical Development of Dairy Industry in Tanzania

During colonial period, through its policies, laws and regulations the Government was directly involved in production, processing and marketing of livestock resources. During that period there were only few large-scale farms. After independence, most of the large dairy farms were nationalized and operated by parastatals. This was in line with socialism and self reliance policies of that time. The aim was to increase milk production so as to cope with the rapid increase of urban demand and to reduce dependency on the importation of milk and milk products (Kurwijira and Boki, 2003).

According to Kurwijira (2002), efforts to develop the industry started as far back as 1950s and early 1960s. The efforts include selection work for milk production potential among indigenous zebu stock, cross-breeding and production of synthetic dual-purpose Mpwapwa breed. These efforts did not result in widespread adoption of dairying by smallholder farmers. After realizing the inadequacy of domestic milk supplies in Tanzania in meeting the demand for milk and milk products, in 1975, the Tanzania Government with the help of the World Bank, formed Dairy Farming Company Ltd (DAFCO) which was charged with the responsibility to operate a number of large scale parastatal dairy farms. Other parastatal companies formed were the National Food Corporation (NAFCO) and the Tanzania Sisal Authority (TSA) that also invested in dairy farming. The main objective of starting parastatal farms was to produce milk for the urban population as well as supply breeding stock to small holder farmers (Kurwijira and Herinksen, 1995).

The policy on livestock development was formulated since independence, however development efforts and strategies to increase domestic milk production were undertaken not earlier than 1983 (Kurwijira and Boki, 2003).The established Tanzania livestock policies of 1967 aimed at supplying affordable milk to urban centres, especially Dar es

Salaam. By mid-1980s the dairy sector had been transformed into a major smallholder production system which was promoted as a means of achieving national self-sufficiency in milk and milk products as well as a means for rural poverty alleviation. In 1983, the Ministry of Livestock Development launched a new policy promoting small scale dairy farming.

Due to economic advantages, Bi-lateral development projects were started in Iringa, Mbeya, Tanga and Kagera Regions. Non Governmental Organizations (NGOs) also supported the development of the smallholder dairying schemes in other regions. A number of smallholder dairy development programmes were initiated in various parts of the country during this period including the Small-Scale Dairy Development project (SSDDP) was established in 1978. The project was located in Iringa and Mbeya Regions. Also, in 1976 Kagera Livestock Development Project (KALIDEP) was established, then in 1982 the project was renamed as the Kagera Smallholder Dairy Extension Project (KSHDEP). Tanga Small Holder Dairy Development Programme (TSDDP) which were established between 1982 and 1985 and funded by the Dutch Government (Kurwijira, 2002). All these projects emphasize on increasing milk production through introduction of improved breeds, heifer production and distribution, and animal health as well as supporting bull centres and distribution of heifers to farmers, Also the projects were selected in these regions so as to close the gap between the growing demand and domestic milk production (Kurwijira, 2002).

Moreover, Ministry of Agriculture Food Security and Cooperatives support milk producers by providing improved and effective breeding through producing and selling semen to farmers to increase the number of improved dairy cattle. This is done through artificial insemination centre (The National Artificial Insemination Centre) located at Usa

River, Arusha. Furthermore, the Ministry has heifer production multiplication units (HMUs) in each zone producing improved breeds of both beef and dairy cattle (RLDC, 2009).

1.4 Performance of Dairying Industry in Tanzania

1.4.1 Production

Tanzania is endowed with abundant natural resources, which include land, water, forage and a large livestock resource base. Out of the total 94 million hectares (ha) of land resource, 24 million ha are used for grazing. The country ranks third, in terms of cattle population in Africa, after Sudan and Ethiopia. The 2010/2011 statistics indicate that, there were about 21.3 million cattle, 15.2 million goats and 6.4 million sheep. Other livestock include 1.9 million pigs, 35 million local chicken and 23 million improved chicken (URT, 2011). About 90 % of the livestock population is of indigenous types. The livestock sector provides livelihood support to a total of 1 745 776 (37 %) households out of 4 901 837 agricultural households (URT, 2006).

Total annual milk production in Tanzania increased from 160 000 litres in 1983 to over 688 million litres in 1998 (Kurwijira, 2002). Furthermore, the study by RLDC (2009) estimated that there were 1 148 000 households owning indigenous cattle producing 813 million litres of milk and about 124 000 households owning improved dairy cattle producing 337 million litres of milk. The number of dairy cattle increased again from 212 000 in 1995 to about 500 000 in 2005 producing a total of 1.38 billion litres of milk, of which 70 % of the milk was produced from indigenous cattle (URT, 2006). During the period 2005/06 to 2007/2008, annual milk production in Tanzania increased from 1.4 billion to 1.5 billion litres which was an increase of 6.1 %. About 66 % of the milk produced was from the indigenous Zebu. Commercial ranching and dairy herd accounted for only 6 % of the total marketed milk (MAFSC, 2012).

Out of the 21.3 million cattle in Tanzania, about 680 000 are dairy cattle mainly crossbred of Friesian, Jersey, Ayrshire breeds with the Tanzania Shorthorn Zebu. Most of the milk about 70 % produced in the country comes from the traditional sector i.e. indigenous cattle such as Zebu, and the remaining 30 % come from improved cattle mainly kept by smallholder producers in urban areas. The increase in milk production from both indigenous and improved dairy cattle is due to increase in herd size rather than in productivity per head (milking cow).

1.4.2 Contribution of dairy sub-sector to GDP

Dairying is one of the fast growing enterprises in the livestock industry in Tanzania. In most Tanzanian regions, urban dairying is becoming popular as is the case in many cities and big towns such as Dar es salaam, Morogoro, Iringa and Tanga. Increased urban dairying is carried out by urban dwellers and civil servants as a source of income, given the high price of milk in urban centres relative to remote areas (Orodho, 2006). Marketed milk comes mainly from small-scale livestock farmers who supply on average about 70 percent and large-scale farmers supplying the remaining 30 % (URT, 2006).

The sector has a great potential for improving the living standards of the people and contributing towards reduction of poverty through improved nutrition, arising from consumption of milk and increased incomes from sale of milk and milk products (Njombe *et al.*, 2011). Livestock sector provides about 30 % of the agricultural GDP. Out of the sub sector's contribution to GDP, 30 % comes from milk production (URT, 2011).

However, over 90.5 % of the produced milk is traded through traditional informal markets; only 9.5 % is processed and sold through formal markets (RLDC, 2009).

1.4.3 Milk processing in Tanzania

In 1995, the seven dairy processing plants out of 35 plants owned by Tanzania Dairies Ltd (TDL) with capacity of processing about 370 000 litres per day were privatized following market liberalisation policy. Consequently its 13 plants were forced to cease their operations leading to a sharp decrease of processing capacity (Njombe and Msanga, 2009). The gap left after privatization of TDL plants created the opportunity for some individuals and companies to invest in the dairy sector mainly in Dar es Salaam, Iringa, Arusha, Mara and Tanga. Most of the companies in the milk-processing sector are privately owned.

Milk processing in the country is mainly undertaken by small and medium scale plants of capacities ranging between 500 and 30 000 liters per day (MLFD, 2010). The leading plants include M/S ASAS in Iringa, Tanga Fresh in Tanga, Tan dairies in Dar es Salaam, International Dairies in Arusha and Musoma and Mara dairies. The main products produced include fresh milk, cultured milk, yoghurt, cheese, ghee and butter and Ultra-High Temperature (UHT) milk produced only by Musoma dairies (MLFD, 2011). Tanga fresh is the leading processing plant in the country which was established in 1996 in Tanga region as a joint-venture between FriZania cooperation from Friesland in Northern Netherlands and Tanga Dairy Cooperative Union (TDCU), a Tanzanian farmer cooperative. According to AECF (2011), Tanga fresh Ltd has invested 4.5m United States dollar in a new milk processing plant that has increased their capacity to process raw milk from 20 000 to 50 000 litres per day. The plant established the cooperative model which organizes the collection of raw milk from smallholder dairy producers to ensure reliable daily supply of milk required for processing.

The current national milk processing capacity is 410 500 liters per day, but, the capacity utilization is about 30 %. The low capacity utilization is partly due to inadequate raw milk production as a result of seasonality in milk production due to inadequate feeding. Other challenges include milk being produced in small quantities and milk producers being widely spread in remote areas thus increasing milk collection and transportation costs. Other bottlenecks include high cost of milk processing due to high cost of equipment, machinery, packaging materials and utilities (RLDC, 2009). In addition to the poor infrastructure, high cost of doing business and low milk consumption levels also constrain milk processing. Among the efforts to create conducive environment for development of the dairy industry, the government has exempted import duties for milk packaging materials, some equipment used in the collection, transportation and processing of milk products. Furthermore, the Local Government Authorities are sensitizing the stakeholders to form groups, associations and cooperative societies in order to enhance milk collection, handling and processing (MMA, 2008).

1.4.4 Milk marketing in Tanzania

Milk produced is mostly consumed locally or on farm and only 10 percent of it is annually sold through the urban markets (Charles and Mchau, 2011). Milk marketing channels in Tanzania include open markets where milk producers sell their milk to consumers in the rural or urban markets, consumers in roadside markets, or to vendors who in turn sell to consumers. Milk marketing can be through producer-customer informal contracts where a farmer delivers milk to a customer on daily basis and payments are normally done at the end of the month. Such arrangements are common where a producer and the customer reside in a neighbourhood (Quaedackers, 2010). Milk marketing can be done at commercial centres such as hotels and restaurants in which farmers can make contracts with their customers. Milk can also be sold to institutions such as schools including nurseries, colleges, hospitals and industries or other corporate canteens, and farmers can sell their milk directly to processors and cooperatives (Nyange and Mdoe, 1995).

According to Quaedackers (2010), many smallholder farmers lack organization in such a way that they show little initiative to organize themselves in production networks. Farmer's organizations are important because they enable them to speak with one voice. However, organizational challenges for dairy farmers have been addressed by cooperatives and Dairy Market Hubs. Milk marketing necessitates milk producers to form cooperatives and dairy market hubs which play a role in milk collection (World Bank, 2008). This is an effort to channel surplus milk to dairy plants for commercial processing so as to supply milk into urban markets (Njombe and Msanga, 2009).

Promotion of producer-owned dairy groups helps to attract more farmers to participate in sales and marketing within milk value chain activities. This helps to improve the performance of smallholder dairy farmers (Bolo *et al.*, 2009). For example, in Tanga Region dairy farmers organize themselves in order to organize milk collection. Currently there are eleven Dairy Primary Cooperative Societies (DPCS) of dairy farmers from five districts (Tanga, Muheza, Pangani, Korogwe and Lushoto) under the umbrella of TDCU (AECF, 2011). Smallholder dairy production sub-sector in Tanga city is expanding fast so as to cater for the demand of milk and milk products in the area (Zylstra *et al.*, 1995). Urban dairying in Tanga is more popular compared to other regions in the country, whereby over 80 percent of smallholder dairy farmers in Tanga are found in the urban areas (Schoonman *et al.*, 2011). Moreover, in Tanga dairy producers are well organized in dairy cooperatives as contrasted to other regions.

1.4.5 Milk consumption in Tanzania

Per capita consumption of milk in Tanzania increased from 20.4 litres in 1995 to 39 litres in 2007. However, the per capita consumption of milk in Tanzania seems to be low as compared to other East African countries. In Tanzania, the average milk consumption per capita of 39 litres is lower than Uganda and Kenya with per capita consumption of 50 litres and 100 litres respectively.

FAO recommends a per capita consumption of 200 litres per year (Charles and Mchau, 2011). The low consumption rate is attributed to low production, cultural beliefs and traditional taboos that make people refrain from consuming milk. In Africa and Tanzania in particular, socio-cultural beliefs and customs have a significant influence on food choice. Some foods are more prized than others.

1.4.6 Challenges of dairying in Tanzania

The biggest challenge facing dairy industry in the world includes its yields, quality, addressing environmental concerns and improves the genetic potential of animals which would boost their production (FAO, 2007). Despite the fact that smallholder dairy farming is widespread in different parts of Tanzania where the climate is appropriate and smallholder dairy farming is growing at a rate of 6 % per year, the supply of milk and milk products has not kept pace with the rapid increase in the human population.

The dairy industry development in Tanzania is limited by low productivity in existing smallholder dairy farms. The main cause of low productivity is small scale production and distance from markets. Others are animal health and reproductive problems and lack of sufficient quantities of good-quality animal feeds. Other constraints include lack of infrastructure for input and output markets, unfavorable regulatory and taxation policies, poor flow of market information, restricted access to credit and limited supply of dairy cattle stocks (Swai *et al.*, 2011).

Urban dairying is also very common in Tanzania's towns. It involves livestock keeping such as dairy cattle. Nyange and Mdoe (1995) reported that most dairy cattle which are kept in urban and peri-urban areas are of improved breeds. Foeken *et al.* (2004) and Guendel (2001) both reported that urban dairying is done to serve as a major source of income for the urban poor and the retired civil servants. Urban dairying is characterized by easy access to market, services, inputs and easy supply of labour. Also, urban dairying contributes to food security, income and employment generation, saving and insurance to the urban livelihood.

More often urban dairying is constrained by shortage of land and risks from pollution and urban growth. Also, urban dairying is affected by a number of laws and regulations, since it has shown to have a negative impact for the urban environment in a number of ways. Firstly, domestic animals transmit animal diseases that can be passed on to other animals. Secondly, when animal dung is left to decompose along roads, it produces an unpleasant odour (Foeken *et al.*, 2004). Therefore, there are by-laws and regulations on urban dairying require livestock keepers of larger herd (cattle) to move to the peri- urban parts of town or to the rural areas (Jacobi *et al.*, 1997).

Dairy producers in urban areas face seasonality which may be removed by instituting good feeding planning practices where forage is bought at a low price when it is abundant and used during the dry season when its price is high (ILRI, 2007; Land O', 2008). The endorsement of such practices requires an attitude change on behalf of smallholders. In other words, they need to start viewing dairy as an annual business that needs to be managed on annual basis, rather than as a daily activity. A number of interviews raised the issue of low or inconsistent quality of commercial feeds.

Urban dairy industry development in Tanzania is also hindered by the low performance of milk processing plants. This makes the dairy industries to be uncompetitive as compared to other countries such as Kenya. This inadequate raw milk production is caused by seasonality, low milk consumption levels and widely spread producers in remote areas with poor infrastructure. All these increase milk collection and transportation costs resulting into high cost of doing business (RLDC, 2009).

1.4.7 Milk value chain in Tanzania

Milk value chain in Tanzania involves different participants who are categorized into three types; primary actors who are the core actors that feed the chain. Secondary actors include input supplies, extension and financial services. Contemporary actors include organizations, institutions, associations, projects and NGOs which create the enabling environment and influence laws, regulations and policies (Dillmann and Ijumba, 2011). Milk value chain involves different stages which include milk production; processing and marketing of milk products (Mpagalile *et al.*, 2008). The main actors involved in milk marketing include milk producers, dairy co-operatives, wholesalers, vendors, hawker's retailers and consumers. Wholesalers (large and small supermarkets, depots and mini depots) owns collection/cooling centres whereby they collect or buy milk in bulk and sell it to retailers such as restaurants, milk bars, shops and dairy kiosks (Kilima, 2008).

Vendors are traders who collect milk from producers and processors and sell directly to consumers and other market agents. They have more or less permanent customers and sometimes deliver milk on credit, bicycles being the major means of transport.

In some areas, vendors collect milk from hinterland producers and deliver it to consumers and/or retail outlets such as milk bars, kiosks and hotels. Milk hawkers are traders who transport milk in small quantities usually fresh or processed to final consumers mostly by using bicycles. Retailers are the group of traders who sell milk directly to consumers (RLDC, 2009).

1.4.8 Value chain coordination mechanisms

Value chain development has become a key approach in both research and policy fields, with an increasing number of bilateral and multilateral aid organizations adopting it to guide their development interventions. At the heart of value chain concept lies the idea of actors connected along a chain producing and bringing goods and services to end consumers through a complex and sequenced set of activities (IFAD, 2010a). Poor agricultural producers often struggle to gain market access because they lack knowledge of market requirements or the skills to meet them. Furthermore, poor information flow and other obstacles in value chains prevent them from entering into new markets, or reduce the benefits they obtained from entry. Donor initiatives that foster value chain development, often with a focus on reducing poverty among smallholder farmers, are designed to overcome some of these obstacles. Often such initiatives try to mobilize the knowledge and resources of lead firms in value chains actors to help poor to enter markets and add value

Kaplinsky and Morris (2001) describes value chain as the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumer and final disposal after use. In differentiating value chain from supply chain, Feller *et al.* (2006) defines value chain as the integration of key business processes from end user through original suppliers that provide products, services and information that add value for customer and other stakeholders.

Similarly, Gibbon (2003) described a value chain as a chain of activities, where products pass through all activities of the chain in that order and at each activity, the product gains some value. The chain of activities gives the products more added value than the sum of added value of all activities. The author further observes that it is important not to mix the concept of value chain with the cost occurring throughout the activities.

Coordination refers to how well the transacting parties perform in accordance with their roles in the system (Hernandez-Espallardo and Arcas-Lario, 2003). It is the extent to which the work activities of the parties are logically consistent and coherent, so that they are directed towards a common objective in such a way that they supplement and complement one another. Buvik and John (2000), provided the initial theoretical models of co-ordination. Coordination is organized as a continuum of governance structures bounded by the spot market prices at one end and within-firm organization (Vertical integration) at the other end (Macbeth and Ferguson, 1994; Zuurbier, 1994, 1996).

Coordination has become critical because of the structural changes that emerge in the business environment from time to time such as low or no market growth, greater and more international competition, more choice and enhanced value, improved food safety and legislation and consumer concerns about various environmental issues. Collaborating is a strategic option for achieving and meeting these requirements (Downy, 1996). Buvik and John (2000) note that greater vertical co-ordination of action between buyers and sellers will create additional economic value through interaction that takes into account the traditional partner's requirements and circumstances. They also note that complete contracts are increasingly difficult to write and that such contracts lock the parties in positions that might otherwise be revised profitably. Incomplete contracts can only work within supportive governance structures, such as vertical co-ordination, that have higher chances of reducing ex-post transaction costs (Douma and Schreuder, 1991).

However, cheating is not limited to cartels only. Explicit governance structures, which are used to manage cheating problems, also face more or less the same problems. Besides the explicit governance structures, trust between parties to a transaction can be used to manage cheating. According to Masuku and Kirsten (2004), trust exists if one party believes the other party is honest or benevolent. Over time, the partners realize that they can be trusted not to behave opportunistically. Thus, trust can be used as a low cost substitute for costly governance structures (Barney and William, 1996; Mentzer *et al.*, 2001).

Beers *et al.* (1996) recognize the importance of collaboration in agricultural product chains with regard to quality, delivery time, assortment and product life cycle of products. They further note that a basic aspect of collaboration between organizations is the exchange of information associated with receiving, processing and delivery of materials and products. Porter (1985) argues that the use of information technology may bestow competitive advantage to those companies involved with regard to new forms of relationships with customers, new product characteristics, quality and delivery time of the product and services. Specifically information tries to bridge the uncertainties in goods flow and quality of products in agriculture (Beers *et al.*, 1996; Downy, 1996).

The study done by Frohlich and Westbrook (2001) demonstrated that higher value chain performance resulted when a firm combined with both an upstream and downstream actors, than either with an upstream or downstream actors. But one-sided integration was found to be better than none at all. Higher levels of integration brought about higher levels of performance Gimenez and Ventura (2003). The success of a value chain management strategy is dependent on the relations among the value chain partners, which further depends on the costs involved, real or perceived. The relations between the value chain actors are determined by the level of transaction costs between them (Porter, 1990).

1.4.9 Coordination in the milk industry

There are three types of coordination mechanisms are commonly used in the milk transactions as used to other products: Spot market contracts, verbal contracts and, written contracts. Spot market contracts are characterized by transactions between agents with no prior arrangements and no guarantee for repeat transactions in future. The transactions usually take place at market centers but buyers looking for milk can also search for sellers to buy the milk. Most of the transactions involve spot cash payments and prices may be negotiated during the transaction (FAO, 2010).

On the other hand, verbal contracts involve prior agreements to supply milk at certain prices (mostly negotiated in advance) and involve repeat transactions. Finally, written contracts are very much similar to verbal contracts except that they are formal agreements, being backed by law. Written contracts are signed by the parties concerned for delivery of quality milk at specified prices and locations. Volumes may not necessarily be specified in the contracts (FAO, 2010).

1.5 Problem Statement and Justification

Currently, Tanzania population is estimated to be 44 928 923 million people of which 26 % live in urban areas (URT, 2013). Urban population has increased faster than the rural population as a result of a high natural increase, rural-urban migration and boundary extensions. Tanzanian towns are facing major problems due to their inability to create jobs in the shrinking formal sector, housing shortages and delays in the development of social services and physical infrastructure (Foaken *et al.*, 2004). This makes the urban poor to face enormous livelihood challenges. Consequently, some urban dwellers are turning to income-generating activities in the informal sector such as urban dairying.

Development of urban dairying in Tanzania has the potential to contribute to household welfare, employment creation and poverty reduction for urban dwellers. However, there are several constraints which hinder further development of the sector. According to Njombe *et al.* (2011), domestic production of milk and milk products does not satisfy national demand particularly in urban areas. It was estimated that, milk demand (based on urbanization levels of 5 % per annum and a population growth of 2.3 % per annum) could increase by 60 % in 2010, which makes the annual demand of milk to be 1.5 billion litres and therefore milk production would have to increase at the rate of 3 % so as to capture the growth of urban demand (Kurwijira, 2002).

It has been shown that urban dairy sector fail to fill the supply-demand gap to capture the ever increasing demand in major urban centres, due to inefficient, inconsistent and unreliable milk distribution channels (RLDC, 2009). Rising demand in urban areas has encouraged the importation of milk and milk products so as to fill the gap of the small market for processed and packaged milk. According to (MLFD, 2011), Tanzania imports about 20 - 36 million tones of milk each year.

The imports of dairy products in liquid milk equivalent between 2004 and 2009 averaged at 26 000 million litres annually, growing at 9.41 percent per annum. The imported dairy products mainly came from Kenya, South Africa and United Arab Emirates (CGIAR, 2011). Lack of standards and grading system makes Tanzanian milk and milk products inferior to imported milk (Charles and Mchau, 2011). Local products thus face strong competition from imported milk and milk products.

In the study of marketing, handling and physical quality of raw marketed milk in Tanga Region of Tanzania by Swai and Schooman (2011), it was found out that poor quality of milk handled by the producers and Milk Marketing Agents (MMAs) in Tanga Region pose obstacle for efficient functioning of the dairy market. As previously revealed, improvement on the quality of milk through better feeding of cattle and hygienic handling of milk as well as the formation of stronger cooperatives will not only increase milk volume but also the competitiveness of smallholder dairy farmers (Nyange and Mdoe, 1995).

The dairy industry also lacks institutional support in terms of technology and finance (Kilima, 2008). According to IDRC (2006) and Mvena (1991), milk processing industries lag behind due to unstable milk supply. The unreliability of the milk supply is a major problem for the dairy processors in Tanzania. Farmers are often not very dedicated in delivering their milk to the milk collection centers. They are very opportunistic in their behavior and are easily tempted to sell their milk to another processor or to the informal market when offered a better deal. For the processors, this results in an unstable supply of milk which is undesirable.

Seasonality is another issue for the dairy sector. In the dry season the production is very low and the competition for milk between the hawkers and the processors intensifies. In contrast, in the wet season the milk is abundant and not even all the milk can be sold and processed. Dairy sector is also supported by weak institutional arrangement. The government's involvement in the sector is not very strong. There is a little guiding regulation or support of the companies or the market in general (MMA, 2008). Regarding quality, the government does not indicate what the minimum standard should be. It is left up to the companies to decide their own standards.

Overregulation and inadequate coordination of regulatory authorities such as Tanzania Food and Drugs Authorities (TFDA), Tanzania Bureau of Standards (TBS) and Tanzania Dairy Board (TDB) tend to increase production cost to smallholder farmers due to high compliance cost (RLDC, 2009). Moreover, smallholder dairy farmers face high transaction costs such as lack of information about markets, poor negotiating skills, and lack of collective organization such as weak cooperatives, regulatory failures, are other impediments to market access (Rich *et al.*, 2009). This makes it difficult for them to gain access to markets.

It is presumed that the existence of relatively high marketing cost for milk in Africa is due to the prevalence of narrow milk markets, and the risks attached to marketing perishables in the tropics (Holloway and Ehui, 2002). This suggests that transactions costs play a central role in dairy production and marketing. In some cases, collective action such as producer marketing cooperatives and milk traders group' can effectively reduce transaction costs involved in accessing markets and hence enhance market participation (IFPRI, 2005). However, in Tanzania, very little is known on the role played by institutions established to reduce these costs. Dairy cooperatives play a small role as they handle only about 5 percent of marketed milk (Knips, 2006).

Omore *et al.* (2004) evidently established that the institutional context of milk marketing issues which are important to value chain competitiveness and sustainability, particularly for urban-based chain, have not yet been researched on. These are the issues that surround coordination mechanism in the industry. On the other hand, another area that needs further analysis is coordination. Coordination is necessary to ensure smooth flow of resources from one technological level to another, such as from a producer to a processor or processor to retailer, that is, within a value chain. This is especially so when the technologies are owned or controlled by different independent economic entities. The developments in the dairy sub sector have brought about new coordination problems in the Tanzanian dairy industry that call for a new look at the management of the milk value chain. The need to generate a fair return on investments by the producers, processors and other chain participants requires approaching the problems in the dairy industry from a holistic perspective. In an attempt to mitigate some of these problems, it is necessary to come up with institutional arrangements that can lower costs for the benefit of all the participants.

The current knowledge base on the management of value chains in Tanzania is thin. While recognizing efforts in production activities, the probability of success is higher when a holistic approach to the chain is undertaken. Both the downstream and upstream chain activities and the management of the flows of information, materials, and funds are necessary for the successful functioning of agricultural value chains. This works makes a contribution in this area of research. The study also aims at providing information and an understanding of the milk value chain operations so as to help in creating conducive environment for the growth of the dairy industry given the role the dairy industry plays in national development.

1.6 Objectives of the Study

1.6.1 General objective

The study was set to investigate and analyze economics of chain governance structures in the milk value chain in Tanga city and assess sustainability of the chain in the prevailing regulatory environment.

1.6.2 Specific objectives

The study attempted to address the following specific objectives:

i. To characterize and describe the milk value chain in Tanga City,

ii. To examine existing governance structures in the milk value chain in Tanga City,

iii. To examine the milk value chain efficiency and competitiveness in the Tanga City,

iv. To carry out an institutional review of Tanga urban dairying.

1.7 Research Hypotheses

The study was governed by the following research hypotheses:

i. "Dairy smallholders' market for raw milk in the Tanga city is concentrated".

ii. The level of inequality in market shares among milk traders in the formal milk value chain affects the efficiency and competitiveness of the market.

1.8 Research Questions

i. What governance structures exist in the milk value chain in the study area and how do they affect chain efficiency and competitiveness?

ii What is the sustainability prospect for urban dairying in the Tanga City?

CHAPTER TWO

2.0 LITERATUR REVIEW

2.1 The Value Chain Concept

Value chain is defined as the full range of activities that are required to bring a product or service from conception, through the different phases of production, delivery to final consumers and final disposal use (Kaplinsky and Morris, 2001). However IFAD, (2006), defined value chain as a market-focused collaboration among different stakeholders who produce and market value-added products. The milk value chain therefore describes the full range of activities ranging from production to its end use/consumption. These activities include raising animals, milk production, collection, preservation, marketing, distribution, processing and support to the final consumer. These activities can be contained within a single firm or divided among different firms.

Ssango (2006) argued that, a value chain is as specific type of supply chain, where the actors actively seek to support each other so that they can increase their efficiency and competitiveness. They invest time, effort, money and build relationships with each other to reach a common goal of satisfying consumer needs so as to increase their profits. Furthermore, Kaplinsky and Morris (2001) distinguish value chains from supply chains by emphasizing the linkages and relationships both between and within actors at each stage of production. The explanation has considerable merit in highlighting the constraints and opportunities at and between stages of the chain and thus can be used to develop integrative policy recommendations that target chain inefficiencies and address distributional issues.

According to Feller *et al.* (2006) the difference between a supply chain and a value chain is that supply chain is the upstream movement which focuses on integration of supplier and producer processes with the aim of improving chain efficiency where the value addition of product is not necessary, while value chain is the downstream movement which focuses on integration of key business processes from end user through original suppliers that provide products, services, and information that add/create value for customers and other stakeholders. Hence this paper describes milk value chain as the full range of activities ranging from production to consumption (Porter, 1990). These activities include input suppliers, milk processors, traders and consumers.

2.1.1 Value chain analysis and its economic importance

Value chain analysis is defined as the process of breaking a chain into its constituent parts so as to understand its structure and functioning. The analysis consists of identifying chain actors at each stage and discriminating their functions and relationships that is mapping of the chain (UNIDO, 2009). Chain mapping is useful in assessing actors' characteristics, profit and cost structures, and flow of good within the chain as well as employment characteristics (Kaplinsky and Morris, 2001). On the other hand, McCormick and Schmitz (2001) argued that value chain analysis also highlights the issues of chain coordination or governance. The direct and indirect control in a value chain is called governance. Value Chains vary in the degree of overall control that is exerted, in the location of control within the chain, and in how much of it is concentrated on a single firm (Gereffi *et al.*, 2001).

Lusby and Panlibuton (2004) contended that value chain analysis is used to show the dynamic flow of economic and organizational activities involving actors within different sectors (identifying distribution of benefits among the actors). The benefit from chain participation and from increased support or organization of the chain actor is determined through margin and profit analysis. Whereas Kaplinsky and Morris (2001) contended that the value chain provides an important construct that facilitates the understanding of the distribution of returns from the different activities of the chain, when it is broken into its constituent parts of design, supply, production, and distribution, one can better understand its structure and functioning and, assessing its scope for systemic competitiveness.

2.2 Coordination Mechanisms in Value Chains

2.2.1 Types of governance structures

The types of value chain governance structures are well established from many studies on global value chain analysis approach (Kaplinsky and Morris, 2000). Gereffi *et al.* (2005) and Hobbs and Young (2001) identify five types of value chain coordination structures ranging from spot markets transaction, specification contracts, strategic alliances, formal cooperation to full vertical integration. Moreover, Gereffi (2003) identified two types of governance structures namely; captive and hierarchy governance.

Gereffi (1994) and Gibbon (2003) describe two broad categories of governance structures for commodity value chains, namely, producer-driven and buyer-driven global value chains. In producer-driven chains, the key parameters are set by firms which control key product and process technologies. It is referred to as upstream-controlled production systems which are common in capital or technology intensive industries such as car industry. Buyer-driven chains is used to describe production networks controlled by downstream located manufactures, large retailers, brand name merchandisers or trading companies, common in labour intensive sectors (Muradian and Pelupessy, 2005; Gibbon, 2003).

According to Kaplinsky and Morris (2001), there are three forms of value chain governance structures. First, is legislative governance which involves setting basic rules that define conditions for participation in the chain. Second, is judicial governance, which has a role of setting audit performance and checking compliance with the rules set, i.e. coordinating conformity to the set parameters. Third, is executive governance which may be direct (for example helping a supplier achieve quality standards) or indirect (for example forcing a first-tier supplier to assist a second-tier or introducing a supplier to a service sector firm in meeting the required standards).

2.2.2 Institutions and urban dairying

Institutions are defined as the "rules of the game", both formal and informal, which are established in society to govern behavior of economic agents. According to Eaton *et al.* (2008), institutional arrangements refer to a set of rules or agreements which govern the activities of specific group of people striving to achieve a particular objective like a contract such as verbal contract. They range from markets to central planning organizations (Slagen, 2003 and Zúñiga-Arias, 2007). Formal institutions include constitutions, laws and regulations which are enforced by judges and courts, while informal institutions include norms of conduct in a society.

The Urban Farming Regulations of 1992 made under the Town and Country Planning Ordinance (Cap. 378) defined urban farming as "the carrying out of plant and animal husbandry activities within statutory township boundaries" and indicated the limits to plot size, rearing systems for livestock and maximum number of cattle per person (URT, 1992). Yigrem *et al.* (2008) defined urban dairying as an agricultural activity that provides a regular and stable income to the household. Also urban dairying is described as a system involving highly specialized, state or businessmen-owned farms, which are mainly concentrated in major cities, townships and municipalities of the country.

According to URT (1997), urban dairying when properly organized has the potential to provide employment, income and is a supplementary source of food therefore the government will continue to regulate the conduct of urban dairying. In order to realise the full potential of urban and peri-urban food production, there is need to develop a policy and institutional framework for the sector. This would also enable unlocking critical technical and financial impediments (Dubbeling and Pasquini, 2010).

Sustainability of urban dairy industry depends much on institutions at the micro-level which is used to create the framework on which stakeholders interact and the conditions under which the farmer organizations and contracts are likely to be effective (Maitre *et al.*, 2011). The government has to play role in setting the institutional environment in such a way that it supports the development of agricultural value chains in which smallholder farmers can find market opportunities (IFAD, 2010b).

The institutional environment should be conceived to favour competitive market arrangements as well as to encourage other types of coordination characteristics that form part of what is termed as the Coordinated Market Economy (Kydd *et al.*, 2002). Different policies can be used to promote efficient market coordination and allocate and enforce property rights since they are prerequisite for efficient exchange within a commodity chain. Also, policies can be used to establish and enforce norms and standards which may reduce transaction costs thereby increasing the available information to buyers and consumers (Jaffee and Morton, 1995).

2.2.3 Institutional roles in strengthening market access for smallholder dairy farmers

Institutions play five potential roles in strengthening markets for commodities produced, bought, and sold by smallholders. They reduce transaction costs, manage risk, build social capital, enable collective actions and redress missing markets (Orden *et al.*, 2004). The growth of smallholder dairy farmers requires development of appropriate institutional arrangements such as specific contractual arrangements between farmers and traders for overcoming market constraints for their products (FAO, 2001). Cooperatives and farmer organizations are institutional arrangements which make it easier for the many small farmers to engage and to draw benefits from their linkages to markets. Farmer organizations can assume a large scope of activities and functions in the commodity chain, such as collection, grading and storage (Maitre *et al.*, 2011).

According to Staal *et al.* (1997), dairy cooperatives play a critical role in enabling participation of smallholder farmers in the formal urban market. Principally, dairy cooperatives help to reduce transaction costs facing individual producers through pooling risks, lowering unit collection costs, making inputs available and enhancing bargaining power of smallholder farmers. For processors, cooperatives may lower raw milk acquisition costs and make milk supplier more reliable.

Although institutions can play a better role in linking farmers to markets, governments have the role in closing the access gap through playing an important role in helping institutions and forms of collective action to emerge that will effectively reduce transaction costs of market entry and participation by smallholders. Government policy is becoming important due to the fact that the market access and technology are areas that are subject to both economies of scale and rent-seeking behaviour (IFPRI, 2003).

2.2.4 Transaction costs and value chain

Molle (2003) defines transaction costs as the cost of measuring the valuable attributes of what is being exchanged and the cost of protecting rights and policing and enforcing arrangements. Transaction occurs whenever a good or service is transferred across a technologically separable interface (Mbise, 2007). According to Williamson (1993), transaction cost includes the cost of gathering and processing the information needed to carry out a transaction, cost of reaching decision, cost of negotiating contracts, policing and enforcing those contracts.

In addition, transaction costs could be defined as the costs of acquiring and handling the information about the quality of inputs, the relevant price and the supplier's reputation (Vannoni, 2002). On the other hand, Makhura (2001) describes transaction cost as the cost of searching the trading partner with whom to exchange the product, screening partners, of bargaining, monitoring, enforcement and eventually transferring the product to its destination.

However, transaction costs are broadly defined as ex-ante costs of determining whether an exchange is advantageous, costs of actually carrying out the exchange such as finding buyers or sellers and transportation costs and where applicable *ex-post* costs of ensuring that all provisions of exchange were met (Goetz, 1995). All these costs are connected to value chain because transaction costs exist in all economic exchanges for example from the first step of milk production to the point where the produce is purchased at retail or at the consumer outlet. Along this chain various stakeholders are involved vertically from milk farmers, wholesalers, retailers, processors, supermarkets and finally to end consumers.

According to Sadoulet and de Janvry (1995), Transaction Costs Economics (TCE) is relevant for agricultural market analysis in developing countries as well as in agricultural sector. This is due to the fact that the institutions or formal rules of market behavior that facilitate market exchange in low-income countries are absent.

Williamson (1996) identifies the critical dimension of characterizing a transaction cost and links it to the institutional governance structure of transactions. Economic activities do not occur in frictionless environment it has to incur cost of carrying out the exchange. Hubbard and Weiner (1991) argued that in order for exchange to be facilitated in the market, some cost (transaction cost) should be incurred. The transaction cost approach argued that the organizational form or "governance structure" that minimizes the sum of production and transaction costs for a given activity will have a competitive advantage and hence tend to dominate that activity (Mbise, 2007). A transaction cost framework can thus contribute in explaining the choice of contracts among farmers and traders, and; farmers and local traders (Kherallah and Kirsten, 2001).

2.2.5 The Concept of value chain competitiveness

Competitiveness can be assessed either at the national or the enterprise level. At the national level, it is defined as a nation's ability to produce goods and services that meet the test of international markets while simultaneously maintaining and expanding real incomes of its people over the long term (UNCTAD, 2005). Altenburg *et al.* (1998) define enterprise competitiveness as the ability to sustain a market position by supplying quality products on time and at competitive prices through acquiring the flexibility to respond quickly to changes in demand and successfully managing product differentiation through innovative capacity and use of an effective marketing system.

The difference between the competitiveness of an enterprise and that of a nation is that the enterprise will cease to exist if it remains uncompetitive for long time, while a nation never stops to exist no matter how uncompetitive it is. According to Porter (1985), the competitiveness of nations depends on their economic creativity measured by using a technology index such as innovation index and transfer of technology index.

2.2.6 Transaction cost and smallholder dairy marketing

According to Staal *et al.* (1997), it is hypothesized that growth in smallholder dairying is limited by high transactions costs i.e. smallholder farmers in Africa are likely to face higher transaction cost than larger producers for both production and marketing of dairy products. Higher transaction costs faced by smallholder dairy farmers are partly explained by the nature of milk and its products. Raw milk is "bulky" commodity which is more than 85 percent water implying relatively high transportation costs and limiting the quantities that can be marketed by individual households or groups of them without vehicular transport.

Also, is partly due to high perishability and natural variation, milk composition and quality is variable and often not easily ascertained. This makes higher costs for monitoring milk quality and losses by traders, processors and consumers when milk is spoiled or adulterated. The general view is that the presence of high transaction costs will affect the pattern and or level of participation in the market (MMA, 2008).

2.2.7 Effect of transaction cost on smallholder dairy farmers market participation

The study done by Vakis *et al.* (2002) indicated that besides access to road infrastructure, a number of other transaction related attributes were found to influence farmers' market decision. Additional cost related to transaction process such as transfer costs and handling costs influence farmers decision in terms of where to sell a particular crop/product and what are the prices they expect to receive in each market. According to Mbwana (2007), the presence of good infrastructures is expected to increase the efficiency of both marketing and production since they reduce transaction costs and ensure more competitive pricing conditions in marketing than would occur in their absence.

The study by Odhiambo and Nyangito (2003) explain the difference in agricultural productivity between regions and between groups of smallholder farmers. The main assumption in this study is that farmers in one region or of a particular size face the same set of sale and purchase prices. However, in practice; farmers even from the same region face different transaction costs. Transportation costs are an important aspect of farmers' participation to the market. These transaction costs tend to be high in developing countries due to pervasiveness of inefficient markets. The consequence of transaction costs is that each farmer will face a unique set of effective prices whether or not a farmer/producer own or hire the means of transport to the market.

2.3 Review of Methodological Approaches Used in Similar Studies

2.3.1 Value chain analysis approach

A function of previous methodologies and procedures for which improvements can be made to enhance new findings and/or strengthen reliability of old one is a crucial activity in any scientific research. Value chains differ both within and between sectors. McCormick and Schimtz (2001) argued that every stage of value chain analysis involves identification of the chain players, their roles, relationships, functions, determination of the chain governance or leadership so as to facilitate chain formation and strengthening; identification of value adding activities in the value chain, as well as costs and added value being assigned to different activities. Porter (2001) distinguishes between primary activities and support activities of the value chain. He contended that primary activities are directly concerned with the creation or delivery of a product or service and support activities are to improve the effectiveness or efficiency of primary activities.

Value chain as an analytical tool can help to provide important insights into various policy challenges. For example it can help to identify factors which are internal and/or outside the firm that influences the competitiveness of a firm or sector. Also, value chain is useful in analyzing the role of policy in enhancing the competitiveness of a firm and analysis of returns to different activities in the chain (Ikiara and Ndirangu, 2002).

Kabuje (2008) analysed the value chain for skins and hides in Tanzania using descriptive statistics to describe the characteristics of the value chain actors; whilst prices, marketing margins and profit margins were determined to examine value chain efficiency. Oduor (2008) characterized dairy production (in terms of management practices, resources used and constraints faced) using descriptive statistics and gross margins. Also, Mbiha (2008) used descriptive statistics to characterize the dairy value chain in Dar es Salaam milk shed. In this analysis, concentration ratio was also used to identify the chain market power whereas profit margins were also used to assess efficiency of dairy value chain.

Makindara (2012), used Chain Competitiveness Index (CCI) to analyse sorghum beer production value chain competitiveness, whereas Roekel *et al.* (2002) and KIT *et al.* (2006) approach was used to map potential players in the sorghum based clear beer value chain. For the purpose of this study the analytical tools used by Kabuje (2008) and Mbiha (2008) were adopted so as to characterize milk value chain in Tanga City and examining the existence of chain governance structures and their implications for chain efficiency and competitiveness.

2.3.2 Gini-coefficient

Gini-coefficient is an alternative measure of inequality of market shares. It is based on Lorenz curve. To use the Lorenz curve, the firms in an industry are ranked from smallest to largest in terms of their market shares. Then the cumulative percentage of firms is related to their market shares. Gini-coefficient compares the area between the diagonal and Lorenz curve with the area of triangle under the diagonal. A simple method to calculate the coefficient is to estimate the area of the trapezoids underneath the Lorenz curve at each quartile, subtracting the total sum from 10 000 and dividing the difference by 10 000. The problem associated with Gini coefficient is that it favors equality of market shares without regard to the number of equalized firms. In other words, the coefficient equals zero for two firms with 50 % market share, for three firms with 33.33 % market share each, and so on. Moreover, the coefficient is sensitive to market errors. The measured degree of inequality in an industry will tend to become larger as relatively small or relatively larger boarder line firms are included (Kidanu, 2010).

The findings from Mshote (2006) study on spice marketing revealed that, concentration ratio for both wholesalers and retailers of spices were high, this implies that the markets were strongly monopolistic. Furthermore, the study showed that the market structure tends to influence conduct and that; the high concentration will affect competitive behaviour. Mshote (2006) explained that concentration ratio is determined by looking at the proportional of total purchases accounted for by largest buyers to the total volume handled.

The Gini coefficient's main advantage is that it is a measure of inequality, not a measure of average income or some other variable which is unrepresentative of most of the population, such as gross domestic product. It can be used to compare income distribution across different populations as well as countries. For example, the Gini coefficient for urban areas differs from that of rural areas in many countries (Cowell and Flachaire, 2007). Moreover, The Gini coefficient can be used to indicate how the distribution of income has changed within a country over a period of time, thus it is possible to see if inequality is increasing or decreasing. In contrast, concentration ratio does not use the market shares of all the firms in the industry and does not show distribution of firm size. It also does not provide a lot of detail about competitiveness of the industry. The concentration ratio just provides a sign of the oligopolistic nature of an industry and indicates the degree of competition (Feinberg, 1980).

In this study the market chain competitiveness was assessed by using the DFID Competition Assessment framework which required identification of relevant market and competitors, examination market structure by identifying the relative importance of the main suppliers on its market share, looking for barriers to entry in the market such as resources or technology needed to become a supplier in the market which included the existence of large economies of scale, problems that new entrants had in obtaining access to technology, raw materials or distribution channels. Furthermore government policies and institutions such as Trade policy and industrial policy were ascertained as well as signs of anti-competitive conduct by firms such as abuse of dominance were examined.

2.3.3 Market concentration

The Herfindahl index also known as Herfindahl–Hirschman Index (HHI) is often used to a measure of the size of firms in relation to the industry hence indicating the amount of competition among them. Herfindahl–Hirschman Index is defined as the sum of the squares of the market shares of the 50 largest firms (or summed over all the firms if there are fewer than 50) within the industry, where the market shares are expressed as fractions

(Hirschman, 1964). The result is proportional to the average market share, weighted by market share. As such, it can range from 0 to 1.0, moving from a huge number of very small firms to a single monopolistic producer. Increases in the Herfindahl index generally indicate a decrease in competition and an increase of market power, whereas decreases indicate the opposite. As such, it can range from 0 to 1.0, moving from a huge number of very small firms to a single monopolistic producer.

Alternatively, if whole percentages are used, the index ranges from 0 to 10 000. In a perfectly competitive market, HHI approaches zero while in monopoly, HHI approaches 10 000. If the one largest firm has 100 percent of the market share, HHI = 100^2 = 10 000. A market with an HHI under 1000 is considered competitive (Catherine and Alan 2004).A HHI index below 0.01 (or 100) indicates a highly competitive index. A HHI index below 0.15 (or 1500) indicates a non concentrated index. A HHI index between 0.15 to 0.25 (or 1500 to 2500) indicates moderate concentration. A HHI index above 0.25 (above 2500) indicates high concentration (Catherine and Alan, 2004). The refore, the higher the HHI, the more the market is concentrated and hence the higher the competitive market.

2.3.4 Institutional analysis

Institutional analysis is often done by using the Institutional Analysis and Development (IAD) framework which focuses on individuals who make decisions over some course of action Ostrom *et al.* (1994). The IAD Framework provide better understanding of the policy process by outlining a systematic approach for analyzing institutions that govern action and outcomes within collective action arrangement. According to IAD framework, institutions are defined as a set of prescriptions and constraints that humans use to organize all forms of repetitive and structured interactions Ostrom *et al.* (1994). Institutions are further delineated as being formal or informal; the former characterized as rules-in-form and the latter as rules-in-use.

Furthermore the IAD framework identifies three key variables which can be used in evaluating the role of institutions in shaping social interactions and decision-making processes. The variables identified include (1) institutions or rules that govern the action stadium (2). The characteristics of the community or collective unit of interest, and (3). The attributes of the physical environment within which the community acts Ostrom (2005). Moreover the IAD identified multiple levels of institutional analysis at operational level, the collective-choice level, and the constitutional level which should be used in studying these choices (Kiser and Ostrom 1982; Ostrom, 1999).

The operational level of analysis is where individuals collectively make decisions about day to day activities. The collective-choice level of analysis focuses on decisions about the choice of rules that govern operational activities. The constitutional level of analysis is concerned with the authorized actors for collective-choice decisions and the rules governing those decisions. Thus, the framework necessitated a review of relevant documents from the city such as Acts, by-laws and regulation. There may be a range of experiences and opinions among members of the community or there may be sensitivity in exposing information to outsiders or to others within the community (Kothari, 2004).

2.4 Synthesis of the Literature Review

Literature review was done by systematically studyingthe existing literature on coordination of milk value chain. It was revealed that there is a growing recognition of the relevance of value chain analysis concepts and their application in agriculture for market-led development. The concepts are applicable across a wide range of products in the primary sector and therefore have great potential to help in developing rural enterprises and the rural economy.

The value chain was defined focusing on activities as well as actors involved from production through delivery to final consumer. The assessment of value chain has considerable merit in highlighting the constraints and opportunities at and between stages of the chain and thus can be used to develop integrative policy recommendations that target chain inefficiencies and address distributional issues. Also value chain is useful in analyzing the role of policy in enhancing the competitiveness of a firm and analysis of returns to different activities in the chain. It is argued that the competitiveness of enterprises or industry depends on the business environment viewed from the policy and institutional point of view and the company operations such as inter-firm cooperation.

Methodological approaches were discussed in the literature review. Herfindahl index was used to measure the size of firms in relation to the industry hence indicating the extent of competition in the relevant market. Market power is viewed as a function of the ability to maintain non competitive structure of market over time. Moreover Gini-coefficient may be used as an initial indicator of potential competition concern of the market. Gini-coefficient is used to examine inequality in market shares amongst buyers and/or sellers.

Furthermore, it was learnt that governments have the role in closing the market access gap through playing an important role in helping institutions and other coordination forms (collective action) to emerge that will effectively reduce transaction costs of market entry and participation by smallholders. Transaction Costs Economics (TCE) was reviewed. It was noted that TCE is relevant in any development venture such as agricultural market analysis in developing countries. This is due to the fact that the institutions or formal rules of market behaviour that facilitate market exchange in low-income countries are absent.

It was discussed that, the institutional environment should be conceived to favour competitive market arrangements as well as to encourage other types of coordination/governance structures that form part of what is termed as the Coordinated Market Economy (CME). Different policies can be used to promote efficient market coordination and allocate and enforce property rights since they are prerequisite for efficient exchange within a commodity chain. Also, policies can be used to establish and enforce norms and standards which may reduce transaction costs thereby increasing the available information to buyers and consumers.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Conceptual Framework of the Study

The conceptual framework of this study was adopted from Day (1990). The conceptualization of this study is that; milk value chain analysis requires an understanding of all the skills and resources which are used to carry out each activity and costs incurred to bring the products or service to the market. This integrated conceptual framework (Fig. 1) consists of six key dimensions namely market supporting functions, governance structures with their determinants, and business enabling environment as important factors for value chain actors.

Furthermore, the chain shows the link between the suppliers and the final consumers. Supporting functions consist of input supply, veterinary services, research and development as well as financial services. These functions are supported by regulations and business enabling environments such as policies and regulations. There are governance structures that refer to the manner in which transactions are organized within the value chain between different chain actors in a bid to ensure chain efficiency and competitiveness.

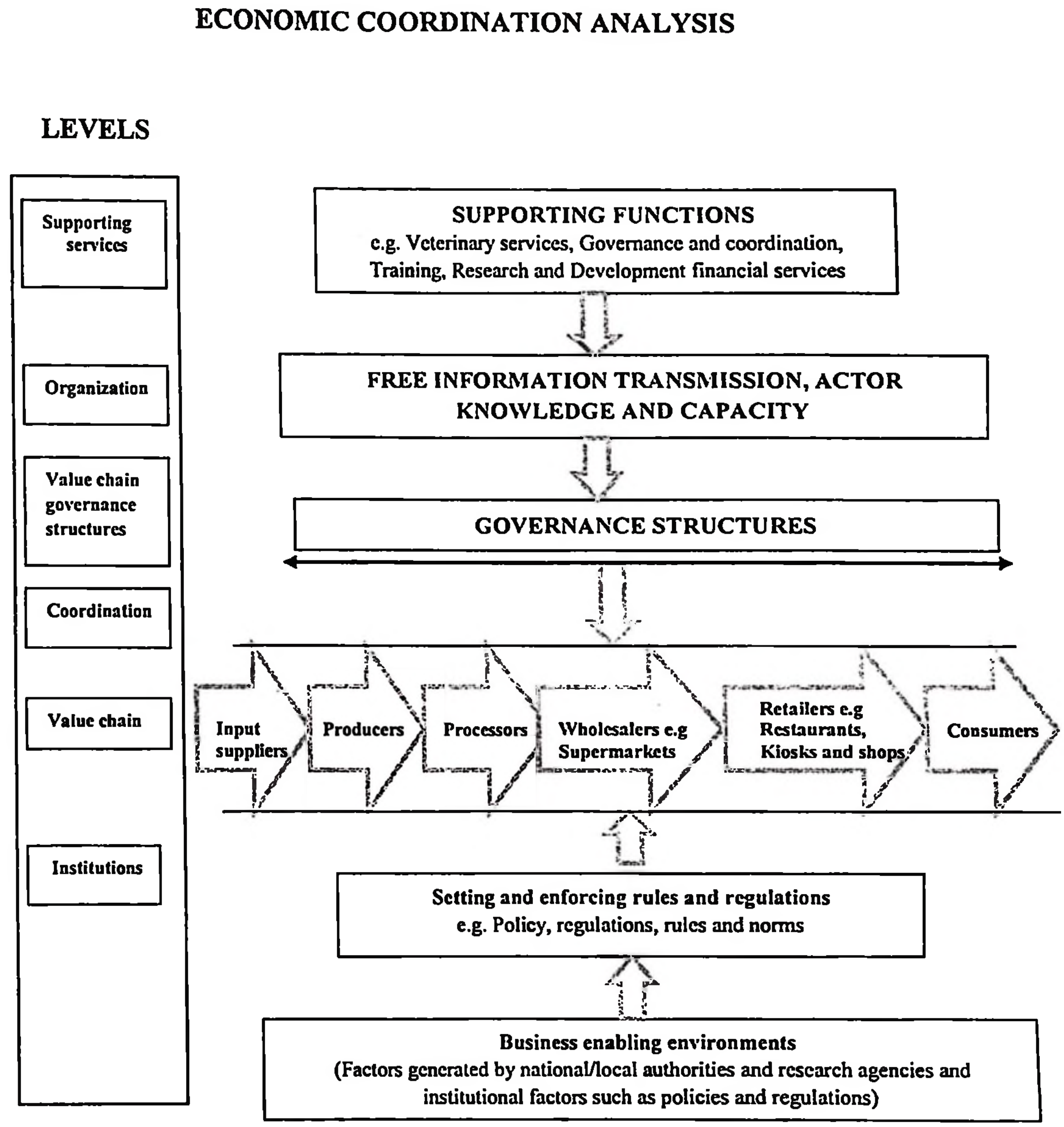

Figure 1: Research Conceptual Framework (Adopted and modified from Day (1990)

3.2 Description of the Study Area

3.2.1 Location

The research study was carried out in Tanga city which is one of the eight districts in Tanga Region. The city is situated in the North Eastern Coast of Tanzania along the Indian Ocean and lies in the Central Eastern part of Tanga Region. In the West and South the city is bordered by Muheza and Pangani Districts respectively. Mkinga District is in the North, whereas Indian Ocean borders the city to the East. The District Council is a newcomer district in Tanga Region which is bordered with the Republic of Kenya to the North, to the East, to the South bordered with Muheza and Tanga Districts and to the West Korogwe and Lushoto with total surface area of 2,948 Km^2 part of it is occupied with Umba game reserve the rest of the district comprises of agricultural land and pastures (URT, 2013). Tanga city is situated between Longitude 38°53' and 39°10'East and extends between Latitudes 5° and 5°16' South (TCC, 2008; Mahenge, 2007).

3.2.2 Topography and drainage

Tanga City lies on the coastal plain that extends about 20 kilometres inland from the Indian Ocean and is between 0 to 17 meters above sea level. However, the gently sloping landscape is featured by small rolling hills punctuated by valleys with rivers and streams, notably the Zigi, Nzimwi and Utofu in the north, and Mgombani / Kalindu and Gombero in the south. They all drain into the Indian Ocean (TCC, 2008).

3.2.3 Rainfall and climate

According to TCC (2008), Tanga City has a humid tropical climate with temperatures ranging from 24^0C to 33^0C due to its location along the coast. Moreover, the city experiences a dry season from January to mid March followed by three rainy seasons. The long rains (also known as *masika*) fall from March to May averaging at 1000 mm to

1400 mm annually. The light rains known as *"Mchoo"* falls from June to August resulting on in average of 100 mm annually. The short rains which are known as *"Vuli"* start in October through December at an average ranging from 500 mm to 800 mm annually.

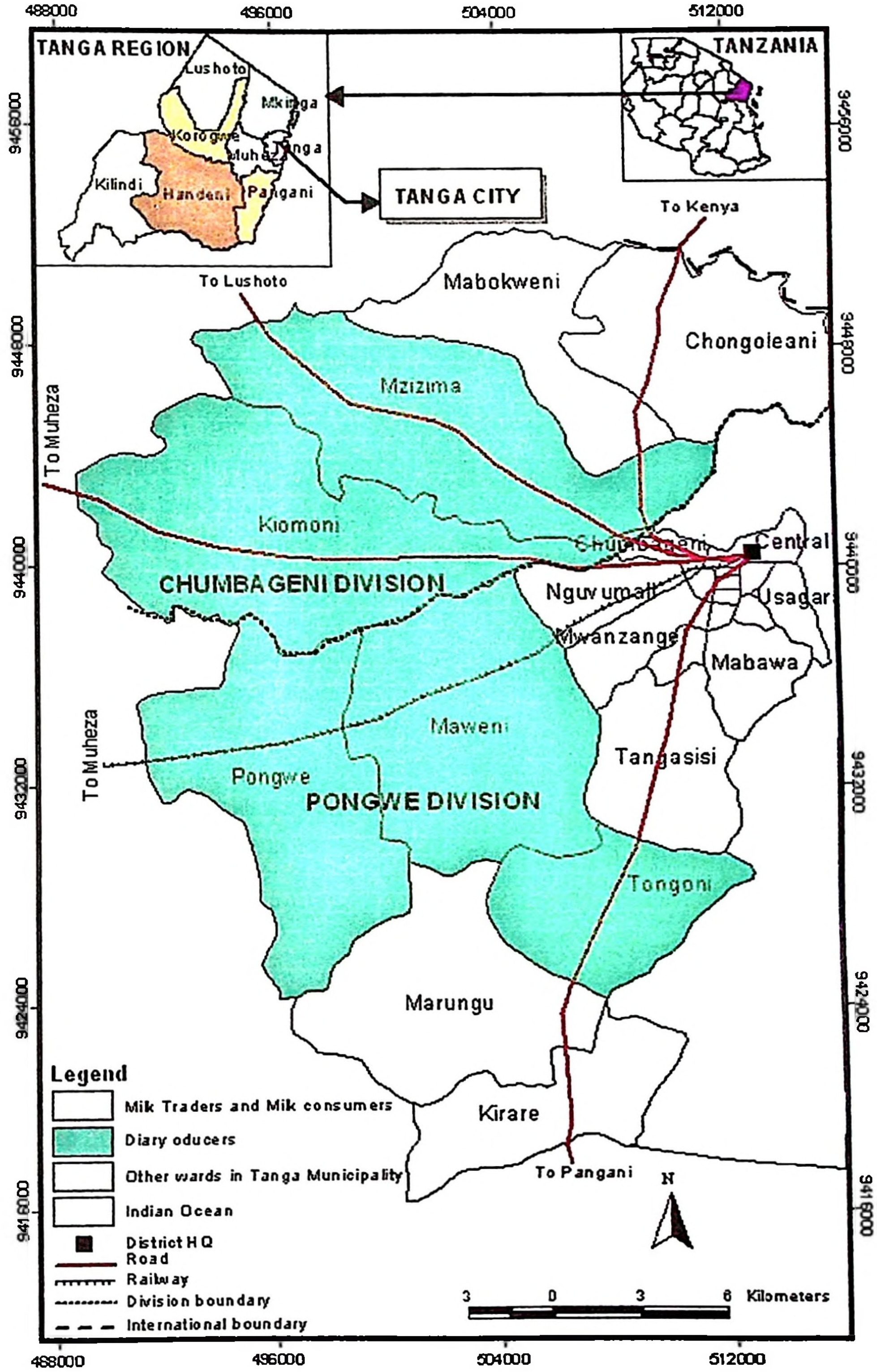

Figure 2 : Tanga city map showing the study area.

3.2.4 Population

Tanga City is the fourth largest urban agglomeration in the country and the most densely populated district in Tanga Region. It had 273 332 inhabitants disaggregated into 130 920 males and 142 412 females in 2012 (URT, 2013).

3.2.5 Economic activities

The city is built around an important harbour which is the second largest in Tanzania, and handles import and export goods of various types. The city is rich in history, natural attractions, good structural design of buildings and interesting aquatic activities such as fishing. South of Tanga City lies the famous tourist attraction centre known as Pangani, with good beaches which are unpolluted and is thus an excellent beach holiday destination. Tourism is likely to grow in the near future following the recent establishment of Saadani National Park which is endowed with a good sand beach and wild animals (Richmond *et al.*, 2003). Tanga city residents are involved in different economic activities ranging from tourism, fishing to agriculture (URT, 2013). Dairying is one of the major agricultural activities in the Tanga city.

3.3 Study Design

The study was a cross-sectional research design. The design allowed data to be collected at a single point in one time and used in descriptive study and for determination of relationship of variables (Bailey, 1994).

3.4 Sampling Procedures

3.4.1 Dairy farmers and traders

Sampling approaches used in this study were purposeful sampling and simple random sampling. Purposeful sampling was done so as to select two divisions which have largest number of dairy keeping farmers out of four divisions in Tanga city. The divisions were Pongwe and Chumbageni. Selection of division was based on the extent and level of dairy keeping. Also, purposeful sampling approach was used to select milk cooperatives. Thereafter, random sampling was adopted to select 80 dairy farmers from Pongwe, Maweni, Kichangani, Pingoni, Mabokweni, Kiomoni and Mzizima wards in the selected divisions. Also simple random sampling was also carried out to select 30 milk traders (milk hawkers, restaurants, kiosks, milk shops, hotels and supermarkets). The selected traders were from five wards namely Central, Makorora, Usagara, Ngamiani North and Ngamiani South.

3.4.2 Milk processors

The two milk processors in the Tanga city were purposefully selected to participate in the study. These were Tanga Fresh Limited and Ammy Brothers and Company. The existence of small number of milk processing plants followed the exit of Azania Fresh Ltd and Moran Dairies from the market for various social and economic reasons. Records show that there had been four milk processing plants in the Tanga city (TCC, 2008).

3.4.3 Cooperatives, umbrella organisations and city council organs

Tanga Dairy Cooperative Union (TDCU) was purposeful selected as an umbrella organization for milk producers in the city. Tanga Livestock Keepers Co-operative Society Ltd (UWATA) and Youth Livestock Keeper's Cooperative Society for Pingoni (UVIWAKAPI) were the two primary milk cooperatives out of eleven that were included in the sample. Furthermore, purposively sampling was adopted to select Livestock keepers cooperative society for Pongwe and Marungu (UWAPOMA) which was the only farmer/keeper network included in the sample.

3.5 Data Collection

Both primary and secondary data were collected in the study area. Tools used to collect data were questionnaires, checklist for key informants and checklists for Focus Group Discussions (Appendices 1, 2 and 3 respectively). The Focus Group Discussion session involved 15 participants, 10 being males and 5 females. The session was facilitated by the researcher. During the session, the facilitation technique used includes giving chances for all participants to speak and air their views. The participants who seemed to be less talkative were encouragement to speak, while those who were too much talkative were not allowed to domineer the session. The session was conducted in an atmosphere of respect to everyone's views.

Primary data was collected so as to characterize the milk value chain in the Tanga city and assess its efficiency and competitiveness. Key informant interviews were held with people who have in-depth understanding and knowledge on milk value chain. These include producers, processors, traders and milk consumers. They were considered to be major players in the market or had extensive experience in their market position and can therefore provide sound insight into their function and give reliable information on costs, trends, problems and opportunities at their node in the marketing chain. Other key informants included City agricultural and livestock officers (CLFO), City Health officer, City business officer City planning officer, extension officers and leaders of farmers/dairy groups (cooperatives). It was considered very important for these key persons to be included in the sample due to the fact that they can provide data on how the institutional and regulatory frameworks interact with milk industry in Tanga.

Information gathered during direct face to face interviews with dairy farmers and traders included socio-economic characteristics of the respondents such as gender, education level, experience and age. Other collected data was on enterprise specific factors such as herd size, quantity of milk produced, type of customers, location of enterprise, type of retail outlets, and type of grazing systems. Also, further data including total litres of milk per month handled by 30 milk traders, producer and consumer prices of milk, variable costs of milk producers and their respective revenues were collected so as to assess competition and efficiency characteristics particularly Gross margins, HHI and Gini coefficients .

Secondary data was collected from Tanga City Agricultural and Livestock offices, Tanga City council and district and regional agriculture offices, the Sokoine National Agricultural Library in Morogoro and the National Bureau of Statistic offices (NBS) in Tanzania. The data include annual milk production in Tanga City, number of dairy farmers and heads of cattle in the city, policies, rules, regulations and bylaws related to urban dairy industry.

3.6 Data Analysis

Data were entered and analyzed by using computer software known as Statistical Package for Social Sciences (SPSS), Microsoft excel and STATA programs. SPSS was used to analyze descriptive statistics including percentages and frequencies. Microsoft excel was used in calculation of Gross Margins and HHI, whereby STATA SOFTWARE was used for computing Gini-coefficient. The qualitative data were analyzed by using content analysis.

3.6.1 Characterization of milk value chain

Characterization of milk value chain was done by using content analysis. In so doing the main players of the said milk value chain in Tanga City were identified including their core functions. The mapping of actors was then done to ascertain their interrelationships which determine the pathways through which milk flows and milk products flow from producers to the ultimate consumers.

3.6.2 Governance structures of value chain

Content analysis was used to analyze the governance structures within the milk value chain in Tanga City. The type of contractual relationships between actors were analyzed to see if they actually exist, are they written or not, among others. This was done for actors operating in both formal and informal channels.

3.6.3 Chain competitiveness

In this study, the market chain competitiveness was assessed by using the DFID Competition Assessment framework which required identification of relevant market and competitors, examination of market shares of milk traders, looking for barriers to entry in the market such as resources or technology needed to become a supplier in the market.Furthermore, government policies and institutions such as City regulations and bylaws governing urban dairying were ascertained. The Herfindahl index (alternatively known as Herfindahl–Hirschman Index, or HHI) was used to measure the size of firms in relation to the industry hence indicating the amount of competition among them. The HHI was calculated by using the following formula:

$$H = \sum_{n=1}^{N} s_i^2 \qquad \text{.........(1)}$$

Whereby

s_i is the market share of firm i in the market, and

N is the number of firms.

H is Herfindahl–Hirschman Index.

Gini-coefficient (Bhuyan *et al.,* 1988) for examining inequality in market concentration was also computed using the formula below:

$$G = \sum_{i=1}^{n} (T_i + T_{i-1})(F_i - F_{i-1}),\ i = 1, 2, 3, \ldots n \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Where:

G = Gini-coefficient

$T_i + T_{i-1}$ = Cumulative proportion of milk traders

$F_i + F_{i-1}$ = Cumulative proportion of the produce (milk) handled by traders

n = number of traders

3.6.4 Analysis of market chain efficiency

The Herfindahl–Hirschman Index was also used to ascertain whether the diary value chain in Tanga City was efficient or otherwise. In addition to HHI, the market performance in the value chain was analyzed by using Gross Margin Analysis (GMA). Gross margin was calculated by taking the difference between revenue and the total variable cost. In this study, the variable costs for milk producers were wages or salary of labour, cost of buying inputs such as veterinary services and drugs, feeds, and cost of transporting milk to the collection centre/market point. Thus the gross margin analysis for various producers was calculated by using the following formula:

$$GM = TR - TVC \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(3)$$

Whereby:

GM	is Gross Margin in Tsh per litre of milk
TR	is Total Revenue in Tsh per litre of milk
TVC	is Total Variable Cost in Tsh per litre of milk.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of Respondents

Table 1 presents some of the main characteristics of the households involved in the study. About 86 % of the interviewed household heads were males. More than a half of the household heads were aged between 31 and 50 years. About one-third of the interviewed households were more than 50 years of age. In addition, 11.3 % were between 20 and 30 age category. Regarding to marital status, 85 % of the respondents were married, widowed (6.2 %), divorced (3.7 %), and single (5 %). Age is used as a measure of experience especially for operations in dairying that continue over time. Higher experience makes certain information and management of operational costs easier or cheaper (Pingali *et al.*, 2005).

Family size of 5 to 6 persons was very common among the dairy keepers. Moreover the data found that 57.5 % (about one-third) of the households had persons more than 6 and just a few had small household size. Household size could have a positive implication on the average cattle ownership of the respondents. Bigger size of cattle herd was found to be owned by the big sized household and this probably was because of various reasons including family labour availability.

It was further observed that 40 % of the respondents were dairy cattle keepers. Thus, the sub-sector is deemed to be the major source of income of most of the households in the study area. Some respondents among the sampled dairy keepers (17.5 %) and (18.8 %) mentioned that wage employment and small business respectively were the alternative sources of income of their households. Despite the fact that the study was conducted in peri-urban setting, about one-fifth of the sampled dairy keepers were depending on crop production as their major source of income.

Majority (71.5 %) of household heads had attained the level of primary education. This implies that few household heads had attained subsequent higher levels of education. Education is an important not only entry point for empowerment but also instrumental in sustaining development. In this context, educational level of the farming households may have significant importance in identifying and determining the type of development and extension service approaches for supporting small scale dairy activities in peri-urban context. The role of education is obvious in affecting household income, adopting technologies, population dynamics, health, and as a whole the socio-economic status of the family as well. The studies by Boger (2001), Pingali (2005) and Makhura *et al.* (2001) found that education increases the efficiency of searching for and processing information.

Majority of households (36.3 %) had an average number of dairy cattle between 1 and 5, while only 2.5 % households had more than 20 cattle. This shows that majority of dairy keepers manage fewer cattle for subsistence due to limited space, regulations and high operational costs. Further results show that 47.5 % of the interviewed milk producers walk shorter distances of between 1 and 2 km to deliver their dairy raw milk to the selling points (Collection centers). Almost a similar proportion of households (43.8 %) of producers walk slightly longer distances of between 3 and 5 km to sell their dairy raw milk. Only a few (8.7 %) walk long distances of more than five kilometers for the same purpose.

Table 1: Socio-economic characteristics of respondents

Socio-economic characteristics	Percentage (%) of sampled milk producers (n=80)
Sex	
Male	86.2
Female	13.8
Total	**100**
Age	
Between 20 to 30	11.3
Between 31 to 50	52.5
51 and above	36.2
Total	**100**
Marital status	
Married	85.0
Single	5.0 0
Widowed	6.25
Divorced	3.75
Total	**100**
Education level	
No formal education	5.00
Primary education	71.25
Secondary education	17.50
Post secondary education	6.25
Total	**100**
Family size	
Between 1 to 4	11.25
Between 5 to 6	57.50
7 and above	31.25
Total	**100**
Source of income	
Wage employment	17.5
Dairy cattle keeping	40.0
Business	18.8
Crop production	23.7
Total	**100**
Herd Size	
Between 1 and 5	36.3
Between 6 and 10	30.0
Between 11 and 20	12.5
More than 30	18.7
Total	**100**
Distance to market	
Between 1 and 2	47.5
Between 3 and 5	43.8
Between 6 and 7	8.7
Total	**100**

4.2 Characterization of Milk Value Chain in Tanga

4.2.1 Value chain actors and functions

Key players in milk marketing in Tanga city comprise a number of actors namely producers, traders, processor, cooperatives, consumers and input suppliers. Their functions and roles are as described below.

4.2.1.2 Milk producers

These are the main actors that feed the chain in the sense that allocate resources so as to produce milk. Their main role is to ensure constant supply of milk in terms of amount and quality to other actors in the milk value chain. The study survey found that in the more often, most of milk producers supply large amount of milk to the milk collection centre rather than to milk retailers and individual customers.

(i) Average milk productivity

Table 2 below shows average milk productivity with season. The table revealed that, the 50-100 litres of milk produced in dry season is only 1.2 % and in wet season is only 2.5 %. The amount of milk produced by a cow is direct related to the quality and quantity of feed she eats. In dry season the quality and quantity of feed is not enough therefore it is expected that the cow will produce less milk compared to wet season.

Table 2: Average daily litres of milk produced per cow

Amount of milk (Litres)	Wet season (n=80) Percent	Dry season (n=80) Percent
0 – 0.99	-	2.5
1 - 2	11.2	8.8
3- 4	12.5	32.5
5 - 6	35.0	30.0
7 - 10	25.0	20.0
11- 20	10.0	5.0
21 - 50	3.8	0
50 - 100	2.5	1.2
Total	**100**	**100**

(ii) Various types of owned livestock

Table 3 below shows that, 73.9 % of the respondents had 1 – 4 calves; 21.6 % had 5 – 8 calves and 4.5 % had 9 – 20 calves. The table also shows that 89.3 % of the respondents had 1 – 4 heifers while 3.6 % had 5 -8 and 9 – 20 heifers respectively. As regards to bulls, 79.1 % of the respondents had 1 – 2 bulls whereas 20.9 % had 3 – 5 bulls. Majority of the interviewed respondents (51.9 %) had 1 – 4 cows. The maximum herd size in dairy unit was 4 bulls, 6 calves, 4 heifers and 10 cows while the minimum herd size was 2 bulls, 2 calves, 2 heifers and 2 cows. Some dairy producers could not afford to keep many cows due to high operational costs particularly feeds and drugs costs. The dairy herd size is an important determinant of milk production.

Table 3: Number of various types of livestock owned by the respondents

	Number	Percent (n=80)
Calves	1 - 4	73.9
	5 - 8	21.6
	9 – 20	4.5
	Total	**100**
Heifers	1 - 4	89.3
	5 - 8	3.6
	9 - 20	3.6
	> 20	3.5
	Total	**100**
Bulls	1 -2	79.1
	3 - 6	20.9
	Total	**100**
Cows	1 - 4	51.9
	5 - 8	34.2
	9 - 11	8.9
	>11	5
	Total	**100**

(iii) Means of transporting Milk

The Table 4 below shows that most (45.5 %) of sampled dairy producers used bicycles as a means of transporting milk during milk selling. Other means of transporting milk included delivering milk on foot whereby 30.5 % of milk producers deriver their produce on foot. It is indicated that bicycle is the most major means of milk this shows lack of access to other means of transport and this results to high losses caused by milk spoilage especially when milk is transported to long distance.

Table 4: Means of transporting milk by the respondents

Type of Transport	Percent (n=80)
Bicycle	45.5
Public Transport(Buses)	8.0
Own Vehicles	2.0
Foot	30.5
Motorcycles	14.0
Total	**100**

4.2.1.3 Primary and secondary cooperatives

Majority of dairy farmers in Tanga city are organized in 11 co-operative societies under the umbrella organizations called Tanga Dairy Cooperative Union (TDCU). The main function of primary cooperatives and secondary milk cooperative was to collect milk directly from milk producers and sell directly to Tanga Fresh processing plant and sometimes to milk consumers. The cooperatives were also maintaining a list of suppliers and continuously monitor day to day operations to meet the daily targets of milk collection with the suppliers.

Upon delivery of milk at the milk collection centre, the quality of milk is checked by measuring its density, colour and absence of foreign matter. Thus, cooperative societies have a role of controlling the quality of raw milk collected from farmers. The amount of milk supplied is recorded and the farmer collects his money in mid and end of the month. Another role played by these organizations was that of guarantor when members seek animal feeds, veterinary services or other inputs on loan basis.

4.2.1.4 Milk processors

Two main processors were found in Tanga city namely, Tanga Fresh and Ammy Brothers and Company, the former being the major milk processor with the installed full processing capacity of 50 000 litrers per day, however the survey observations revealed that the utilized capacity of the plant is 33 000 – 35 000 litres of milk per day. Under-utilization of installed full processing capacity was mostly explained to be caused by seasonal supply of milk in the city. The processor was found to be the reliable chain for raw milk produced by smallholder milk producers. The collected raw milk were then processed into different products such as sour milk, yoghurt, cheese, cream, butter and fresh pasteurized milk. The products were then sold into different milk retailers (markets) such as restaurants, hotels, supermarkets (small and big) and shops. On the other hand the Ammy Brothers and Company was a small scale milk processor with the installed capacity of 1000-2000 litres of milk per day and utilized capacity of 400 litres of milk per day. The plant processed sour milk, fresh pasteurized milk and yoghurt these products were sold around the city and the major consumers were the local residents and individual households.

The interviewed milk processors officials reported that they belong to Tanzania Milk Processor Association (TAMPA) and Tanzania Milk Producers Association (TAMPRODA).These are private sector associations formed by actors along the chain with the aim of having collective actions. Milk processors reported that by being members to that associations negations on tax reduction, provision of Government incentives, provision of market were made possible. Also associations enabled milk processors to have a common voice especially when they faced by problems such as marketing problems

According to the discussion made with the plant's officials, it was reported that the main constraints faced these plants were the regulatory burden. Milk processors reported to be over regulated in the sense that they were regulated by more than fifteen regulators which required them to abide with about 25 Acts and more than 25 regulations. More specifically the mentioned regulatory issues were the inspections of premises which had a variety of regulations aimed at food hygiene and this was regulated different authorities such as TFDA, TBS, TDB and Zoo-sanitary and OSHA. This made the plants to incur additional regulatory costs and therefore increase the burden on businesses and finally which therefore affects their ability to compete within the sector. Other reported challenges were high cost of equipment, inadequate machinery, packaging materials and utilities, poor infrastructure, inadequate raw milk due to seasonal fluctuation of milk production which made these plants to fail to utilize full the installed capacities and low milk consumption levels due to customs and norms. However the plants officials reported that they have a common voice in rationalizing and harmonizing the overlapping regulations in the sector through Milk Processors Association (TAMPA).

4.2.1.5 Milk traders / retailers

These actors were found to link the marketing chain whereby they buy raw milk from milk producers or milk cooperatives and sell directly to either final milk consumers or milk retail outlets. Traders / retailers also buy processed milk and milk products such as sour milk, yoghurt, cheese and cream from processing plants and sell directly to either final milk consumers or milk retail outlets. The study survey observed different milk retailers which include restaurants, milk bars, shops, kiosks, hotels and supermarkets. Milk hawkers are street traders who sell milk in various parts of Tanga City by using bicycles.

In order for a person to be a milk trader in the city he / she had to comply with the regulations and by-laws provided by the city council. For example the Tanga Municipal Council (Hawking and Street trading) by-Laws of 1992 provided guidelines which require a person to be issued with a business licence and every business premises shall be provided with a valid health card and shall be displayed on a conspicuous part in the business premises throughout the period of the business is in operation (URT, 1992).

(i) Major source of milk marketed by the sampled milk traders

Table 5 shows that most of the interviewd milk traders obtained fresh milk from milk producers (farm gate). Farm gate was reported by most dairy traders (55 %) to be as their most reliable source of milk as compared to other sources such as milk collection centres and from milk wholesalers except those who deals with supermarkets and shops obtained packed pasteurized milk and packed fermented milk from milk wholesalers such as Tanga fresh milk marketing agents, also the price of milk offered from the farm gate were most affordable as compared to other sources.

Table 5: Major sources of milk of sampled milk Traders

Source of Milk	Percent (n=30)
Milk Collection centers	20
Wholesalers	25
Farm Gates	55
Total	**100**

4.2.1.6 Milk consumers

These are the ultimate end users of milk and milk products in Tanga City. Survey found that the common milk products produced and consumed in the study area included raw milk and processed milk such as sour milk, butter, yoghurt and cheese. However it was noted that 73.2 % of the milk is consumed after boiling; 21.3 % is consumed after souring; and 5.5 % is consumed as raw milk (Table 6). Furthermore, the interviewed respondents reported that butter is used for various purposes like cooking (61 %) and sale (39 %). Much of cheese produced is consumed at home (62 %) and the rest is sold to different local consumers.

Consumer preferences and culture shape the consumption behavior, which affects consumption decision. Henriksen (1996) reported that, unprocessed raw milk is consumed by people of all income levels. Furthermore it is reported that consumer preferences in Tanzania are dictated by prices where by consumers tend to avoid buying processed products which they believe they are relatively expensive compared to unprocessed products UNDP/BCS/TetraPak (2006).

Table 6: Consumption of milk and milk products

Variables	Percent of sampled milk consumers (n=30)
Consumption	
After boiling	73.2
After souring	21.3
Consumed raw	5.5
Total	**100**
Utilization of milk products	
Butter	
Cooking	61
Sale	39
Total	**100**
Buttermilk	
Human consumption	70
Animal consumption	30
Total	**100**
Cheese	
Home consumption	62
Sale	38
Total	**100**

The Fig. 3 below shows all actors involved in milk chain in Tanga city. The product flow is indicated with blue arrows, information flow with double pointed brown arrow and money flow is shown with black dotted arrow on the chain map.

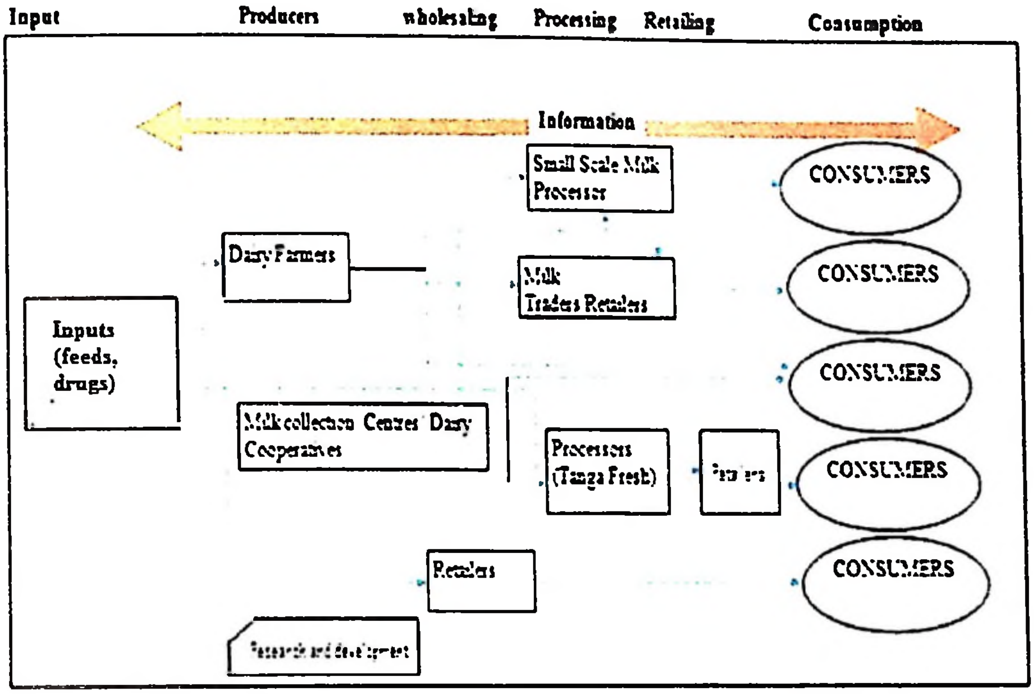

Figure 3: Milk Value Chain Actors in Tanga City.

4.2.3 Milk marketing channels in Tanga city

Marketable milk commodities in the study area include whole milk, butter, cheese and butter. Milk producers, milk cooperatives, and consumers were key participants in the milk market. Since other milk products, such as butter and cheese were produced and sold in small quantities, the analysis focused mainly on milk marketing. The survey therefore identified five types of milk marketing channels as indicated below:

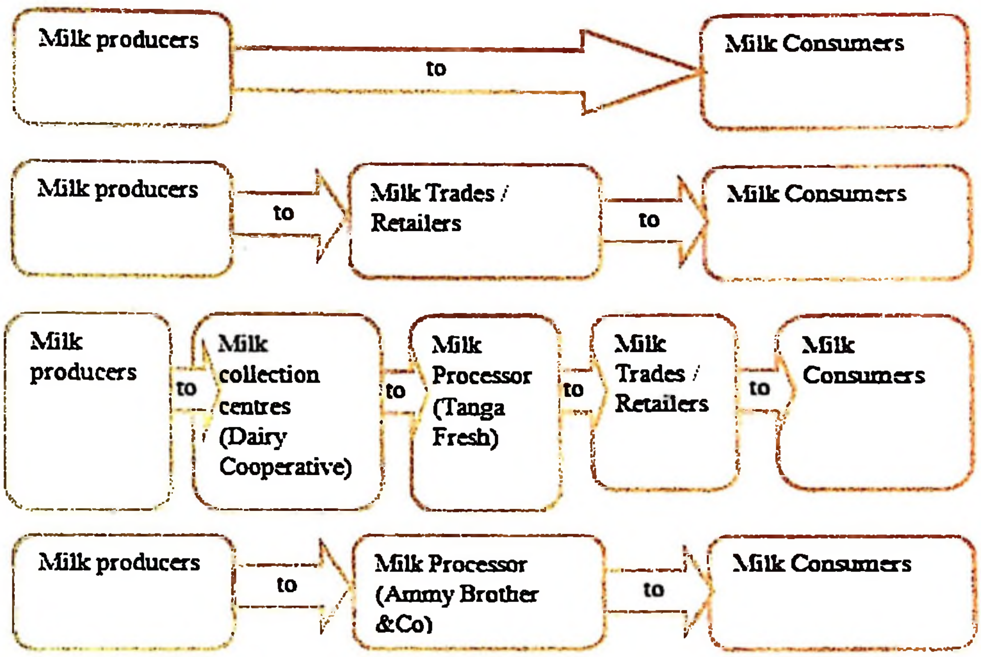

Figure 4: Milk marketing channels in Tanga city

The map shown in Fig. 4 above shows the milk marketing channels identified in Tanga city. The study survey revealed that some (22.5 %) of the sampled milk producers sold milk direct to consumers at the farm gate and about 298 litres per day were sold through this channel. However this channel was not very common because there were a number of alternative marketing channels.

Producers could also opt to dispose their milk through intermediaries/retailers who delivered the milk directly or indirectly to consumers in the city. The common intermediaries used in this channel were milk bars, hotels, kiosk and restaurants. On average about 3750 litres per day were sold to milk retailers directly from milk producers. However there were some milk producers (15 %) who opt to sell milk directly into the informal milk marketing channel through street traders such as milk vendors, kiosks, restaurants, street food vendors, milk shops/bars and milk wholesalers.

Most of the sampled milk producers (56.25 %) delivered their large volumes about 4295.52 litres per day of milk at collection centres established by large milk processor in the City (Tanga fresh) as shown in Fig. 3. Among of the sampled milk producers (6.25 %) sold their milk direct to Ammy Brother's and Company. The survey revealed that about 400 litres per day were procured by Ammy Brothers and Company and after processing, milk and milk products were sold directly to milk consumers.

Tanga fresh can process 33 000 – 35 000 litres of milk per day, however processing capacity of the plant was about 50 000 liters in full capacity. After processing milk collected by Tanga fresh from the dairy cooperatives, milk products such as pasteurized fresh milk sour milk, yoghurt and cream were delivered to milk retailers such as restaurants, milk hawkers, milk shops, kiosks, hotels, and supermarkets. The survey results revealed that on average about 4037.79 litres of raw milk per day were delivered in this channel. The survey results therefore shows that large volume of milk produced in the city were channeled to milk cooperatives which in turn are purchased by the processor (Tanga Fresh Limited).

Table 7: Milk marketing outlets in Tanga city

Milk outlets of sampled milk producers	Percentage of producers (n=80)
Farm gate/homestead	22.5
Milk collection centres	56.25
Door to door collection (by milk Traders)	15.0
Small Milk processing plant	6.25
Total	**100**

4.2. 4 Dairy farmers' gross margin

Gross margin for dairy producers was between 208.1Tsh and 228.1 Tsh per litre in the formal and informal market channels respectively as shown in Table 8 below. The findings indicate that dairy producers trading their milk through the informal channel received higher prices compared to the average price obtained by those in the formal channel. This could give a wrong signal that the informal sector was more efficient and competitive than the formal chain while as such in the absence of the latter (processing channel), milk in the informal chain will be worthless.

Producers in the formal channel argued that the competition was unmerited because those operating in informal channel were offered with high price and are not regulated with formal procedures; laws and regulations as well as standards set and thus get away with immoral reduction of costs by adulterating milk with water. This helps them to get more profit margins compared with those in the formal channel. However, in most cases an individual producer would participate in both chains at the same time, the only difference being the milk volume traded on each at different seasons.

Table 8: Gross margins per litre of milk in the formal and informal markets

	Channel type	
Item	**Formal (TZS/ Litre)**	**Informal (TZS/ Litre)**
Average Variable Cost	371.9	371.9
Average Revenue	580	600
Gross Margin	208.1	228.1

Table 9 below shows the results of independent sample t-test for comparison of mean GM assuming equal variance yielded a t-statistic of -0.37 which was statistically not significant in both single tail and two tail scenarios ($p > 0.1$). These results entails that the farmers operating under formal and informal channels earn the same all other factors being equal.

Table 9: Independent t test for comparison of mean GM of formal and informal channel

	Formal chain	Informal chain
Mean GM (TZS/Liter)	208.1	228.1
Variance	116041.38	116041.38
Hypothesized Mean Difference	0	
df	154	
t- statistic	-0.37	
P(T<=t) one-tail	0.36^{NS}	
P(T<=t) two-tail	0.71^{NS}	

^{NS} = No significant difference between GM obtain in formal and informal

4.3 Governance Structures of the Milk Value Chain

4.3.1 Organization of farmers in the milk value chain

Farmer-led co-operatives are democratic associations of voluntary members that work collectively to meet a common goal of mutual benefits. Majority of smallholder dairy farmers in Tanga city are organized in primary co-operative societies. There were about eleven primary dairy cooperatives with a total of more than 3000 dairy farmers. The eleven primary dairy cooperatives are organized under the umbrella of Tanga Dairies Co-operatives Union (TDCU). There are also some few farmers who are not members of primary cooperatives. TDCU is an autonomous body that is, member-owned, non-governmental and non-partisan. Members of cooperatives were contractually obliged to supply milk only to their cooperative society and nowhere else. They were also obliged to comply with other terms and conditions of the cooperative societies including paying annual membership fees. Non-members of cooperative societies were allowed to sell their milk to the cooperatives but are not obliged to comply with terms and conditions of membership. Non members are also free to sell their produce at other market outlets. Reported major benefit of joining cooperative societies were a reliable source of milk market through the formal contract as well as to have a common voice during price negotiation between TDCU and TFL.

The main role of TDCU was to supply milk to Tanga Fresh Limited (TFL) as well as administering the payments made to the Primary milk Co-operatives (PCSs). TDCU owns 22 milk collection centres while Tanga Fresh Limited (TFL) operates 16 Milk collection centres. There were no contractual disputes between farmers and primary cooperatives or between cooperatives themselves. However, primary cooperatives blames TDCU that it does not support them in negotiations with Tanga Fresh Limited about price of raw milk. Particularly the primary cooperatives are in view that TDCU is not fairly representing their case at the negotiation table with Tanga Fresh Limited. However Tanga Fresh Limited is a joint venture company with two major shareholders namely, De Oude Beuk (DOB) and TDCU owing 45 and 35 % of the total share respectively. Others are termed management shares which are owned by Mr. Lut Zijlstra (10 %) and Al Noor Hussein (10 %). TDCU is receiving dividends from TFL, however the amount disbursed for the last financial year was not mentioned because of preservation of confidentiality. Also, some detailed information about shareholding structures was not disclosed. The disclosure of sensitive information by firms was not easy because of fear of competitors.

4.3.2 Contractual arrangements

Contractual relationships were observed between actors at various levels of the value chain. There were a formal written contract between individual framers and their respective primary cooperative societies. Also a formal written contract between TDCU and primary cooperative societies, and between TDCU and TFL on the other hand were observed. According to the contracts primary cooperatives are obliged to ensure constant supply of raw milk to TDCU and the later is obliged to represent the cooperatives in price setting and other negotiations with their customer namely TFL. On the other hand, TDCU and TFL have agreement that the former is obliged to ensure constant supply of raw milk to TFL. The study observed that majority of dairy producers (90 %) in the study areas had formal written contracts with primary milk cooperatives while verbal agreements were reported by 10 % of the milk producers. Despite having written contracts, there was no any enforcement mechanism since no action was taken in case of violation when farmers decided to sell their milk to informal chain. Therefore, although there were written contracts, the contracts were neither binding nor effective.

Formal or written contracts on the other hand are enforceable by law along the lines of promises that define each party's obligations. According to these contracts, farmers who supply milk to cooperatives are paid twice in a month basing on the agreed price and volume of milk supplied. For instance, the unit price of milk according to the contract in was 560 Tsh during the dry season and 540 Tsh during wet season. However, the price of processed milk and milk products produced by TFL remained unchanged during dry and wet season.

The findings of this study indicated that since TDCU is a shareholder of TFL and also represents farmers in the negotiations for milk prices with TFL, there is a possibility of conflict of interest through a '*regulatory capture process*' involving the management teams of the two entities, especially when considering that TFL maintains its position as the chain leader in the industry. The fact that primary milk cooperative members are complaining against both the entities attests to this inference. Moreover, there is a problem with relative prices in this coordination set up whereby the price of raw milk from milk farmers fluctuated with season while the prices of processed milk and milk products from TFL do not. This situation affects chain efficiency as well as competitiveness and consequently degree of market transparency.

The coordination system is typically a quasi-vertical form of integration whereby TFL through its shareholder TDCU contracts with the supplier of milk (farmers) to produce milk that is used in the processing of milk and milk products at the TFL plant. This type of coordination system is different from full vertical integration whereby the production and processing of milk would have been carried out by TFL itself.

4.3.3 Organization of input market

The input suppliers were the traders who supply animal feeds and veterinary drugs to producers. Producers in Tanga city normally search feeds such as cotton seedcake, bran, minerals and medicine from reliable input suppliers. Their main role was to ensure that the value chain was alive by supplying the necessary inputs to make the production systems sustainable. Apart from passively waiting for customers, sometimes input suppliers engage in active search for customer's right in their households. In each of the study wards there were one input supplier. They type of inputs supplied include veterinary drugs, vaccines and animal feeds such as cottonseed cake. The service rendered by input suppliers was on the basis of direct payments for goods or service offered. In case the members of milk cooperatives have no funds to make direct payments, his membership to the cooperative society acted as collateral to access such services. Thus, the member of cooperative society who access input services on credit was obliged to pay for the service when he received the payment from milk collection centre later in the month. Since this scenario was rare, the interlock between the input and output market was uncommon. The services rendered by input suppliers are not subsidized.

The survey observations showed that the input market was directly connected with individual farmers and diary cooperatives and to some extent interlocked with the output market. The obligation of primary diary cooperatives was to provide farmers with collateral to access inputs such as animal feeds and drugs as well as veterinary services when they are unable to pay for these inputs at that particular period of time. The farmer debts on these inputs directly deducted at source by the cooperative from their bimonthly payments. In addition, primary dairy cooperatives provide farmers with technical assistance related to milk quality observance. The TDCU officials reported that plans were underway to hire veterinary graduates who would assist dairy farmers on animal health and production issues.

4.3.4 Accessibility to extension service

Table 10 shows that 38.7 % of the sampled milk producers do access information about milk production from extension agents such as extension officers and veterinary doctors. Other sources of technical information about milk production are from family experience (5 %), colleagues (6.2 %), newspapers (10 %), and primary milk cooperatives (3.7 %). There were also farmers who got such information from radio and television (5 %), NGOs (7.5 %), while the rest (23.7 %) used their own experience. Therefore, majority of milk producer's respondents have access to various types of information concerning milk production albeit government extension service. Information received include animal husbandry (improvement of milk cow breeds and use of artificial insemination, improved feeding, frequent health care, market opportunity, conservation and treatment of agricultural crop residues as alternative source of feeds).

Table 10: Sources of technical information on milk production

Sources of technical information for milk producers	Percentage of respondents (%) (n=80)
Government officers/extension agents	38.75
Own experience	23.75
Newspaper	10
NGOs	7.5
Experience from elders	5
Colleagues	6.25
Associations	3.75
Radio/TV	5
Total	**100**

4.4 The Milk Value Chain Efficiency and Competitiveness

4.4.1 Market concentration

To analyze market concentration, the Herfindahl-Hirschman Index for volume of milk supplied in the City by individual traders was computed. This index is used as a criterion for judging if the market is concentrated or otherwise. The result shows that the milk sub sector in Tanga City is monopolistic and the market is highly concentrated. This is because the HHI index computed was 7772.59 far above 2500 which is the cut off point for high market concentration (Table 11). Since the market concentration is high there is less competition and efficiency hence increasing the chances of both collusion and monopoly (Kwoka, 1977).

Table 11: Herfindahl - Hirschman Index (HHI) for Milk Industry Market Concentration in Tanga City

Market player	Litres / day	Market concentration (% of total volume of milk per day)	Herfindahl-Hirschman Index *(HHI)*
Milk producers to consumers (Direct sales)	298	0.8	0.64
Ammy Brother's and Company	400	1.1	1.21
Retailers to consumers	4037	10.7	114.49
Tanga Fresh	33000	87.5	7656.25
Total volume of milk	**37735**	**100**	**HHI = 7772.59**

4.4.2 The level of equality in sharing the market

Lorenz curve was used to visualize the level of inequality in market shares while Gini coefficient was used to measure the level of inequality in market shares among traders. The Lorenz curve shows the cumulative percentage of market share (traded volume of milk in litres) versus cumulative percentage of traders in the local market.

Table 12: Gini index

Variable	Gini Coefficient	Standard Error	Confidence interval at 95% Lower Boundary	Upper Boundary
Milk (litres)	0.754312	0.077858	0.595305	0.913318

As it is shown in table 12 above, the Gini coefficient was 0.7543. The actual value lies between 0.5953 and 0.9133 as indicated in Table 12. This implies that the milk handled by these traders vary from one trader to another with very few traders handling significant proportion of total milk production (closely approaching monopsony situation).

The finding suggests that, there is high level of inequality in the milk market share. This is due to the fact that Tanga Fresh Limited (TFL) has been able to organize the milk producers to collect their produce through the established Milk collection centres as well as through TDCU and scared and/or predated on new entrants.

This inference is made due to the fact that the Gini coefficient is used to summarize inequalities in the market share by firms in the industry, therefore if the suppliers in a market have near-equal market share, the Gini coefficient is near zero and if most of the suppliers have very low market share but there exist one or a few supplies providing most of the market share then the Gini coefficient is near one. Gini coefficient ranges between 0, which shows that there is no market concentration (perfect equality), and 1 which shows that there is a total market concentration (perfect inequality). The closer the coefficient is to 1, the more unequal the distribution in the market. The Gini-Coefficient with highly unequal distributions typically lies between 0.50 and 0.70, while with relatively equitable distributions the coefficient lies between 0.20 and 0.35 (Rodrique, 2013).

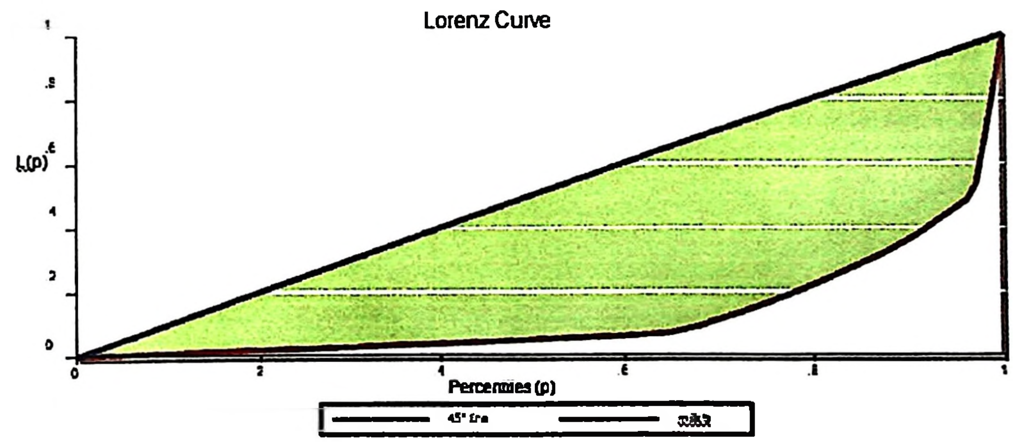

Figure 5: Lorenz curve showing inequality in market share of milk traders in Tanga city

The Fig. 5 above shows the Lorenz curve for milk volumes handled by different milk traders in Tanga city. The blue (45 degree) line is the line of equity. If all traders handled the same amount of milk the red line (Lorenz curve) will have the same slope with the blue line (line of perfect equality) because of variation in the amount of milk obtained from different traders, and that variation is indicated by the area between the blue line and red line.

4.5 Institutional Analysis of Tanga Urban Dairy Industry

4.5.1 Legal and policy environment

The regulation of urban dairying lies with the urban authorities as by-laws and regulations of livestock keeping. In the city by-laws, keeping animals requires the purchase of a special permit from the Town or City Director which cost 1000 Tsh and 500 Tsh per head of cattle and calves of less than one year respectively. The by-laws restrict a maximum of four head of cattle; only to be kept under zero-grazing system and in specific structures. Removal of manure, liquid waste material and other animal waste is compulsory. At the household level, this requires an awareness of the environmental impact of dairy farmers' activities and their willingness to take the environment into account in their dairying activities. This means that the households should practice zero grazing to make sure that their animals do not contaminate the city with their wastes such as dung (URT, 1992; URT, 2003).

Urban dairying is also governed by several national laws and regulations. For example the Urban Farming Regulation of 1992 which was revised in 2003 provides guidelines which indicate the maximum plot size and the number of cattle and the grazing system of livestock required. The regulation states that no person shall occupy or use more than three acres of land for urban farming. No person shall, except where that person practices zero grazing, graze his animal in an urban area. Furthermore, National Human Settlements Development Policy of January 2000 designates areas for urban dairying, granting legal rights for the people involved in dairying in those areas as well as facilitating the construction of appropriate infrastructure in those areas. These measures were at the same time meant to prevent an interference of planned urban development (URT, 2000).

Urban dairying was considered by policy makers, such as town planners and city health officers, as an environmental hazard since it can cause bad smells, noise, erosion, traffic accidents and diseases. Urban dairying is thus discouraged unless you get permission from respective authorities. However, according to the discussion with city agricultural and livestock officer, urban farming is usually practiced. Sustainable urban dairying was reported to be related to environmental consequences of the practice. Dairying in the city can only be sustainable as long as it does not harm the urban ecological environment.

According to Tanga City Agricultural and Livestock officer (CALDO), it had been established that for the urban dairying sector to be sustainable, dairy producers have to be moved to peri-urban areas where all necessary services including cattle grazing areas, veterinary services such as dipping facilities are well established. However, the experience from the interviewed dairy producers, livestock officers and own observation showed that the city was not well prepared to make producers relocate to the peri urban area due to limited construction of appropriate infrastructure in those areas as well as lack of stringent by- law to force famers to relocate.

Poor institutional environment and lack of enforcement mechanisms was observed and reported by the officials from Tanga City Council and Tanga District Council. This was shown by the lack of capacity of governmental bodies such as City Agricultural and

Livestock office to coordinate their actions and implement Livestock keeping policies as well as by-laws regarding to dairy farmers in the city. Another hindrance was that many senior officials living in the high income and low density areas in Tanga City kept more than the permitted four head of cattle and allow them to graze openly on public land, this possibly is because of their seniority in the government level which made the enforcers mainly junior staffs fail to enforce and implement policies.

The study have revealed that there are several added costs that hinder the starting or expansion of business to milk value chain actors such as milk producers and milk traders especially those who were dealing with kiosks, restaurants, hotels and supermarkets. The costs includes charges for business license, taxes for starting a business, charges for granting legal rights, purchase of special permit and construction of appropriate buildings and infrastructures required for dairying activities.

4.6 The Research Hypotheses

4.6.1 First hypothesis

The first hypothesis of this study stated that *"Dairy smallholders' market for raw milk in the Tanga city is concentrated"*. The Herfindahl-Hirschman Index for volume of milk supplied in the City was high indicating a higher level of concentration in this sub sector. This is because the HHI index computed was 7656.25 far above 0.25 or 2500 which is the cut off point for the high market concentration. Thus there was no enough evidence to reject the null hypothesis which asserted that 'smallholders' market for raw milk in the Tanga city is concentrated'.

4.6.2 Second hypothesis

It was hypothesized that "*The level of inequality in market shares among traders in the formal milk value chain affects the efficiency and competitiveness of the market*". The study findings showed that the raw milk supply contracts created conducive environment for strategic barrier of entry into business by other firms in Tanga city. Although contractual buying of raw materials is acceptable in economics, such system may be abused when monopolistic market is created. Also there exists policy and regulatory barriers to entry to particular restrictions in the herd size, and double standards in their enforcements. In addition, the Herfindahl-Hirschman Index for volume of milk supplied in the City was high indicates a possible monopoly of Tanga Fresh in this sub sector. This situation seems to be supported by a high value of Gini coefficient for the market share of raw milk indicating a higher level of inequality. Therefore it is imperative to suggest that the chain is liable to inefficiency and lack strong competitiveness. Therefore there was enough evidence to fail to reject the hypothesis that the level of inequality in market shares among traders in formal milk value chain affects efficiency and competitiveness of the market.

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The general objective of this study was to investigate and analyze chain governance structures in the milk value chain in Tanga city and assesses sustainability of the chain in the prevailing policy and regulatory environment. The specific objectives were: (i) to characterize and describe the milk value chain in the Tanga City (ii) to examine existing governance structures in the milk value chain in the Tanga City (iii) to examine the milk value chain efficiency and competitiveness Tanga City, and (iv) to carry out institutional review of Tanga urban dairying. The major conclusions from the study findings for each specific objective and related recommendation are presented below.

(i) Characterization of the milk value chain

The survey results shows that large volume of milk produced in the city is collected from the formal chain through collection centres owned by TDCU and Tanga Fresh Limited. The latter is responsible for price setting under negotiation with the former. The offered price has not so far favoured smallholder milk producers (given their complaints). This signifies weak negotiation capability/skills on the part of TDCU. Ownership of milk collection centres by the processor is disputed as being in total contravention of the underlying supply contract terms with the TDCU. The contract establishes the Union as the sole milk supplier to the factory. Therefore, smallholder milk producers are not benefiting much, as would be expected, with the system compared to milk processors in terms of price and established contracts.

Furthermore, the survey results indicated that milk producers operating in informal marketing channel received higher prices (a margin of Tsh 20 per unit) more than those who opted to operate in the formal marketing channels (milk collection centres). This could insinuate that it is more worth to operate in informal marketing channel rather than formal marketing channel. However, the observed upper hand of the former is only possible when the formal chain is in place. In its absence, the fallacy of composition will set in and erode all of these artificial benefits. It follows therefore that the formal chain is capable of self sustenance as opposed to the informal chain. It therefore makes economic sense to promote the formal chain even before factoring-in food quality and safety issues.

(ii) Milk value governance structures

(a) The survey results showed that the level of organization among smallholder dairy producers/farmers is still low and the representation of their interest through associations (primary dairy cooperatives) is rather insufficient. This is because the formed dairy cooperatives such as UVIWAKAPI and UWAPOMA are locally formed and not well known; therefore they cannot represent their members at the national and policy level.

(b) The study findings showed that the raw milk supply contracts created conducive environment for strategic barrier of entry into business by other firms in Tanga city. This makes other smallholder farmers fear to enter into business and this in turn makes the milk value chain in the city to remain uncompetitive.

(c) Only few farmers (38.7 percent) of the sampled milk producers do access information about milk production from extension agents such as extension officers and veterinary doctors. This shows that the formed smallholder dairy cooperatives are not well organized to facilitate their members' (milk producers) access of the required services it being among the key goals of forming those cooperatives (poor coordination of activities).

(iii) Milk value chain efficiency and competitiveness

(a) Basing on The HHI which indicated a higher level of concentration in the formal milk value chain, it is concluded that milk market in the Tanga city is highly concentrated and thus not efficient and competitive.

(b) The existence of Tanga Fresh Limited as the giant milk processing company in Tanga City creates near monopoly situation in the market and affects chain efficiency and competitiveness due to the sole price controlling power enjoyed by Tanga Dairy Cooperative Union (TDCU) which is one of its major shareholders. Thus, in the long run, it affects the sustainability of the milk industry in the Tanga City by paralyzing competition.

(c) Although the producers in the informal milk chain realized a slightly higher gross margin as compared to their counterparts in the formal channel, statistically the margins were not significantly different either.

(iv) Institutional landscape of Tanga urban dairying

(a) Urban dairying was found to be governed by the Urban Farming Regulation of 1992 which was revised in 2003, providing guidelines which indicate the maximum plot size and the number of cattle and the grazing system of livestock required. Also, the National Human Settlements Development Policy of January 2000 designates areas for urban dairying and defining and granting legal rights for the people involved in dairying in those areas, among others. These policies require smallholder farmers with more than four cattle to relocate to the peripheral area which in turn leads to decrease in the number of smallholder farmers in the city. Since the designated peripheral areas are not well equipped for dairy keeping, the supply of milk in the city as well as to the large scale milk processor (Tanga Fresh Limited) will likely decrease in the future and adversely affect the factory. The regulatory limitation on urban dairying in respect of number of dairy cows allowed also threatens sustainability of the large dairy commercial farms and the 23 dairying villages in the city.

(b) There is double standard in the enforcement of City by-laws whereby senior officials living in higher income and low density areas in Tanga City kept more than the permitted four herds of cattle and are allowed to graze openly on public land.

5.2 Recommendations

(a) There is a need for the concerned bodies such as Tanzania Dairy Board and the Government as a whole to review the price setting mechanisms in the industry so as to make sure that offered producer price is cost-effective, an intervention that will also enhance competitiveness of milk marketing in the city.

(b) There is a need for concerted efforts from various stakeholders to promote formation of strong smallholder dairy associations which can effectively lobby for friendly policies and regulations for urban dairy farmers at all levels. The associations will also represent smallholder farmers in business negotiations and win better bargains with Tanga Fresh Limited as regards to contracts and price of raw milk.

(c) Formal milk marketing channel in Tanga city should be promoted so as to as to make smallholder milk producers operating in this channel to be more worth as compared to those who operates in the informal milk marketing channel, Also formal milk marketing channel tends to have a minimal health risks hazards since Informal milk marketing poses health risks to consumers of raw milk as it contains appreciable number of bacteria this in turn will tend to increase efficiency and competition in the milk marketing channels in the city.

(d) The policy makers and other concerned bodies such as the City Livestock and Fisheries Officer (CLFO) and other City council Authorities should strive to formulate policies and regulations / by-laws that are effectively and equitably implemented and enforced on all dairy keepers in the city irrespective of one's position/status in the government hierarchy.

5.3 Areas of Further Research

There is a need for a broader study on coordination of milk value chain at country level to see the general equilibrium across different actors. This will help government and policy makers in planning and setting sustainable regulations and policies for the growth of the industry. Lastly, further studies on milk marketing system should be conducted in all milk producing areas other than Tanga city so that a well coordinated national milk production and marketing system can be established and implemented.

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APPENDICES

Appendix 1: A Questionnaire to be administered to Milk Producers in Tanga City

SECTION A.GENERAL INFORMATION

1. Name of respondent...
2. Name of Household head...
3. Village/Street.....................Ward...............District.......................Region...
   ...
4. Gender of household head 1=Male 2= Female
5. Age of household head...
6. Marital status...
   1=Married 2=Single 3= Widowed 4= Divorced 5= cohabiting
7. Education level of household head
   1=Formal education 2=No formal education 3=Primary education 4=Secondary education
   4= Post secondary education
8. What is your primary occupation?
   1= Wage employment............ 2 = Dairy cattle keeping...........
   3=Business........... 4 = Crop production................
   5= Others (specify)..................
9. What is your secondary occupation?
   1 = Wage employment............ 2 = Dairy cattle keeping...... 3 = Business...........
   4 = Crop production............... 5 = Others (specify)..................

Section B: Information on Milk Production

1. For how long you are in the business?
   (a) 1- 2 years ago (b) 3 – 4 years ago (c)More than 5 years ago
2. How many dairy cattle do you keep?
   Cows...........Heifers..........Bulls..........Steers.............Calves.......................

3. What was the source of the initial capital for the establishment of your dairy enterprise?
   1) Own saving 2) Family / Friend 3) Formal credit 4) Informal credit 5) Others (Specify)...................................

4. What type of feeding system do you practice?
   (a) Zero grazing (b)Semi grazing (c)Grazing
5. How many cow do you milk per day...................?
6. What is the average amount of milk per cow per day in
   (a)Wet season...................(b)Dry season........................
7. What is the average amount of milk obtained (in liters) per day during
   i. Dry season? ....   ii. Wet season?................
8. Do you purchase inputs for your cattle? Yes/No
9. If Yes please indicate the following per day/month/year

Type of Input	Unit	Source of input	Quantity purchased	Price per unit	Total cost
Animal feeds					
Verterinary sercice					
Verterinary Drugs					
Others(specify)					

10. Please indicate how much you pay for the following kind of costs of producing/handling/selling milk per day/month
    (a)Wages/Salary...........(b)Transport cost..........(c)Others (specify)..................
11. Do you purchase your inputs on contractual basis? Yes/No
12. If yes what is the form of the contract?
    (a)Verbal contract (b) Written contract with lawyer assistance(c) Written contract without lawyer assistance
13. What type of contract do you have?
    (a)Short term contract (b) Long term contract (c) Others (specify)
14 What is your opinion about these contracts?
   ....
   ....

- Is it better to work under contract or sell your produce in the open market?

15.What are the major problem(s) do you face in your business?

Production problem (specify)1..................2.....................3....................

Marketing problem (specify)1....................2.....................3.....................

Milk handling problem (specify)1..............2.....................3....................

16. Is there any service provider in your area from which you get any kind of support?

1.Yes (Please specify from whom and which kind of support)

....

....

2. No

Section C: Information On Milk Processing

1. Do you process milk? [Yes/ No]

2: If No, What are the reasons?

Lack of knowledge	Lack of capital	Lack of market for Processed products	Lack of time to do Processing	Others (Specify)
[ ]	[ ]	[ ]	[ ]	

3: If Yes, Please mention the type of product you process

....

....

4. Please indicate the cost of processing and the selling price for each product you mention

5. What kind of material do you use to pack your products?

No packaging	Plastic containers	Plastic bags	Paper materials	Others (Specify)
[ ]	[ ]	[ ]	[ ]	

Section D: Information on Milk Marketing

1. Where do you sell your milk?

(a)At farm gate (b)Milk vendor(c)Milk Hawkers(d)Wholesaler(e)Milk collection centre(f)Processing plant(g)Others (specify)

2. Give reason(s) for the choice in the question above

   1……………………2……………………3…………………………4………………

3. What price offered in (Tsh) per litre……………………….?
4. Is there any price fluctuation for you milk/product in different season of the year? [YES/NO]
5. If yes, what is the price of milk in Tsh during(a)Wet season…………(b)Dry season…………………
6. Who sets the selling/buying price of milk?

   1= Producer 2 =Buyer 3= Negotiated 4= others (specify)………………

7. What is the distance from home to milk market in Km………
8. How did you came into contact with the buyer?

   1. Through other family members
   2. Through neighbours
   3. Buyer contacted me

   4 other(specify)

9. Is your milk graded according to the quality?1.Yes 2.No
10. if yes specify how and the difference in price

    ……………………………………………

    ……………………………………………

11. Do you have special requirements/specification from your (input) supplier?

    1. Yes 2.No

12. If yes, what is the requirements/specification?

    …………………………………

    …………………………………

13. Do you have special requirements/specification from your buyers/customer?

    1. Yes 2.No

14. If yes, what are the requirements/specification?

    …………………………………

    …………………………………

15. Are you able to supply the required order according customer/buyer requirement throughout the year?1.Yes 2. No
16. If no please give reasons

    ………………………………

    ………………………………

17. Do you get milk spoilage/1.Yes 2.No

18. If yes, please estimate the volume of estimate per day/week/month.............(Litres)

19. Please estimate the amount of milk that you allocate to different uses on daily basis

Items	Wet season	Dry season
Consumed at home		
Send to collection centre		
Send to hotel/kiosks/		
Sell to processing plants		
Sell to supermaket		
Remain unsold		

20: Which mode do you use to transport your products to the market? Indicate charges/cost to hire.

Bicycle	Public Transport	Hired vehicle	Own vehicle	Head carrying
[ ]	[ ]	[ ]	[ ]	[ ]

21. What other cost do you incur per day/month

....

....

22.Who are the major competitors for your business?

1...

2..

3...

4...

23 Are there any regulations governing urban dairying in this area? 1= Yes 2= No

24. If yes,What are your suggestions regarding regulations on urban dairying, milk production and marketing for the current and future sustainability of the dairy industry in this area?

....

....

25. Are you a member of any producer organization/association? Yes/No

26. What are the functions and benefits of these associations?

1..

2...

27. Any other problem(s) do you face during marketing?

Seasonal Supplies [ ]	Unreliable Buyers [ ]	Price uncertainty [ ]	High competition [ ]	Un trust customers [ ]	Product deterioration [ ]

28.Any other suggestions/comments related to your business/urban dairying?

1..................................

2................................

THANK YOU FOR YOUR COOPERATION

Appendix 2: Questionnaire Administered to Milk Traders in Tanga City

Section A: General Information

1: Name of respondent...

2: Village/Street...

3: Ward...

4: Division...

5: Region...

6: Age of respondent (years)...

7: Sex of respondent................ 1= Male and 2= Female ( )

8: Marital status of respondent 1= Single ( ) 2= Married ( )

3= Divorced 4= Widow ( ) 5= Others (specify)...................

9: What level of education did you attain........... (indicate by putting tick)

1= No formal education ( ) 2= Adult education ( )

3= Primary education ( )

4= Secondary education ( ) 5= Tertiary ( ) 6= Other (Specify) ....

11: What is your primary occupation?...

Section B: Information on Milk Procurement And Marketing

1. Business type: (a) Vendor/kiosk/hotel/milkshop/supermarket (d) Others (Specify)
2. When did you start the business.............................?
3. What is the main source of milk ....

   (1) Farm gate (2) Wholesaler (3) Milk collection centre(4) Others (specify).............
4. Which source(s) do you rely on for your procurement?....................................

5. Give reasons for your answer

High quality	Cheap products	Constant Supplies	Sufficient supplies	Others (specify)
[ ]	[ ]	[ ]	[ ]	

6. Do you have any kind of contractual arrangements/agreement with suppliers/ buyers of your milk/products? Yes/No.....................

7. If yes, what is the nature of your contract?

   (a)Verbal contract (b) Written contract with lawyer assistance(c) Written contract without lawyer assistance

8. What type of contract do you have?

   (a)Short term contract (b) Long term contract (c) Others (specify)

9. Is there any price fluctuation for you milk/product in different season of the year?

   [YES/NO]

10. If yes, please indicate the following

Selling point	Selling Price		Quantity sold (Litre/Kg)	
	Wet season	Dry Season	Wet season	Dry Season
At home				
At Street				
Supermarkets				
Kiosk/retailer shops				
Hotels/Restaurants				
Others (specify)				

11. Please provide the following information for milk/Products procured

Product/ Source	Small farmer	Other traders	Local Processor	Imported	Unit of Measure for purchase	Quantity purchased	Buying Price/ Unit	Selling price/ Unit
Raw Fresh Milk								
Fresh boiled milk								
Sour milk								
Cheese								
Yoghurt								
Butter								
Ice cream								
Others (specify)								

12. Are you able to supply the required order according to customer requirement throughout the year? 1. Yes 2. No

13 Do you have special requirements/specification for your supplier? 1. Yes 2.No

14. If yes, what is the requirements/specification?

1......................................

2.....................................

3...................................

15. Do you have special requirements/specification of products from your buyers/customer? 1. Yes 2.No

16. If yes, what is the requirements/specification?

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

17. Who sets the following for your products?

Buying price.................... Selling price...

18. Please indicate the cost you incur in (a) Transportation...........................

(b)Preservation.............(c) Labour............ (d) Other (specify)...............

per day/month (Tsh)

19. Any other cost do you incur during milk marketing?

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

20.Do you have equal chance in selling/marketing of your milk /products compared to other milk marketing actors? (e.g Hotel, supermarkets, Tanga fresh marketing agencies,)?(1)Yes(2)No

21. If no who have more power/chance in selling/marketing of the milk/products?

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

22. In your opinion why do you think the mentioned market players are more powerfully?

1..2...

3..4...

23. Who are your major competitors?

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

24. What have you done recently to improve your products or services?

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

25. Accessibility to Market

Product	Where do you sell	To whom do you sell	Quantity sold	Price/ unit	Distance from buying to the selling point (Km)	Mode of transportation to the selling point
Fresh milk						
Yoghurt						
Ice cream						
Cheese						
others						

26. What are the major problem(s) do you face in your business?

Production problem (specify) 1....................2.................. 3.....................

Marketing problem (specify) 1....................2...................3......................

Milk handling problem (specify) 1...................2....................3.......................

27. Are you a member of any trader's organization/association? Yes/No

28. If Yes, What are the functions and benefits of these associations?

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

4.................................5..........................6.........................

29: What are your major dairy product marketing problems?

Price	High Competition	Seasonality	Unreliable Buyers	Un-trust Customers	Production Deterioration	High marketing costs	Legal restriction
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

30 .What kind of materials do you use for handling your products?

No packaging	Plastic containers	Plastic bags	Paper materials	Metal tins
[ ]	[ ]	[ ]	[ ]	[ ]

31. Any other suggestions/comments related to your business?

1.................................

2.................................

3.................................

THANK YOU FOR YOUR CO-OPERATION

Appendix 3: Checklist for Participatory rapid appraisal

PRA for Processors/Traders; Description on;

- Seasonality of dairy products sale and procurement, and the price of the product
- Main source of milk
- Buying price from their main source
- Selling price to their main outlet
- Marketing techniques
- Do they have contractual arrangements with buyers and producers?
- How do they promote and market their products/services?
- Who are the major competitors of their business?
- Financial source for the business

PRA for consumers; Description on;

- Seasonal patterns of consumption, prices, preference
- Main market sources and reason for their use
- Constraints to availability and unmet demand
- Buying price of milk/products in Tanzania Shillings (Tshs)

PRA for primary dairy cooperatives/milk cooperative union; Description on;

- Do they have contractual arrangements with buyers and producers?
- How do they enforce these contractual arrangements?
- Seasonality of dairy products sale and procurement, and the price of the product
- Their main source of milk
- Their main outlet of milk
- Buying price from their main source
- Selling price to their main outlet
- What type of support which the offer to producers eg (Market arrangements, price stabilization)

THANK YOU FOR YOUR COOPERATION

Appendix 4: Checklist for Key Informants

1. What are strength and weakness of dairy industry acts (Act No. 32 of 1965 and *Act* No. 8, 2004) with regard to the present needs of dairy industry?
2. Currently the by-laws, regulation and orders established in these acts are in operation? Yes/No
3. If no please give the reason(s)
4. Are regulations, by laws, and orders made under this acts law strictly enforced.
5. What are the strength and weakness of the Urban Farming Regulations of 1992 made under the Town and Country Planning Ordinance (Cap.378)?
6. What is your plan in creating the environment and establish the infrastructure and policy environment which are needed to facilitate the development of the dairy industry
7. What are the by laws and regulations govern milk industry in Tanga city ?
8. What is your opinion regarding the sustainability of urban dairying?
9. What are the impacts of by-laws and regulations on the sustainability of the dairy industry in the city?

THANK YOU FOR YOUR COOPERATION