

## **Chain Governance in Urban Dairying in Tanzania: A Cross-Learning Study on Value Chain Development**

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**Abstract:** Tanga city is the most unlikely location to have the most evolved urban milk value chain in Tanzania, being the most North-easterly coastal metropolis in the country, especially when contrasted with an urban milk value chain in cooler environments like Iringa Municipality in the Southern highlands. This is a paradox that has attracted many interests to unravel including this study. Presence of persevering and unrelenting champions has been the cornerstone for achieving this high level of organization on the value chain. The spontaneous upgrading has seen development of a cooperative model that integrates milk production, processing and marketing into a one whole competitive and efficient value chain. These are the qualities that elude the milk value chain in Iringa Municipality. The market concentration figures on Tanga may not be interpreted at face value given the cooperative procurement model which is coordinated under a quasi-vertical integration governance arrangement. Sustainability prospects of both value chains are however challenged by town/city and urban agriculture development policies/regulations that are moving in different directions. Multi-stakeholder initiatives are necessary to address outstanding challenges threatening the industry in Tanga for the sake of city revenue, livelihoods of communities and country development at large.

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### **1. Introduction**

Urban dairying has received immense interest in Tanzania over the last two decades. This perhaps follows from the recognition of its potential for household welfare improvement, employment creation and alleviation of income poverty for urban dwellers (Guendel, 2001; Njombe *et al.*, 2011) who make up 26% of the country's total population (URT, 2013). For Tanga in particular, urban dairying is more popular compared to other parts of the country as over 80% of smallholder dairy farmers in the region are found in the urban areas (Schoonman *et al.*, 2011), a situation which is likely to change following the on-going implementation of the Township regulation no. 8 of 2007.

According to Nyange and Mdoe (1995), urban dairying involves livestock keeping, mostly improved dairy stock, in the urban and peri-urban areas within acceptable limits as specified by respective town/municipality/city by-laws and regulations. The urban Farming Regulations of 1992 made under the Town and County Planning ordinance (Cap. 378) define urban dairying as “*the carrying out of animal husbandry activities within statutory township boundaries*”, and indicate the limits as to plot size, rearing system for livestock and maximum number of cattle per person (URT, 1992). Tanga, being the most north-easterly coastal city in Tanzania with average temperature range of 15°C and 36°C between seasons (annual average of 26.3°C), is the most unlikely location to grow a thriving dairy industry. The latter thrives well within a temperature range of 4°C and 25°C ([www.fao.org](http://www.fao.org)). Iringa, a municipality in the southern highlands with an annual average temperature of 19.1°C (Climate-data-org), technically offers a more favourable environment for a vibrant dairy industry. Ironically though, Tanga region has the most evolved dairy value chain (Hatibu<sup>1</sup>, personal communication, 2016) and home to the largest milk processing plant in the country a situation which is in sharp contrast with the fledgling industry in Iringa Municipality. This unexpected development provokes the need for research to unravel the paradox.

The history of dairying in Tanga city is relatively short and dates back to the late seventies and early eighties when the subsector was dominated by several large scale farms (Azimio, Mgwisha, Kange Buhuri and Tanga Dairy) which were heavily financed by the Royal Dutch Government and the World Food Programme (WFP). This support shifted to smallholder farmers by mid and late eighties and kick started dramatic development of the industry to its current level (Zylstra et al., 1995) under the Tanga Smallholder Dairy Development Programme (TSDDP). As a result, there have since been several research efforts attempting to explain and/or understand the dynamics of this development from different perspectives (Nyange and Mdoe, 1995; Zylstra et al., 1995; Kurwijila, 2002; Omore et al., 2004; Mahenge, 2007; Njombe and Msanga, 2009; Njombe et al., 2011; AECF, 2011; Schooman et al., 2011; Swai and Schooman, 2011).

Amongst the most recent efforts has been an IDRC-financed research project that covered the two contrasting urban centres above which ran from August 2011 to July 2013 with a focus on determining the industry’s contribution to poverty alleviation in these areas. Specific contribution from the project has been research paper publications on contractual choice in the urban dairy chains in the two localities (Kadigi et al., 2012), technical efficiency of smallholder dairy farmers in Tanga city (Wikedzi et al., 2012), gender equity and poverty alleviation in urban dairying on both locations (Mvurungu et al., 2014) and field techniques for rapid market assessment (Coles et al., 2013). The current work examines urban dairying chain governance in the two locations with a bid to determine inherent differences in the level of organization and coordination forms/governance structures that will perhaps explain the disparity in the efficiency and competitiveness that exists in the two chains. The paper therefore addresses the following specific objectives:

- (i) Analyzes the milk value chains in the two urban areas,
- (ii) Examines existing governance structures (coordination forms) in the two chains and their implications for chain efficiency and competitiveness,
- (iii) Carries out institutional review of dairying in the two urban locations.

## **2. Review of literature and conceptual framework**

### **2.1 Underlying Theory**

Value chain Literature is generally focused on definitions and distinctions between value and supply chains (Kaplinsky and Morris, 2001; IFAD, 2006; Ssango, 2006, Croom et al., 2000); Hobbs and Young, 2001), chain analysis (UNIDO, 2009; Gereffi et al., 2001), and chain governance/coordination (Hobbs and Young, 2001; Kirsten et al., 2009). There is a very high degree of consensus between authors on the meaning of a value chain as summarily defined by IFAD (2006) as a market-focused collaboration among different stakeholders who produce and market value-added products.

There are controversies between authors when distinction between supply and value chains is in reference. Some take the two words as synonyms that can be used interchangeably (Croom et al., 2000) whilst others refer to value chain as a subset of supply chain and thus describing it as a special type of supply chain where the actors are actively seeking to support each other to enhance their efficiency and competitiveness (Ssango, 2006). Yet, others take the two as distinct concepts referring to supply chain as an upstream movement which integrates supplier and producer processes without necessarily involving value addition of products as contrasted to value chain which is held as a downstream movement which integrates key business processes from end user through original suppliers of products, services and information that add/create value for consumers and other stakeholders (Feller et al.,

2006). Hobbs and Young (2001) give a clearer distinction between the two by referring to value chain as a 'vertical alliance' and supply chain as a 'vertical movement'.

Literature is also consistent and clear on what constitutes chain analysis. UNIDO (2009) defines value chain analysis as a process of breaking down the chain into its constituent parts so as to understand its structure and functioning. It thus involves mapping the chain i.e. identifying chain actors at each stage, discriminating their functions and establishing the nature of their relationships. Mapping also assesses actor characteristics, profit and cost structures, and flow of goods within the chain as well as employment characteristics (Kaplinsky and Morris, 2001). According to Lusby and Panlibuton (2004), chain analysis also extends into identifying distribution of benefits among the actors which can be done through either margin or profit analysis. The literature also specifies the particular connectivity of interest to this study between chain analysis, chain coordination and chain governance. McCormick and Schmitz (2001) contend that value chain analysis also highlights issues of chain coordination or governance. This thus qualifies the fact that chain governance and chain coordination are synonyms.

Many governance studies are mostly focused on vertical and horizontal coordination forms in a value chain. This is rather a myopic view considering that there are chain actors and chain stakeholders, direct and indirect chain participants and core and support services. Other authors categorize them differently into functional, supporting and framing actors (Karina and Sorensen, 2016). This perhaps explains the emerging focus onto the more encompassing economic coordination studies in this part of the world (Makoye, 2013; David, 2015). Economic coordination is defined by Poulton *et al.* (2004) as effort or measures designed to make players within a market system act in a common or complementary way or toward a common goal. This entails not only vertical and horizontal coordination forms but also complementary coordination which is coordination among providers of complementary services rather than among otherwise competitive providers of the same service(s) (Poulton and Lyne, 2009). This is a hybrid form between vertical and horizontal coordination.

In the literature, various chain governance structures are identified the forms with which differ with authors. For instance, Hobbs and Young (2001) identify various structures ranging from spot market, contracting, strategic alliance, formal cooperation, quasi-vertical integration to full vertical integration. Other authors identify three generic forms to include legislative, judicial and executive chain governance structures (Kaplinsky and Morris, 2001). Gereffi (1994) and Gibbon (2003) define two other broad governance categories; producer-led and buyer-led chains whilst Gereffi *et al.*, (2005) identify five basic types of global value chain governance to include market, relational, modular, hierarchy and captive modes of governance. The authors contend that the five governance forms are determined by the interplay of three factors namely; complexity of the transactions involved, codifiability of information and capability of the suppliers, the latter reflecting the degree of explicit coordination and power asymmetry in a value chain (Gereffi *et al.*, 2005). In essence, this analytical framework could also, to a modest degree, be used to study governance of localized/domestic value chains. Literature is however replete of chain governance structures when market-based (price mechanism), non-market based and hybrid forms are factored into the equation.

Chain governance structures are the modes that govern transactions between players in a value chain and as such the institutional arrangements being referred to in the literature (Williamson, 1993). Principally, they are transaction cost economizing coordination forms (Orden *et al.*, 2004; FAO, 2001; Maitre *et al.*, 2011; Staal *et al.*, 2011; Kherallah and Kirsten, 2001) hence their emergence in managing particular transactions in a value chain is rather competitive. In a coordinated market economy, the institutional environment (the ground rules controlling production, distribution and consumption) supports competitive market/institutional arrangements to unlock critical technical and financial impediments in favour of chain efficiency and competitiveness (Dubbeling and Pasquini, 2010; IFAD, 2010b; Kydd *et al.*, 2002). In principle, the organizational form (governance structure) that minimizes the sum of production and transaction costs for a given activity will have a competitive advantage over the others (Mbise, 2007).

## **2.2 The research problem**

It had since been noted (Foaken *et al.*, 2004) that the ever increasing growth in urban population resulting from high natural increase, rural-urban migration and boundary extensions is not being paralleled with an equal increase in livelihood opportunities in the respective areas. Tanzanian towns are thus invariably faced with identical problems which oscillate between inability to create jobs in the shrinking formal sector, housing shortages and delays in the development of social services and physical infrastructure. 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. The potential of urban dairying in the country to contribute to household

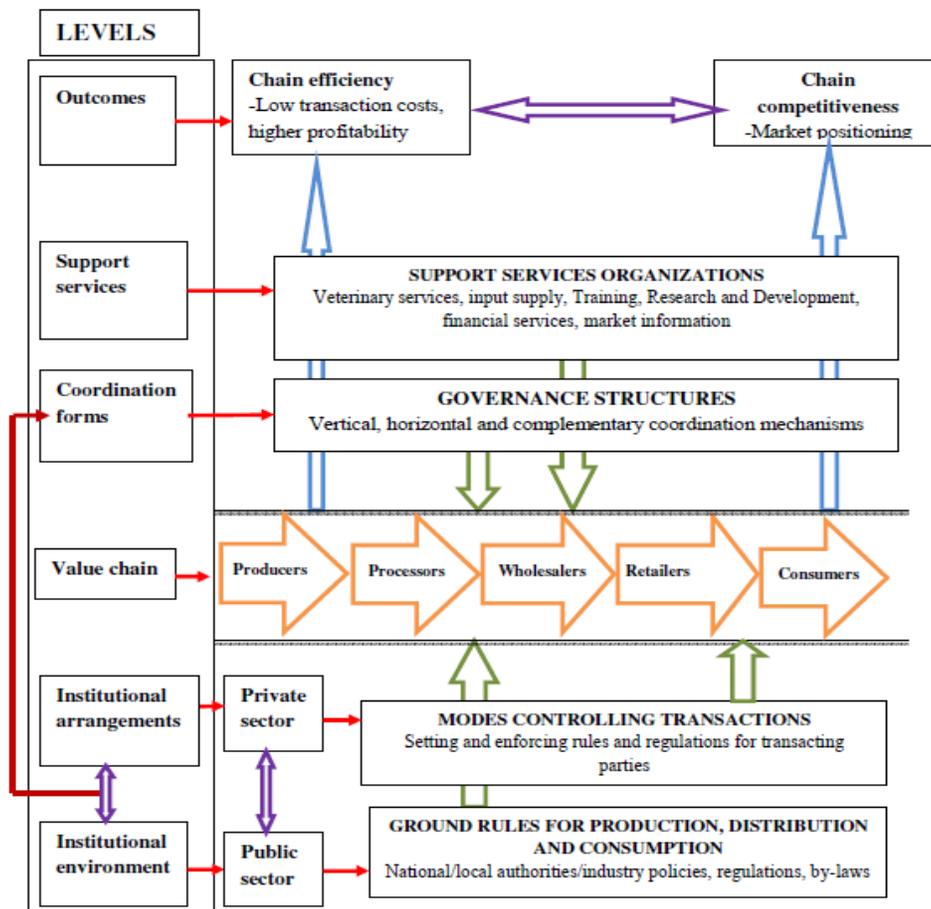
welfare, employment creation and poverty reduction for urban dwellers has also been echoed by various scholars since the turn of the last decade (Kurwijira, 2002; Njombe *et al.*, 2011).

However, the possibility to tap on this potential is not constraint free. According to Kurwijira (2012), estimates (assuming 5% and 2.3% annual growth rates for urbanization level and population respectively) had it that national milk production should have increased by 3% if the anticipated demand increase of 60% (to reach 1.5 billion litres) was to be met by 2010. Njombe *et al.* (2011) contend that domestic production of milk and milk products did not satisfy national demand particularly in urban areas, signifying non-achievement of the earlier estimates above. This failure was attributed to inefficiency, inconsistency and unreliable milk distribution channels in the urban dairy sub-sector (RLDC, 2009) with resultant increased importation of milk and milk products (annual imports of dairy products in liquid milk equivalent between 2004 and 2009 averaged 26 000 million litres).

A variety of other challenges facing the dairy industry have been enlisted by various scholars to include poor quality and safety oversight (Swai and Schooman, 2011; Mdoe and Nyange, 1995), lack of institutional support on technology and finance (Kilima, 2008), unreliability and seasonality of milk supply leading to low capacity utilization processing (IRDC, 2006; Mvena, 1991), weak institutional arrangements and enforcement, spatial and seasonal price volatility due to free-riding, lack of investment capital, over-regulation and high transaction costs (TDB, 2006; RLDC, 2009). The current study thus still found value in Omore (2004) contention that institutional context of milk marketing issues (especially chain governance), which are important for value chain competitiveness, efficiency and sustainability have not been researched on hence its focus on the analysis of coordination mechanisms in the two urban chains under reference.

### 2.3 Conceptual Framework

The conceptual framework for the study is schematically summarized in Fig. 1 and its brief explanation follow below it.



The study's conceptual frame rests on the literature of economic coordination which essentially addresses how to make marketing system participants act complementarily to achieve chain efficiency and competitiveness (Poulton and Lyne, 2009). The framework cements the fact that such a chain needs some important ingredients to bear on its performance. The ingredients include favourable institutional environment and arrangements and support services that are effectively coordinated to maintain harmonious movement of efforts in one direction.

The public and private sectors need to collaborate adequately to put in place and enforce the necessary controlling institutions/rules at the micro and macro levels (Kydd *et al.*, 2002; IFAD, 2010b). A variety of governance structures emerge in the course of managing exchange/transaction between actors in a value chain. The most transaction cost economizing governance structure will prevail for a particular exchange between actors in a value chain (Mbise, 2007; Kheralla and Kirsten, 2001).

Efficiency of the value chain is reflected in lowered transaction costs with resultant high profitability on the part of individual actors (Maitre *et al.*, 2011; Staal *et al.*, 1997, IFPRI, 2003). On the other hand, chain competitiveness at the enterprise level is reflected in its ability to produce according to the requirements of the market hence ensuring sustainable access i.e. sustenance of favourable market positioning (Altenburg *et al.*, 1998). Chain efficiency and competitiveness are therefore, in most cases, bearing on each other.

### 3. Methodology

The analysis of the urban dairy value chains in the two locations generally followed the approaches suggested by Hurley *et al.* (2003), McCormick & Schmitz (2001) and Marshall *et al.*, (2006) which entail tracking, mapping and diagramming, and assessing enterprise profitability in the two chains. The tracking in this study was done through a rapid market appraisal that entailed physical walking of the value chain i.e. interviews with relevant actors along each node of the value chain. Mapping of the upstream chain actors was through interviews with key informants from the industry, government, producer-, processor- and research organizations, milk producers /dairy keepers and consumers.

This study draws from data collected from a number of rounds of stakeholder interviews that were carried out during the third quarter of 2010, second quarter of 2011, first, second and third quarters of 2012, and the last two during the third and second quarters of 2016 and 2017 respectively which were however outside the IDRC project life time<sup>2</sup>. Farm-level enterprise profitability was calculated from questionnaire survey data collected from randomly sampled dairy keepers whereas case studies (using respective checklists) were used for all of the other chain actors (processors and traders). Profitability assessment (also a proxy for chain efficiency) entailed calculation of profit margins using the formula;

$$GM=[(TR-TVC/TR)] \times 100$$

Where

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

Mapping of downstream actors was done as part of the consumer study that also determined existing marketing channels, volumes of milk flowing in each channel, categories and numbers of milk traders and final outlets to consumers / consumption points. The consumer study characterized milk traders into a variety of categories ranging from wholesalers to retailers (hawkers, small retailers, hotels, restaurants, milk bars, kiosks). Interview checklists were prepared for each category in which an interviewee indicated the volume of milk and milk products (different types) they handled. They also indicated their best guess of the number of similar dealers in their category (like the interviewee) existing in the town/city. Identification of successive interviewees was carried out using the snowballing method. The data collected was run in an excel algorithm to calculate the total milk flows and number of traders in each marketing channel. The data on various milk products handled was accordingly converted to fresh milk equivalent volume in calculating total milk flow in each channel.

Competition status of milk marketing was taken as a proxy for chain competitiveness. Competition status of the marketing chain was assessed by the Herfindahl-Hirschman Index (HHI). This assessment was only done on Tanga city. The HHI was calculated using the formula:

$$H = \sum_{i=1}^N S_i^2$$

Where:

$s_i$  is the market share of *ith* firm in the market

N is the number of firms.

H is Herfindahl–Hirschman Index.

The HHI cut-off point for a concentrated market is 0.25 or 2,500 (DfID, 2008).

Institutional review entailed a critical examination of the policies, rules, regulations, and by-laws related to urban dairying and their applicability and outcomes in the two locations. Chain coordination was analyzed according to the value chain governance framework suggested by Gereffi *et al.*, (2005).

## 4. Results and discussion

### 4.1 Value chain analysis

#### 4.1.1 The milk value chain map

The maps of the milk value chains in the two urban locations are diagrammatically shown in appendices 1 and 2. The description of and interrelationship between different actor and stakeholder categories in the two chains are discussed in some detail below.

#### A. Producers

This is the first actor category in the milk value chain. It consists of small, medium and large scale dairy farmers. However, demarcation of these scales does not only differ with the conventional text book approaches but also with the locations i.e. Tanga city and Iringa municipality. In Tanga for instance, the scales refer to dairy herd of  $\leq 10$ ,  $10 - 50$  and  $> 50$  respectively<sup>3</sup> (cf. standard / text book categorization of  $<50$ ,  $50 - 100$ , and  $>100$  (Hatibu' person. Comm., 2017). In Iringa, the small, medium and large scale producers refer to dairy herd size of 1-4, 5 -30 and  $>30$  animals respectively. The total number of dairy cattle during the first survey (September 2010) was estimated at 5,000<sup>4</sup> and 3,000 for Tanga city and Iringa municipality respectively.

Total daily milk production stood at 30,000<sup>5</sup> and 3,952 litres in Tanga city and Iringa municipality respectively (only for milk traded on the formal chain i.e. processed milk). In compliance with urban development regulations and bye-laws, producers in both locations are required to shift to the peri-urban areas for meeting their pasture needs and upholding respective towns' cleanliness standards. In the urban centres the allowed farming practice is strictly zero grazing. Tanga is unique in this as there are 23 villages within the city which have areas for livestock farming. The dairy industry in Tanga city is thus fragile in that the new City master plan may not provide protection for these milk production areas. In the old setting, in addition to having dairy keepers scattered all over the city, Pingoni area was identified and reserved as a satellite village/area for dairying<sup>6</sup>.

As shown in appendix 1, producers can either deliver milk to collection centres, to roving hawkers or directly to end consumers. Delivery to the collection centres entails informal arrangements between producers and the collection centre (for individual producers outside the cooperative marketing system) and formal agreement between the two parties (for farmers under the cooperative system) (see cooperatives below). The purpose here is collect milk for onward delivery to the processor (the buyer) in a manner that meets both critical volumes and quality specifications in the most cost-effective way. These are not spot market transactions as payments are effected on a later date. In Tanga, payments are effected bimonthly whereas monthly payments are applicable in Iringa. Moreover, Iringa payments are made directly into individual producer's bank account which is not the case in Tanga.

The relatively underdeveloped milk cooperatives and the consequent absence of milk collection centres in Iringa compel the processor (M/s ASAS Ltd) to deal with individual producers more directly as compared to arrangements in Tanga. In the Tanga city the processor (M/s Tanga Fresh Ltd) settles producers' milk bills through the cooperative set up i.e. Tanga Dairy Cooperative Union (TDCU) and its affiliate primary cooperative societies like UWATA (*Ushirika wa Wauza Maziwa Tanga*). This is essentially the chain that is referred to as 'formal'. Notwithstanding its formality the relationships between the parties has at times been strenuous. The *de facto* unilateral processor/buyer decisions on milk pricing and prices have invariably led to producers' complaints on both locations. The situation is more serious in Tanga city where producers and other stakeholders are pressing for the re-organization of the milk marketing system (see cooperatives for details). Milk delivered to hawkers and vendors and directly to end users constitutes the informal milk value chain. The relationships between the parties involved are explained below.

#### **B. Hawkers and vendors**

Producers may also deliver milk to street hawkers and vendors. In this case, hawkers use bicycles to buy milk from producers for onward delivery to processors and/or end users. These are mostly (with exception of very few cases where credit sales may apply) spot market transactions which entail cash terms. Hawkers will normally sell milk to individual users in the municipality, vendors and hotels for whom they have had long term business ties. Vendors are mostly small shops owners who buy milk from hawkers for onward selling to end users.

Occasionally however, hawkers sell milk to collection centres as a strategy to establish and maintain informal relationship with the centre(s) to ensure them a market outlet during flush (rain) season. The hawkers' ability to source milk from distant places at low prices gives them the capacity to absorb collection centre's price range. This actor category is however well pronounced in Tanga city at the moment and, reportedly, operated in Iringa in the past albeit a different version/model.

#### **C. Milk collection centres**

Iringa municipality is devoid of milk collection centres (CCs). As at the end of 2016, Tanga city had 47<sup>7</sup> milk collection centres of which 90% were owned by TDCU and the rest by M/s Tanga Fresh Ltd. The latter, due to a growing need to source milk from far and wide, own collection centres in Dakawa (Morogoro), Kimamba (Kilosa, Morogoro), Lugoba & Mbewe (Coast region) and Kabuku (Handeni district, Tanga region), places which are sometimes over 400km from the processing plant. This possible given properly equipped CCs (cooling tanks, standby generators, trained personnel) and refrigerated milk transporting trucks. Ideally, all collection centres were contractually to be operated by the milk cooperatives under TDCU but the changed circumstance may no longer ascribe to this arrangement/agreement to date. However, 70-80% of the total milk procurement comes from TDCU-owned centres.

Initially, the arrangement between TDCU and Tanga Fresh Ltd on milk collection centres operation was contractual (only a signed MoU which is not legally binding). However, there had been complaints from either side of the agreement terms being broken. For instance, UWATA accused Tanga Fresh of opening competitive centres in their areas of jurisdiction whereas Tanga fresh accused UWATA of extra-contractual selling. UWATA admitted the claim and justified it as a measure to augment the meagre resources obtained from members' fees (Tsh. 10 per litre of milk sales) to meet the society's operational costs. The agreement between the Union and the processors is thus no longer complied with per letter.

#### **D. Milk processors**

M/s Tanga Fresh Ltd are the main milk processors in Tanga with installed capacity of 50 - 60,000 litres per day and utilized capacity of 30,000 litres per day. The underutilized capacity (due to milk shortage) is claimed to

contribute to the low producer price offered (Tshs. 420 per litre at the time of the survey<sup>8</sup>). According to information from the plant management, the plant was established in 1996 and started operation in July 1997 with shareholding structure of 45% (DOTF-Dutch Oak Tree Foundation), 35% (TDCU) and 20% (Management shares owned by two individuals<sup>9</sup>). Reportedly, the plant is jointly owned by TDCU (20%), FriZania Invest (40%), and Tanzania Venture Capital Fund (40%). The TDCU stake in the plant has grown<sup>10</sup> steadily from 20% in 1996 to 28% in 2005, 35% in 2009 and 42.5% currently. The standing shareholding structure at the time of writing stands at 42.5% (TDCU), 52.5% (D.O.B) and 5% (Management shares). Tanga Fresh operates under a cooperative model which organizes the collection of raw milk from smallholder dairy producers to ensure critical volume availability and supply reliability.

M/s ASAS Ltd, on the other hand, are the sole milk processor in Iringa municipality with installed capacity of 12,000 litres per day and current capacity utilization of 50%. The plant was a result of a forward vertical integration move by M/s ASAS Farms Ltd which still supplies 30% of the daily capacity. Other milk supplies are sourced from Njombe (10%), Kitulo (5%), and smallholder producers within the municipality (10%). The farmer groups involved in the latter supply milk on credit and are paid off on a monthly basis. The relationship between the farmer groups and the plant is non-contractual and based purely on mutual trust between the parties.

In both areas shortage of milk restrains the processors from going for Ultra High Temperature (UHT) technology which is good for longer shelf life milk products. The processors are thus for cheese, yoghurt, pasteurized milk, sour milk, ice cream, butter and ghee.

### **E. Consumers**

The major consumers of processed milk from both plants are in Dar es Salaam city (over 80%) with local consumption ranging from 10 – 15%. M/s Tanga Fresh Ltd also sells its milk in Arusha, Zanzibar, Morogoro, Coast and Dodoma regions. Trans-regional distribution is handled by the plant's own transport. Local distribution (in the city) uses same means to supply numerous scattered retail outlets. Some specially equipped bicycle hawkers are used to sell packaged milk on the street. M/s Tanga Fresh has own warehouse facility and four agents in Dar es Salaam which supply about 2,000 shops.

### **F. Farmer groups and networks**

In Tanga, farmer groups are the constituent entities of the 12 primary cooperative societies (e.g. UWATA) forming the TDCU (see cooperatives below). Farmer groups in Iringa municipality are independent as cooperatives are yet to be developed. The formation of these groups had been supported by the then Regional office of the Ministry of Agriculture and Livestock Development Office (MALDO) and the NGO 'Southern Highlands Livestock Development Association' (SHILDA). Generally, farmer groups are formed for marketing purpose and enhancement of easy access to important facilities like DADPs' (District Agricultural Development Plans) credits to implement projects (e.g. improved bulls' project, establishment of demonstration farms etc). They are thus numerous and joining is voluntary.

Within these groups there are networks that unite livestock farmers nationwide through representation in the Annual Milk Council and Milk Board. Tanga city has two networks namely; UVIWAKAPO (*Ushirika wa vikundi vya wafugaji kata ya Pongwe*<sup>11</sup>) and UVIWABAMO (*Ushirika wa Wafugaji Bara bara ya Mombasa*<sup>12</sup>). The two networks were formed under TADAT (Tanga Dairy Trust) the NGO that was formed to oversee phasing out of the then Tanga Smallholder Dairy Development Project (TSDDP). They are currently involved in issuing and monitoring cow credits, milk collection and provision of various other services e.g. pasture/feed credits. SHILDA is the TADAT- equivalent organization for the then Southern Highland Dairy Development Project (SHDDP) in Iringa. According to the Tanzania Milk Producers' Association (TAMPRODA), the current situation whereby the networks operate within the cooperative framework (instead of them being NGOs) is a clandestine opportunistic effort by processors to weaken milk producers' bargaining power.

### **G. Cooperatives**

TDCU is the umbrella organization for the 20 (up from 12 in 2010) primary milk cooperative societies in Tanga region. It is now present in all eight districts in the region including Handeni and Kilindi districts which were not there in 2010. TDCU was formed in 1994 to assist in the marketing of milk in Tanga. UWATA is one and the major affiliate TDCU primary society in the Tanga district. The relationship between TDCU and the primary societies (as for any other Cooperative Union vs. Primary society relationships in Tanzania) is legal and falls under the Cooperative Act no. 6 of 2013 (regulations 2015). In this particular case, milk producers (primary society members) are charged Tshs. 20-30, 10, and 10 per litre for Primary society levy, TDCU levy and milk transport cost

to the plant respectively. These charges / deductions are not frictionless however. Milk cooperative institutions are yet to be developed in Iringa.

As has already been explained above, there is a (rather gentlemen's) agreement<sup>13</sup> between the processor (M/s Tanga fresh Ltd) and TDCU. Given the problems discussed earlier on this agreement, there is a strong sentiment amongst stakeholders to replace TDCU's representative role for the primary societies in this agreement. The suggestion is to allow primary societies to contract directly with the processor on their own account. Previously, the feelings were that TDCU management had joined hands with the processor/buyer to exploit milk producers on price setting in a situation where dairy farmers were/are price takers. Currently, TDCU is seen, from the Regional Livestock development office position, as ineffective due to weak leadership which has run out of ideas on how to advance further the course of the Union<sup>14</sup>.

#### **H. Pasture suppliers**

This category constitutes casual labourers who are hired specially by small scale dairy farmers for providing pasture to the zero grazed dairy cattle within the urban areas. On a larger scale, the category encompasses hay cutters who store it for selling to producers in the dry season.

The known hay producers and sellers in Tanga include Tanga Livestock Research centre (LRC), LITI Buhuri and M/s Laila farm. ASAS Farms are doing the job in Iringa.

#### **I. Input suppliers**

These include veterinary preparation shops which also sell feeds and supplements to milk producers. It has been observed on both areas that these vet shops operators are also livestock farmers (vertical integration). Most of these are also people who have been trained as veterinary doctors or animal scientists. Some of these operators are still government employees serving in various capacities. There is no private clinic in Iringa as the environment is not yet conducive for the facility. Farmers are thus using the government Veterinary Investigation Centre (VIC) services. The government facility is however meant for diagnosis only. Tanga city, on the other hand, has more than 21 livestock input suppliers.

#### **J. Heifer producers**

Three types of heifer producers are identified in the Tanga city, namely; Tanga Livestock Research Centre (governmental), Holland Dairies (connected to M/s Tanga Fresh Ltd) and M/s Laila Farm Ltd (private). Most producers would sell heifers to producers on cash terms. Heifer credits in Tanga would normally be sourced from M/s Farm Friends-Tz (an affiliate of Holland Dairies), banks, BRAC (Building Resources Across Communities – only on semen for artificial insemination), and Heifer International which is based in Korogwe district. The Farm Friends-Tz<sup>15</sup> dairy cattle credits are arranged through the networks and the respective primary cooperative societies.

In Iringa, heifer producers include ASAS Farms Ltd and Phillips farm. The latter is however claimed to have declined to supply heifers within the municipality for undisclosed reasons.

#### **K. Support services**

Most of the support services in terms of coordination, extension services and Research are still government- led. Regional and district livestock/agricultural development offices are the organizing centres for these services.

### **4.1.2 Value Chain Governance**

#### **4.1.2.1 Vertical coordination**

The two urban chains are majorly domestic though occasionally; under extreme drought conditions, the major processor in Tanga (M/s Tanga Fresh Ltd) could source milk from as far as Kenya. Governance structures holding the actors together differ with location, position on the chain, number of chain players and the degree of evolution of the chain. Within the Gereffi *et al.*, (2005) framework both chains are captive in the sense that a large number of weak suppliers (smallholder dairy farmers) are dependent on a major buyer, the processor(s). However, this holds true only in the formal chains otherwise transactions in the informal chains are either trust- or market-based. Complexity of the transactions in the formal chains is high given the need to comply with standards that are buyer specified (both food quality and safety standards). Codifiability of information is equally high as milk tests<sup>16</sup> in the collection centres are well documented and known by the suppliers/dairy farmers.

The upstream dairy value chain actors (producers) in Tanga are held together in networks and cooperatives (see discussion of actors above). Both are collective actions meant to enhance producers’ bargaining power for a better producer price from the processor and also curb free riding problem with the rest of the other buyers. Within the bigger picture between the milk cooperative union (TDCU) and the main processor (Tanga Fresh Ltd), the transaction is managed through contractual and hierarchical coordination forms. TDCU is the *de jure* sole supplier of fresh milk to the processor whereas the Union is also one of the major shareholders of the processor with a 42.5% stake (quasi vertical integration). This well institutionalized set up is yet to develop in Iringa Municipality with milk producers only organized in small informal groups and a very weak supply base (supply only 10% of total supplies to the processor). This compels the main processor (Asas Ltd) to vertically integrate backwards and produce milk for itself and also source from distant places like Njombe and Kitulo (a distance of over 100km from the plant’s location)’. Processor’s sourcing of milk in Iringa is thus far more costly than in Tanga as the full backward vertical integration in the former puts the whole burden of production, management and associated transaction costs on the processor. In the latter case, Tanga Fresh is completely free from production costs and comparatively lower cost transactors being a direct result of operating in a more competitive and efficient value chain. This represents a situation where identical coordination forms (hierarchy in this case) leads to varying chain performance (efficiency and competitiveness) given varying degrees of chain evolution between locations.

### 5. Chain efficiency and competitiveness

#### 5.1 Dairy industry market structure in Tanga city

The structure of the dairy industry in the Tanga city is unveiled by the results of the Herfindal – Hirschman Index (HHI) as shown in table 1 below.

Table 1: Herfindahl - Hirschman Index (HHI) Results in Tanga City

Market player	Milk volume (Litres / day)	Market concentration (% of total volume of milk per day)	Herfindahl-Hirschman Index (HHI)
Milk producers to consumers (Direct sales)	298	0.8	6.4
Ammy Brothers & Co	400	1.1	1.21
Retailers to consumers	4037	10.7	114.49
Tanga Fresh	33000	87.5	7656.25
<b>Total</b>	<b>37735</b>	<b>100</b>	<b>7778.35</b>

The calculated HHI of 7778.35 (table 1) is far above the cut-off point of 2,500 signifying that the milk market in the Tanga city is highly concentrated. As such, Tanga Fresh, with a market concentration of over 87% is close to reaching a monopsony status. This position is counter-productive as such a high level of market concentration stifles competition with resultant inefficient and uncompetitive market. It should be noted however that this concentration is contributed much by Tanga Fresh’s dominant position in milk processing in a situation where raw milk is procured under a cooperative model, and the respective Union (TDCU) is part of the plant’s ownership.

As if confirming the above results, Tanga Fresh Ltd had been found guilty of unlawfully strengthening their dominant position in the market and failing to notify a merger to the Fair Competition Commission (FCC) following its acquisition of their competitors’ assets (*Morani Dairy Co. Ltd and International Food Processors Ltd*) between February and March 2009. The FCA held that the acquisition of the two companies lessened competition for raw fresh milk collection in the Tanga region which is in blatant breach of the Commission’s competition laws/regulations. In the 2014 verdict, the Commission ordered the company to pay administrative fine amounting to 5% of its annual turnover in 2009 (over 450 million Tanzanian shillings). M/S Tanga fresh, as at the time of writing, are still trying to fight the verdict through the responsible ministry<sup>17</sup>.

**5.2 Enterprise profitability in the milk value chain** Table 2: Actor profitability across locations

Actor category	Tanga city		Iringa municipality	
	Gross margin	Volume handled	Gross margin	Volume handled
	Percentages (%)			
Small scale farmers	28	29	-	27
Hawkers – retail level	27	10	-	-
Hawkers – mobile	18	5	26	25
Hawkers - wholesalers	-	-	23	22
Small scale retailers	16	49	16	4
Restaurants	33	2	41	3
Milk bar/kiosks	37	3	27	4
Supermarket	16	1	24	13

The results in Table 2 show that the highest profit making actor categories in both markets are the least volume handlers and are also retailers (i.e. selling to the final consumer). Restaurants are the highest profit makers in Iringa Municipality whereas milk bar/kiosks are leading in the Tanga city. It is difficult however to give definitive reasons for the noted differences as milk volumes for respective actor categories are a result of computations using acceptable technical conversion rates between fresh milk and other milk product types which have varying price and profitability levels.

## 6. Institutional review

Urban dairying is governed by several national laws and regulations. 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. Furthermore, National Human Settlements Development Policy of January 2000 designates areas for urban dairying, granting legal rights for the people involved in dairying in the 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).

The actual practice of urban dairying lies with the urban authorities' by-laws and regulations of livestock keeping. In the city/town by-laws, keeping animals requires the purchase of a special permit from the town or city Director which cost Tsh 1000 and Tsh 500 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 households should practice zero grazing to make sure that their animals do not contaminate the city with their waste such as dung (URT, 1992; URT, 2003).

In the particular case of Tanga, the main outstanding institutional challenge is the sustainability prospect of the urban dairying industry in the face of the city's new master plan as discussed elsewhere above. Statistics for the City's contribution to the processing plant is as shown in table 3.

Table 3: Raw milk supply to Tanga Fresh by district for 2016

Name of district	Volume supplied (million litres)	Relative percentage contribution (%)
Tanga	4.15	35.08
Muheza	2.9	24.51
Lushoto	.48	4.06
Korogwe	.90	7.61
Mkinga	.97	8.20
Pangani	2.43	20.54

Kilindi	Negligible
Handeni	Negligible

Source: Derived from ‘Tanga Regional Livestock Development Office Data (June 2017)

The threat is more pronounced when signs suggest that town planning and urban dairying regulations are not integrated. The former are overly inclined to real estate development and oftenly, rather covertly, denounce urban dairying as a nuisance activity in cities/towships. Contribution of Tanga district to the processing plant (see table 3) is not only the highest but the district has been the major driving force behind other districts’ upcoming contributions i.e. the milk value chain organization in the urban district has been a blue print for other districts in the region to emulate. This is the cross-learning that is also anticipated for Iringa Municipality and its hinterlands.

It is worth noting that development of the Tanga City milk value chain has come a long way thanks to the efforts of highly committed and persevering champions who spearheaded the building of requisite institutions to that end. Dutch partners and expatriates are the champions who, against all odds, managed to boldly weather the problems of low governmental support, threats of repatriation from the country, policy inconsistencies and eviction order from legally allocated and for heifer production<sup>18</sup> for the sake of the dairy industry in Tanga. This is the spirit that has seen perpetuation of results of the age old TSDDP which is in sharp contrast with the developments in Iringa under SHILDA hence the observed disparity in the level of organization in the two urban dairying chains.

## 7. Conclusions and policy implications

It has, against all odds, taken more than three decades to build a well organized and competitive milk value chain in Tanga thanks to the presence of unrelenting champions and an engaging dairy keepers’ populace. The spontaneous evolution of the chain over the years was being prompted by the changing needs of the market. For instance, the cooperative model that delivers raw milk to the Tanga Fresh processing plant developed out of the stakeholders’ efforts to address the then incessant problem of lacking market which saw huge volumes of milk being spoiled. This explains the quasi-vertical integration that exists between the plant and the Union (TDCU)<sup>19</sup>. Iringa Municipality has a smaller dairying populace and a fragmented milk value chain given that production, processing and marketing are not as integrated as in Tanga. Milk cooperatives may be developed over time but their success will depend on the willingness of the processor (M/S ASAS Ltd) to engage and support the process<sup>20</sup>.

Market concentration figures in table 1 should thus be read with this reality in mind and that despite all the achievements so far the plant is still under-utilizing its installed capacity (only 60% utilization so far). It is difficult to see the authenticity of the competition scrutiny on Tanga Fresh Ltd and the impending fine (5% of their net worth!) for a set up which is still an in-progress market development endeavour. When the modality of acquiring the assets of the claimed ‘notifiable’ merger is factored into the equation, the credibility of the assessment is put to test even more. A fair assessment of Competition status in agriculture needs a deeper understanding of the special dynamics, in terms of coordination, of these markets as contrasted with conventional self-liquidating merchandize markets.

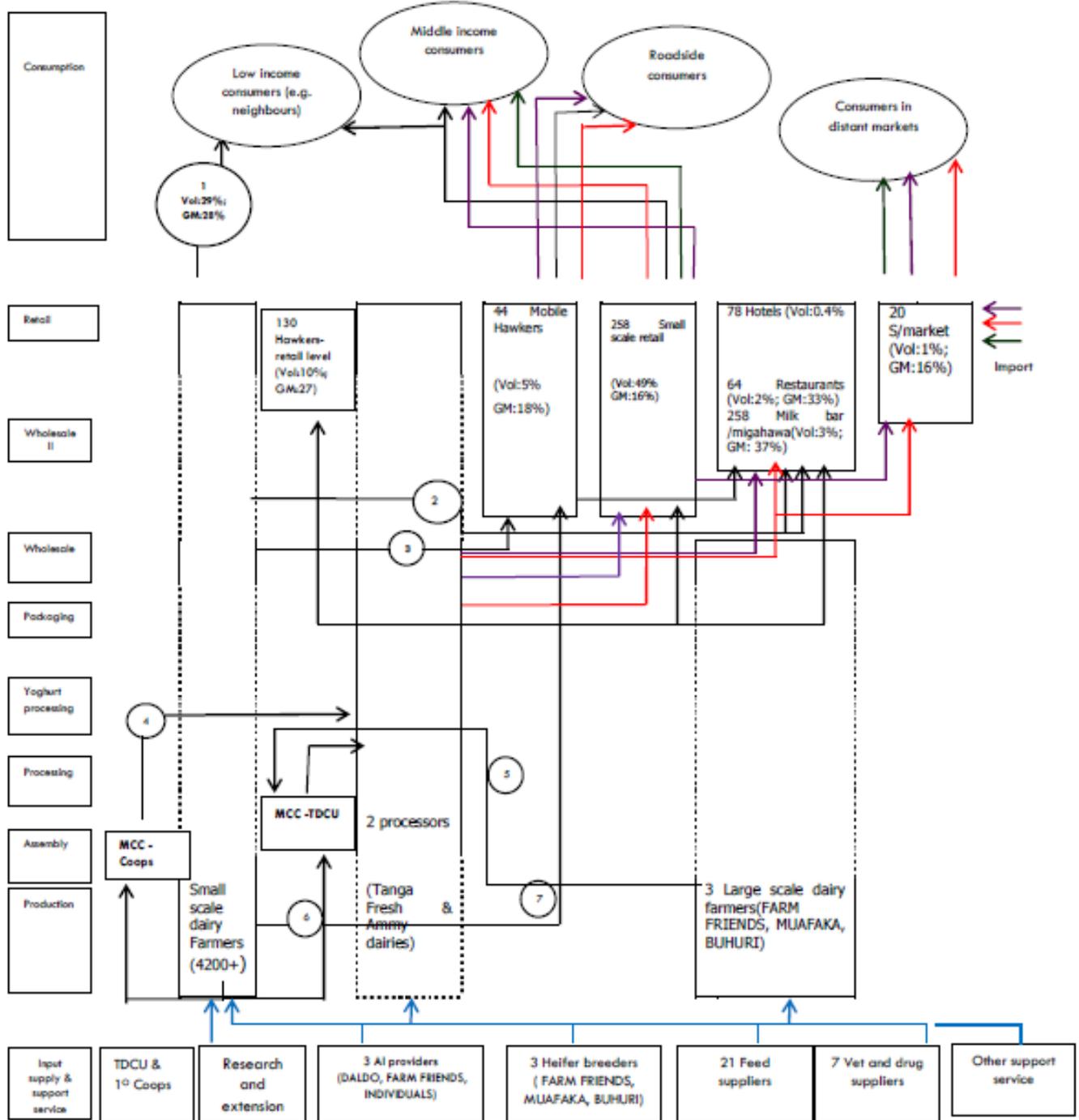
Coordination of the milk value chain in the two locations is captive and market-based on the formal and informal chains respectively. The informal chain however rides on the formal chain as without the latter the informal may not sustain the market for the entire volumes (fallacy of composition!). Processors are thus the key category to lead the impending upgrading that will ensure efficient and competitive milk value chains in the two locations. Policy focus should thus take this reality on board.

It is imperative to sustain the progress gained so far on the Tanga milk value chain. In the circumstance of lacking integration between town and urban agricultural development policies, the risk of losing the 30+ year gains on this chain is very high. To retain ‘Pingoni’ milk production satellite area, the 23 dairying villages and the 3 large and the 2 medium farms which are situated within the city’s boundaries is a necessity which cannot be traded-off for anything. Existence of Tanga Fresh processing plant depends on these production areas as 35% contribution from Tanga district is largely coming from these farms and the smallholder dairy farmers in the 23 villages, designated Somali and Maasai areas and Pingoni ‘satellite’ dairying haven. Elimination of these will lead to the demise of the plant with serious revenue and welfare implications for the city, communities and the country at large. The areas should be legally accommodated within the city’s master plan.

Smallholder farmers are takers price takers though the Union can leverage producers’ position significantly through effective bargaining. The latter is not possible in the absence of a thorough understanding and appreciation

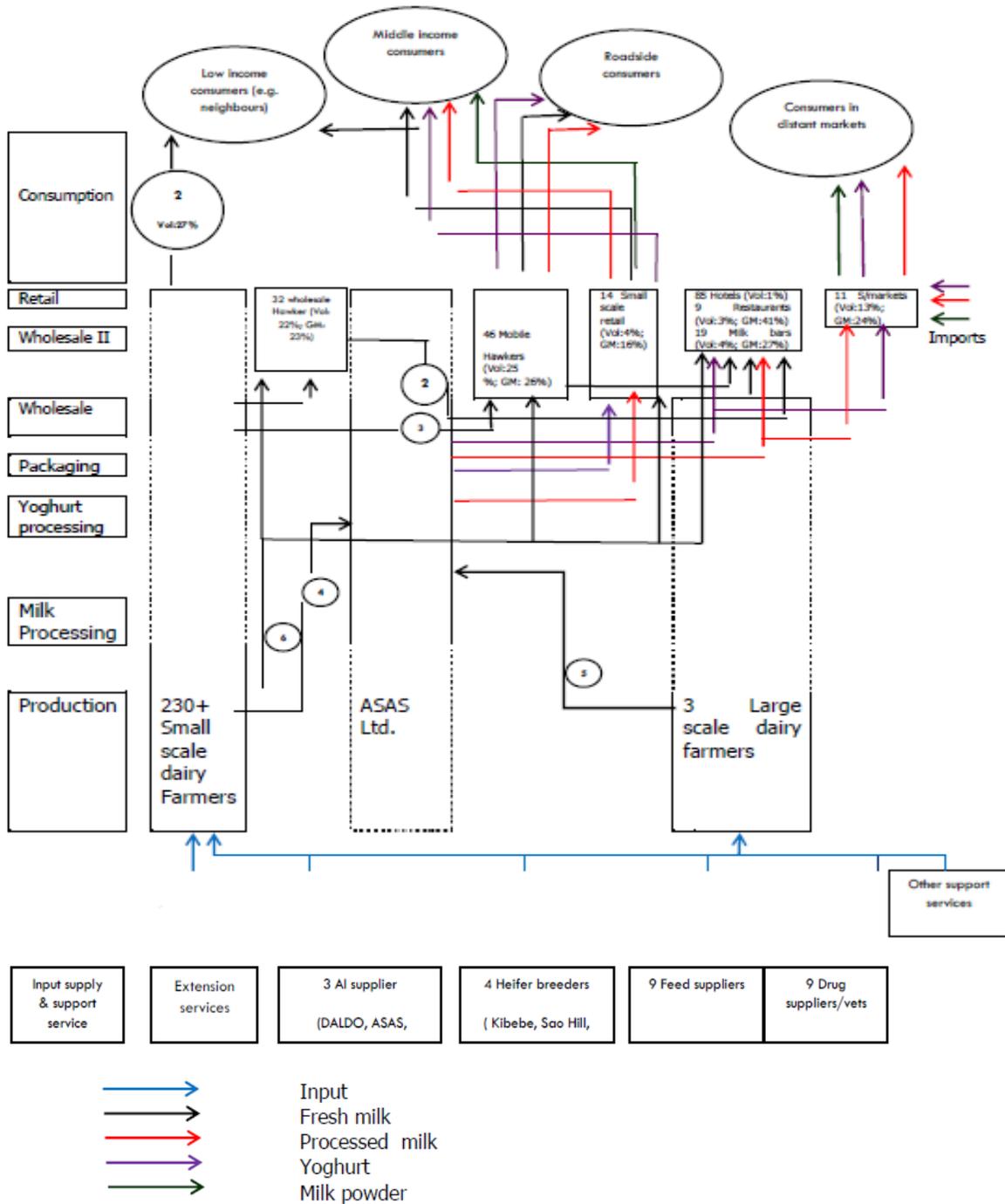
of farmers' production costs. A study on the cost of production is thus imperative. This goes hand in hand with the need for the Union to enter into legally binding agreements (as opposed to the current practice) with important actors and stakeholders in the milk value chain (e.g. processors, financiers, input suppliers etc) to avoid failures that have been reported in this paper. An entity like TDCU is better placed to cheaply receive legal and audit services from within the national cooperative framework/structure.

**Appendix 1: Milk Value Chain in Tanga City**





Appendix 2: Milk Value Chain in Iringa Municipality



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