

# Integrating Smallholder Dairy Farmers into Formal Milk Markets in Tanzania: Key Lessons and Policy Implications

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## Abstract

*There have been remarkable efforts to promote innovation and inclusive value chain development so as to facilitate the integration of smallholder dairy farmers into high value chains. In Tanzania this endeavour has mainly focused on enhancing linkages between small holder dairy farmers and milk processors. This article compares and contrast the way small scale dairy farmer-processor relationships affect chain upgrading in two milk shed areas in Tanzania. Findings reveal that well-managed dairy co-operatives are appropriate means for enhancing horizontal coordination in the dairy industry and could be more relevant for achieving the upgrading through efficient and effective management of production and marketing functions to make the entities more competitive and resilient to market shocks. Ensuring dedicated technical support towards identifying appropriate business models for more effective engagement with milk processors and other chain actors is the best strategy to enhance the performance of dairy co-operatives and promote farmers' linkage to milk processing plants. The findings show that value chain champions can leverage livestock extension services and support smallholder dairy farmers to upgrade. Interventions pioneered by value chain champions are seen to be more effective when geared towards self-selected and committed dairy farmers than generic interventions targeting all smallholder dairy farmers.*

**Keywords:** Milk Value Chain, Upgrading, Dairy Farmers, Milk Processing

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## Introduction

Value chain analysts support the view that innovative and inclusive upgrading<sup>3</sup> of value chains that predominantly comprise small holder farmers could be achieved through effective coordination of node-specific functions, core business support services and other market functions in a multi-stakeholder setting. The setting allows diverse actors to be involved in various chain activities and their dynamic relationships are vital to influence value addition and market linkages (Ayele *et al.*, 2012). Occasionally this generic focus has been conceived without due consideration of value chain structures and dynamics of such structures that are not only affected by local and external

<sup>3</sup> *There are varied and context specific definitions of the term upgrading. In the context of this paper it refers to changes in production processes that allow smallholder farmers to acquire new technologies or management techniques, improve productivity, product quality and their resilience to shocks so as to gain access to remunerative markets (Bolwig *et al.*, 2011).*

market forces but also prevailing institutional context (Bitzer *et al.*, 2013). Some analysts (Jaffee *et al.*, 2011; Maertens *et al.*, 2012; Kilelu *et al.*, 2017) reveal that production-oriented interventions such as commercialisation of agricultural enterprises might result into limited benefits to smallholder farmers when broader issues related to inclusiveness of chain actors are not addressed. Inclusiveness of smallholder farmers is increasingly becoming a topical policy issue because of the on-going transformation and modernization of global food systems (Maertens *et al.*, 2012) that are characterized by shifting demographics, wealth status and preferences of consumers. These changes expose smallholder farmers to new challenges in addition to their inefficient and poorly coordinated production and market arrangements (Webber and Labaste, 2010).

Assessment of value chain upgrading interventions involving smallholder farmers

under these changing circumstances reveal mixed results. There is evidence that farmers are reasonably able to seize new opportunities in the emerging agri-food markets (Drost *et al.*, 2012) implying that they are not excluded. However, there is also evidence revealing cases where chain upgrading has resulted into exclusion of some or adverse inclusion of other small holder farmers (Jaffee *et al.*, 2011). Kilelu *et al.*, (2017) reveals that these farmers may actually fail to upgrade due to inherent uncertainties in production and marketing processes or inability to venture into more rewarding chain activities. The consensus is that smallholder farmers are more likely to participate in remunerative markets when interventions are tailored to promote actors' linkages and interactions that allow joint learning, effective exchange of knowledge and skills as well as capacity building (Kolk *et al.*, 2008). These outcomes can be achieved through various forms of horizontal and vertical coordination.

Mitchell *et al.* (2009) reveal that horizontal coordination<sup>4</sup> is the dominant form of upgrading in agrarian economies. It is considered to be the starting point for all interventions seeking to improve smallholder farmers' access to markets. It requires organising farmers into functional groups; which may eventually acquire legal recognition as marketing groups or co-operatives, to undertake collective action so as to achieve economies of scale in supplies and reduce transaction costs (Mitchell *et al.*, 2009). Traditionally farmer co-operatives have been the predominant form of organization for farmer to access external markets for major cash crops and selling perishable products to local processors in Africa (Shiferaw and Muricho, 2011). However, co-operatives and related entities are not meant to replace private enterprises but to facilitate collective action where the institutions have competitive advantages or can engage more effectively with private firms (Shiferaw *et al.*, 2011).

Chain champions herein referred to as actors within value chains with clear vision of opportunities that could arise from establishing business relationships with

other actors (individually or in groups) are increasingly becoming important for organising and driving processes linked to building business relationships (Wiggins and Keats, 2013). These relations are vital to achieving vertical coordination—a mechanism that enable an agent to shift from spot towards longer-term transactions with other actors. The shift can result in greater certainty about future business dealings and income flows for poor participants. In many cases the champions are large scale operators and legal business entities such as processors, exporters or retail chains whose incentives are largely commercial gains (Wiggins and Keats, 2013). The role of a champion in agricultural value chain is often linked to supporting smallholder farmers to access technical assistance, training and credit which are vital for upgrading.

In general, there have been several interventions to support smallholder farmers to upgrade in the value chains through various forms of coordination so as to change the way they behave and relate to each other and bring about desired changes in markets (Campbell, 2010). To date some studies (Vorley and Proctor, 2008; Anania and Bee, 2018; Kingu and Ndiege, 2018) have assessed how to better organize smallholder farmers to undertake concerted efforts and become formidable players in the market place. Other studies have particularly focused on linking upgrading processes with specific outcomes so as to pin-point pathways towards effective participation of smallholder farmers (Jaffee *et al.*, 2011; Vorley *et al.*, 2012). In general, these studies give context-specific recommendations that may not apply to all circumstances and at all times because chains rarely stay the same. More case studies are needed to assess better effects of various forms of interventions on smallholder farmers' market participation. This paper offers a comprehensive review of linkages involving smallholder dairy farmers and milk processors, which is one of the major means to facilitate upgrading among dairy farmers in Tanzania.

The paper compares and contrast upgrading mechanisms that are purely based on innovation cluster and chain champions within the dairy industry to draw specific lessons to inform

<sup>4</sup> Horizontal coordination is a mechanism that allows organization of individual farmers to ease the bulking-up of produce or inputs or access to critical support services.

future technical and policy interventions. The study seeks to assess the way small scale dairy farmer-processor relationships affect chain upgrading in two study areas. The assessment is vital to clearly understand how transactions between smallholder dairy farmers and milk processors impact on milk quality as well as production and marketing systems. Specifically, the paper seeks to answer two questions:

- i) What are the interactions between small holder dairy farmers and milk processors?
- ii) How do the relationships influence marketing decisions and upgrading in the milk value chains?

**Material and Method**

The study was designed as a comparative case study to examine interventions and draws lessons from a development project (IDRC Grant No.: 105186-004) that focused on milk value chains in Tanga City and Iringa Municipality with a view to draw specific impacts of urban dairying on involvement of smallholder farmers and its impact on market access, income and poverty levels. These towns represent two distinct milk collection and marketing arrangements. Milk collection centres organised by farmer groups are well developed in Tanga City where the Tanga Dairy Development Programme (TDDP) has been supporting the Tanga Dairies Co-operative Union (TDCU), an apex organization of 10 primary co-operatives in five districts to promote joint marketing of smallholder dairy farmers’ milk. In contrast, the major processor in Iringa Municipality (M/s

ASAS Ltd) has established its own mechanism to source milk from some individual producers. The two cases describe market arrangements found elsewhere in Tanzania and are selected to draw specific lessons with respect to the impact of an innovation cluster (formal co-operation) vis-à-vis champion’s own efforts to source milk from individual farmers on upgrading.

The study used both rapid appraisal methods and in-depth data survey. It involved 222 dairy farmers (99 from Iringa Municipality and 123 from Tanga City Council) and other key stakeholders within the dairy industry that are shown in Appendices 1 and 2. The stakeholders included input suppliers, whole sellers, retailers, vendors, breeders, providers of artificial insemination and large-scale dairy farmers. Methods used to collect information included key informant interviews, focus group discussions, stakeholders’ fora and in-depth interviews with chain actors. Information collected from these sources was useful to assess broader project issues that go beyond the scope of this paper. The information that is analysed and presented in this paper is on arrangements in both formal and informal markets to pin point how the set-up affect smallholder farmers’ participation and their prospect to upgrade in the chains. This information was also used to map value chains, assess in details the participation of different actors and rules of engagements. The assessment of smallholder farmers’ engagement in both informal and formal market was based on a conceptual frame shown in Figure 1.

The conceptual frame guiding the analysis

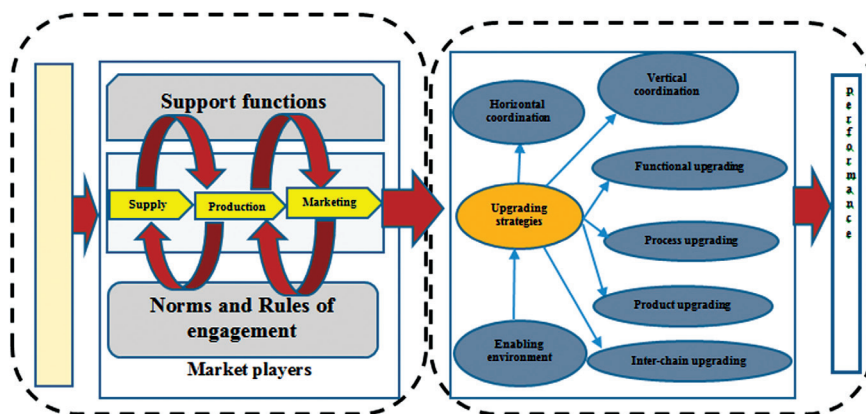


Figure 1: Typology of Upgrading Strategies, Source: Adapted from Mitchell *et al.* (2009)

(Figure 1) implies that interventions to promote value chains are normally pioneered by many players. In Tanzania these interventions may be implemented through Central Government, Local Government Authorities, Development Partners and the Private Sector. The market set-up is bound to influence the effectiveness of the support and services rendered through such interventions; especially with respect to organizational issues (norms and rules of engagement), promotion, up-take, utilization and sustainability. The interventions and market set-up have direct influence on specific aspects of supply of inputs and core business support services that shape production and marketing of agricultural and related products. It is worth noting that there are always interdependencies (see curved arrows) between supply, production and marketing of these products. Ultimately, the effect of interventions under prevailing levels of market development, institutional landscape, business environment and socio-cultural conditions will determine conditions for effective participation (enabling environment) that will influence who participate, upgrading pathways to be adopted and outcomes of interventions. This analytical frame is conceived in the context of value chain intervention in case studies to assess how the interplay of these factors affect linkages between smallholder dairy farmers and milk processors and the ultimate effect of this linkage on upgrading.

The paper assesses the prospect for smallholder dairy farmers in Tanga City and Iringa Municipality to upgrade in milk value chains focusing mainly on: typologies of business linkages and upgrading trajectories (Kaplinsky and Morris, 2000) namely: horizontal and vertical coordination; changing the mix of functions performed (functional upgrading); enhancing chain efficiency through increased output volumes or reducing per unit cost of production (process upgrading); improving old or introducing new products using own strategies or through inter-firm processes (product upgrading) and investment in new but related enterprises or diversifying the portfolio of enterprises (inter-chain upgrading).

This analysis centres on two milk processing plants because they play vital role

in improving coordination of milk production, value addition and utilization in the study areas where milk market is largely informal (Kilima *et al.*, 2015). These roles are implicitly imbedded in processors' pricing and quality control mechanisms which are normally linked to rewards or incentives when dairy farmers and suppliers attain desired level of milk quality (Nightingale *et al.*, 2008) and penalties for non-compliance. The analysis considers incentives to dairy farmers related to input supply, capacity building programmes, issuance of preferential credit and advance payments as well as advisory services. In context of the paper, sanctioning mechanisms like deduction in milk price for suppliers failing to meet minimum standards with respect to factors such as fat content and buyer's decision to reject delivery when milk is adulterated or of poor quality, serve as significant force to ensure compliance with milk standards (Flores-Miyamoto, 2014).

The presence of milk processors in the study areas is an opportunity for smallholder dairy farmers to secure market because milk production is not consistent in its availability, with more milk produced during the rainy season and less in the dry season (Kilima *et al.*, 2015). The informal milk market in the two areas is generally thin to absorb surplus milk during the flush season. This surplus could be channelled to buyers in the formal channel, who have the capacity to prolong the shelf life of milk and even out the supply between low and high seasons. However, many smallholder dairy farmers cannot seize this market easily because they normally fail to differentiate milk products and identify market niches, communicate product quality and safety to immediate buyers and reduce costs of production while maintaining quality and high levels of production (Kilima *et al.*, 2015).

Moreover, there are several standard compliance challenges among smallholder scale farmers when informal and formal markets co-exist and milk production is unstable. The co-existence can potentially bring competitive supplier-client relationship and reduces incentives for strict quality oversight (BIRTHAL, 2017). Overall, the co-existence of markets with different quality demands coupled with

the prevailing weak institutional arrangement to enforce standards make the milk value chains in study areas fragile. Farmers contracted to supply milk in the formal sector may specifically fail to achieve standards and decide to supply it in the informal market where enforcement of standards is weak and there are no objective criteria to differentiate milk quality and match it with price.

### **Results**

The milk sector in Iringa Municipality was relatively underdeveloped compared to Tanga City where there were more intensive interventions to promote milk production by smallholder dairy farmers linked to groups or co-operatives. M/s ASAS Ltd was a sole milk processor in Iringa Municipality, which was established following a move by founders of the business to integrate vertically by establishing own dairy farm as source of milk for the plant. This source was reported to supply almost 30% of the daily processing capacity. A significant amount of milk was sourced from Njombe (10%), Kitulo (5%) and dairy farmers within the municipality (10%).

The main linkage involving smallholder dairy farmers was through sell of milk to the processor. The linkage was through vertical coordination arrangements pioneered by the processor (chain champion). The involvement of smallholder farmers was found to be a modest affair. Appendix 1 reveals that almost all smallholder dairy farmers (80%) sold milk through the informal market, about 12% sold it to the processor (loop 4) while the rest relied on other options including hotels and local vendors (loop 3).

Interestingly, the relationship between the processor and smallholder dairy farmers was tighter than in Tanga City as it was not only focused on selling and buying milk but also dedicated services to smallholder dairy farmers encompassing several aspects of value chain upgrading including: Process upgrading through advisory services with respect to feed formulation and feeding to increase milk production; hygienic milking and handling of milk as well as diagnoses of diseases to promote milk quality and safety; functional upgrading

through champion's direct engagement in sale of hay and provision of veterinary services to contracted farmers. The former is meant to ease availability of animal fodder so as to minimize variation in milk production while the latter is meant to maintain milk quality and safety. The sale of hay and provision of veterinary services are linked to the provision of credit as dairy farmers can access the services on credit. The Champion's endeavour to issue credit to dairy farmers was an important aspect of chain upgrading as it allowed the farmers to access these critical services even when they were unable to pay immediately. Credit provision was also vital for promoting trust between parties that were engaged in such transactions.

Appendix 2 reveals that some smallholder dairy farmers in Tanga City sold milk to processors. This interaction comprised both the horizontal and vertical coordination. Horizontal coordination was through farmer organization where Tanga Dairy Cooperative Union (TDCU) and its affiliate primary cooperative societies like Ushirika wa Wauza Maziwa Tanga (UWATA) were contracted to supply milk to processing plant—M/s Tanga Fresh Ltd (loop 4).

Vertical coordination entailed individual smallholder farmers supplying milk to both M/s Tanga Fresh Ltd and Ammy Dairies either through milk collection centres owned by these processors or directly to plants (loop 6). Other forms of upgrading were implicitly imbedded in processes smallholder farmers went through to integrate vertically. It worth noting that small scale dairy farmers in Tanga could deliver milk to collection centres (formal market)—largely through non-binding contracts where price quoted in the contracts tended to be less than “spot” market price; roving hawkers or directly to end consumers (informal market—see loops 1, 2&3). Consequently, producers with less than three milked cows sold milk in the informal markets (neighbours and friends) while those with more milked cows sold milk to both informal and formal markets so as to maintain access and hedge against risks associated with market saturation, especially in the informal (thin) market. The emergence of individual farmers supplying milk to processors is an evidence of upgrading among such farmers.



However, there was no evidence to support functional, product and chain upgrading in Tanga City.

In general, farmer groups and co-operatives were vital to facilitate horizontal coordination between smallholder dairy farmers. However, like many other forms of farmer organization in Africa (Develtere *et al.*, 2008; Sikawa and Mugisha, 2011); dairy co-operatives in Tanga occasionally failed to perform the coordination role effectively owing to: inability to assess milk markets and adopt effective means to promote members' participation and independence, along with the absence or incompleteness of legal instruments to ensure adequate oversight on co-operative affairs. Other challenges were: side-selling of milk among farmers contracted to supply it to processors who could deliberately supply the milk to the processors and other buyers (e.g. hawkers or vendors), lax enforcement of milk regulations to actors in informal value chain and strict enforcement to actors supplying milk through the formal value chain; and, absence of institutional arrangements to allow co-operators to hedge against potential risks from supply disruption and abrupt changes in contract terms.

### Discussion

The study identified well-established and managed co-operatives to be effective means for building trust and co-operation between actors that are needed to facilitate their access to information, critical inputs, business support services and new innovations. The institutions are vital in facilitating horizontal co-ordination among dairy farmers. This co-ordination is seen to be associated with enhanced stability of economic gains through reduced transaction costs for individual dairy farmers resulting from joint acquisition of inputs and services as well as marketing of milk. These collective arrangements were also reported to have improved the position of the weak actors in the value chain and broaden choices of market outlets through enhanced milk quality by means of effective support in knowledge, governance and monitoring as well as specific sanctions for non-compliance.

These findings are consistent with previous

studies in east African milk markets. In Kenya, for example, horizontal integration has been achieved through a mixed approach entailing bundling of inputs and services by co-operatives and milk processors along with privatization of input and service delivery (Baiya and Kithinji, 2010; van der Lee *et al.*, 2016). An integrated approach involving small, medium and large-scale dairy farmers, milk processors and service providers has been the impetus behind the growth of dairy milk co-operatives in Tanga City. Kenya Co-operative Creameries Ltd and Tanga Dairies Co-operative Union have been the most outstanding co-operatives for enhancing the participation of smallholder dairy farmers in Kenya and Tanzania, respectively (Kilima and Kurwijila, 2020). Similar stories abound in Uganda and Rwanda where dairy co-operatives have delivered similar growth and linkages within the industry (<https://cgspace.cgiar.org/bitstream/handle/10568/>). Dairy co-operatives could be more relevant for achieving value chain linkages through efficient and effective management of production and marketing functions to make the entities more competitive and resilient to market shocks. Ensuring dedicated technical support towards identifying appropriate business models for more effective engagement with other chain actors is the best strategy to achieve such outcome.

The study observed tighter linkages between smallholder dairy farmers in Iringa Municipality than Tanga City Council which is attributable to the champion's implementation of a strict milk quality tracking system and complementary incentives for farmers' continued participation and upholding quality requirements. The champion's endeavor to adopt the system which was tied to a quality-based payment and dedicated support in critical areas of fodder and feed quality, animal health and enterprise development; are pro-poor interventions that go beyond the conventional act of selling and buying and are more effective in ensuring long-lasting business relationships. The approach has been demonstrated to offer an acceptable mechanism for accessing farmers' felt needs and core services for improving milk hygiene and safety, addressing concerns of policy makers and bringing about desired welfare benefits

(Kaitibie *et al.*, 2010). More recent reviews of this pro-poor intervention indicate that it can be strengthened when more investment is targeted at accredited business development service (BDS) providers (Alonso *et al.*, 2018). The involvement of value chain champions in the provision of critical business development support services is a feasible entry-point to leverage service provision through livestock extension services that are characterized by weak research-extension-farmer linkage and inadequate infrastructure and facilities.

### **Conclusion**

The co-existence of formal and informal value chains is a common feature of milk value chains in Tanga City and Iringa Municipality. There is evidence to support functional and process upgrading in Iringa Municipality which was not obvious in Tanga where horizontal and vertical coordination were common. These findings have four ramifications for future efforts to support smallholder farmers to upgrade in milk value chain. Firstly, there is limited prospect for dairy farmers to upgrade where the level of production is low and milk standards are not enforced. Secondly, chain champions are ideal means to enhance productivity and facilitate a shift in milk supply from informal to formal markets. Thirdly, champions' interventions can leverage livestock extension services and facilitate the upgrading although not all categories of smallholder dairy farmers may upgrade, qualify and continue to supply milk in the formal market. Lastly, interventions to support self-selected (committed) smallholder dairy farmers seem to be more efficient to facilitate the upgrading and ensure long-lasting business relationships than generic interventions targeting all smallholder dairy farmers.

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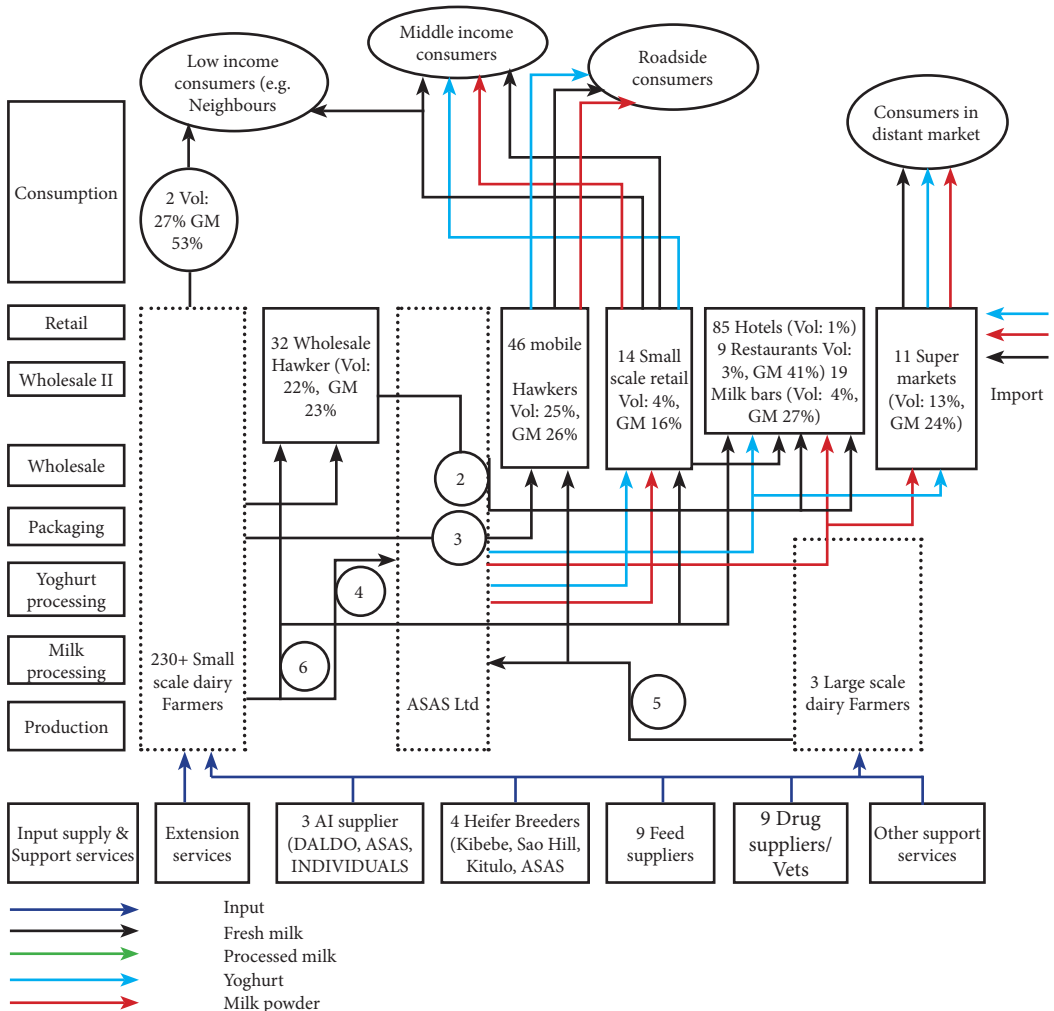
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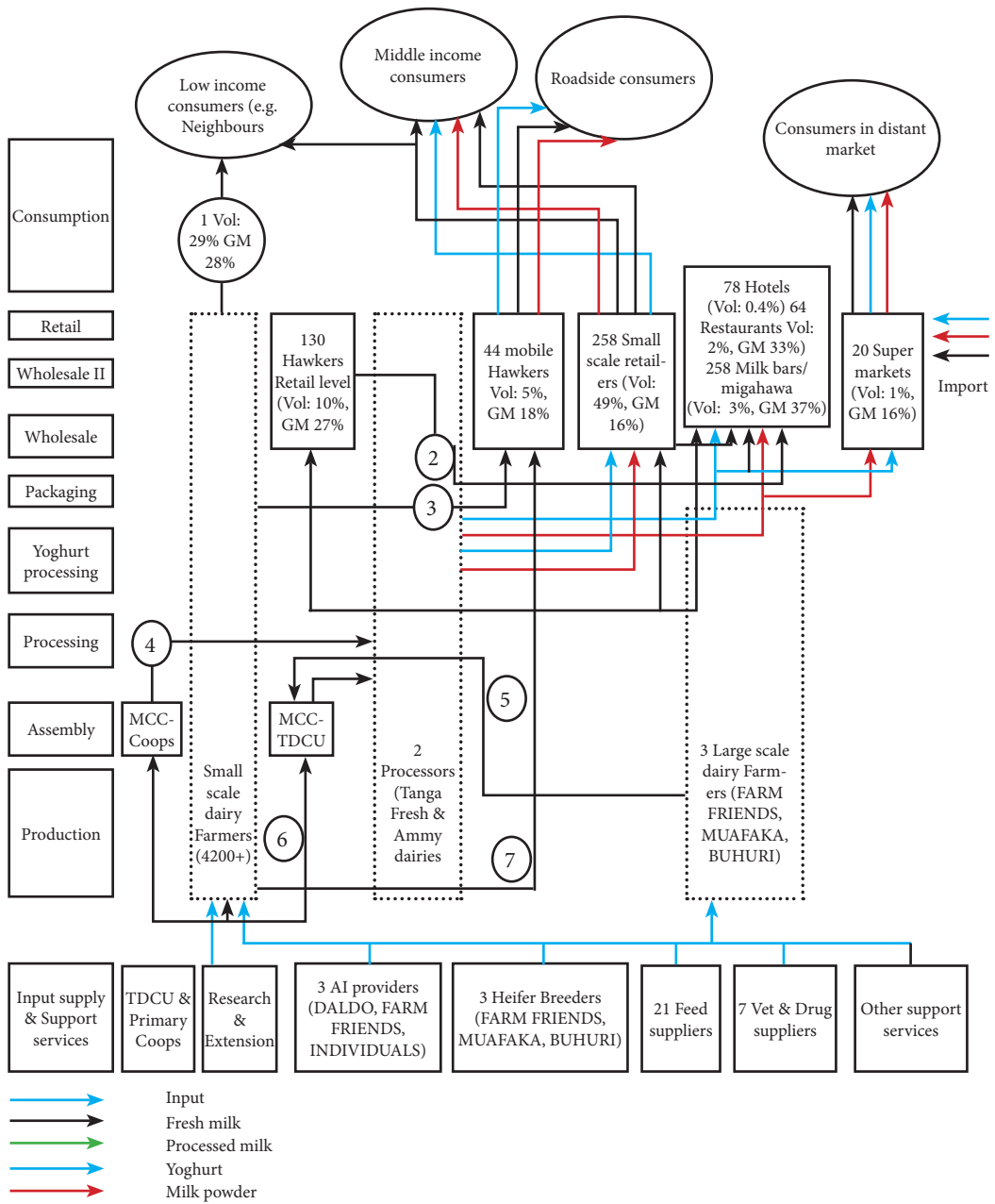
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**Appendix 1: Milk value chain in Iringa**



Numbers in circles represent outlets through which milk moves

Appendix 2: Milk value chain in Tanga



Numbers in circles represent outlets through which milk moves