

Strategies to increase milk deliveries to the Tanzanian milk
processing industry

A case of ASAS Dairies Ltd in Iringa district.



**A Research Project submitted to
Larenstein University of Applied Sciences
In Partial Fulfilment of the Requirements for the Degree of Master in
Agricultural Production Chain Management
Specialization in Livestock Production Chains.**

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Dedication

I dedicate this work to my son Nassoro J. Katuga, I have set a standard for you and I wish you emulate this. And to the loving memory of my father Ibrahim I. Fussi and my mother Angelina M. Payowella who both passed away when I was about to start my studies.

List of tables

Table 1: Summary of Information/Data and their Sources.....	6
Table 2: Overview Structure of the Milk Sector.....	11
Table 3 Utilisation of Dairy Processing Capacity in EA (2006).....	11
Table 4 Stakeholder analysis.....	18
Table 5 Gross margin dairy cow per month at peak production in Iringa.....	20
Table 6 Gross margin calculation for ASAS for one litre of milk per month.....	20
Table 7 Profitability analysis for the milk vendor.....	21
Table 8 Value shares.....	21
Table 9: Groups of clients for milk products from ASAS Dairies Limited.....	25
Table 10 Age proportion of respondents.....	28
Table 11 Distribution of education level of respondents.....	28
Table 12 Proportion of male and female of respondents.....	29
Table 13 Choice of customer in relation to age of the respondents.....	30
Table 14 Breeding methods for the sampled herd.....	32
Table 15 Milk deliveries to ASAS Dairies Ltd.....	33
Table 16 Advantages and disadvantages of formal and informal milk marketing.....	36

List of figures

Figure 1: Geographical map of Tanzania showing Iringa location.....	4
Figure 2: Iringa hilltop view.....	4
Figure 3: Livestock Population in Iringa.....	4
Figure4: Research Framework.....	5
Figure 5: Cattle population trend.....	8
Figure 6: Dairy products based on Installed Capacity.....	12
Figure 7: Trend of dairy products imports.....	12
Figure 8: Chain map of milk marketing.....	13
Figure 9: Map of dairy supply chains in Iringa.....	17
Figure 10: Main value chain actors and their expectations in Iringa.....	19
Figure 11: Pie chart for value shares.....	21
Figure 12: Quality attributes.....	23
Figure 13: Milk marketing channels in Iringa.....	29
Figure 14: Problems farmers face in marketing raw milk.....	30
Figure 15: Influence of distance to market	31
Figure 16: Grazing systems and average milk production in dry season and wet season	31
Figure 17: Average milk productions in dry and wet season	32
Figure 18: Milk trend and milk prices in Iringa district 2005-2010.....	38
Figure 19: Chain empowerment.....	40

List of pictures

Picture 1: ASAS Dairy products in Iringa milk shops.....	25
Picture 2: Tanga Dairies milk distributor	27
Picture 3: Female farmer	35
Picture 4: An old male farmer	35
Picture 5: ASAS dairy farm	43

List of abbreviations

ASAS	ASAS Dairies Ltd.
BOT	Bank of Tanzania
GDP	Gross Domestic Product
lme	Liquid milk equivalent
lpd	Litres per day
MFEA	Ministry of Finance and Economic Affairs
MLF	Ministry of Livestock Development and Fisheries
MMA	Match Maker Associates Limited
NBS	National Bureau of Statistics
NMB	National Microfinance Bank of Tanzania
PO	Producer Organization
RLDC	Rural Livelihood Development Company
TAMPA	Tanzania Milk Processors Association
TAMPRODA	Tanzania Milk Producers Association
TDB	Tanzania Dairy Board
TFDA	Tanzania Food and Drug Authority
TFL	Tanga Fresh Limited
TDCU	Tanga Dairy Cooperative Union
UHT	Ultra high temperature
USD	United States Dollar
WTO	World Trade Organization

TABLE OF CONTENTS

Permission to use.....	i
Acknowledgement.....	ii
Dedication.....	iii
List of tables.....	iv
List of figures.....	v
List of abbreviations.....	vi
Abstract.....	viii
Chapter 1: Introduction.....	1
1.1. Background.....	1
1.2. Problem statement.....	1
1.3. Justification of the study.....	1
1.4. Research objective.....	2
1.5. Research questions.....	2
Main research question 1.....	2
Main research question 2.....	2
Definition of concepts.....	2
Chapter 2: Methodology.....	4
2.1 Study area.....	4
2.2 The Research strategy.....	5
2.2.1 Data collection.....	5
a) Survey.....	5
b) Interviews.....	5
2.3 Analysis of the Survey Data:.....	6
2.4 Limitations of the study.....	6
2.5 Conceptual framework.....	7
Chapter 3: The dairy industry in Tanzania.....	8
3.1 Introduction.....	8
3.2 Dairy sector overview.....	8
3.3 An Overview Map of the Dairy Sector.....	13
3.4 The General Environment of the dairy industry.....	13
Chapter 4: The dairy supply chain in Iringa district.....	16
4.1 Value Chain Concept.....	16
4.1.1 Mapping the chain actors and the roles.....	16
4.1.2 Stakeholder analysis.....	17
4.1.3 Value shares of actors in the dairy value chain.....	19
4.2 Situational analysis of task environment for ASAS Dairies Limited.....	23
4.2.1 Marketing strategy analysis.....	23
4.3 Market segmentation.....	24
Chapter 5: Results.....	28
5.1 Survey results.....	28
5.2 Case study results.....	32
Chapter 6: Discussion.....	35
Chapter 7: Conclusion and Recommendations.....	45
References.....	47
Appendices.....	50

Abstract

The theme of the research is "*Strategies to increase milk deliveries to the Tanzanian milk processing industry. A case of ASAS Dairies Ltd in Iringa district*" The study was carried out in eight wards in the district between the last half of July and the first half of August 2009. The objective was to contribute to the revamping of the dairy industry in Tanzania by identifying challenges facing the formal milk marketing channel and provide recommendations and strategies which the processor can follow to be ensured of stable and reliable milk supply throughout the year.

The research examined the current status of the dairy chain and the interventions to increase milk deliveries to the processing plants for establishing smallholder farmers association

Survey questionnaires were administered to 40 smallholder dairy farmers in eight wards (five farmers per ward) randomly selected. Milk processor, large scale farmers, District veterinary officer and extension staff were interviewed. For triangulation statistical officers in the Ministry of Livestock Development and Fisheries and Tanzania Dairy Board officials were interviewed. Discussion with milk vendors and consumers was done to get more information for the research

The results revealed that over 80% of milk produced is sold through the informal chain from the small scale farmers to which they have access and 10- 20% filters into the formal chain resulting into the under utilisation of the processing capacity. The structure of dairy chain showed that there are two channels from the farmers to the urban and rural consumers which are the informal and formal channels. Farmer's access to services like artificial insemination, commercial feeds and finance is difficult.

The findings that culminated into recommendations are expected to help in reviving of the dairy sector and for the processor to develop appropriate strategies in increasing milk deliveries to their plants.

Key words: informal chain, formal chain, dairy supply chain, small holder dairy farmers, producer organizations,

Chapter 1: Introduction

1.1. Background

Tanzania is a developing country in Eastern Africa bordering the Indian Ocean, between Kenya and Mozambique, with a total area of about 945,087 square kilometres of which approximately 5, 9048 square kilometres are land water. The population of Tanzania is about 40.67 million people (Economic Survey, 2008)

The country is endowed with abundant natural resources which include among others 60 million hectares of rangeland suitable for livestock grazing (Koggani, 2005). However, only 40% of the rangelands are utilized by approximately 18.8 million cattle; 13.3 million goats; 3.6 million sheep, 1.1 million pigs and 33 million poultry and other species. (MLF, 2009 also see Appendix 4).

According to the Economic survey, 2008, the livestock industry is currently contributing about 6 percent to the National Gross Domestic Product (GDP) out of which 30% of this contribution comes from dairy products. Besides its share to the GDP, the dairy industry plays an import substitution role for most of its products consumed in the country and acts as a source of animal protein and employment to the rural population. Moreover, in smallholder systems which dominate agriculture, livestock are capital assets, provide cash and source of manure and power for cultivation/transport.

1.2. Problem statement

Processed milk play an important role in the development of dairy industry in any country. The processor play the role of transferring and transforming milk from rural production area to different consumer dairy products sold in urban centre or milk deficit areas. ASAS Dairies Limited is a private owned large milk processing company in Iringa. The plant has the capacity of processing 12,000 litres per day (Appendix 1) but most dairy farmers in Iringa market their milk individually through an informal channel. In the informal market apart from producers selling milk in the neighbourhood, milk hawkers are the dominant milk trading agents who collect milk from producers and sell it to households, hotels/restaurants, vendors etc.

Milk volumes delivered by a few numbers of dairy farmers to ASAS processing plant either directly to the plant or through ASAS milk collection centre is around 5,500 litres per day (45.8% of installed capacity) depending on the season. The supply does not counter the high demand from the processing plant; therefore it is running below capacity to sustain the dairy production chain in Iringa (ASAS Dairies Limited report, 2009).

Given this background the study aims to find out why farmers prefer informal market which will be the basis for recommendation on the strategies to improve milk deliveries to the processor so as to ensure a stable large amount of good quality milk for the effectiveness of the organization and the sustainability of the value chain.

1.3. Justification of the study

The dairy industry is slowly recovering from the fast decline in the 1990's when the large state owned companies (Tanzania Dairies Limited and Tanzania Dairy Farms Limited) proving uncompetitive were privatized. (Tanzania Dairy Board report, 2007) After disappearing of these companies, milk sector in the country remained marginal. In the recent years efforts are being made to revamp the industry through private sector

involvement (Mpagalile, Ishengoma and Gillah, 2008). However, the currently emerging companies including ASAS Dairies Limited in the market that are slowly expanding face many obstacles in the process which include strong foreign competition, small domestic market, lack of financial means and difficulties of sourcing large amounts of milk for processing (Match Maker Associates, 2008).

This study will provide insight to the Ministry of Livestock Development and Fisheries (employer of the author) whose objectives among others is to facilitate access to markets, promote increase in livestock productivity and strengthen institutions and stakeholders in the sector on how development of value chains can be useful in developing the dairy sub sector. Additionally, the study will also give suggestions on strategies that will serve as a guide for the ministry on how to improve milk collection in order to ensure a stable and reliable milk supply for processors so as to develop dairy value chain in other regions too- a multiplier effect.

1.4. Research objective

The purpose of this study is to contribute to the revamping of the dairy industry in Tanzania by identifying challenges facing the formal milk marketing channel and provide recommendations and strategies which the processor can follow to be ensured of stable and reliable milk supply throughout the year.

1.5. Research questions

Based on the research objective two main research questions are formulated and a set of sub questions which endeavours to address the main questions.

Main research question 1

What is the current status of milk supply chain in Iringa District?

- 1.1 What are the marketing practices and channels?
- 1.2 What are the benefits of the informal market?
- 1.3 What are the roles of the actors and the supporters in developing the dairy value chain?
- 1.4 What are the problems faced by small holder dairy farmers in marketing raw milk?

Main research question 2

What strategies can be employed to strengthen the formal milk marketing?

- 1.1 What can be done to improve milk deliveries to the processor?
- 1.2 What are the challenges to milk processing?
- 1.3 What benefits will the actors get in the value chain?

Definition of concepts

Small holder farmer are farmers with 2-10 cattle in an intensive or semi extensive system for income generation.

Value chain development- Value chain development can be defined as strategies used to improve small-scale dairy farmers' participation in chain activities and their involvement in management of the chain.

Bargaining power is the ability to influence the price or terms of a business transaction and can enable producers to negotiate for better prices and terms, such as a long-term supply agreement or access to business services. Bargaining power depends on many different factors but the most important are scarcity, the availability of alternative marketing options, and market information.

Stakeholders-people who are directly involved in dairy value chain. These include actors, chain supporters and chain Influencers.

Formal milk marketing is the channel through which farmers deliver milk directly to the milk processing plant or to a milk collection centre (MCC) or traders who buy the milk from farmer and sell to MCC.

Informal milk marketing is direct delivery of raw milk by the farmer to consumers or through two or vendors /hawkers before reaching the consumer

Producer organisation is a rural business, producer-owned and controlled organisation that helps smallholder farmers to collaborate, coordinate to achieve economies of scale in their transaction with input suppliers and buyers, access inputs, services, information channels and raise levels of knowledge and skills in agricultural production and value addition.

Dairy Cooperative: registered organization with the Ministry of Agriculture and Cooperatives and is a combination of more than one farmer groups.

An association is a non profit organisation that enables members to collaborate for services, information exchange and representation. A typical example is the bargaining association, which negotiates on behalf of its members with the buyers of their products.

Through collective bargaining, the association can obtain better prices or more favourable trading conditions than could an individual producer.

Chapter 2: Methodology

2.1 Study area

The study area Iringa Municipal is part of Iringa district, located in the Southern-highlands of Tanzania within 7° latitudes south of equator 35° longitudes east of the Greenwich (figure 5). The area covers 162 square kilometres with a population of 161,000 people.

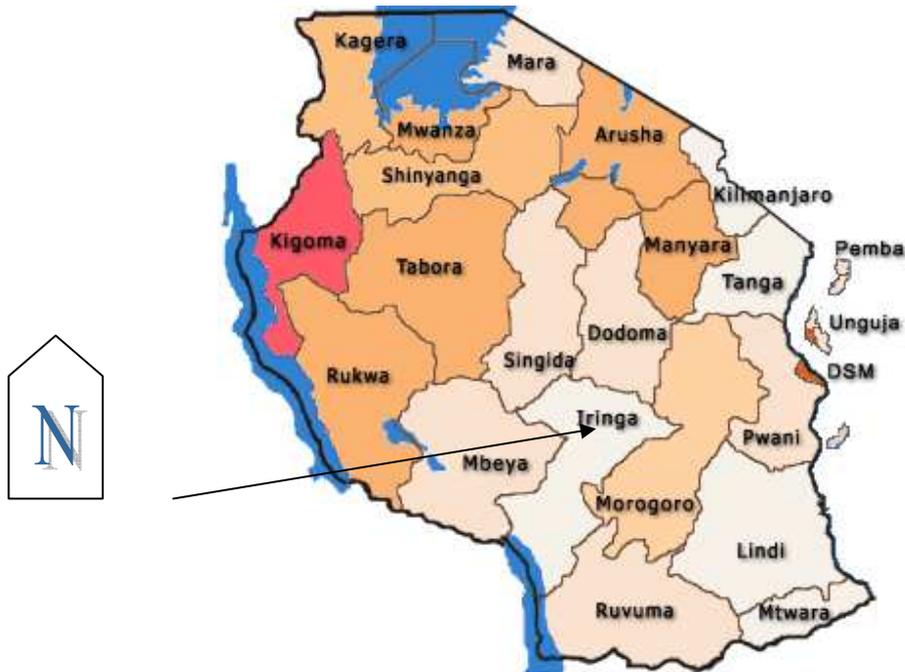


Figure 1: Geographical map of Tanzania showing Iringa location. Source: GIS, Iringa

Dairy, poultry and pig rearing is mostly practised in AEZ II (humid) and III (sub humid). Commercial ranching and agro pastoral systems are found in AEZ IV (sub humid to semi arid) (see figure 3 for livestock distribution & Appendix 4). The vegetation is predominantly savannah woodland with leguminous trees and grass (*Panicum*, *Bracheria*, and *Setaria*) as indicated on figure 6 below.

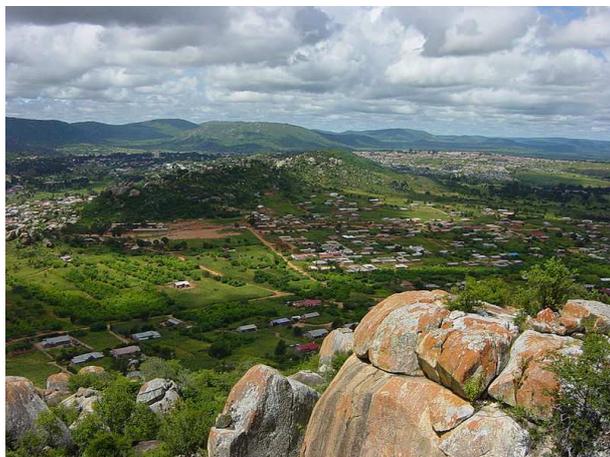


Figure 2: Iringa hilltop view, Source: District GIS section

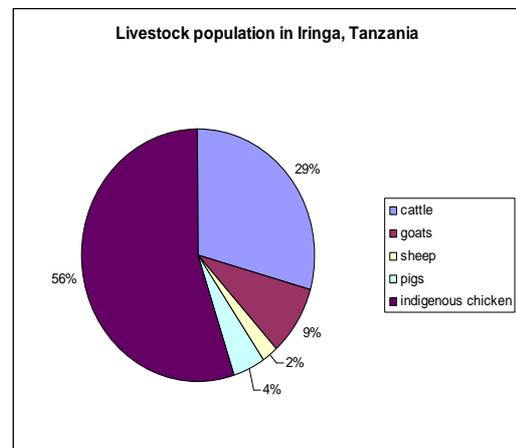


Figure 3: Livestock Population in Iringa

2.2 The Research strategy

The research has a qualitative and a quantitative approach and is based on field survey results, interviews, professional literature and documents from district veterinary department. The whole process of the study was conducted in a way as indicated in figure 7 below.

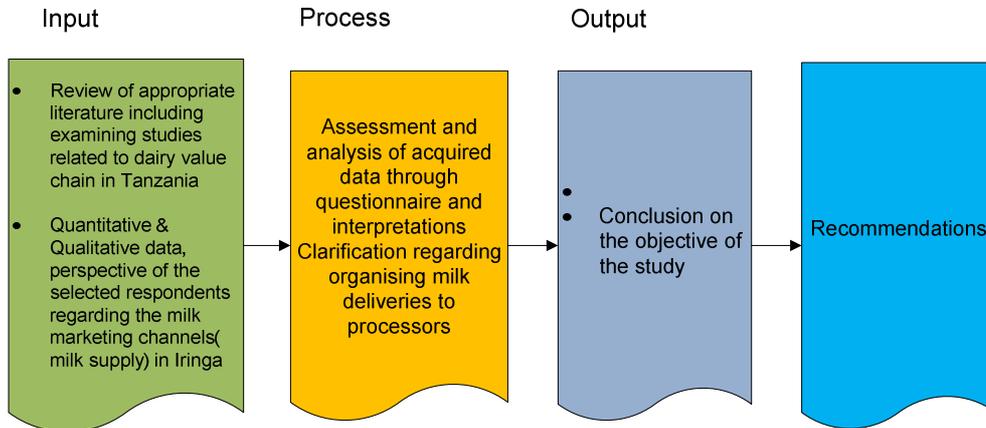


Figure 4: Research Framework

2.2.1 Data collection

The data of the study was collected through surveys and interviews.

a) Survey

The survey was carried out in eight wards in the municipality namely Ruaha, Kitwiru, Mwangata, Kwakilosa, Gangilonga, Kihesa, Mtwivila and Mkwawa. A sample of fourty smallholder dairy farmers was randomly selected five in each ward in the district. Questionnaire was administered.

The survey questionnaires for the smallholder dairy farmers addressed issues related to the problems faced by smallholder farmers in the dairy chain (sub question 1.4), how they market their milk, constraints they encounter and how to improve the situation of milk marketing (sub question 1.1) and their role in the dairy chain (sub question 1.3). A structured questionnaire was used to gather background information from the respondents (smallholder dairy farmers) regarding their age (age group in dairy production), level of education (provides information on capacity needs of the farmers).The other pieces of information collected are on land size, number of dairy cattle owned by the household.

b) Interviews

i) Milk processor, large scale farmers, District Veterinary Officer and Extension Staff

The interviews address issues related to milk collection, marketing and the intervention required to improve the situation. In order to allow spontaneous questions coming out from interviewees comments, semi- structured interviews were conducted (Bryman, 2004) consisting of up to 8 questions for an ideal length of between 20- 45 minutes. However, the study adopted an embedded case study approach (Yin, 2003) to examine the milk industry by closely analysing the ASAS Dairies milk processing in Iringa district.

ii) Observations

Observation on morning and evening market to check for milk vendors was done at Amani store, Baba Mussa Hotel, Consolata and Takrima hotel

Triangulation

Triangulations was done from three or more angles to get a general understanding of the situation for better analysis (Verschuren and Doorewaard, 2005)

c) Other sources of information

- Literature review

The literature review was related to (sub question 1.3)

-Documents

The document answers questions related to the structure of the dairy chain (sub question 1.1), the roles of the actors (sub question 1.3), the supporters and their roles (sub question 1.3)

Table 1: Summary of Information/Data and their Sources

Sub-questions	Information/data	Source of information/data
1.1	The marketing practices and channels i	Survey and
1.2	Benefits of the informal markets	Literature review and Survey
1.3	Roles of actors and supporters in developing the dairy value chain	Literature review
1.4	Problems faced by small holder farmers in marketing raw milk	Survey
2.1	How to improve milk deliveries to the processor	Survey, literature review, Case study
2.2	Challenges of milk processing	Case study
2.3	Benefits of value chain to actors	Case study, literature review

2.3 Analysis of the Survey Data:

The collected survey data were coded and analysed using statistical package for social sciences (SPSS 17.0 for windows). Descriptive analysis was used to visualise the demographic composition of the smallholder dairy cattle keepers in the survey such as average age, land size, and number of dairy cattle. Crosstabulation was used to explore relationships contributing to informal marketing. Crosstabulation was also done to compare between the two clusters on the level of education and constraints faced in the dairy chain.

Analysis on the existing dairy chain and assessing how milk marketing is done by ASAS from farmers was done by use of chain map, PESTEC, Porters five forces, cost price determination all within the concept of value chain analysis (VCA). Criteria for assessment were on information flow, bargaining power, quality system, value shares and profit margins.

2.4 Limitations of the study

The sample size was small due to the limited time for data collection and it was not possible to perform some tests like Chi- square.

2.5 Conceptual framework

The framework entails analyzing the existing dairy chain and assessing how milk is marketed. Criteria for assessment was information flow, bargaining power, quality system, value shares and profit margins analysed by use of chain map, PESTEC, Porters five forces, cost price determination all within the concept of value chain analysis (VCA).

The conceptual frame work tries to see how milk marketing is influenced by pricing and bargaining power difference as a result of interdependent four elements between farmers and processors. These elements are processor-producer relationship, market place access, qualities of product and chain embedded services with their sub-elements. These elements help producer farmers and processors (or their organisations) to position their product or service in appropriate market chain. Farmers needed to strength their bargaining power over the price instead of trying simply to sell what they have produced and then seeking for higher price market opportunities (KIT et al, 2006).

Chapter 3: The dairy industry in Tanzania

3.1 Introduction

Dairy production is one of the main activities in the livestock sector supporting the livelihood of more than 1 million small scale farmers. The sub-sector offers employment opportunities for about 600,000 people along the milk marketing chain (MLD, 2007).

3.2 Dairy sector overview

The livestock population is ranking 3rd in Africa after Ethiopia and Sudan (MMA, 2008). About 98% of the livestock population are indigenous type known for their low genetic potential, raised for multipurpose use. Only 2% (about 560,000) are dairy improved breeds. The total contribution of livestock sector including dairy sub-sector to the total GDP and agricultural GDP is estimated at 18% and 30% respectively (Njombe and Msanga, 2007).

3.2.1 Dairy cattle population

Tanzania's national cattle population has increased over a decade (figure 5). The population growth has been attributed by the increase in demand and milk processing plants. Njombe and Msanga (2007) reported that despite of diseases and drought, Tanzania dairy herd has been growing steadily over years. Given an example of Uganda, cattle density is typically closely and relative correlated with human population (Staal and Kaguongo, 2003).

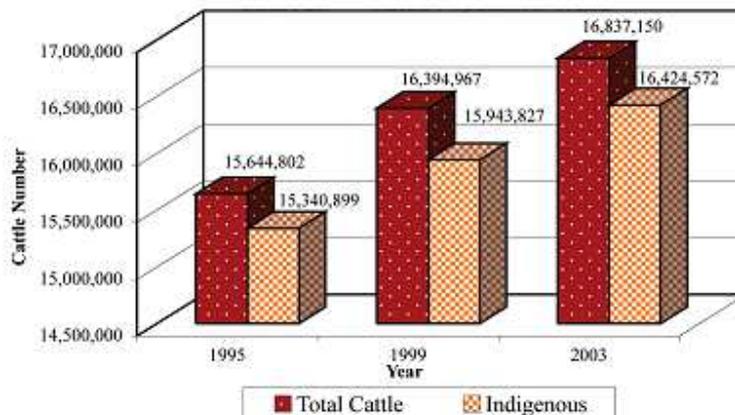


Figure 5: Cattle population trend in Tanzania
Source: Agricultural sample census 2003

In its report (2009), the Ministry of Livestock Development and Fisheries reported that the country have about 1.6 billion litres of milk production from 18.8 million cattle of which about 97% of these are indigenous, raised for multipurpose use and only about 560,000 are dairy cattle (Agricultural Sample Census, 2003). It is estimated that about 70% of produced milk comes from Zebu (indigenous cows), which are widely distributed across all regions whereas the crossbred dairy cows produces only 30% (Njombe and Msanga, 2007). The Major dairy breeds kept in Tanzania are Friesian, Jersey, Ayrshire, Sahiwal, Mpwapwa and their crosses to the Tanganyika Shorthorn Zebu (TSZ) and Boran.

Cattle herd composition

The 2003 Agricultural Sample census indicated that the herd composition consisted of 39% breeding females; 15% heifers; 11% female calves; 16.4% mature males, 8.8% immature males and 9.6% male calves with production parameters of:

- Age at first calving is 3- 4 years
- Calving interval is 18 months
- Calve mortality is 27% (overall mortality is 7%)
- Female culling age is over 10 years.

Diseases are a major cause of animal losses and the government is promoting private sector participation in livestock health inputs and services (National Livestock policy, 2006). Efficient delivery of these private goods will enhance the competitiveness of small holder dairying. However, this requires government support due to the fact that private market is contingent upon the ability of the state in providing the public goods for example infrastructure and institutional support.

3.2.2 Cattle feeds

According to MLD (2007) there are a number of issues regarding the feeds sector in Tanzania. These include less fodder production due to decreasing farm sizes and competition for land; smallholder farms face seasonal fluctuations in feed quality and quantity. Msangi and Kavana (2002) observed that the pressure of decreasing land ownership, worsening soil fertility and reduced access to input and output services will continue to face smallholder farmers in Tanzania.

FAO in 2000 reported that the Tanzania Bureau of Standards (TBS) have inadequate human resources to monitor and enforce various requirements for feed standards. MLD (2007) report confirms that TBS which is responsible for developing and enforcing quality standards lacks the capacity to act.

3.2.3 Animal Health and Breeding Services

With liberalization in 1986 the government changed gradually from subsidized services to privatization of several veterinary services including clinical services, artificial insemination, management of cattle dips and distribution of drugs/vaccines, and chemicals. Apparently, the progress has been slow in provision of more efficient private veterinary services due to the poor economy, competition from public vets and constraints that affect the sustainability of private practices (MLF, 2007).

The dairy breeding policy has focused on upgrading the indigenous Zebu through artificial insemination (AI), use of elite bulls or imported germplasm to increase milk production while controlling breeding diseases. Studies of Msechu et al (1987), Msechu (1988) and Mpiri (1994) on performance of zebu cow for milk production found out that zebu production potential ranged from 530- 950kg per lactation period of 232-257 days.

AI started in 1932 when it was privately operated in large –scale farms and the government started providing for smallholder farmers since 1976 when the National Artificial Insemination Centre in Arusha was set up through the concept of breeding superior cattle. (Kyomo, Maiseli and Haule, 2006). But due to financial constraints and withdrawal of donor support, AI services were privatized in 1993. Although not many smallholder farmers had been sensitized adequately towards that end, the government intensified the training of inseminators. A large gap still exists in the availability of the artificial insemination (AI) in many areas and high levies on imported semen have hampered breed improvements.

3.2.4 Credit facilities/ services

Despite the importance of credit in farming, little has been done to promote lending institutions for smallholder farmers. Most smallholders receive credits through their own organizations (cooperatives and self help groups) and through micro finance institutions.

According to Avishay Braverman and Gucsch (1991), rural farmer organisation aim at improving economies of scale and bargaining power with the external agents. It also provides access to savings and loans facilities. Through farmer organisations, input supply and marketing become more efficient.

With time, farmers without access to loans/credits are gradually increasing their participation in market-oriented milk production through cross-breeding (upgrading) their local breeds. Small holder farms contribute to 70% of marketed milk (MLF 2009). There has been increased milk production over years despite of periodic fluctuations often associated with weather conditions. As mentioned previously, dairy production in Tanzania highlands is faced by declining farm size, upgrading into dairy breeds and increasing reliance on commercial feeds and forages (RLDC, undated). According to TDB (2007, annual report) the Dutch government under the Small Scale dairy Development Program (SSDDP) has assisted in areas like Tanga in developing and disseminating zero-grazing (stall feeding) technologies to improve productivities in land scarce areas. The technologies are an important strategy through which smallholders can intensify their farming systems in small farm sizes.

3.2.5 Milk Production

Milk production is estimated to be about 1,664 million litres of milk annually (Ministry of Finance and Economic Affairs (MFEA), 2008), of which 90% is consumed at the point of production and only 10% that is 166.4 million litres is marketed (figure 9).

Of the marketed quantity from local production, the Ministry indicates that 90% (that is 149.76 million litres) is distributed through informal marketing channels and the remaining 10% of the marketed milk or 16.64 million litres is marketed through formal channels.

3.2.6 Milk Collection

Raw milk is highly perishable, therefore efficient means of collection and processing is crucial. Poor infrastructure is the main constraint in milk collection and processing. In 2008, the World Bank survey indicated transport costs of 50-60% of total marketing cost in Benin, Malawi and Madagascar due to poor roads. Study by Kurwijila (1995) show a price increase by 27% per litre due to bad road in Tanzania.

3.2.7 Milk Processing

When explaining the industry structure, there is an adjustment to the volume of milk marketed through formal and informal channel. According to the Ministry of Livestock Development and Fisheries 2009 Budget Statement, cited by RLDC, 2010, Tanzania had an annual installed milk processing capacity of 353,100 litres per day (lpd) if Brookside Tanzania Limited (with a 45,000lpd) capacity is included. The milk processed was 88,440 lpd or 32.28 million litres. Brookside was reported to have worked at 2,000lpd. If we include Brookside the installed capacity can absorb 7.75% of domestically produced milk.

On the overall, in 2008 processing plants operated at about 25% of their capacity producing 88,440lpd or 32.28 million litres per annum, this is 1.94% of the total milk produced in Tanzania. Relaxing the definition of formal marketing to include non-

processed but tested and sold in hygienically approved and organized environment, the formal channel may be accounting for more than 2% as indicated in the table below:

Table 2 Overview Structure of the Milk Sector

	Percentage	In million litres
Production	100.00	1,664.00
From traditional cattle	70.00	1,164.80
From improved breeds	30.00	349.44
On farm consumption	90.00	1,497.60
Available for marketing from domestic production	10.00	166.40
Informally marketed from domestic production	8.06	134.12
Installed capacity for processing	7.75	128.88
Volume of processed	1.94	32.28
By large processors	1.64	27.27
By small processors	0.30	5.02
Add imported	1.57	26.14
Total volume marketed of processed milk	3.51	58.42

Source: MF&EA, MLF

Milk processing in Tanzania is not well developed; the total operable installed capacity attends to hardly 7.1% against about 25% in Kenya. In terms of capacity utilisation still Tanzania lags behind other EAC countries as seen in Table 3 below.

Table 3 Utilisation of Dairy Processing Capacity in EA (2006)

	Kenya (i)		Uganda (i)		Rwanda (i)		Tanzania (ii)	
	Capacity in lpd	Percent	Capacity in lpd	Percent	Capacity in lpd	Percent	Capacity in lpd	Percent
Installed	1,850,000	100%	510,000	100%	49,599	100%	417,000 ⁱⁱ	100%
Idle	653,181	35%	352,600	69%	36,899	74%	58,700 ⁱⁱⁱ	27%
Used	1,196,619	65%	157,400	31%	12,700	26%	234,000	73%

Sources:

- i. Heifer, 2008
- ii. MMA, 2008. Adjusted by taking out Tanzania Royal Dairy capacity of 90,000lpd from a total of 507,000 lpd.

By December 2009 processors that were operating in the country were processing 88,400litres/day. Mchau, et. al. in 2007 reported that the 35 processors operated at between 59,000 - 80,000 liters per day in 2007. Active processors are New Musoma Dairy, Mara Milk Ltd, Arusha Dairies Limited, International Dairy, Tanga Fresh, Tandairies Limited, ASAS, CEFA and New Tabora Dairy Limited (Appendix 3)

The under utilisation of capacity is caused by among others, underdeveloped milk collection systems, weak technological capacity to manage the machineries, unreliable

milk supply, seasonality of supply, weak institutional support, market demand and fluctuating prices.

3.2.8 Milk Products

There is a wide array of dairy products. However the product range is relatively narrow which include fermented milk (mtindi/mala), pasteurized fresh milk, UHT milk and to small extent, yoghurt, cheese, butter and ghee (RLDC report, 2009)

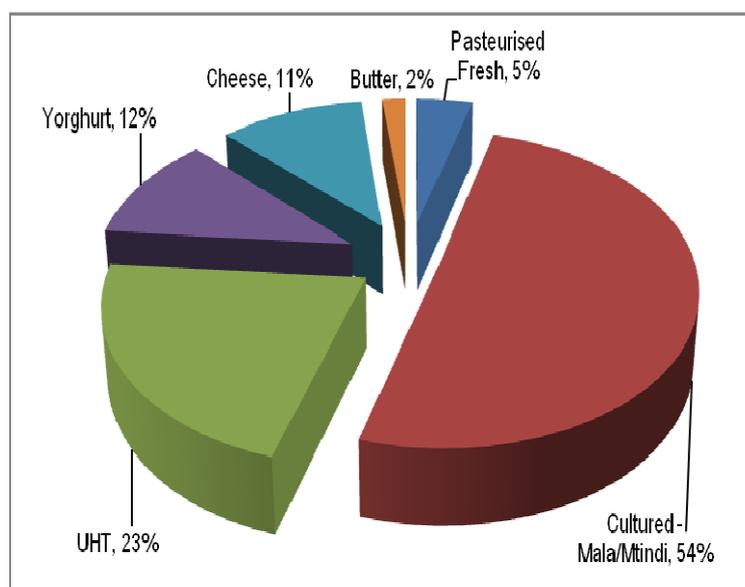


Figure 6: Main Dairy Industry Products in Tanzania based on Installed Capacity

3.2.9 Dairy product imports

According to the Tanzania Revenue Authority annual import bill for dairy products stood at 25.92 million lme worth USD 4.22 million between 2004 and 2009. In 2009 imports accounted for 1.79% of the national supply, but up the value chain it account for 48% of the processed dairy products end market.

The trend shows that imports have been growing at an annual rate of 9.41% per annum, far ahead of the local production (estimated at 6.7% between 2007 and 2008).

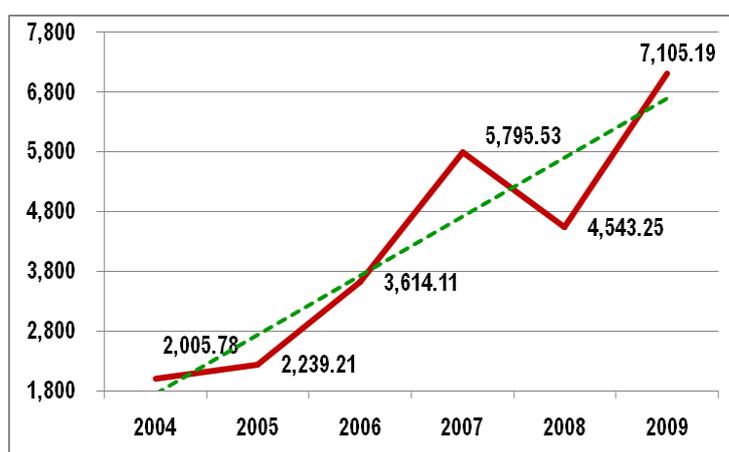


Figure 7: Trend of Dairy Products Imports in USD Source: Tanzania Revenue Authority

In 2009, imported dairy products as shown in figure 7 were from South Africa, Kenya, United Arab Emirate, EU countries and others.

3.3 An Overview Map of the Dairy Sector

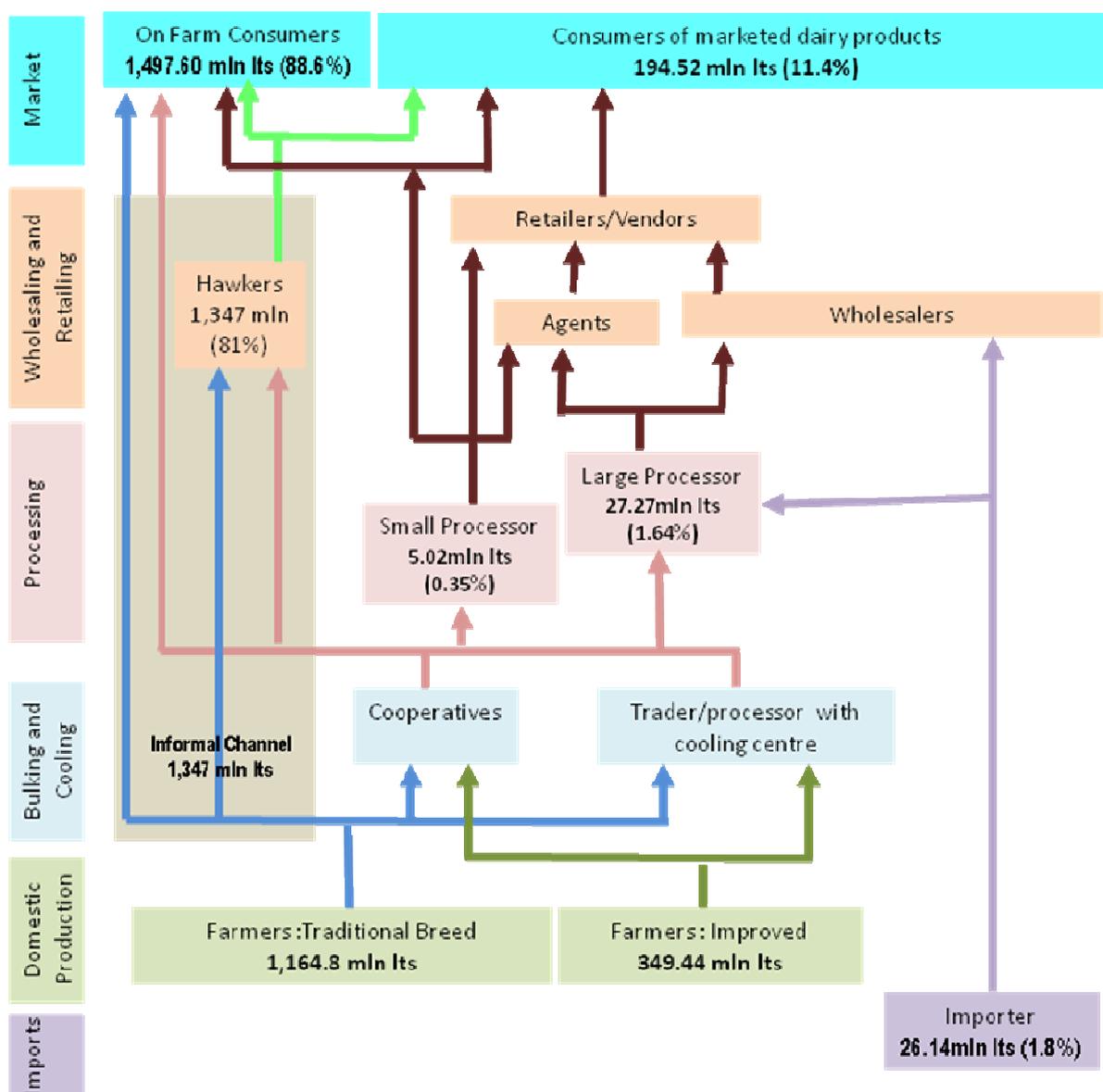


Figure 8: Map of the Dairy Sector in Tanzania
Source, Rural Livelihood report (2009)

3.4 The General Environment of the dairy industry

The dairy industry performance is influenced by many external factors without action. These factors are political, economical, social, technical, environmental or cultural aspects. Analyzing these factors using PESTEC tool gave the following findings:

Political

In Tanzania like many countries in sub-Saharan countries there have been efforts to institute policy and institutional reforms to increase productivity, quality control and income in the dairy sector. Government policy encourages dairy production through non-taxation of inputs. Regulatory framework and institutions are however weak.

Liberalization of the dairy industry in 1995 has abolished business monopoly and farmers are free to sell unprocessed milk directly to consumers or milk vendors. The smallholder farmers in Tanzania supply over 80% of the marketed milk, of which 70% is unpasteurized or "raw milk" and only 30% filters in the processing plants (MLF report, 2009). The informal marketing channel has offered expanded business opportunities and enhanced competition but has impact to the growth of the dairy sector in regard of the performance of the chain.

The parastatal policy reform has promoted private involvement and establishment of business association bodies (Mpagalile et al) such as Tanzania Milk Producers Association (TAMPRODA- which was facilitated by Small Holder Dairy Development Program), Tanzania Milk Processors Association (TAMPA) and Tanzania Dairy Board (TDB). However, regulations in which the industry was government owned still exist which require overlapping registrations for different Ministries. This may discourage foreign and local investors.

Effect of Globalization

Globalization in reference to international trade agreements policies has increased market opportunities both regional and international but quality requirements for food safety are crucial for international trade. Moreover, milk imports pose competition and threat of cheap milk products that will force farmers out of production as consumers will go for cheap imported milk products. However globalization has made collaboration in projects possible.

Under the liberalized dairy product trade in Tanzania is benefiting mostly those in milk import trade and the highly subsidized farmers from Europe and from African countries like Kenya and South Africa who have stable dairy industries for many years and now are expanding regionally (Shem, 2004).

A study by FAO's Committee on commodity prices (2004) in Tanzania reports surges in milk imports that are disrupting the local markets, with negative effects on processing, production and food security in the rural areas.

The competition with imported dairy products from EAC countries is expected to grow particularly from Kenya where the sector is bigger, stronger and it seems there is a unified strategy to promote exports particularly to Tanzania and Uganda. Further, Kenya's vicinity to Tanzania implies they can at short notice enter into cold range products expanding the scope of competition at product level. Already products from Brookside have higher frequency of citation in retail shop in Musoma, Mwanza and Arusha. (RLDC, 2009)

Economic

The macroeconomic instability such as high inflation rates, exchange rates and high interest rates affects the prices of inputs.

High investment cost in milk processing plants limits new entrants in the business and use of new equipment.

Over 80% of the population lives below the poverty line (National Strategy for Growth and Reduction of Poverty (NSGRP), 2005). The low income limits the overall consumption of milk products and can influence the formal and informal markets. Per capita consumption of dairy products increased from 22 to about 40 litres between 2000/01 to 2005/2006. That accounts for production increase of about 82%. However, this consumption is still lower than 200 litres which is recommended by FAO. From these data, it shows that, the current per capita consumption of milk stands at only 20% of the recommended level. (Njombe et al, 2007)

The herd sizes are small (5-10 cows) which is not economically sustainable and milk prices are fixed by traders/processor to the disadvantage of the farmer.

The low input/low income production leads to low economies of scale to farmers who also have inadequate credit facilities to invest. There are inadequate quality control systems which is crucial in international markets.

Social

High population growth (2.8% annually) increase demand for milk and milk products although there is high migrations to the urban of young people posing farm labour scarcity or farms run by old people which in turn influences low production. (Njombe et el 2007)

Gender balance is not considered in recruitment of women in the industry therefore there are few women extension officers who would share experience better with fellow women involved in small holder dairy farming.

Strong societal relations that make it easy to form farmer organizations and eventually cooperatives.

Technical

Poor infrastructure (road network) is the main constraint in milk collection and processing. There is a price increase of 27% due to bad road and sometimes may cause spoilage of milk (Kurwijila, 1995)

The breeds are of low genetical potential with an average milk production of 600 litres per lactation. Milk production is seasonal with a flush in wet season and low production in dry season. Farmers rely mostly on crop residues to feed their cows in the dry season. The poor quality feeds cause low production.

The industry is faced with weak quality control system and low biosecurity measures at the level of production to meet the standards of international markets.

Insufficient and poor market organization affects milk processing as more than 80% of the milk produced is sold in informal markets.

The Government is not investing sufficiently in infrastructure therefore call for higher degree of chain integration is necessary.

Environmental

Natural disaster e.g. floods; draught & diseases have negative impact on dairy production and disease increase the production costs. However, manure is useful for improving the soil fertility and the environmental pollution from effluents from cowsheds and processing plants is not given much consideration.

Cultural

The culture of the Maasai and Barbaig of cattle keeping contributes to high populations of livestock in the country.

In some tribes, milk is considered is for children consumption reducing number of consumers.

Chapter 4: The dairy supply chain in Iringa district

This chapter is partly based on literature review and research study.

4.1 Value Chain Concept

Various studies have come up with different definitions of value chains. Vermeulen et al, (2008) describes a value chain as a sequence of all activities from the provision of specific inputs for a particular product to its primary production, transformation, marketing and distribution, and final consumption.

According to Ritcher (2005) value chains also analyses the links and information flows within the chain and reveals the strengths and weaknesses in the process. It also analyses the boundaries between national and international chains, takes into consideration buyers' requirements and international standards. The value chain approach addresses factors that determine if a product meets market requirements with regard to quality, price, dependability, volume, design and speed of delivery.

KIT et al (2006) noted that in order farmers to get more profit they should add value to their commodity or increase the number of activities in the chain. The strategy of vertical integrating farmers into processing and marketing eliminates middlemen and increase profitability of small scale farmers.

4.1.1 Mapping the chain actors and the roles

The chain actors in this dairy value chain in Iringa include input suppliers supplying mainly the replacement stock and drugs/vaccines; small scale farmers concerned with milk production function but have little influence over the chain management. The hawkers who sell milk informally and traders (also does retailing function) who transport milk from farmers to MCC and the processor who process the milk. The final chain actor is the consumer who in this value chain is either the middle class or high income earner that buys milk for consumption. (Quaedackers, Linden and Boer, 2009)

Then there are the chain supporters who are not involved directly with dairy business but give such service as training of farmers, information dissemination, linkages, and disease control. The other group of actors are involved in regulation and quality control. These actors interact and exchange information relating to the chain activities in informal ways, mobile phones which are nowadays extensively used.

Information flow

The role of market information network is to collect process and disseminate market data systematically and continuously and make it available to users for decision making purposes (Schubert, 2008). In the local dairy value chain information is shared among actors as indicated in the figure 10. However, the environment is controlled and making the sector to be commodity and production oriented instead of being market driven and consumer oriented which is in line with most global food industries. A market oriented focus on variety, nutritional factors, and food safety and consumer awareness issues while consumer oriented calls for adoption of strategic marketing approach to meet consumer needs.

The value chain map below illustrates the specific linkages between the actors and the flow of inputs, milk, money and information.

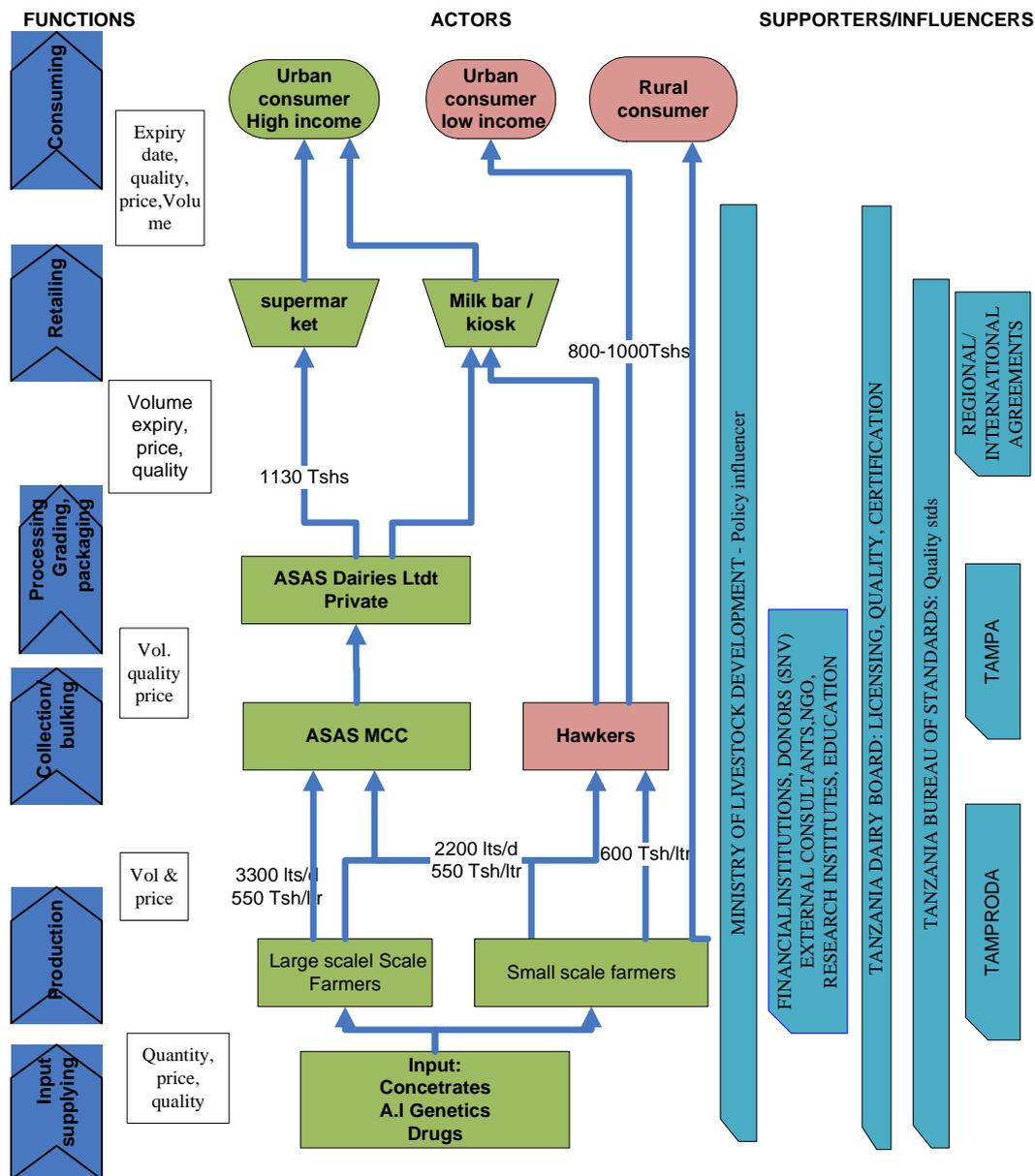


Figure 9: Dairy supply chains in Iringa district sub sector map

Much of the organization and planning of milk movement from the farm to processing is done by ASAS Dairies Limited. Other logistics that ASAS puts in place include availing transport for collection and bulking milk. Therefore, ASAS is the coordinator in the value chain and can strongly influence the structure and configuration. This is due to the fact that ASAS has a strong bargaining power because he sources large amounts of milk from the suppliers.

4.1.2 Stakeholder analysis

A stakeholder analysis technique was used to assess the importance of actors and supporters in the dairy value chain who may significantly influence the success of the organization in strengthening the dairy value chain (Table 4).

Table 4 Stakeholder analysis in formal chain

Name	Objectives/ interests	Influence (power) on the chain
Input suppliers	Supply animal feeds, drugs, AI services and equipment to farmers.	Medium
Producers	Keep dairy cattle, produce milk and sell to consumers.	Low
Cooperatives	Collect and sell milk to processors. Sometimes they also process.	Medium
Processors:	Process and add value to milk before selling to consumers through supermarkets and shops	High
Traders and Retailers	Buy milk from farmers and supply to consumers	High
Consumers	End users of the milk and milk products.	Medium
Research Institutes	Develop control strategies for priority diseases affecting the dairy sector. Its focus is mainly at farm level	Low
Government Ministries of Agriculture & Cooperatives; Livestock Development and Local Government	Policy formulation and implementation. Facilitate production, research and delivery of extension services and management of farmer cooperatives. Commissions the organizations research.	High Main influencer of the environment in which other actors operate
Tanzania Dairy Board	Licensing, inspection and certification of actors. Quality control of milk. Training actors on milk handling practices.	Medium
Tanzania Bureau of standards	Provide standards and code of practice for production, processing necessary for marketing of milk and dairy products in local and international markets	High
NGO's - Land O Lakes, Heifer Project International, Small Scale Dairy Development Project	Train farmer organisations on feed conservation methods. Coordinate project on mapping of milk sheds for optimum targeting of resources and services. Transfer knowledge, skills and technology	Medium
Donor agencies	Support various projects along the chain. Collaborates with the government and service providers.	Medium

The actors have varying degrees of influence in the chain activities. The farmer has very low influence on chain activities, which is attributed by his lack of information

especially market information. The processor who buys the local milk is in contact with consumers and retailers therefore assume the role of chain coordinator.

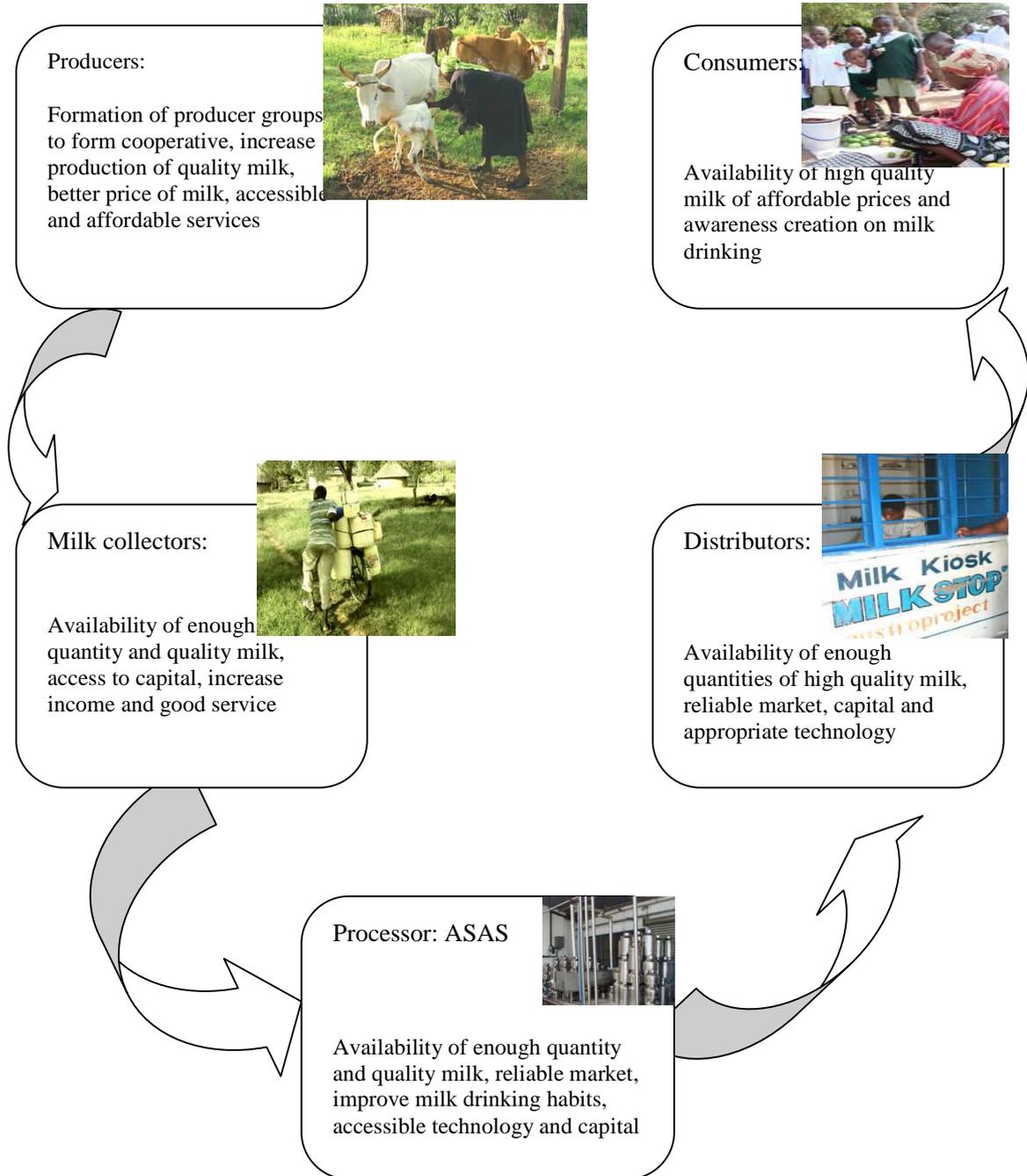


Figure 10: The main actors in the Iringa district dairy value and their expectations
Source: Tanzania Milk Processing Association Report (undated)

4.1.3 Value shares of actors in the dairy value chain

In participating in chain activities, actors incur costs. Some incur more costs than others depending on the investments and risks they have to bear (KIT and IIRR, 2008). In products where no or very little value addition is done, the value share of the farmer

is usually more than in situations where final products have undergone processing and adding value to them. In the case of the small holder dairy farmer, investment and variable costs are high and time spent is not normally accounted.

The processor costs include hiring / own transport for bulking milk, labour, capital to purchase milk, expenditures in acquiring permits and time. The vendor who is also performing retailing functions, costs such as rent, electricity bills trading fees, labour costs and storage costs are included.

Gross margins calculation for milk production

The cost and income for a dairy cow per month at peak production in Iringa municipality does not include the capital costs (costs of equipment, housing or buying of animals), or income from selling calves or cows after reaching end of productive lives because getting the information was difficult.

Table 5 Gross margin dairy cow per month at peak production in Iringa

	Tshs	Total
Inputs (costs)		
Concentrates (+ mineral licks & normal salt)	30,000	
Spraying	600	
Veterinary drugs/vaccines	550	
Veterinary services	5000	
Subtotal		36,500
Labour		
Fodder (zero grazing)	45,000	
Milking	30,000	
Subtotal		75,000
Total costs		111,500
Income (Revenue)		
Sale of milk	10 litres/day x 550Tsh/lt x 30 days	165,000
Gross income	165,000 – 111,500	53,500
Gross margin	53,500 x 100/165,000	32.4%

Table 6 Gross margin calculation for ASAS for one litre of milk per month

	Tshs	Total
Inputs (costs)		
Cost of raw milk at factory gate	550	
Variable cost	88	
Packaging material	50	
Subtotal cost at factory	688x5500ltsx30 days	113,520,000
Transport outward	28	
Distribution/retailing cost	145	
Subtotal cost	173x5500x30days	28,545,000
Total costs		142,065,000
Income (Revenue)		
Sale of products	1,130x5500x30days	186,450,000
Gross income		44,385,000
Gross margin	44,385,000x100/186,450,000	23.8%

Exchange rate (in Tshs/USD)- 1230 (Appendix 5)

Table 7 Profitability analysis for the milk vendor

	Tshs	Total
Costs		
Milk purchases	100lts/dayx600/litre	60,000
Transport		1,000
Other		4,000
Total costs	65,000x30days	1,950,000
Income (Revenue)		
Daily sales	100lts/dayx800	2,400,000
Gross income		450,000
Gross margin		18.75%

The value share of the farmer and the processor and vendor is shown in table 8 below by considering variable costs and revenues for these actors in the above tables; 5, 6 and 7.

Table 8 Value shares

	Variable cost	Revenue selling price	Gross income revenue-costs	Added value revenue-previous actors rev	Gross margin gross income*100/revenue	Value share added value*100/retail price
Farmer	370	550	180	550	32.4	48.67
Vendor	650	800	150	250	18.75	31.35
Processor	861	1130	269	580	23.8	51.32

The results indicate that the processor has a value share (expressed as the percentage of the final retail price) of 51.3% while the farmer has a value share of 48.6% and the vendor 31.35%. The value share of the three in the market is processor 39%, the farmer 37% and the vendor 24% as shown in the pie chart (figure 12). We can argue that the farmer can still make profits in selling milk to the processor because the operational cost is lower than the price offered by ASAS of 550 Tshs. Results of the vendor are different from what was expected because he does not incur much cost in his business. The price the vendor offers (higher than the processor) is basically to compete in buying milk.

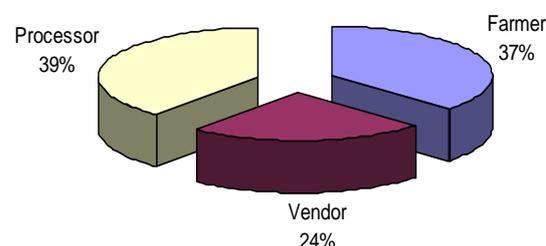


Figure 11: Pie chart for value shares

Quality Management

There have been difficulties in monitoring the quality of milk in the informal chain (which is relative stable and dominating) giving rise to the risk of outbreak and spread of diseases such as tuberculosis (TB) and brucellosis which are zoonotic. However, in the

formal chain there exist quality management systems that ensure milk and milk products being produced are safe and wholesome. Quality and quality checks along the chain are carried out by government institutions which are; Tanzania Dairy Board (TDB), Ministry of Health, Tanzania Food and Drug Authority (TFDA), Tanzania Bureau of Standards (TBS) and Government Analysis Laboratory.

Nowadays, consumers are putting more demands on the assurance of quality and safety of food products and their production process (Luning and Marcelis, 2009). However, "a food product is regarded safe if its risk is judged to be acceptable" Analysis of the quality management system in this chain is divided into technological functions and managerial functions.

Technological functions

In the traditional system, livestock co-habit with humans, have free contact with other potential reservoirs of viruses and pathogens. These factors compromise stamping activities and vaccination exercises. However, production and herd data are commonly not available.

At the milk factory, although the quality management system is not optimum, the three major components of bio- security (isolation, traffic control and sanitation) are adhered to. Milk processing is carried out by healthy workers and storage facilities are adequate and functioning preventing deterioration of required milk properties and hence safe milk products.

Managerial functions

Employees at the factory have valid public health certificates. A veterinary official does the inspection and certification of milk products and carriage equipments. This reduces chances of cross contamination of infectious disease.

Milk quality control at the reception

The quality of dairy products is to large extent dependent on the quality of raw milk used in the production. For this reason in many countries payment for raw milk is linked with quality.

Milk is examined immediately before it is delivered to ASAS milk plant in order to determine whether it is of acceptable quality. If not it is rejected to avoid endangering the quality of the plant's final products. Examination is based on a combination of physical and chemical properties.

The quality management systems in this value chain aims at maintaining milk physical and keeping quality and to a lesser extend the safety aspects. The consumers requirements are also basic i.e. price and freshness. A more optimum management system that seeks to satisfy more quality requirements such as traceability, certification, and safety conformity to standards and availability will meet more consumer demands.

Optimum quality management systems have the advantage of realising and even sometimes exceeding consumers' expectations giving them satisfaction. This also enhances reliability of the product. However, this comes with a cost and the product eventually will cost slightly higher so as to cover the extra costs incurred in the quality management activities.

Quality attributes

Consumers in Dar es Salaam city and Iringa municipality have high regards for the milk products they buy from ASAS. Factors affecting the quality of the milk products have been considerably checked by applying the quality management system in place. The most significant factors include biological hazards such as salmonella, food intoxicants derived from improper veterinary drugs usage and from badly stored feed. However, the acceptance of products can be influenced by different types of quality attributes i.e. intrinsic and extrinsic (Luning et al, 2009). The figure 13 below analyses this attributes in the chain.



Figure 12: Quality attributes

Although the milk products from ASAS are judged of good standards and quality in the area, traceability from the producer is not well structured. Apart, from the basic inventory the trader keeps which includes name of the producers, dates and volumes delivered, there are no mechanisms that can trace back the source of milk from small scale farmers.

4.2 Situational analysis of task environment for ASAS Dairies Limited.

4.2.1 Marketing strategy analysis

By using the five competitive forces analysis tool to determine attractiveness and long run profitability of the business in the value chain the results below were observed.

The threat of new entrants (competitors)

- The possibilities of new processors in the business create competition. Regulations allow free entry into milk processing provided standards are met

before registrations.

- The economies of scale make it attractive to new entrants.
- Access to distribution channel for the products is not difficult and there is no much product differentiation.
- Therefore the *threat for new entrants is high*.

The threat of substitutes

- Foreign brands of cheaper milk are available in milk shops/ supermarkets at affordable prices to different type of consumer poses threat.
- The cost of switching to soya milk which is also used for making yoghurt is negligible to the buyer.
- Buyer is also willing to substitute depending on the level of threat.
- In this case the *threat of substitute is also high*.

The bargaining power of suppliers

- Suppliers of processing industry raw materials such as packaging and other inputs have a strong bargaining power compared to processor since they set prices for their products and determine the quality.
- There are many competing farmers who produce milk compared to processors they so have low bargaining power.
- Large scale farmers have forward integrated they can do both processing and distribution on the farms without supplying the processor so they have more bargaining power.
- Hence the *bargaining power of the suppliers and large scale farmers is high while of disorganized small scale farmers is weak*.

The bargaining power of buyers

- The industry has few dominant buyers and many sellers.
- The product is standardized and not much differentiated.
- Buyer threatens to integrate backwards while the suppliers do not threaten to integrate forward into the buyer industry.
- Fragmented buyers therefore not very strong
- Therefore the *bargaining power of the buyer is high*.

The degree of rivalry between existing competitors

- Milk products are sold as product and not commodity.
- There are many small/equally sized competitors.
- Competitors can not differentiate their product.
- High storage cost make the trader/buyer sell product quickly therefore increases rivalry.
- The rivalry is more intense with the supplier/farmer compared to the trader.
- Therefore we can say the *degree of rivalry is average*

The results indicate that marketing of milk products by ASAS Dairies Limited is attractive and profitable in the long run. He holds a higher bargaining position compared to any of his suppliers and buyers. There are also no serious threats from competitors or substitutes and even if they were to emerge his switching costs are not so high.

4.3 Market segmentation

The lack of product diversification predisposes the processor to risks of market failure by only depending on one market segment. ASAS Dairies Ltd employs full market

coverage with differentiated product strategy to supply the various grades of the processed milk products to his customers (see picture 1 below). This multi-segment strategy has the advantage of diversifying the firm's risk.

Table 9: Showing groups of clients for milk products from ASAS Dairies Limited

	Segmentation			
Product	Fast food cafes, hotels/restaurants (Dar es salaam, Iringa)	Institutions (university)	Retail (supermarkets, urban milk shops/kiosk)	Open air /street milk vendors
Pasteurized milk in plastic sachets (250ml & 500 ml)				
Yoghurt with flavours of strawberry, vanilla, chocolate & plain in 250mls cups.				
Mtindi (fermented milk in 250ml & 500ml plastic sachets				



Picture 1: ASAS Dairy products in Iringa milk shops.

An observation at Shoprite supermarket and BP Petrol Station convenience groceries found out *mtindi* from Tanga Fresh and ASAS get equal space in the cooler, what exists is more of a consumers' choice.

5.6 Comparison of ASAS and Tanga Fresh Limited

As shown in Appendix 3 Tanga Fresh Ltd (TFL) is operating at a capacity of 93.3% of the installed capacity processing 14,000 litres per day while ASAS is processing only 5,500 litres per day at 45.8% of the installed capacity. The study sees TFL as a model to ASAS.

TFL is a progressive and commercial company in partnership with Tanga Dairy Cooperative Union (TDCU), Mifugo Bora Dairy Breeding Farm and National Microfinance Bank (NMB) of Tanzania.

In 1996, several cattle farmers from Friesland (North of Netherlands) formed the FriZania cooperation and started coordinating with TDCU to invest in a modest dairy

factory the TFL through the initiative of Lút Zijlstra, a Dutch who had been to Tanga since 1985 as a cattle- breeding expert assigned to stimulate small- scale dairy farming.

With the help of the Dutch small holder dairy farmers organized themselves in 1985 in village cooperatives for cooling and selling their milk and later the village cooperatives which were about 13 united themselves in the umbrella organization TDCU to sell milk collectively to the capital Dar es Salaam. TDCU currently has 3,100 active members.

To cater for the shortage of dairy cattle in Tanga region, people from Friesian Agricultural Sector started investing in the breeding company called Mifugo Bora (Swahili word for better breed). The company produces up to 300 carrying and crossbred heifers annually which are sold to the expanding small holder dairy farmers. The crossbreed has toughness of Zebu but produces more milk because of 50% Holstein- Friesian genes. In 2009, a joint venture was set up by Mifugo Bora with TDCU, Katani Sisal and Rabo Foundation for a new 1000 hectares breeding company where crossbred heifers and breeding bulls will be bred for the local small holder farmers.

The NMB is the largest bank in Tanzania which Rabobank Netherlands has a minority of interest. NMB has refinanced the loan for TFL which amounts to € 3.000.000 loan in Tanzanian shillings. The bank is expecting to start a pilot with mobile banking for the payment of the milk money.

With the above information on the partnership, TFL has been successful due to the following reasons:

- The management have been intensively involved over a long period of time and have a strong network in The Netherlands and Tanzania that includes cooperation, advisors, suppliers and financiers.
- The chain-approach assures continuity (guaranteed sales, availability of means of production and credit). The cooperation of farmers in the TDCU and their participation in the dairy factory assure a strong and cohesive stronghold.
- Communication within the chain is easy and Kiswahili (the local language) is officially used. Therefore, there is no problem for the chain to be expanded.
- The small- scale zero grazing policy whereby cows are kept in sheds and fed on roadside grass and supplements gives small chances of diseases which would otherwise affect production.

This has resulted into an enormous growth in the amount of farmers, supply of milk and the turnover of dairy since 1997; the demand for Tanga Fresh products exceeds the supply; local competition is hardly a threat because of the trust the farmer has in the chain and the management of TDCU and TFL and a new factory with a larger capacity of up to 50,000 litres has been operational since May 2009. The project is employing 64 people in the factory and another 60 in the distribution section- the runners. The above information has been cited from d.o.b foundation website http://www.dobfoundation.com/eng/deeds/projects/tanga_fresh



Picture 2: TFL milk distributor- the runner taken by the researcher in June 2008

Hence, with the above information ASAS has a model to look at but the question is who is going to mobilize farmers to form a cooperative is it ASAS, the government or NGO. Since ASAS also have contacts with PUM Netherlands assisting in consultancy it could be wiser to extend the relationship with the Dutch and look into partnership with foreign investors for ease of loans for expansion in investment.

Chapter 5: Results

The data recorded, analyzed and discussed in this chapter include that collected during survey and case study and documented data from journals, texts, reports and internet searching during literature review. Graphs, tables, charts and models are used according to type of data for analysis and discussion.

5.1 Survey results

5.1.1 Demographic characteristics

Fourty farmers were randomly sampled from eight wards namely; Ruaha, Kitwiru, Mwangata, Kwakilosa, Gangilonga, Kihesa, Mtwivila and Mkwawa five from each ward. Unfortunately, two farmers declined to give information about their house hold claiming that their spouse were not around and four others had different reasons and were not present at time the survey was conducted. It was difficult to replace because of short time notice thus it has affected the study to some extent by reducing the sample size.

The section mainly outlines the respondents' demographic characteristics which include age, gender and highest level of education of the household head. This helps to place in context the economic activities that impact dairy producing households in the country. They are important considerations in small scale farming because they assist in tailoring interventions in regard with the dairy farmers' situations.

Table 10 Age proportion of respondents

Age	Frequency	Percent	Cumulative Percent
21- 40	7	20.6	20.6
41-60	16	47.1	67.6
>60	11	32.4	100.0
Total	34	100.0	

47% of the interviewed farmers are between 41- 60 years of age; above 60 are 32.4% while 20-40 are only 20.6%. The majority are pensionable and are full time farmers. Delivering milk to the MCC can be stressful due to age and means of transport is mainly cycling.

Table 11 Distribution of education level of respondents

Education Level	Frequency	Percent	Cumulative Percent
Primary	15	44.1	44.1
Secondary	9	26.5	70.6
Certificate	3	8.8	79.4
Diploma and above	7	20.6	100.0
Total	34	100.0	

From the survey, 44.1% of the respondents have attained primary school level and while 26.5% secondary level, 8.8% certificate level and 20.6% diploma and above. The results of the level of education reflect the previous analysis on age where the majority of the farmers are pensionable that means they are expected to have higher levels of education.

Table 12 Proportion of male and female of respondents

Gender	Frequency	Percent	Cumulative Percent
Male	21	61.8	61.8
Female	13	38.2	100.0
Total	34	100.0	

The survey results revealed that the proportion of male farmers were more (61.8%) while that of female was below 40%. Most of the female farmers were either widows or single parents; they are engaged in dairy farming to earn money for the family.

5.1.2 Milk marketing

The section outlines the situation of milk marketing which includes; where respondents sell their milk and reasons for their choice, price offered and problems encountered in milk marketing.

5.1.3 Milk marketing channel and price offered.

The survey showed that majority of respondents sells their milk in the informal market that is at farm gate, restaurants/institution and milk vendors, few deliver their milk to the MCC. Milk prices offered are different in informal market ranging from 600-800 Tanzanian shillings (Tsh). The processor offers 550 Tsh.

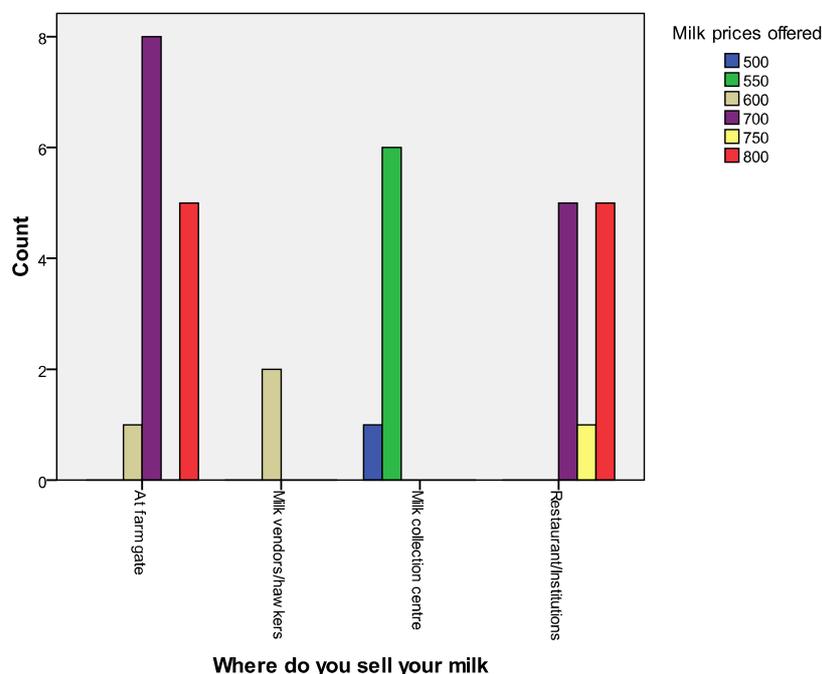


Figure 13: Milk marketing channels in Iringa.

5.1.4 Reasons for choice of customer in relation to age of respondents

Table 13 Choice of customer in relation to age of the respondents

Age	Choice of customer					Total
	better price	no transport required	low production	available market	reliable market	
21-40	1	0	1	3	2	7
	2.9%	.0%	2.9%	8.8%	5.9%	20.6%
41-60	7	0	2	4	3	16
	20.6%	.0%	5.9%	11.8%	8.8%	47.1%
>60	1	4	0	4	2	11
	2.9%	11.8%	.0%	11.8%	5.9%	32.4%
Total	9	4	3	11	7	34
	26.5%	11.8%	8.8%	32.4%	20.6%	100.0%

According to the survey results, the respondents of 21- 40 years old out of the 20.6% of the total sample number, 8.8% sell their milk to their customers because of available market, 5.9% say the market is reliable while 2.9% feel the production is low for other market channels.

Those of 41-60 years of age, 20.6% go for better prices, 11.8% because of available market and 8.8% is reliable market.

Respondents above 60 years majority sell at farm gate because there is no transport required and they look for the possibility of selling their milk easily, price could not be a priority as the above age group.

5.1.5 Problems faced in marketing of milk (rank wise)

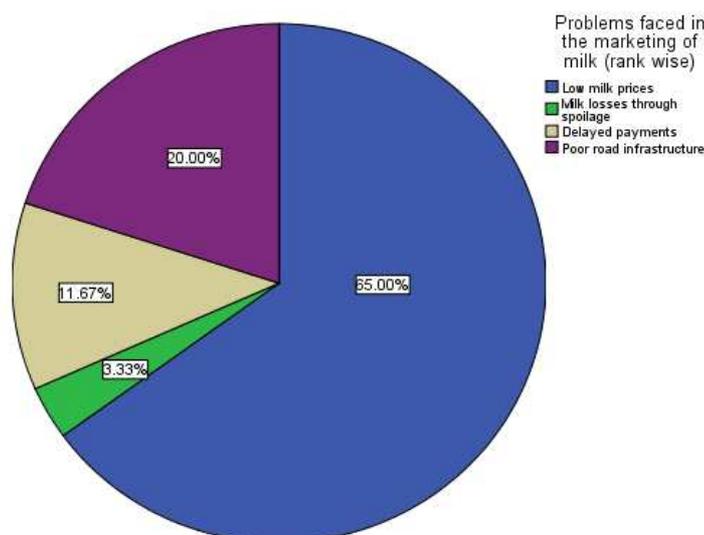


Figure 14: Problems farmers face in marketing raw milk

The above figure show how the respondents ranked their problems in milk marketing. It is obvious that low milk prices were the most experienced problem. The majority of farmers (more than 80%) mentioned low milk prices and poor roads as their most important problems they are facing in marketing their milk.

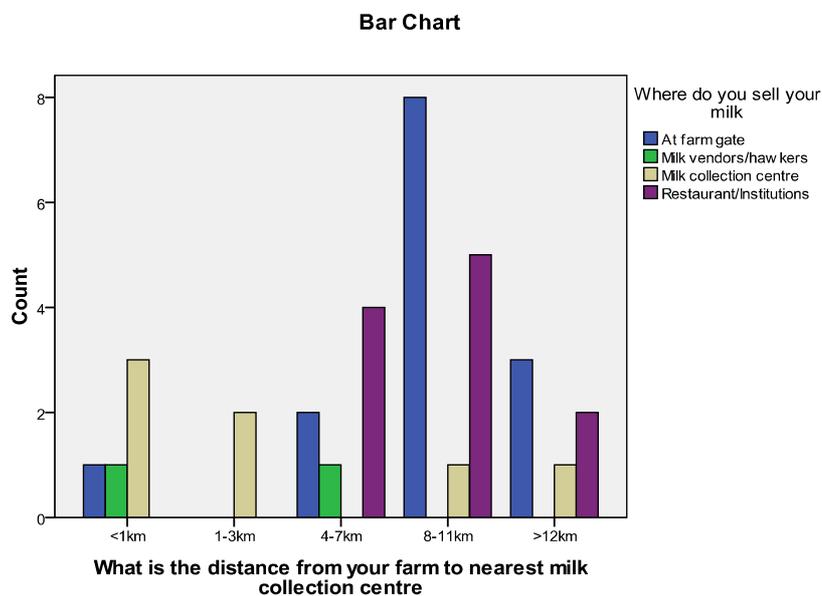


Figure 15: Influence of distance to market

5.1.6 Factors influencing herd performance

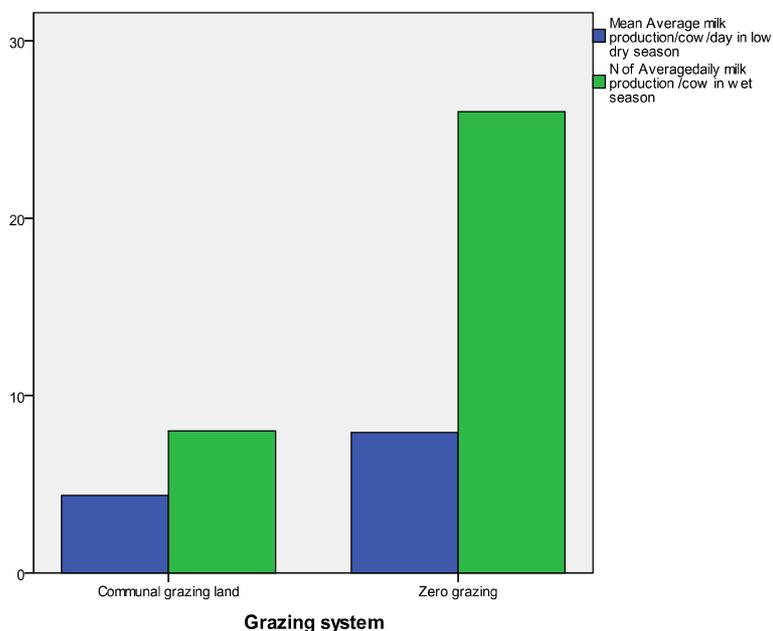


Figure 16: Grazing systems and average milk production in dry season and wet season.

From the above figure, survey results indicate that there is a significant difference in average milk production in the two grazing systems of the respondents. During the wet

season the daily average milk production is 25 litres per cow in zero grazing while in the communal land grazing system the is 8 litres per cow which is the average daily milk production in the dry season in zero grazing. In the dry season the communal grazing land system experiences very low average milk production of less than 5 litres per cow. This is due to lack of pastures and water.

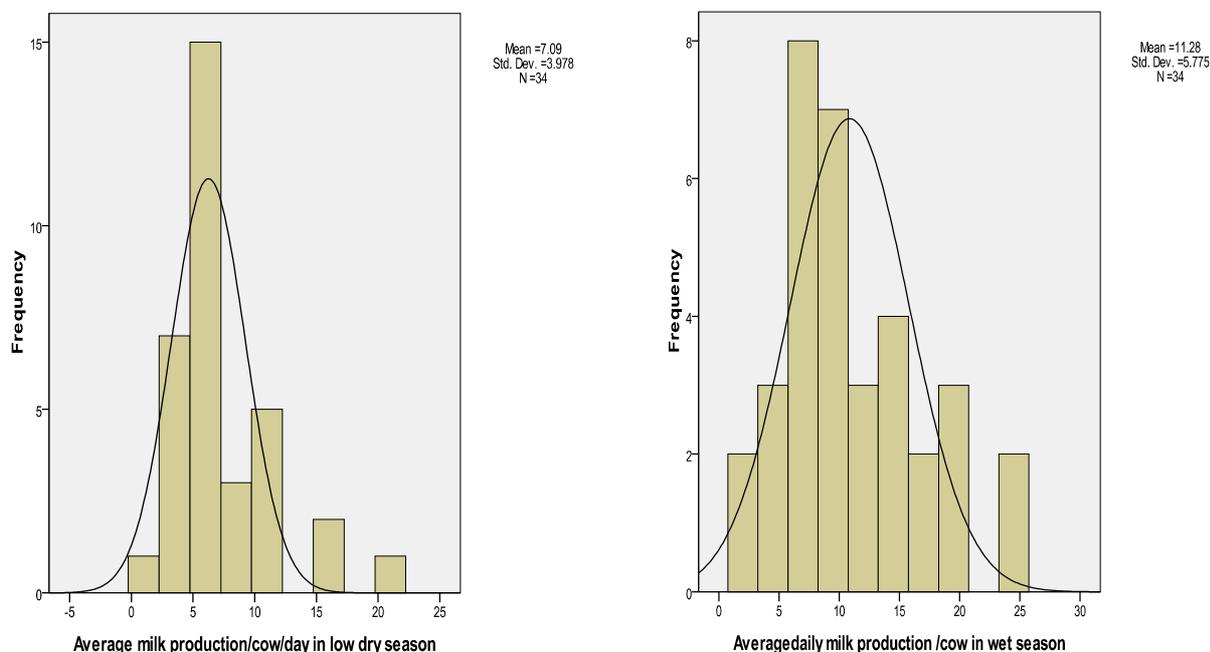


Figure 17: Average milk productions in dry and wet season

Table 14 Breeding methods for the sampled herd.

Breeding	Frequency	Percent	Cumulative Percent
Artificial insemination	20	58.8	58.8
Natural Service	14	41.2	100.0
Total	34	100.0	

Results indicate that over 60% of the sampled herd, respondents use artificial insemination and this is due to the fact that all respondents are frequently visited by the extension staff, it is expensive to maintain a bull and for the respondents who use natural service (40%) complain of the cost for AI especially when there is a need to repeat insemination.

5.2 Case study results

a) Processor

5.2.1. The processing capacity of ASAS Dairies Ltd

The plant has the capacity of processing 12,000 litres per day (Appendix 1) But the amount of milk delivered is around 5,500 litres per day depending on the season. Therefore it is under utilized operating only at 45.8%

5.2.2 How milk supply is secured by the processor

The processor has various sources of milk supply which include as indicated in the table 11 below:

Table 15 Milk deliveries to ASAS Dairies Ltd

Milk supplier	Amount of milk delivered per day	Percentage
ASAS Igingilani Dairy Farm	1400	26
ASAS Mgongo Dairy Farm	1000	19
Phillips Dairy Farm (Kibebe)	500	9
Ndoto Dairy Farm (Kilolo district)	1000	19
Kitulo Dairy Farm (Government owned)	300	6
CEFA Dairies Ltd	700	13
50 Small scale farmers	500	9
Total	5400	100

45% of raw milk comes from companies dairy farms (Igingilani and Mgongo), 46% from above mentioned large scale farms and the remaining 9% is from the small scale dairy farmers around the municipality.

5.2.3 Milk payment scheme for farmers

Farmers are paid by the processor in a monthly basis through bank personal accounts. The price offered is 550Tshs per litre of milk.

Some respondents were not in favour of this paying scheme because they live from hand to mouth and feel the process of having a bank account is cumbersome.

5.2.4 Support given to farmers by ASAS

ASAS Dairies Ltd has little support to farmers in terms of services like credits, technical advice, information, provision of improved heifers or AI services and formation of farmer self help groups. The processor feels it is the responsibility of the local government to provide such services to the farmers.

5.2.5 Challenges involved in getting raw milk

In the case study, the researcher identified the following challenges in sourcing raw milk for processing:

- *Unstable milk supply.* Farmers are often not committed in delivering milk to the processor. They are opportunistic and easily tempted to sell their milk to another processor or to the informal market when offered a better deal like what has happened to Phillips Dairy Farm who is currently selling his milk to hawkers/vendors. This is an undesirable situation to the processor.
- *Seasonality of supply.* This enforces the previous challenge of unstable supply. Iringa has only one rainy season, in the dry season milk production is very low and the competition for milk with hawkers intensifies. In contrast, in the wet season there is excess supply that not all the milk is sold and processed.
- *Competition with hawkers.* Hawking is done using plastic/aluminium containers on a bicycle at a price ranging from 600-800 Tshs per litre of milk. It is difficult to know exactly the number of hawkers in Iringa but on average they are selling up to 40 litres of milk purchased per day although some hawkers adulterate the

milk with water or other materials (cassava juice) to increase the volume. This reflects the low volumes of milk to the processor from small scale farmers.

- *High Cost of Doing Business.* The cost of the processing business in Tanzania is very high due to high costs involved in transportation; electricity; financing and high burden of taxation (multiple taxation) which include; industrial licence, Cess rate, Income tax, VAT (processed products), Service levy, Health permit, Analysis of sample, TBS mark /product, Import permit, Pre registration fee, Product analysis, Municipal Medical examination, Electrical inspection, Fire rescue service... This situation prohibits the processor from sourcing high volumes of milk.

ii) Tanzania Dairy Board (TDB)

The role of TDB in milk marketing

According to the case study TDB was appointed in 2005 to follow up on the enactment of The Dairy Industry Act, No.8, 2004 which repealed the old one, The Dairy Industry Act, 1965 Cap 590. This new Act regulates, develop and promote milk and milk product production, processing, marketing and consumption in order to meet the socio-economic changes occurring in Tanzania.

In summary, the Tanzania Dairy Board is responsible in regulating the safety and quality of milk and milk products. However, the principal activities of TDB are: licensing; inspection and certification of actors; quality control of milk and training actors on milk handling practices. The board collaborate with Tanzania Food and Drugs Agency (TFDA) on licensing and inspection of dairy facilities such as dairy farms, plants, kiosks, parlours and other similar facilities.

Constraints experienced in milk marketing

Tanzanian Dairy Board / Government officials in the case study had the following concerns on the dairy industry which in one way or another can affect milk marketing:

- Diseases which include tick-borne diseases like East Coast fever (ECF), FMD, tuberculosis (which is caused by housing the cows in sheds that are not well ventilated and also when the cows experience a lot of cold) and Anthrax which mostly occurs in the rainy season.
- Unreliable milk markets due to low consumption of dairy products. Official data suggests that people only consume 39 litres of milk per year (MMA, 2008) WHO recommends about 200 litres per person /year. In comparison to Kenya the consumption is about 100 litres person annually indicating that the demand for milk in Tanzania is underdeveloped.
- Low prices. (The cost per litre of imported milk is relatively cheaper compare to Tanzanian milk and superior in terms of packaging)
- The dairy industry operation costs are very high, and the profit to the farmers the opposite.
- Stiff competition from imported cheap milk from South Africa, Kenya, Australia, New Zealand and Zimbabwe etc.
- Land is also becoming less due to sub divisions as the population grows.
- Lack of adequate technical, veterinary and advisory services.
- High transportation cost due to increase in fuel prices and poor roads especially in rural areas hindering milk collections effectively.
- Lack of dairy/cross breeds with high milk potentials causing low milk productions.
- Lack of unity among individual farmers cause high transaction costs for the processor.

Chapter 6: Discussion

6.1 Background information of the respondents

From the survey it was observed that majority of the farmers in the respondents category are relatively old (see picture 3). The fact that young people prefer to go for white collar jobs in urban areas could be the main reason behind. Farming is also regarded as old people's jobs that are pensionable with less formal education. Female farmers (see picture 2) are majority in urban areas (Gangilonga, Kihesa, Kwakilosa and Mkwawa) than in the rural area (Kitwiru, Mwangata, Ruaha and Mtwivila) despite some of them declined to give information especially in the rural area. However, men are the majority with 60% over all. More study needs to be done to ascertain the actual proportion since the sample size of the survey was small in proportion to the total number of dairy farmers in the district. The pictures below are sample representative for women farmer and male farmer for the respondents.



Picture 3: Female farmer with her cow



Picture 4: An old male farmer

6.2 Marketing practices and channels

Over 80% of raw milk supply is channelled through the informal market and only 20% is processed and formally traded raising concern over the growth of the dairy sector as the processing capacity is under utilized. However, the government policy is to channel milk to dairy plants for processing commercially, in order to supply urban markets with hygienic milk and milk products (Mbwambo et al, 2004)

Formal and informal milk marketing

Markets only work because of institutions (Vermeulen et al, 2008). They are implicitly and explicitly agreed ways of interacting (rules of the game) that govern individual and collective behaviour at different scales and marketing channels can either be formal or informal.

Formal milk marketing involves the channels through which farmer delivers milk directly to the milk processing plant or to a milk collection centre (MCC) or to traders who buys milk from the farmer and sell it to the MCC or processor. Retailers have the role of supplying the products that are mainly demanded and can influence what processor produce.

Informal milk marketing involves the direct delivery of fresh milk by the farmer to the consumer or may pass through two or more milk vendors before reaching the consumer; this is typical of traditional markets. Consumers develop relationships with traders and they supply products according to consumers' taste and preferences.

Table 16 Advantages and disadvantages of formal and informal milk marketing

	Advantages	Disadvantages
Formal milk marketing	<ul style="list-style-type: none"> - Easy access and reliable market - Farmers are more organized and responsible - Easy access to services (e.g. inputs and credits) - Payments are regular under good management of cooperatives. - Milk quality assurance as it involves cold chain. 	<ul style="list-style-type: none"> - Pricing system not transparent - High investment costs for the processing plant - Low profit for the farmer - Economics of scale for value addition required.
Informal milk marketing	<ul style="list-style-type: none"> - High farm gate price for farmer - Sometimes there is direct contact with consumer and they get products cheaply giving a win-win situation for the farmer and consumer - Simple decision making by farmers - Trust building among actors - Low investment costs - Employment for traders - high consumer demand because of low price 	<ul style="list-style-type: none"> - Adhoc spot markets- risk to farmers and traders - Dependence on trust among actors and not contracts so unreliable when there is oversupply of milk - No transparency in pricing - Exploitation by middlemen in times of surplus (unreliable payments) - Loss of milk when there is imbalance between demand and supply No quality control and traceability of products - High risky with food safety

Source: Cousins et al, (2005).

6.2.1 Reasons for the decline of raw milk deliveries to the processor

Liberalization of the dairy industry in 1995 has abolished business monopoly and farmers are free to sell unprocessed milk directly to consumers or milk vendors. The smallholder farmers in Tanzania supply over 80% of the marketed milk, of which 70% is unpasteurized or "raw milk" and only 30% filters in the processing plants (MLF report, 2009).

Milk hawkers are the dominant milk trading agents. Study by Mlay *et al* 2004 revealed that some milk is processed informally by producer groups; they have decided to go for value addition and have vertically integrated to processing and marketing. The relative market share have been changing since then with an increasing role for the informal market (Mlay et al, 2004). The informal marketing channel has offered expanded business opportunities and enhanced competition but has impact to the growth of the dairy sector in regard of the performance of the chain.

Other reasons also include inadequate raw milk production (due to seasonality, milk being produced in small quantities and small scale milk producers being widely spread in remote areas) which increases milk collection and transportation costs for the processor.

In response to the milk supply shortages ASAS has devised ways of survival that have overlooked the consumer demand, like in the case study the focus of ASAS Dairies Ltd is to maximize margins from the limited volumes they receive. This led them to segment their market and from the findings it reflects that this led to the thriving of the informal market channel. The consumers that ASAS did not target- the low income with low purchasing power group who form the bulk of the population (90%) are main consumers in the informal chain. ASAS dairies although they are trying to diversify into new products like yoghurt with different flavours and juices for new markets which has better returns, they are however faced with lots of challenge from imported milk products which are cheaper.

6.2.2 The benefits of the informal market

A value chain analysis is a specific type of a supply chain, one where actors actively seek to support each other so that they can increase their efficiency and competitiveness. They invest in time, effort and money and build relationships with each other actors to reach a common goal of satisfying consumer needs so that they can increase profits. (KIT and IIRR, 2006).

Low volumes of milk supply to the processor have resulted in milk shortages in supermarkets. In the case of ASAS operating at 45.8% capacity means overhead are shared on low volumes and to survive the processor has segmented the high end products for the high income group and hotels, which need high quality products. Supermarkets in low density areas have a lot of ASAS products while the high density areas have fewer products. This has excluded the majority who are getting their milk through the informal chain.

Milk vendors are entrepreneurs who have identified an opportunity in supplying raw milk and *mtindi* (fermented milk) in the high density areas. Vendors have over the role of milk collection, from producers like Phillips Dairy Farm, 50km from the municipal who apparently produce large volumes of raw milk. Vendors provide a market for this category, they take a risk of travelling to the farms to buy the milk and endure the transport difficulties but make a living out of selling milk, therefore they have created employment for segment of the 80% unemployed Tanzanians.

The vendors have also identified the shortage of *mtindi* in the supermarkets and have targeted the low income group (90%) who are living below the poverty line and this group enjoy the traditional taste of naturally fermented milk which the vendors sell at open markets, in offices and door to door.

Mtindi is however more expensive per unit volume which contradicts Cousin, (2005) who argues that products in the informal chain are cheaper due to less transaction cost. Cousin further states that farmers get higher farm gate prices in the informal chain which is also the case in Iringa where farmers get a value share of 37% and vendors get 24% (Figure 12). It is a clear indication that vendors do not exploit the farmers. Like the ASAS

6.2.3 Milk produced in the district and that sold to the processor

The figure below shows the trend of milk production in the district for the past five years.

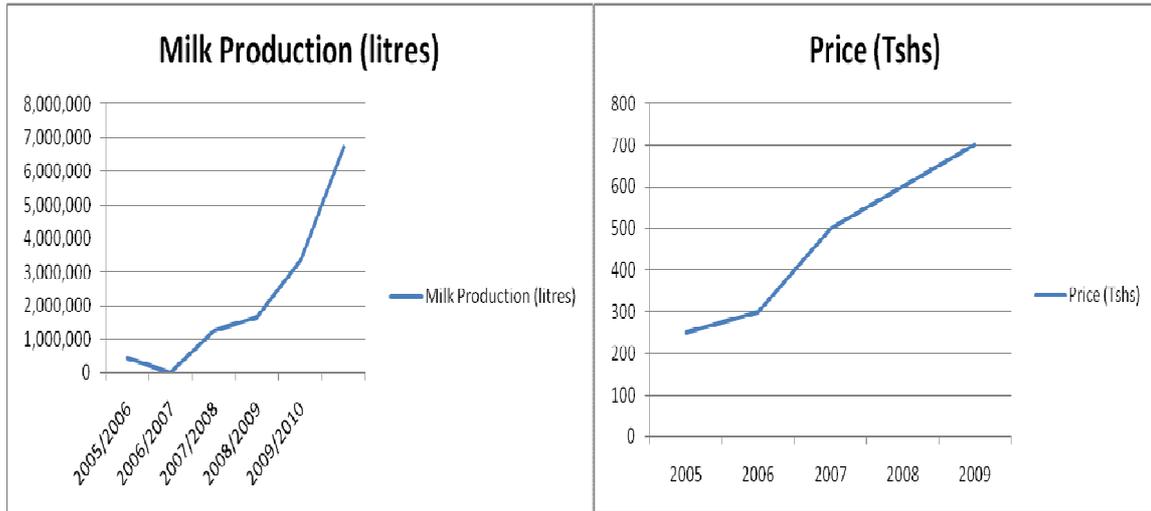


Figure 18: Milk trend and milk prices in Iringa district 2005-2010

The survey showed that the processor get milk from 30% of the respondents while 70% sell to the informal milk market channel. There is no any formal contact between the farmers who deliver milk to the factory and the processor. The figure reflects that milk that is being accounted for is far less than the actual milk production and is being split among so many channels. The milk price that ASAS offers of 550 Tshs is also far less the average milk prices in the market which is the major factor of farmers not delivering milk to the processor.

The majority of farmers are not getting any financial assistance in form of micro-credit which can be an attribute to the low yields. Possibilities of the scope of scaling up can focus on financing and improving other services such as extension services.

6.4 Strategies to improve milk supply to the formal chain.

As discussed earlier the informal dairy chain plays a dominant role in milk marketing handling over 80- 90% of raw milk sold. The informal milk marketing provides millions of low income consumers with nutritious affordable product and employs thousands of Tanzanians as traders and service providers.

From the survey, it is evident that the formal chain will grow as the income of households' increases. Therefore, it is expected that the informal marketing chain to predominate for many years to come, given trends in demand. Besides the price advantage, other factors underlying the demand are the income and relative high-value employment.

Pro-actively engaging actors in the informal chain to integrate it into formal dairy value chain requires both appropriate changes in policy (mind-set/or written) and developing appropriate policy implementation instruments for relevant institutions. This should

involve developing appropriate milk quality assurance standards and institutional approaches towards integrating informal chains into the formal value chains. The rationalisation and harmonisation of the dairy policy approach should involve piloting a training and certification scheme as a dairy business services like in other countries in the region (Kenya).

6.4.1 Enhancing milk supply to the processor

The small scale farmers are the majority with small herds of 5- 10 cattle with low productivity but they cannot continue to be undermined their importance has to be recognised sooner or later. Majority of households are small holder farmers. The theory of Gandhi supports production by masses and not mass production as a pro poor development strategy. Participation by the increased numbers is scaling out and can considerably increase national milk production.

Small scale farmers: Small scale farmers in Tanzania are mixed farmers (>80%) living in rural areas having cattle which are important in the farming system because: the provide draft power and transport; produce manure for the field and provide milk and meat. The cattle in this sense are dual purpose, giving meat and milk; with perception of extension agents these cattle are not proper for milk although they acknowledge their milk production. Some cows in the sample, although not black and white give higher milk production than the average obtained from cross breeds or commercial herds. The crosses give up to 8lpd.

Dairy production for extension staff and development agents is from dairy cows but milk is milk whether it comes from a Friesland cow, crossbred, beef or Zebu. The thrust could be using the fact that most small holders gradually improve their milk production through breeding, feeding and other good farming practices. Feeding especially during the dry season when the pastures have poor grazing crude protein (CP) around 28g/kg dry matter (DM). However, the quality of natural pastures available in the dry and wet season for both communal and zero grazed animals cannot meet the requirement for lactating cow without supplementary feeding. The sampled herd in both grazing systems have low yields, the communal grazing being worse in all seasons. This can be attributed by the lack of funding for the sector in the district reflected by 95% farmers using own capital for dairy farming.

Producer organization:

The survey revealed that in Iringa district there is lack of unity among individual farmers (although under the Southern Highland Dairy Development Project (SHDDP) there were farmer groups which collapsed in 2000, after the end of the project) compared to fellow farmers in Tanga region where 13 village cooperatives of more than 3,000 small-scale farmers formed the Tanga Dairy Cooperative in 1985. The dairy farmers organize themselves in village cooperatives for cooling and sales are guaranteed in the umbrella organization Tanga Dairy Cooperative Union (TDCU), (dob foundation 2010) (http://www.dobfoundation.com/eng/deeds/projects/tanga_fresh) TDCU currently has around 3100 registered members and plays an important role as shareholder of Tanga Fresh Ltd in the development of policy and (political) lobby. TDCU is also involved in the cattle breeding company and the credit facilities.

These producer/farmer organizations can be instrumental in including farmers in the formal chain or formalising informal chains.

POs are fundamental building block of dairy development agenda, by helping in organizing members and facilitating the innovation process targeted at reaching higher quantities and better quality of raw milk by providing technical assistance; thereby

augmenting government efforts of providing extension services. PO can link farmers to markets at a low cost and enable small-scale producers to access other markets by combining their produce to reach the scale necessary to deal with buyers in other markets, or by processing their produce to access higher value markets at a later stage in the chain and also ensure farmers get adequate information on quality standards expected, this will be an opportunity to strengthen their membership as more farmers will join to get access to the services.

POs help increase small-scale producers' bargaining power for negotiating better prices through bulking and improving the quality of their product .POs improve small-scale producers' access to services when the services are provided to a group other than to individuals. Through POs, there are opportunities for incentives and value addition, members have increased confidence and influence (Chris Penrose-Buckley 2007).

According to Avishay Braverman, et al 1991, rural farmer organisation aim at improving economies of scale and bargaining power with the external agents. It also provides access to savings and loans facilities. Through farmer organisations, input supply and marketing become more efficient.

Producer organisations strengthen smallholder's positions in markets, strengthen bargaining power, reduce transaction costs and raise the voice of smallholders in the policy process (World Development Report 2008).

However, farmers can be linked to markets but complication may come from farmers failing to comply with agreements, especially where there is a contractual agreement; right quality and agreed quantity and a continuous supply and strict rules. It is important that capacity building efforts focus on management skills for staff working for the PO so that they can lobby for favourable legislation, improve negotiating skills for entering into partnerships either for vertical or horizontal integration.

The effort of PO will be to transform the milk producers from Adhoc spot markets and formalise the markets by improving the chain relations as shown in figure 14 below.

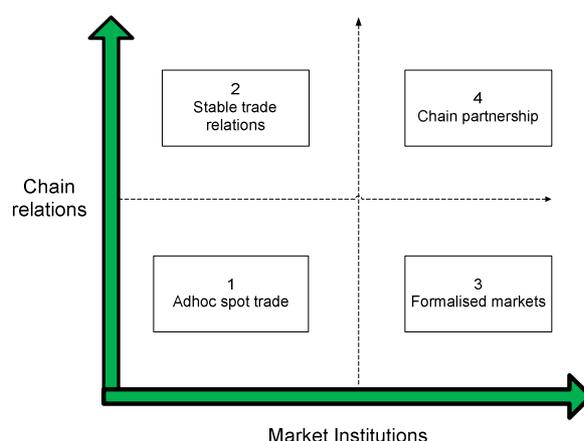


Figure 19: Chain empowerment
Source: KIT and IIRR 2006

Contract farming

According to the survey and case study there is no any contract between the farmers

and the processor. Contracts are however important in supporting the production base. Value chains have become increasingly buyer driven and vertically integrated. Small holder farmers in this survey are struggling to finance their dairy business due to capital constraints, or failure to access bank loans and feed suppliers.

Small holder farmers use family labour so contract farming would reward their effort through increased output after optimum inputs are used. The major draw back with contracts is that farmers lose control of their produce and sell to contractor at agreed prices, not the market price. This is disadvantage in case of inflation. It can be a challenge and therefore in case PO is formed in Iringa it has to play a pivotal role in ensuring the stability and longevity of contract farming.

In the case study the processor had made some efforts to assist some farmers by giving some inputs and heifers when requested and gradually repay from their milk cheques. There is no provision of extension and services by the processor so it is difficult to maintain good rapport with producers.

Policy and regulations

The study revealed that there is definitely a need to revise the strategies of the dairy development policy framework and work on inclusion of small holder farmers into the formal chain. India opened up the sector for Direct Foreign Investment (DFI) and many companies are into milk collection and processing e.g. Dynamics operating in Maharashtra, India is collecting milk from small holder farmers for their processing plants.

Tanzania already has standard set for milk quality and product certification but the study suggests there is a need to revise regulations to make sure that small holder farmers are included into the formal chain. Harassment of milk vendors is socially unacceptable because this category of entrepreneurs is working to improve their livelihoods at the same linking farmers to the consumers. Engaging them will help find sustainable solutions that can be incorporated into a new policy framework. Policy change in raw milk vending can be modified and allow training and licensing rather than policing to improve milk safety in traditional markets, through use of improved technology.

The scaling up process of the dairy farms will need to be accompanied by an effective use of available public support through extension services; financial, consultancy or legitimating, which is crucial at a start up of a new initiative. Private Public Partnerships (PPP) will invite investors and NGOs to support the development of the dairy sector. Such a support reduces the related risks and shapes up a more favourable environment for the initiative. All actors in the chain have to change from being production driven i.e. produce according to the market requirement.

Production standards contribute to building consumers' trust. If these standards are made transparent to them by communication, it is much easier for consumers to have confidence. The requirements, which may compromise quality, provenance or way of processing, are fulfilled. Informed consumers who 'see' their requirements fulfilled contribute considerably to a stronger embeddedness of the product or even of the initiative as a whole. This can help processors keep high quality standards for their products and dairy services in collaboration with TFDA, TDB and Consumer Council of Tanzania. Consumers' education is important especially on food safety issues and promotion of consumption of milk and milk products.

Coordination and networking

This involves:

- Organisation of the industry through forums where stakeholders can sit, understand and respect each other's role in the chain and improvement of networking among stakeholders like what Tanga Fresh Ltd does.
- A milk production recording scheme can help identify high potential areas through milk recording of the census through the office of Central Statistics Bureau (last livestock census was in 2003).
- Improving identification, registration and traceability for herd improvement, important for export market and also reduction of stock theft which is rampant especially in the borders where a cattle rustling is high.

Improved provision of extension services

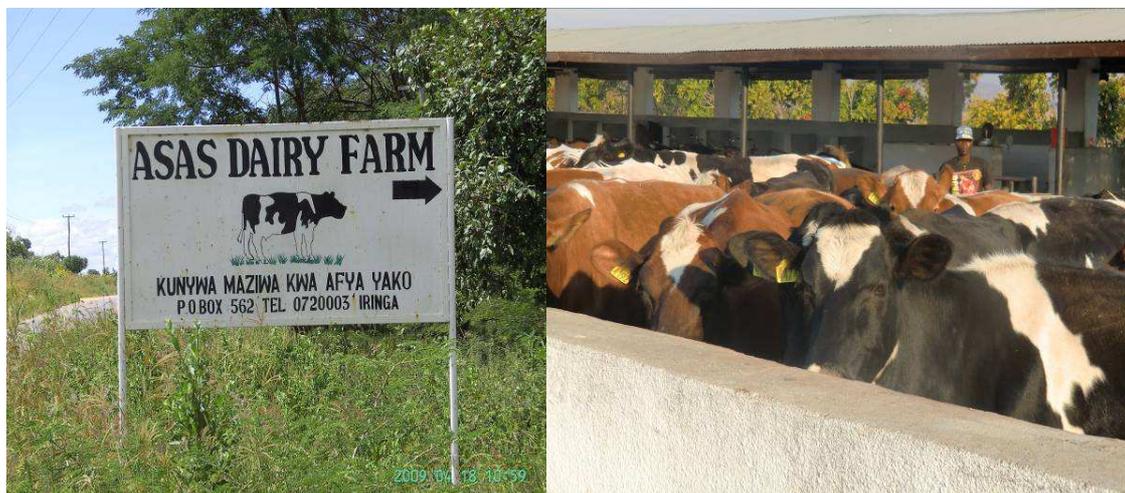
The challenge for the dairy industry is therefore to shift smallholder milk producers Adhoc spot trading to formalised markets in which markets are transparent and standardization of quality grades and enforcement of contracts occur. For this to happen, the government should play a facilitative role in the following:

- Building capacity of producer organization TAMPRODA. Small holder milk producers on the need to organize themselves into marketing groups in order to benefit from the bulk purchasing and also to improve bargaining power within the chain. Farmers on the other hand should be willing to innovate and take risks
- Growth implies a more intense use of existing resources, scaling up implies a different organization of resources(e.g. from informal to formalised, from artisanal to industrial, from local to international markets
- A clear strategy regarding management and marketing allows a more efficient coordination in all processes along the chain.
- Continuous innovation is an important factor for growth or scaling up. Research for development should be supported and given enough resources in breeding, feeding and animal health.
- Farmer training on Good Agricultural Practices (GAP) will improve production on the farm and increase the supply base for both the formal and informal chains.

Increasing milk supply base

Efforts of ASAS to horizontally integrate into improving its supply base have failed because of lack of enabling environment as a result of weak institutional support. According to Match Maker Associates Ltd (MMA, 2008) there is little guiding regulations or support for the companies or the market in general. The issue of quality the government does not indicate what the minimum standards should be, all is left up to the processor to decide own standards. There are weakly organized programs to support the market demand for processed milk. The government does not actively address the large informal market though selling milk informally is officially prohibited. Also there is no loan facility to support dairy farmers to increase production.

However, the company's two dairy farm projects have yielded positive results supplying around 40% with a target of 60% of the milk deliveries to the plant. There is a need to improve management so as to increase milk production in Igingilani and Mgongo ASAS dairy farms (see picture 5 & 6) so as to reach the target of feeding the factory with 60% of the milk deliveries.



Picture 5 ASAS Dairy Farm

Milk collection

ASAS has closed temporarily, the MCC because of high running costs in relation to the volumes of milk delivered to the MCC. A new strategy in milk collection is inevitable and ASAS have to seriously consider this setback. It is worthy to venture into collection of milk currently sold to the informal chains who buy milk at farm gate. In the district there is electricity and road network though gravel which makes milk collection possible.

6.4.2 How to improve milk safety

Informal- non processed milk marketing has raised concern by consumers and policy makers. The concerns are over public health hazards associated with informal milk marketing such as brucellosis and tuberculosis (which are zoonotic). In the past when TDL was in operation, the government policy promoted pasteurized milk sales and prohibited raw milk trade to minimize the risks.

The change in policy scenario requires an alternative mechanism to protect public health. However, these concerns are a subject of further research so as to get accurate information which can be used to formulate appropriate mechanism for protecting public health.

- Training on milk handling and food safety has helped to improve regulating the informal sector like in Kenya where 80% milk goes through the informal chain (ILRI, 2004). This is also possible in Tanzania.
- Provision of stainless steel utensils and aluminium cans rather than using plastic cans to reduce contamination.
- Shelter can reduce risk of food contamination in open air marketing; if consumers could understand that they can buy milk of their taste in a kiosk at their convenience will improve business for the informal chain.

6.4.3 Benefits of formalising informal chain

Milk vendors have 24% while farmers get 37%, while the formal chain has 39%. If the formal chain is developed, farmers can get higher incomes from milk which will trigger increased production as the law of supply and demand states. The increase in production will then benefit the processors who are struggling to utilize their processing capacity.

Increased milk supply will also help in the revising the product mix to cater for the neglected social classes who are buying milk from open spaces. It is anticipated that this will reduce the informal sector and deliver most of the milk into the formal chain; where consumers are guaranteed of high quality products that meet the international standards of food safety.

Investors will find lucrative business within the dairy sector as demand for services increases like stock feeds, veterinary drugs/vaccines, milking equipment and utensils. This will contribute to the economic growth of the country.

The per capita consumption of milk will improve and the health of the nation will also be improved. Livelihood for the small scale farmers will be enhanced and poverty level will be reduced which is the ultimate goal of the Ministry of Livestock Development and Fisheries of having a department that deals with livestock production and development.

Chapter 7: Conclusion and Recommendations

The conclusion and recommendations are drawn from the results and discussions of the report.

Conclusion

- From the survey results large amounts of milk is sold through the informal chain (>80%) from the small scale farmers to which they have access, as they are not linked to the formal chain, resulting into the under utilisation of the processing capacity.
- Farmers tend to have a short- time orientation regarding the sales of milk while the processor have a more long term orientation with specific focus on reliability and quality supply of raw milk. The short term orientation of the farmers for profits makes them sell milk to the one who offers high price (highest bidder).
- The informal markets do not guarantee whether the farmer can sell all his milk against the highest price, hawkers are not to be trusted especially regarding payments. To this regard, processor has an advantage because he can offer secure market and steady payments.
- Government regulations do not sufficiently support formal chains; their enforcement and monitoring has to be supported by an effective extension service. The dairy development policy framework is failing to keep pace with developments of this century.

To support the dairy sector no subsidies is required according to the WTO regulations (which Tanzania is a member) but what is needed is; a level playing field, a market for milk, farmer– oriented policies and provision of a right environment for Tanzanian dairy sector to develop and take its rightful place in national development.

Recommendations

Taking into consideration the objective of the study and the research questions that were posed at the onset of this report, the researcher recommends strategies for processors in Tanzania which can prove very useful in increasing milk deliveries to the processing plants for more efficiency.

Recommended strategies for the processor

Basing on the observations and subsequent analysis, in order to increase milk deliveries the processor should have innovative thinking and apply the following strategies;

- Develop pricing mechanism by paying premium to farmers that have organised themselves in a formalized farmer group. This can motivate them to form groups which may eventually lead into a cooperative and build relationship.
- Pay more for better quality in order to stimulate farmers to produce more.
- Build trust and farmer commitment to strengthen relationship for reliable milk supply year round.
- Introduce incentive schemes by paying bonus or a type of profit sharing to farmers who performed well to develop a stable production.
- Introduce low interest loan for the farmers (profit can be used as revolving fund) to increase production
- Support artificial insemination services and supply on loan heifers from own ASAS Dairy farms to improve breeding and increase production.

- Integrate the middlemen into the chain where they can have a clear added value for example to be hired as transporters of milk from farm gate (venture into collecting milk in the informal market).
- Build links with organized farmers to have equity in processing plant to encourage farmers participation in decision making upstream (enhancing transparency thus building trust).

Recommended strategies to the central government

- Revise of policy to create an enabling environment for small holder dairy development which will support farmers to meet market, registration and certification standards that can link them to sustainable markets.
- Enforce regulation to put control as farmers are scaling up and vertically integrating to expand their business so as to protect the processing industry. Vendors need to be included in the regulations and certified so as to ensure public health safety.

Recommendations to the local government

The local government through District Agriculture Development Plans (DADPs) should

- Stimulate and take initiative in the formation of Producer organizations which is instrumental in linking farmers to processor. Closer linkage by a processor to an organised group of farmers makes it easier to take recommended action to level out seasonal fluctuation in milk intake by price differentiation over the year.
- Invite potential facilitators for change ('change agents') - NGOs and consultants to train and work with farmers to form unions and build their capacity in value chain development.

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Appendices

Appendix 1: Survey questionnaire for small holder dairy farmers

1. Age of the farmer..... gender
2. Location:Village.....
3. Division.....District.....

4. Educational background

Never been to school Primary level Secondary
 Certificate level Diploma & above

5. What is the total size of the land in acres?

Less than one acre 1- 2 acres
 3 - 4 acres 5 acres & above

5. What is dairy herd size per category?

Age category	Males	Females	Total
Calves (Less 8 weeks)			
Weaners (8 weeks-14 weeks)			
Heifers			
In- calve heifers			
Cows			
Bulls			

7. Where do you sell your milk?

At farm gate Milk vendor Cooperator
 Milk collection centre Others (specify)

8. Give the reason(s) for the choice in question 7.

9. What price is offered?

At farm gate Milk vendor Cooperator
 Milk collection centre Others (specify)

10. Are you satisfied with the price?

Least satisfied Fairly satisfied Moderately satisfied
 Most satisfied

If no, how would you like it to be improved?

11. What is your opinion on the role of value chain play in promoting small-scale dairy farmers in the district?

Very important role Important role
No role Not important ro Least important role

12. Please give reason(s) for the answer you have chosen above (question 11).

13. Who provides you with market information?

Government Milk vendors Cooperativ
MCC Processor Other (sp
None

14. What kind of market information do you get from the answer you have given in question 13?

Quality Price
Quantity/litres None

15. What challenges do you face in marketing your milk (rank in order of priority)?

- Low milk prices
- Milk losses through spoilage
- Delayed payments
- Others (specify)

16. How do you access credit facilities?

Bank Cooperative Processor
Fellow farmers Money lende Others (specify)

17. How is breeding done in your farm?

Natural service Artificial Insemina

18. Do you supplement the feeding of your cows?

Yes No

19. What is the distance between your farm gate and nearest milk collection centre?

20. What is the situation in accessing veterinary and extension services?

21. What is the milk production per cow/d in high and low season?

Appendix 2: Check list for Case Study

a) Processor

1. What is the processing capacity?
2. How is milk supply secured?
3. What is the milk payment scheme for farmers?
4. What support is given to farmers?
5. What challenges are involved in getting raw milk?
6. What strategies are employed in getting raw milk?

b) Tanzania Dairy Board

1. What is the organizations role in milk marketing?
2. What is the Quantity of milk marketed through the formal and informal chain?
3. What is the current situation of milk in the district?
4. What are the constraints experienced in milk marketing?
5. How can the organization best seize the opportunities in milk marketing?
6. What are the strengths of dairy farming in the district?
7. In your opinion what needs to be done, by whom, to strengthen milk marketing?

c) Milk vendors: An observation on the morning and evening market

1. What strategy do they use to get a regular supply of raw milk?
2. Who are the customers?
3. At what price is the milk sold?
4. How do you guarantee quality of milk?

Appendix 3: Milk processors in Tanzania

Location	No	Plant name	Current status	Installed capacity (lts/day)	Current production (lts/day)	Capacity utilization %
Dar es Salaam	1	Royal dairy Products Ltd	Prod. suspended	90,000	0	0.0%
	2	Azam Dairy	Operating	3,000	NA	
	3	Tommy dairy	Prod suspended	15,000	0	0.0%
	4	Tan dairies	Operating	15,000	4,000	26.7%
Tanga	5	Azania Dairies Ltd (Ex TDL)	Operating	12,000	6,000	50.00%
	6	Tanga Fresh	Operating	15,000	14,000	93.3%
	7	Morani	Operating	5,000	1,000	20.0%
Arusha	8	New Northern Creameries (Ex TDL)	Operating	45,000	2,500	5.6%
	9	International Dairy Products	Operating	5,000	1,200	24.0%
	10	Arusha Dairy Company	Operating	5,000	2,000	40.0%
Kilimanjaro	11	Nronga women	Operating	5,000	2,000	40.0%
	12	West Kilimanjaro	Operating	1,000	300	30.0%
	13	Mboreni Women	Operating	1,000	200	20.0%
	14	Marukeni	Operating	1,000	200	20.0%
	15	Ng'uni Women	Operating	1,000	200	20.0%
	16	Kalali Women	Operating	1,000	280	28.0%
Mara	17	Musoma dairies (Ex TDL)	Closed	45,000	0	0.0%
	18	Utegi (Ex TDL)	Closed	45,000	0	0.0%
	19	Baraki Sisters	Operating	3,000	2,500	83.3%
	20	New Mara Milk	Operating	8,000	4,500	56.3%
Mwanza	21	Victoria Dairy (Kishimba)	Closed	45,000	0	0.0%
	22	Lake Side	Closed	5,000	0	0.0%
Kagera	23	Kagera Milk (KADEFA)	Operating	3,000	350	11.7%
	24	Kyaka Milk Plant	Operating	1,000	450	45.0%
	25	Del Foods	Operating	1,000	250	25.0%
	26	Mini Dairies (several)	Operating	1,800	1,500	83.3%
Morogoro	27	SUA	Closed	3,000	0	0.0%
	28	Shambani Graduates	Operating	700	250	35.7%
Tabora	29	Ex TDL Plant	Closed	5,000	0	0.0%
Coast	30	Mojata	Closed	6,000		0.0%
Iringa	31	ASAS Dairies Ltd	Operating	12,000	5,500	45.8%
	32	CEFA Njombe Milk Factory	Operating	2,000	650	32.5%
Mbeya	33	Ex TDL Plant	Closed/dismantled	16,000	0	0.0%
	34	Mbeya Maziwa	Operating	1,000	500	50.0%
Several micro- dairies in the country			Operating	83,500	8,350	10.0%
TOTAL				507,000	56,680	11.6%

Source: MLD 2007, Rapid survey

Appendix 4: Livestock population in Tanzania by species and region

Region	Cattle	Goats	Sheep	Pigs	Indigenous Chicken
Dodoma	807,711	696,349	121,371	43835	1,825,867
Arusha**	1,523,238	1,795,227	717,620	58657	931,178
Kilimanjaro	603,401	609,975	267,612	155,070	1,561,340
Tanga	309,262	320,156	81,798	6281	1,788,767
Morogoro	114,172	305,734	57,661	44986	2,100,861
Pwani	129,255	68,514	7,900	3673	1,420,152
DSM	20,504	73,789	7,484	12993	525,052
Lindi	6,630	102,325	8,075	4956	1,261,290
Mtwara	22,811	262,959	22,986	6293	710,132
Ruvuma	94,090	981,935	60,834	134951	1,555,617
Iringa	1,201,434	361,320	98,672	180904	2,241,683
Mbeya	845,652	371289	71,251	229,465	2,559,913
Singida	1,810,098	1236046	454,995	6,375	1,658,178
Tabora	1,817,236	910469	247,448	6,286	2,507,469
Rukwa	411,467	252501	13,111	58,754	1,122,432
Kigoma	129,713	477610	43,068	23,698	797,537
Shinyanga	3,818,106	2083659	833,743	3,266	2,979,590
Kagera	840,978	862221	64,354	145,761	918,858
Mwanza	2,186,821	875890	167,031	610	2,620,818
Mara	1,285,959	658268	195,397	2,409	1,521,166
Total	18,755,254	13,330,238	3,556,423	1,129,223	32,607,903

Source: Ministry of Livestock Development and Fisheries, Dairy Investment Opportunities in Livestock Sector, 2009

Appendix 5: TANZANIA COUNTRY PROFILE

	2004	2005	2006	2007	2008
Population in millions ⁱ	36.31	37.27	38.67	39.45	40.67
Annual growth of GDP in percent - at 2001 prices ⁱ	7.80	7.40	6.70	7.10	7.40
Growth of livestock sector at 2001 prices ⁱ	6.60	4.40	4.00	4.50	5.10
Percentage contribution of livestock sector to GDP at 2001 prices ⁱ	4.50	4.40	4.20	4.00	3.80
Domestic milk production in million litres		1,386 ⁱⁱ	1,410 ⁱⁱ	1,420 ⁱⁱ	1,664 ⁱⁱⁱ
Exchange rate (in Tshs/USD) ^{iv}	1,089	1,123	1,252	1,132	1,280

Sources

ⁱ Economic Survey, 2008

ⁱⁱ Match Maker Associates, 2008

ⁱⁱⁱ Ministry of Finance and Economic Affairs, 2009

^{iv} Bank of Tanzania (BOT)