



Dairy Investment Opportunities in Uganda- Report

Dairy Sector Analysis

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Acronyms and Abbreviations

AGOA	African Growth Opportunities Act
ASARECA Central Africa	Association for Strengthening Agricultural Research in Eastern and Central Africa
COMESA	Common Market for Eastern and Southern Africa
DCL	Dairy Corporation Limited
DDA	Dairy Development Authority
EAC	East Africa Community
ECAPAPA	Eastern and Central Africa Programme for Agricultural Policy Analysis
CBOs	Community Based organizations
ISO	International Standards Organisation
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MCC	Milk Collection Centre
MFPED	Ministry of Finance, Planning and Economic Development
NAADS	National Agricultural Advisory Service
NAGRC	National Animal Genetic Resources Centre and Data Bank
NARO	National Agricultural Research Organisation
NGOs	Non Governmental Organisations
PARC	Pan African Rinderpest Campaign
PEAP	Poverty Eradication Action Plan
PMA	Plan Modernisation of Agriculture
UBOS	Uganda Bureau of Statistics
UNBS	Uganda National Bureau of Standards
USA	United States of America
GDP	Gross Domestic Product
NEMA	National Environmental Management Authority
EAC	East African Community
UIA	Uganda Investment Authority
CIA	Central Intelligence Agency
UDISA	Uganda Dairy Industry Stakeholders Association
SAP	Structural Adjustment Programme
UCCU	Uganda Crane Creameries Cooperative Association
ABC	Animal Breeding Centre
PACE	Pan African Control of Epizootics
MFI	Micro Finance Institutions
SACCOs	Savings Credit Cooperative Organizations

Executive Summary

The purpose of this study was to assess the development of the dairy sector in Uganda over time with the aim of: (a) generating information useful in directing and advising on the need for investment in the dairy sector; (b) providing guidance on the nature, scale and location of investments if the sectors prove to have opportunities for enterprising venture; and (c) identify investment opportunities in the dairy subsector of Uganda through value chain analysis to find out entry points into the business.

The livestock sub sector contributes 18% of agriculture gross domestic product (GDP) and between 7%-9% of the national gross domestic product (GDP). Of the GDP attributed to the livestock sub sector the dairy sector is estimated to contribute up to 45% and plays an important role as a source of food, income and employment. Dairy farming is concentrated in 42 districts found in the cattle corridor which stretches from the South Western region through central to north eastern. On average, 60% of the households in the cattle corridor keep livestock

Within the livestock industry, dairy development continues to receive the greatest attention in the development of the animal industry in Uganda. Consequently total national milk production has grown from 365 million litres in 1991 to over 1.4 billion by the end of 2006 with per capital milk consumption growing from 16 litres in 1985 to 50 litres by end of 2007.

The productivity of smallholder dairy farms is generally low. Small-scale producers are facing many challenges/ constraints, which are partly responsible for the poor production performance. Despite various initiatives to enhance quality at various stages of the dairy chain, many weaknesses still exist. The hygiene and handling practices at farm level are generally poor. The collection and transportation of warm milk as well as sale of loose unprocessed milk are still a big challenge as far as improving quality in the dairy chain is concerned.

One of the key challenges to milk procurement and marketing may not be the generally poor milk collection, transportation and marketing infrastructure but lack of harmony between the formal and informal marketing channels. There is a need for policies to streamline the procurement and marketing of milk in the country. There is also a need for Policies that will promote processing and enhance the flow of milk from the surplus to deficit areas within the country. There is a need for policies that will facilitate a sustainable increase in the productivity of dairy farms, promote the collection, transportation, processing and marketing of milk and enhance the participation of stakeholders in the formulation and implementation of policies, standards and regulations

Uganda's population growth is averaging 3% for the last 10 years. This rapidly increase in population size coupled with a growing urban population is resulting in a growing demand for dairy products. Dairy development can lead to income generating activities in the rural areas increasing farm incomes and employment opportunities. However, the available high potential land is intensively cultivated and fodder supply is insufficient leading to often serious environmental consequences as inappropriate husbandry measures are applied in non-suitable areas. With exception of South Western and Central Uganda, there is still low milk production levels in Eastern and Northern Uganda, milk collection, processing and marketing less developed.

The Government of Uganda through its regulatory organs like the Dairy Development Authority aims at stimulating dairy sector potential areas. It is believed that development of milk marketing structure will create the incentive to improve production especially in the potential regions of North and Eastern Uganda. Urban, semi-urban and rural milk production systems are dominated by informal marketing systems which accounts for 80% of the milk sold. The formal market also appears to be expanding with the private sector liberalization. There have been and still are several initiatives to stimulate milk production, collection, processing and marketing at village level (among other Land O' Lakes, East Africa Dairy Project, Send A Cow, Heifer International).

Over the last decade, the dairy sector has undergone a number of reforms. The Dairy Master Plan (1993) has provided the key guidelines for transformation of the sector particularly liberalisation of the dairy

industry, establishment of a regulatory body as well as restructuring and privatisation of the state owned dairy-processing company, which is now at an advanced stage. The Dairy Industry Act, 1998 is the main law under which the new institutional and policy reforms in the sector are being implemented. This has been supported by the general livestock sector policies such as the Policy on marketing of livestock and livestock products, Animal health policies, the Animal breeding policy, as well as the Public Health Act and the broad national policies and strategies such as Liberalisation, Privatisation, Decentralisation policy (Local Government Act); the Poverty Eradication Action Plan (PEAP), Plan for Modernisation of Agriculture (PMA) and the National Agricultural Advisory Services (NAADS). Favorable government laws, policies, and regulations as part of the economic liberalization program besides investment incentives are necessary to smooth the progress of easy entry in to and expand the investment opportunities in the Uganda dairy industry.

The dairy industry in Uganda accounts approximately 9% of the national GDP and yet a greater percentage of the population derives their livelihood. The dairy sector in Uganda will be successful if the key constraints are properly addressed. These constraints include a variety of socio-economic and institutional considerations. The major socio-environmental factors represent underlying opportunities for increased trade that may be tapped by dairy businesses in Uganda, East African Community, COMESA and AGOA to expand trade and enhance their long term return on investment goals are: low demand and high transaction costs, low productivity and genetics, low per capita consumption, poor animal health, lack feed, quality and health problems, lack of institutional support, lack of infrastructure, lack of access to land and credit, seasonality of supply, collection problem and insecurity in some regions of Uganda (especially the North and North-East).

The following are the dairy sector constraints which, when addressed, will assist the sector in improving its competitiveness.

There's currently a surplus of milk being produced in Western region looking for a market.

Success in the introduction of exotic breeds, management practices and Milk Collection Centers (MCCs) have outstripped the ability to produce and market quality milk. Part of the problem resides in processors not being aware of the opportunity to give incentives for milk that meets the profile of the product being produced, and on the other hand, inefficiencies in transport has lead to farmers being turned away at collection points, being left to sell the milk themselves. Still other farms find a better market selling direct to the public as opposed to processors especially the farmers in Central part of Uganda. The milk market now requires an adjustment to provide processors an opportunity to reward farmers for the work and money it takes to improve on quality, and at the same time become more competitive with imports.

Quality standards along the dairy value chain are inconsistent

The dairy sector in Uganda is to certain extent unregulated. Dairy farmers from the Western and Central milk sheds transport raw milk in a wide variety of containers to bulking and chilling centers. These containers are also poorly cleaned. Milk collection centers check acidity and density (added water). Processors also spot check the milk they receive from transporters. Most of the raw milk goes to registered fresh-milk kiosks in and around the capital city of Kampala, and may not be tested regularly. Recognizing that milk quality is very inconsistent, consumers boil their milk to kill harmful bacteria.

Inputs and services delivered to farmers are inconsistent

There are several initiatives underway in Uganda to improve the breeds and output of indigenous, rustic animals. However, whether the services are feed inputs, veterinary services, or artificial insemination, the services are sporadic, of inconsistent quality, and of varying results. In the Mbarara and Bushenyi region of the South Western milk shed, dairy farmers expressed frustration that the artificial insemination services have very little success, with only a 5% insemination rate. International averages for artificial insemination are 65%. Dairy farmers have come to expect a low level of service from these few providers.

Dairy processors lack strong linkages to dairy farmers and milk collection centers

Similarly, there has historically been little effort in linking dairy farmers and Milk Collection Centers (MCCs) with processors and formal milk markets. Many dairy farmers do not have formal relationships with processors, and therefore are subject to inconsistent demands. In the Central & Eastern milk shed, most

MCCs have little control over when their milk will be purchased by the area processor. This is because of their weak bargaining power especially due to lack of cooperative societies. Apart from Sameer, the majority of processors are located in either Central or Western Milk shed. To compensate, most dairy farmers have established relationships with fresh milk kiosks, or have opened and run their own fresh-milk marketing channels.

The existing dairy plants are operating well below capacity

At the time of this study there were only twelve operating dairy processors in the country of Uganda. Of these 12, majority were operating at or below 50% of their installed capacity. There are many reasons for this low utilization of capacity:

- Supply fluctuations occasioned by seasonality in production
- Poor quality of milk
- Lack of cold chain
- Low and decreasing per capita consumption (low demand base)
- Factor costs are high (e.g. electricity)
- High processing costs (are large and negatively affect prices of milk products and hence consumer prices)
- Lack of competitiveness (due to relatively high cost of production/inefficiency in processing)
- High and unstable interest rates that discourage new investments (processing require high capital outlays for plant installations)
- Stiff competition from informal milk vendors

Market opportunities for farmers and milk collection centers are largely informal.

With the existing processing capacity at such low levels, little coordination between farmers and processors, and not enough demand for pasteurized or value-added products, most dairy farmers have established relationships with fresh-milk kiosks, or have opened and run their own informal marketing channels. This raw milk market is estimated to be at least 90% of the entire dairy market in Uganda. Most importantly, it is the most affordable form of milk with a consumer base of limited purchasing power. Processed products are marketed to a thin niche of the population.

Access to affordable financing options and investment vehicles along the dairy value chain is not consistent, is uncoordinated and insufficient to keep pace with growth in production. Critical to the ongoing success of the sector is the affordable access to financing. Dairy farmers, cooperatives, transporters, and processors all have desires to upgrade equipment which improves quantities and the quality of milk, but very few have financing options which allow them to do so. While the Uganda Development Bank has instituted credit guarantees to encourage lending to the dairy sector especially processors and large scale commercial farmers, few commercial banks and micro finance institutions offer products specifically designed for the dairy industry.

Public-private dialogue is weak within the sector, and sector-wide issues are not addressed

While the Government of Uganda and the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)) have instituted policies and programs intended to increase the production of milk in the country, other policies and constraints affecting the entire industry have not been addressed. The revival of the East African Community has sparked discussions about inter-regional standards for milk (draft COMESA/East Africa Dairy Standards), but these standards have not been developed in coordination with the sector, nor have they been widely disseminated. Similarly, other agencies are passing national laws which have implications to the sector. The National Environmental Management Agency (NEMA) has outlawed plastic bags and sachets, and wishes to outlaw many other plastic containers. This ban inadvertently impacts the dairy sector as dairy processors have had to re-tool their processing facilities at their own expense to change their packaging to conform to the new regulations.

Improved public-private dialogue is a must to ensure that existing and future regulations are vetted with the dairy industry before passed into law.

Little information is shared amongst and between actors in the value chain

Dairy farmers are well aware of the capacity constraints of milk collection centers. During peak periods of production, some farmers have their milk turned away because milk collection centers are not organized with transporters to coordinate additional pick-up and deliveries, nor do they have up-to-date price information

from processors this is true in areas where cooperatives are not fully operational (Central, Mid Western & Eastern Uganda) . In the absence of hard data, anecdotal evidence and hearsay is taken as fact, without efforts to confirm the information. Some milk collection centers collect milk from farmers only to learn that their nearest processor is not collecting milk from them for days at a time. Processors are not aware of the ever-changing dairy farm production quantities, nor do they have up-to-date information on new cooperatives and milk collection centers being formed. Almost the entire dairy value chain operates oblivious to the changes occurring up or downstream with exception of South western Uganda. With so little market information being shared, it is nearly impossible for the dairy chain in Uganda to operate efficiently, profitably, or competitively.

The investment opportunities exist in the Ugandan Dairy Sector Uganda. The potential exist, however, this is within the seize of investors. It only needs adapting the technology, capital and human resources to specific market niche by targeting either existing market or venturing into new opportunities.

1.0 Introduction

1.1 Background

The dairy sector in Eastern and Southern Africa is dominated by the smallholder producers who keep a few head of cattle on small pieces of land, usually less than 3 ha and often under a mixed crop-livestock production system. In Uganda, smallholder producers own over 90% of the national herd of about 7.5 million cattle and almost all the small ruminants and produce over 80% of the milk in the country.

Dairy farmers especially small scale farmers in Uganda, mainly pastoralists and mixed crop-livestock farmers are currently facing a number of challenges in the production and marketing of their produce following the implementation of various policy and institutional reforms. Recent policy changes such as liberalisation, privatisation, decentralisation, and globalisation have generated new challenges for the small scale producers who now have to compete with global giants in the market place.

The importation and/or dumping of cheap dairy products from developed countries that directly subsidise the production and export operations is a key concern to producers in Uganda and other developing countries. Dairy farmers are also facing new challenges resulting from the need to exploit emerging trade opportunities created by the different partnership arrangements between African states such as Common Market for Eastern and Southern Africa (COMESA) and East Africa Community (EAC).

In order to address some of the key challenges and strengthen the dairy sector, the Dairy Development Authority (DDA) has been mandated by Ministry of Agriculture, Animal Industry and Fisheries to provide proper coordination and efficient implementation of all policies designed to achieve and maintain self sufficiency in production of milk in Uganda and competition in the dairy industry and monitoring the market for milk and milk products. The ultimate objectives of the Authority are:

- Register and license milk processors and traders
- Support dairy farmers' marketing organizations
- Register dairy farmer groups
- Advise government on milk standards and coordinate the enforcement of those standards in liaison with Uganda National Bureau of Standards
- Control and regulate dairy and dairy related import and export activities in conformity with external trade act, but without violating the animal disease act.
- Implement government policies designed to promote the development of the dairy sector
- Support various dairy development activities such as dairy extension, dairy breeding, dairy research, dairy training, dairy products development and general market promotion including promotion of dairy export
- Acts as an arbitrator in any conflict between companies and processors
- Coordinates all dairy processing and marketing promotional activities
- Pools dairy processing and marketing data.
- Advises government on research priorities of the dairy sector.

In order to ensure that SNV participate and contribute to the development of the dairy sector in Uganda, Kenya, Rwanda and Ethiopia a study of the existing investment opportunities in the dairy sector in Uganda was done. SNV seeks to promote enhanced productivity, employment and income generation in various sub sectors in East and Southern Africa for the purpose of poverty alleviation. In this regards, SNV connects firms, practitioners, researchers, policy makers, investors with each other and with information, services and markets promoting investments in dairy industry and markets in Kenya, Uganda, Rwanda and Ethiopia. The study looked at existing literature about the dairy sector and key stakeholder. Data were also collected on various aspects of production, collection, on-farm processing and marketing of milk and milk products.

1.2 Objectives

The aim of the study is to reveal current and future dairy investment opportunities in Uganda. The specific objectives of this study are, among others, to:

- To Assess entry requirements into the dairy sector in Uganda
- To review and document the regulatory framework promoting/ hindering investment in the dairy industry
- To understand the social environmental factors, this may limit or promote the case for investment in the dairy sector and how this could influence trade. Asses key technical, institutional and socio-environmental challenges and opportunities for investment in the dairy industry
- To review/assess business organisation and access of Ugandan dairy products to domestic and regional markets
- Analyse scope and scale of support services and business service markets required for growth and competitiveness of the dairy industry, and
- Identify investment opportunities in the dairy subsector of Uganda through value chain approach to find out entry points into the business.
- To review the key trends in the dairy sector in Uganda
- To develop a SWOT analysis of Dairy sectors in Uganda, putting in consideration current social and political trends in the country

1.3 Methodology of the Research

The study has mainly focused on desk research. It is supplemented with consultation and key informant interviews with individuals who are practitioners or officials in the dairy industry, small scale commercial farmers, public institutions and non-governmental organizations.

Relevant literatures were reviewed to obtain secondary data. The secondary data were collected from Dairy Development Authority (DDA), Land O'Lakes, Uganda Investment Authority (UIA), Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), Heifer International, Ministry of Finance, Uganda Revenue Authority and extensive internet search (see References section).

Relevant literature was also reviewed from other surveys, evaluations, and project progress reports. Moreover, interviews were held with small scale dairy farmers, key government, non-government and private firms involved in the dairy production, promotion, regulation and marketing.

1.4 Limitation

The dairy sector does not have specific institution or custodian which collects, collates and analyses dairy related data that can be used to inform investors, policy makers and other industry stakeholders. Except the professionals in public or non governmental institutions, only a few stakeholders were willing to share information about their business operations. Dairy Development Authority the regulatory body of the dairy sector has very limited information they rely on other professionals and sectors. There is lack of reliable, up-to-date and consistent information in the sector and in some cases conflicting information were also observed in the process.

2.0 THE DAIRY INDUSTRY IN UGANDA

2.1 Overview of Uganda's Economy

Uganda has a population of 31.3 million people that is estimated to grow at a rate of 3.6% in 2008 (*CIA World Fact Book 2008*). Per capita GDP at purchase power parity is estimated at \$1,100 with real growth in GDP estimated at 6% (*CIA World Fact book 2007*). According to 2008/09 budget report, the GDP growth for Uganda is 8.9%, this is projected at 8.1% by end of 2009 while controlling inflation at below 5% within the same period.

Agriculture accounts for 31% of GDP and 80% of total employment (*CIA World Fact book 2008*). In 2005/06, the number of agricultural households was estimated to be 4.2 million or 78.8% of all the households. Growth in the agricultural sector output which includes cash crops, food crops, livestock, forestry and fishing activities, is estimated at 0.7% in FY 2007/08. The overall performance of the agricultural sector has been undermined by many factors including a decline in the stock of fish, post harvest losses, effect of pests and diseases and floods in the Eastern Uganda.

2.2 Macro-Economic Developments

The recent data by Uganda Bureau of Statistics show that the Ugandan economy has been buoyant than had previously been reported. With an estimated growth rate at factor cost of 8.9% FY 2007/08 and an average of 7.9% over the past five years, the economy has shown resilience against increase in the international price of oil, floods in Eastern Uganda, and disruption from the post election conflict in Kenya.

The strategy of the Ugandan government is to build on the positive trends by;

- Investing more in infrastructure (energy and roads)
- Human resources (education and health).
- Agriculture productivity and value addition.

According to Uganda Bureau of Statistics report 2007, the national average rate of poverty was 31.1% in 2005/06 household survey. The Northern rural areas registered 64.2% poverty index the highest in the country followed by Eastern rural areas with 37.5%. This has been driven by the twenty year old insurgency in the Northern Uganda. In order to improve the household incomes and standard of living in Northern and Eastern regions, it is necessary to stimulate production as one of the key agricultural enterprises particularly under the program of Prosperity for All. Agriculture is one of the key sectors which the government plans to intervene in 2008/09 financial, with hope of increasing agricultural production and productivity.

Government Intervention in the Agricultural Sector

Increasing Agricultural Production and Productivity:

Agricultural production and productivity remains unacceptably low, yet the sector employs 85% of Ugandans. During the medium term additional resources will be allocated to interventions that increase production and productivity for both farm and non-farm activities so as to increase employment and consequently incomes of rural households.

The medium term funding priorities in the agricultural sector will focus on the expansion of National Agricultural Advisory Services (NAADS) to reach all sub-counties, provision to farmers of necessary inputs, and investing in agro-processing and marketing. Supply of improved varieties and inputs to farmers within NAADS will be linked to Savings and Credit Cooperative Organizations (SACCOs) and marketing co-operatives.

The agricultural sector will focus on the following emerging priorities for the medium term: Institutional Reform and Strengthening, especially MAAIF; Water for Agricultural Production; Strengthening of the capacity for Strategic Agricultural Planning, Strengthen Agricultural Advisory Services; Primary and Middle-level Agricultural Processing and Marketing; Provision of Physical Agricultural Infrastructure; Epidemic Diseases, Parasites and Pest Control; Quality Assurance and Regulatory Services; and Provision of

Improved seeds, Planting and Stocking Materials.

Strengthening and Expanding Rural Financial Services: With the appropriate institutional framework now in place, Government plans to focus its efforts in FY 2008/09 on consolidating the creation of a nationwide network of rural financial institutions. This will be done by:

- a. Strengthening Uganda Cooperative Savings and Credit Union (UCSCU) to deliver on its mandate including the establishment of 15 regional branches, following the attention accorded to its headquarters during FY 2007/08. These branches will subsequently be transformed into regional networks of UCSCU
- b. Supporting MSCL to strengthen its regional offices and to increase them from the current number of 12 to 15. Each of these offices will be given a credit loan of Ushs 500 million, and will have authority to approve and disburse loans of up to Ushs. 50 million to qualifying SACCOs at any one time.
- c. The Rural Financial Services Programme (RFSP) will also focus on the operationalization of the SACCO Specific Act 2008 and the SACCO Regulations 2008. The key area of attention will be the establishment and operationalization of the SACCO Regulatory Agency (SRA). A study will be carried out to determine the financial and human resource implications of the Agency. Thereafter, attempts will be made to operationalize it. Furthermore, efforts will be made to ensure that SACCOs begin to comply with the new law once it takes effect.
- d. The RFSP will also focus on the regulation of the remaining institutions under Tier 4, which include the Non-deposit taking MFIs, the micro finance NGOs, and the privately owned wholesale lending institutions. A framework will also be provided for the operations of the Rotating Village Savings and Credit Associations (ROSCAs) and the Village Savings and Loan Associations (VSLAs)
- e. The RFSP will develop a monitoring and evaluation system that will help in reporting the progress of the programme. Specifically, a survey of all micro finance institutions will be carried out to determine its size and its impact on household income.

Expanding Market Access: As parts of its efforts to draw in more farmers into commercial agriculture, Government plans to:

- a. Refurbish a total of 173 commodity stores;
- b. Construct 10 warehouses at Sub-county/LC III level.
- c. Extend support to the operations of the Uganda Commodity Exchange (UCE)

Loan Guarantee Scheme: Government plans to support a Loan Guarantee Scheme for commercial banks that provide credit to agricultural and agro-processing projects. This will be available for projects appraised and vetted by commercial banks for which the scheme will guarantee 50% of the lending.

2.3 Overview of the Dairy Sector

The dairy sector is one of the critical sectors in Uganda, COMESA and East African Community (EAC), with high potential for improving food security and welfare. Recent analysis provides clear evidence of increasing demand for dairy products (and other foods of animal origin) in Sub Saharan Africa (SSA) and other developing regions of the world as a result of rapid population growth, urbanization and increasing purchasing power.

In Uganda, dairy production takes place under any of the following four categories of farming systems;

Zero grazing (i.e. the cow is fed exclusively on concentrates; no grazing). Refers to the confinement of a few animals in a small enclosure where feeds or fodder and water are brought to the animals. According to study done by Mbabazi Pamela (2005), at least 20% of low income households in Ankole have received a zero-grazing cow not only from government but also from such organizations as Send A Cow (UK) and Heifer International Project. The advantage of this grazing system is that people without much land for grazing are able to raise cattle to produce milk for home consumption and to earn an income. This system is widely practiced in Uganda especially in the Eastern, Western and Southern Western regions.

Fenced/paddock grazing (i.e. grazing cattle in paddocks or/and feeding them with concentrates) is a common farming practice in areas where the land holdings are fairly small. This type of grazing requires land clearing and improved pasture. It's largely practiced by farmers of hybrid and cross-breed cattle and has expanded rapidly with the liberalization of the economy which has resulted in the need to make farms economically viable. In order to increase production, dairy farmers have planted legumes, elephant grass and alfalfa for their cattle.

Free range grazing (i.e. grazing cattle by moving them all over the farm). Traditional practice especially in

the extensive grasslands in the Southern part of Uganda. The farmland is often not paddocked, but the boundaries are fenced with a local plant. The daily routine of open grazing is morning milking, grazing, watering evening milking and late evening grazing. This system is being phased out because of the sensitive nature of land encroachment.

Communal grazing (i.e. pastoral grazing on communal land owned by clan). Still practiced in North-Eastern part of Uganda (Karamoja, Kotido, Moroto, Amuria, and Soroti). The government is discouraged this system of cattle grazing, but culture still overrides government initiative.

The livestock sub sector contributes 18% of agriculture gross domestic product (GDP) and between 7%-9% of the national gross domestic product (GDP). Of the GDP attributed to the livestock sub sector the dairy sector is estimated to contribute up to 45% and plays an important role as a source of food, income and employment. Dairy farming is concentrated in 42 districts found in the cattle corridor which stretches from the South Western region through central to north eastern. On average, 60% of the households in the cattle corridor keep livestock.

In 2002 the national census puts the Uganda's livestock sector at 48,670 animals (Cattle, Sheep, Goats, Pigs and Poultry); however 2005/06 household survey estimates the animals at 51,531. The national cattle population over the years has experienced steady growth from an estimated 365 million litres in 1999 to 1.4 billion litres in 2006 (estimate based on livestock numbers). The national herd size is about 7.5 million cattle of (indigenous, exotic and crosses)

Uganda produces a variety of milk products; these include pasteurized milk, UHT milk (long life milk), cheese, yoghurt, cultured milk, butter, ghee, creams and ice cream. A substantial amount of milk and milk products is also imported indicating that the domestic production is not sufficient to meet market demands. Uganda also exports dairy products mainly to the regional market. The annual growth rate of milk production between 2001 and 2006 has been 9 percent leading to total national milk output growing from 900 million litres in 2001 to 1,400 million in 2006. Dairy farming is concentrated in cattle corridor districts of Uganda which stretch from the south western region through central to north eastern. On average, 60 percent of the households in the cattle corridor.

The cattle population in Uganda today is 7.5 million with indigenous lot accounting for 95 percent while the exotic and crosses accounting the balance. Because of the high productivity associated with intensive dairy farming methods such as zero grazing of improved breeds. Most farmers have adopted modern farming techniques at various levels of production.

The population of goats has also increased from 5.8 million in 1997 to over 7.8 million according to 2005/06 household survey. The number of the exotic dairy goats has proportionately increased with Kasese continuing to lead in this area. Most of the milk produced by the goats is, however, consumed at household level with minimal processing.

Within the livestock industry, dairy development continues to receive the greatest attention in the development of the animal industry in Uganda. Consequently total national milk production has grown from 365 million litres in 1991 to over 1.4 billion by the end of 2006 with per capital milk consumption growing from 16 litres in 1985 to 50 litres by end of 2007.

The productivity of smallholder dairy farms is generally low. Small-scale producers are facing many challenges/ constraints, which are partly responsible for the poor production performance. Despite various initiatives to enhance quality at various stages of the dairy chain, many weaknesses still exist. The hygiene and handling practices at farm level are generally poor. The collection and transportation of warm milk as well as sale of loose unprocessed milk are still a big challenge as far as improving quality in the dairy chain is concerned.

One of the key challenges to milk procurement and marketing may not be the generally poor milk collection, transportation and marketing infrastructure but lack of harmony between the formal and informal marketing channels. There is a need for policies to streamline the procurement and marketing of milk in the country.

There is also a need for Policies that will promote processing and enhance the flow of milk from the surplus to deficit areas within the country. There is a need for policies that will facilitate a sustainable increase in the productivity of dairy farms, promote the collection, transportation, processing and marketing of milk and enhance the participation of stakeholders in the formulation and implementation of policies, standards and regulations.

2.4 Developments in the Dairy Industry in Uganda

Uganda has probably been the most successful African example of economic liberalization in the 1990s. Uganda probably has the most liberal trade regimes of any African country today. Liberalization began way back in 1987 and included initiatives aimed at redressing imbalances in the system of allocation of foreign exchange, restoration of credibility of the monetary and fiscal policy, abolition of marketing monopolies, the reduction of administrative red – tape, and gradual introduction of a more rational tax and tariff structure. All these efforts were geared to increase competition, which would in turn improve the quality of manufactured goods, encourage the emergence of new products and promote adoption of new production techniques.

The dairy sector is one of the sectors that had been under government control for some time with the Uganda Dairy Corporation (UDC) dominating most of the buying of milk from farmers. The liberalization of the dairy industry in the mid 1990s broke the monopoly of the Dairy Corporation and opened up opportunities for private investment. Subsequently, the proportion of the national milk production that is processed before marketing has increased to an estimated 283,800 litres per day in 2007 where currently, 13 companies are involved in processing. Of the 900 million litres of milk produced in 2001, over a half was offered for marketing and over 70 per cent was sold un-processed leaving the rest for processing. 10 per cent of the processed milk was exported to the neighboring countries earning the country over US\$3 million

2.5 Dairy Sector Policies, Regulations and Standards

Over the last decade, the dairy sector has undergone a number of reforms. The *Dairy Master Plan (1993)* has provided the key guidelines for transformation of the sector particularly liberalisation of the dairy industry, establishment of a regulatory body as well as restructuring and privatisation of the state owned dairy-processing company, which is now at an advanced stage. The *Dairy Industry Act, 1998* is the main law under which the new institutional and policy reforms in the sector are being implemented. This has been supported by the general livestock sector policies such as the *Policy on marketing of livestock and livestock products*, *Animal health policies*, the *Animal breeding policy*, as well as the *Public Health Act* and the broad national policies and strategies such as Liberalisation, Privatisation, Decentralisation policy (Local Government Act); the Poverty Eradication Action Plan (PEAP), Plan for Modernisation of Agriculture (PMA) and the National Agricultural Advisory Services (NAADS).

At the milk-shed level, the liberalisation policy has resulted in an upsurge in the number of traders and processors vying to purchase the milk and an increase in competition, better milk prices and a more reliable market. Under the decentralisation policy, local governments levy taxes on dairy and dairy related businesses. Milk traders who set up milk vending outlets in urban centres are required to pay for annual trading licences up to as much as US\$ 100. Hawkers and vendors who sell milk in urban areas are obliged to pay a small fee ranging between 200/= (US\$ 0.1) and 500/= (US\$ 0.25) per day to the local authorities. In some areas dairy farmers who deliver milk to bulking facilities within town councils are required to pay for an annual licence ranging between U Shs 10,000/= and 20,000/= (US\$ 5 and 10) per year depending on the amount of milk delivered per day.

The Dairy Development Authority is responsible for promoting and monitoring quality in the dairy industry through enforcement of standards and regulations. The Authority develops new and updates existing standards in liaison with the Uganda National Bureau of Standards (UNBS). The government has released new regulations, "*The Dairy (Marketing and Processing of Milk and Milk Products) Regulations, 2003*", which provide the framework for enforcement of quality standards and good hygiene and handling practices. DDA in liaison with UNBS has developed the *code of*

hygienic practice for Milk and Milk Products. The document provides guidelines for hygienic production and handling of milk and milk products at different stages of the dairy chain. There are several other legal documents (Policies, Acts of Parliament, Ordinances of Local Authorities, etc) being implemented by different government institutions/departments but which also address dairy related issues. The *Public Health (sale of Milk and Milk Products) Rules, the Kampala City (Sale of Milk and Milk Products) Ordinance and the UNBS Standards* for milk and milk products are all concerned with the standards for marketable milk and milk products, as well as the requirements for handlers and handling facilities. The need for harmonisation of the content of different statutory instruments/ legal documents in respect of the quality and handling of milk and milk products cannot be overemphasised.

In order to enhance quality in the dairy chain, DDA, on behalf of government outlawed the use of plastic receptacles/equipment for handling transporting milk.

The Authority also registers and inspects all facilities for handling and processing milk and milk products. Facilities that meet the minimum requirements are issued with a registration certificate after paying an annual registration fee. The Authority also promotes the training of dairy stakeholders on quality, and good hygiene and handling practices for milk and milk products.

There is a formidable challenge to improve the quality and handling of milk at farm level. This study revealed that milk-handling practices are generally poor.

2.6 Development of Cooperatives Societies

Successive governments since the 1960s partly saw the cooperative movement as an instrument of control and an informal mechanism through which rural surplus could be extracted for the benefit of the urban dwellers while at the same time improving the incomes and quality of life of rural communities. However, the cooperative system was abused and cooperatives lost the purpose for which they were created. Cronyism became rampant and often the hard earned savings of society members were misappropriated.

With the adoption of Structural Adjustment Programmes (SAPs) by the government of Uganda in the 1990s, the financial support to cooperatives through the marketing boards dried up. Since cooperatives had never learnt how to be financially self reliant, they started collapsing one by one especially with private sector competition becoming severer. The challenges as well as the opportunity for the cooperatives to succeed in today's competitive environment exist.

Recently, co-operatives societies have developed and many of them are involved in milk collection and marketing. Some have gone into milk processing. The Uganda Dairy Industry Stakeholders Association (UDISA), an organization of all stakeholders in the dairy industry was recently formed. UDISA together with Uganda National Bureau of standards have completed the formulation of the code of practice for Raw Milk Handling and marketing.

In the areas where cooperatives have been revived, farmers are beginning to reap profits in terms of more stable prices and regular payments. In an interview with Mr. Grace, the chairman of Biharwe Farmers Association, it was established that farmers in Mbarara have negotiated a fixed price for milk throughout the year and guarantee to buy all milk that is collected. This has made farmers' incomes more predictable than they used to be.

In 2005, Uganda Crane Creameries Cooperative Union was born out of the Western Uganda Dairies Association. It has a membership of 7 district cooperative unions, 76 primary society/milk collection centres (MCC) and total of 10,500 dairy farmers. The East African Dairy Development Project will help small scale come out of poverty.

3.0 TRENDS AND PERFORMANCE OF THE DAIRY INDUSTRY

3.1 Contribution of the Dairy Sector

In 2007/08 financial year review, the livestock sub sector contributed 18% of agriculture gross domestic product and 9% of the national gross domestic product. Of the GDP attributed to the livestock sub sector the dairy sector is estimated to contribute up to 45%.

According to the Dairy Development Authority, Uganda's annual milk yield is averaging 1.4 billion litres over the last 3 years, 30% of this is retained at the farms and only about 980 million litres is commercially traded, 83% of it is consumed unprocessed.

Ugandan milk production is cyclical: some seasons produce a glut of milk, whilst at other times supply is insufficient to meet domestic demand.

Despite the fact that Uganda has an elaborate regulatory framework, the private sector in the industry is not properly organized to respond to the sector's challenges and take advantage of the available market opportunities.

Over 2.5 million households in Uganda engage in milk production with a national herd of 7.5 million (2005/06 household survey) heads of cattle comprising 6.2 million indigenous and 1.3 million either exotic or crossed breeds

3.2 Livestock Population in Uganda

The national livestock population over the last seven years has experienced steady growth. The growth has been attributed to the increasing demand for milk by consumers and milk processing plants, better herd management, adoption of improved breeds and improved animal health and support services. In 2005/06 Uganda National Household Survey (UNHS), the number of agricultural households was estimated to be 4.2m or 78.8% of all the households. Only 2.5m households are engaged in milk production. Uganda's national herd was 7.5 m, with a composition of 1.3m exotic/cross breed and 6.2m indigenous cattle. See table below for livestock composition in Uganda

Table 1: Livestock numbers (000 animals): 1997-2005/06

	1997	1998	1999	2000	2001	2002	2003	2004	2005/06
Cattle	5,460	5,651	5,820	5,966	6,148	6,328	6,558	6,567	7,531
Sheep	980	1,014	1,044	1,081	1,108	1,141	1,603	1,552	1,600
Pigs	missing	1,475	1,520	1,573	1,644	1,710	1,226	1,940	2,000
Poultry	missing	22,293	24,622	26,622	29,671	32,639	23,031	31,622	32,600
Goats	5,825	5,999	6,180	6,396	6,620	6,852	7,821	7,566	7,800

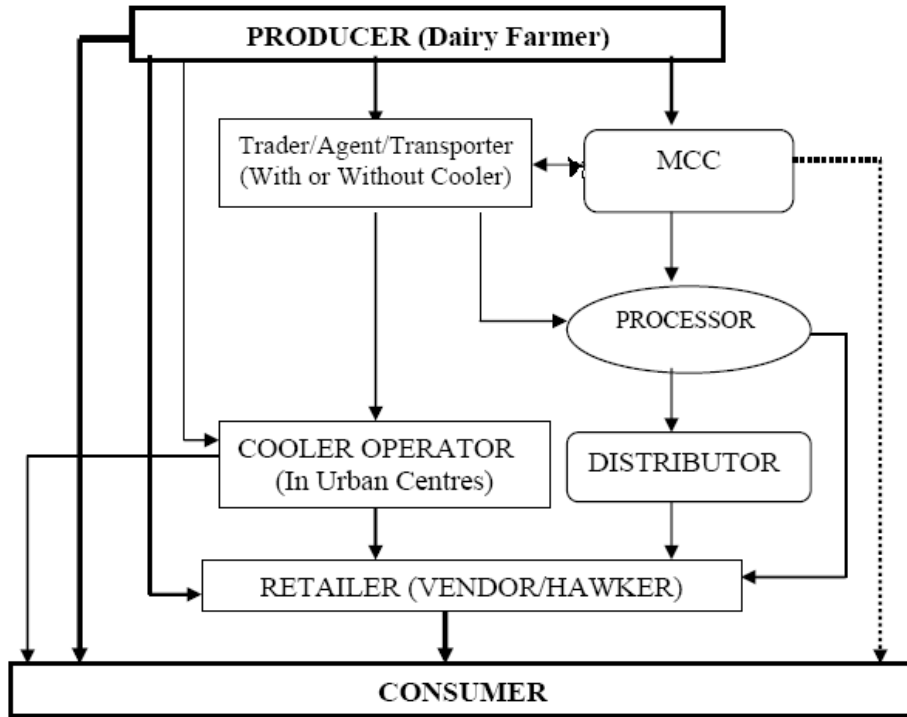
Source: Uganda Bureau of statistics, statistical Abstract 2005/06.

3.3 Dairy Farming and Milk supply

Since 1994 dairy farming has grown with many farmers adopting high milk producing exotic and crossbred cattle, and better farming methods. The exotic and crossbreeds proportion of the dairy herd country wide is 1.3m (UNHS 2005/06) representing 17.3% of the total dairy herd. The exotic breeds include the jersey, Holstein, Friesians, Guernsey, and the Brown Swiss.

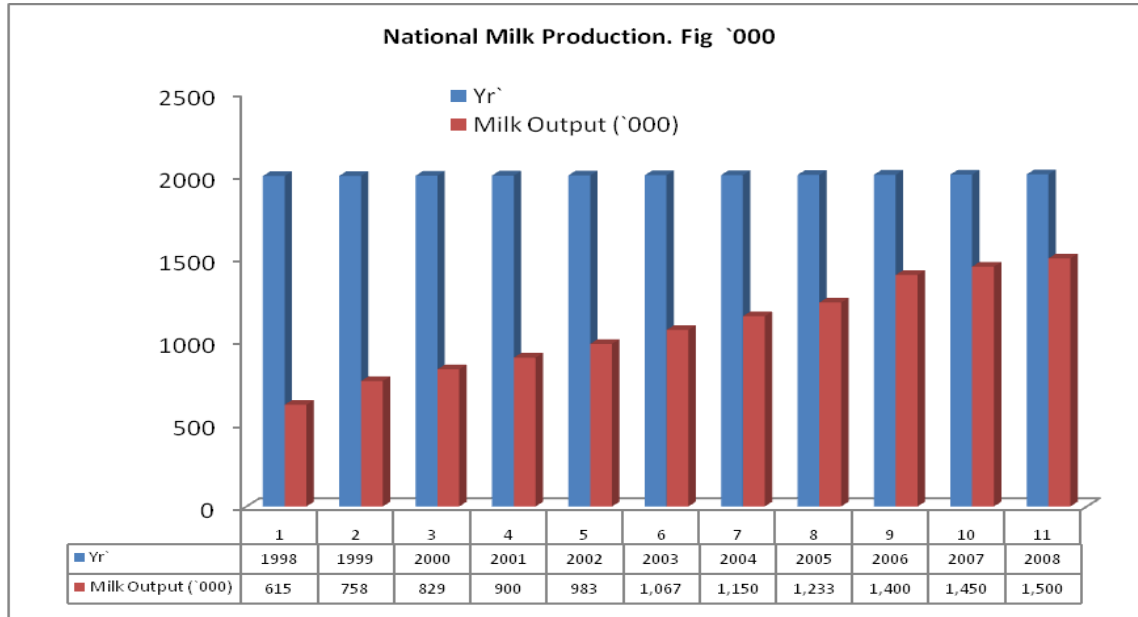
The leading districts in dairy production are Mbarara, Bushenyi, Mukono, Ntungamo, Kabale, Kiboga, Kiruhura, Luwero and Ibanda. The North and Eastern part of Uganda has collapsed due to the insurgency. Milk production country wide has steadily increased since 1998 with the Western and Central Uganda districts accounting for 70% on the milk production.

Milk Markets and Marketing Channels



The milk supply chain in Uganda entails the flow of milk from the farm level, through the trader/agents/transporters, milk collection centers and processor and finally the consumer. This process takes two forms; the formal supply chain for processed milk and the informal chain for unprocessed milk, which appears to be more problematic due to the continuous entry and exit of different agents from time to time, particularly in this era of liberalization. The total amount of milk produced in Uganda, more than 90% is consumed without being processed which means that supply chain for unprocessed milk is more voluminous and gives vendors and licensed milk traders a lion's share of the milk trade in the country.

Milk production has been on the increase since 1998, where national production was at 615 million litres to 1.45 million in 2007. It's estimated to close at 1.5 million litres by end of 2008. Below is a graph showing annual national milk production in Uganda.



Source: Dairy Development Authority Report 2007/08

The DDA has thus far registered 1,002 raw milk dealers and processors, 236 coolers and categorized 763. The sources and transport routes for milk have been clearly identified whereby five milk grids have been identified. Table 3; gives pictorial presentation of the grid demarcation

Table 3: Milk Grids by Regions (litres)

Region (Milk-shed)	Milk produced (L/day)	Milk available for Marketing (L/day)	Milk production per region (%)
South Western	1,380,000	966,000	36%
Central	1,300,000	910,000	34%
Northern	575,000	402,500	15%
Mid-Western	306,000	212,200	8%
Eastern	268,000	187,600	7%
Total	3,829,000	2,678,300	100%

Source: Dairy Development Authority Report 2007/08

Table 4: Milk Processing Plants and Mini Dairies in Uganda, February 2008.

Name of Company	Location	Annual (365 days) Installed Capacity (Tons)	2007 Production Total (Tons)	% to Capacity	Products Made
1. Sameer Agricultural Livestock Limited	Kampala	44,530	20,916	47.0%	Pasteurized Milk, UHT, Yoghurt, Butter, Ice Cream, Ghee
2. Jessa Farm Dairy	Busunju	2,920	2,500**	85.6%	Pasteurized Milk, Yoghurt, Butter, Ice Cream
3. White Nile Dairy	Jinja	2,190	779	35.6%	Pasteurized Milk, Yoghurt, Ghee, Cream
4. GBK Products Uganda Limited	Mbarara	20,440	1,234	6.0%	UHT, Ghee, Pasteurized Milk, Yoghurt
5. DairiBoard (U) Ltd	Mbarara	14,600	3,001	20.6%	Pasteurized Milk, Yoghurt, Butter, Ghee, Cream
6. Birunga Dairy Industry	Kisoro	5,402	2,400**	44.4%	UHT
7. Teso Fresh Dairies	Soroti	1,168	145**	12.4%	Pasteurized Milk, Yoghurt
8. Maddo Dairies Ltd	Masaka	475	200**	42.1%	Pasteurized Milk, Yoghurt
9. Gouda Gold	Kampala	5,475	170	3.1%	Cheese
10. Paramount Dairies Ltd	Mbarara	1,095	600**	54.8%	Cheese
11. NIRMA Food & Dairy Industries-Mother Dairy	Entebbe	2,920	300**	10.3%	Pasteurized Milk, Yoghurt, Cream
12. Nile Valley International Foods Ltd	Mbarara	7,300	5**	0.1%	Cheese
TOTALS		108,515	32,249	29.7%	

Source: Dairy Development Authority; 2006/07 Annual Report (** Estimates)

Milk Products on Ugandan Market

Pasteurized Milk

Production of pasteurized milk is the largest processing activity in the dairy industry. About 80% of processed milk goes into the production of pasteurized milk currently as nine firms are involved in the production of pasteurized milk.

UHT Milk

Until 1995, all the UHT milk in Uganda was imported mainly from Kenya. As of 2008, two (2) firms in the country produce UHT milk with a combined annual installed capacity of 64,970 tons. The two companies Sameer Agricultural Livestock Limited and GBK currently handled about 30% of their installed Capacity and 10% of this is exported to Kenya, Sudan, Rwanda, Tanzania, Egypt, Syria and Ethiopia.

Cheese

Although cheese is produced locally, Uganda still continues to import this product. The Sameer Agricultural Livestock Limited produces 3.0 metric tons/year, which is mainly is Cheddar, Gouda, Maribou cheeses. Other private firm like paramount dairies Ltd in Mbarara have exploited the increasing cheese market and started production of cheese mainly Cheddar and Gouda types.

Cream and ice Cream

Five out of the twelve firms produce cream but this is mainly an input product. The Sameer Agricultural livestock Limited produces substantial amount of creams, which it uses in the production of Ice cream. Apart from Sameer Agriculture Livestock limited other private dairy processors like NIRMA food and Dairy Industries, DairiBoard, White Nile Dairy and Jessa farm dairy produce cream for sale on the market.

Yoghurt

The yoghurt produced in the country is mainly the set and drinking type. Led by Sameer Agricultural Livestock Limited, the production of yoghurt has continued to increase due the growing market for this product since 1995, a number of small and medium scale dairy processors have started producing and marketing yoghurt.

Cultured milk

Commercial cultured milk is newly developed from indigenous cultured milks. Several small scale dairy processors do production and marketing of cultured milk.

Butter and ghee

Sameer Agriculture Livestock Limited, Jessa farm dairy and DairiBoard are the only firms producing salted and unsalted butter. The butter demand and production is expected to increase. Farmers produce ghee mainly on small scale which is for domestic consumption. A number of small scale processors have started production and sell of ghee. Other firms producing ghee includes. GBK Diaries (U) Ltd based in Mbarara.

3.5 Demand for Milk and Milk Products (Marketing and Consumption)

It is estimated that 1.05 billion litres or 70% of the total annual production of 1.5 billion (2008 estimates) litres is marketed, while 30% (0.45 billion litres) is consumed by the producing households. Approximately 90% of the marketed milk goes through the raw milk market, leaving only 10% to be processed and packaged before marketing. This is mainly attributed to the limited processing capacity of existing plants.

The informal channel includes milk sold by the farmers directly to consumers in their neighborhood as well as milk purchased by traders or their agents and sold to consumers without prior processing or packaging.

The per capita consumption of milk has increased over the last five years from low of 40 litres per year in 2001 to a level of 50 litres as of 2007. However this is still below the World Health Organization recommended level of 200 litres/person/year. In urban areas, the per capita consumption is higher and estimated at 48 litres/year, while in rural it is estimated at 22 litres/year.

The K-2 survey indicates that consumption in the Central Region (including Kampala) is highest with 91 litres per year; Western region is the second highest in the Country averaging 51.7 litres per person per year. Consumption is lowest in the North at 15.6 litres per year due to limited supply. Overall milk consumption is growing at an average rate estimated at 8% per annum. Table 4 shows the per capita consumption of milk since 1997.

Table 4: per capita consumption of fluid milk over the last three years

Year	Per capita consumption (litres/person/year)
1997	28.5
1998	29.5
1999	30.0
2000	38.1
2001	40.0
2007	50.0

Source: Ministry of Agriculture animal and Fisheries; Dairy Development Authority

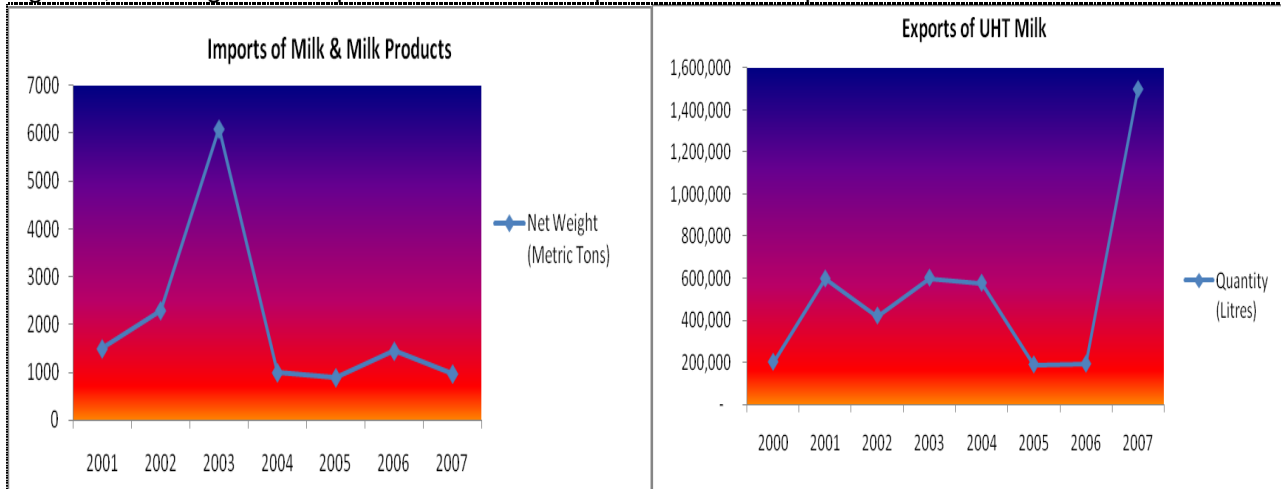
The demand for milk in Uganda comes from Households, schools hospitals, Catering institution, food and dairy processing plants. According to the Dairy Development Authority annual report 2007, the demand for

processed milk is estimated at 400 million litres per year. The demand for milk from processing plants and other consumers is expected to increase.

3.6 Dairy Import and Export Trade

Dairy Imports

The total quantity of milk and milk products imported has been declining progressively since 2003. Figure 1; show Uganda’s imports of milk and milk products. UHT Exports



Source: Dairy Development Authority 2007 Report

As a result of the decline in the imports, the amount of money spent on importing milk and milk products has been a steady decline since 2001.

Dairy Export Trade

UHT milk is the main dairy product exported to regional markets, including Rwanda, Kenya, Tanzania, DR Congo, Southern Sudan, Egypt and Mauritius. Informal dairy trade goes on across all borders of Uganda. The volume of milk exported declined progressively from 2003 to 2006 but increased to 1.5 metric tons in 2007. The increase in 2007 was mainly driven by opening up of the Southern Sudan and DR Congo Market. This was not only for milk but also for all other exports. Between 2000 and 2006, Uganda exported an average of 380 metric tons of milk per year. The figure 2, below illustrates the trend in dairy exports between 2000 and 2007.

3.7 Marketing Structures of Dairy

3.7.1 Production

There are groups and association that have organized them-selves to influence the supply and demand of the dairy industry sector and these are: the Uganda National Dairy farmers Association/groups, transporters, vendors and processors. These groups Influence standards as well as market conditions in terms of supply and demand for the products. However the milk and dairy products market in Uganda has been liberalized since early 1990s whereby the price of both raw milk and its products are determined by market forces to a larger extent. This has led to free participation of the private sector and also increased informal marketing standards and regulations for dairy products. Unlike other regions, the South Western part of Uganda has revived the cooperative movement; this has led to the formation of the Uganda Crane Creameries Cooperative Union with a membership of seven (7) district unions, 76 primary societies/MCC, and 10,500 dairy farmers. Its mandate is to represent the views of the farmers as a single voice.

Currently the milk market is mainly in two categories namely: the formal and informal sector. There are categories of milk buyers and vendors. The first categories are the bicycle vendors who buy milk from

farmers and sell it from house to house. Secondly, there are the licensed traders who own coolers and sell milk on wholesale or retail basis.

Then there are established and licensed processors who process pack and sale milk and milk products to consumers where the demand for milk is high. The milk marketing chains are therefore two fold; the processed milk chain and unprocessed milk chain. The boundaries between the two chains are at times porous and continuous shifting. Since the vendors and some licensed traders have no regular suppliers, they receive milk of variable quality. However, the informal/unprocessed milk chain is flexible enough to undercut the prices offered by the processors more regular and upfront through payments. Given their lower overhead costs, vendors and licensed traders have managed to outcompete the formal/processed milk chain and this has constrained the growth of the milk industry.

Below is a table of the key characteristics of milk chain in Uganda

Processed Milk Chain	Unprocessed Milk Chain
Test the raw milk at the farm level to ensure quality	Do not usually test the milk and quality is not an issue
Largely use modern methods to preserve the milk and quality is an important issue.	Use traditional methods like boiling to preserve milk
Obtain fresh milk from key established suppliers	Obtain milk from any source
Maintain contact and collaborate with suppliers	Often have no attachment to suppliers
Deal in processed milk with a longer shelf life	Deal in raw milk with a very short shelf life.

Approximately 90% of the marketed milk goes through the informal sector (raw milk market) leaving only 10% to be processed and packaged before marketing. The formal sector markets pasteurized milk and other dairy products. The informal sector mainly markets unpasteurized milk because the public Health Act that prohibits its sale is not enforced. However, the enforcement of the Act began in 2003 and has prohibited the sale of unpasteurized milk, thus boosting sale of pasteurized milk.

This formal sector distributes and markets dairy products through vendors or direct delivery to groceries, supermarkets, hotels, restaurants, schools and hospitals. Some dairy co-operative societies and agents also involved in marketing mainly un-pasteurized milk. See chart below

3.7.2 Milk Preservation

The need to preserve milk normally arises after the evening milking when the farmer may not be able to deliver the milk to the MCC or other buyer. Farmers have very few options for preventing spoilage of milk at farm level. Cold storage equipment would be necessary for storing milk for long hours before marketing. Small-scale farms may need equipment such as deep freezers while large farms may need coolers. In the South Western milk-shed, milk preservation at farm level is still a big problem. About three quarters of the farms do not have any means for milk preservation while the other one quarter relies on heat treatment to prevent spoilage of the milk

3.7.3 Milk Collection and Transportation

There are two systems of milk collection. One system is used by the informal milk marketing channel and the other is used by the formal channel. The system used by the informal channel is characterised by the following:

- Lack of established milk collection infrastructure. Farmers deliver milk in aluminium cans or plastic jerrycans to a "pick-up point" established by a trader, transporter or his agent. A pick-up point is an open place, usually along the roadside without milk chilling equipment.
- Quality control during milk reception is very limited. Simple quality tests particularly physical appearance and lactometer reading may be carried out before the milk is accepted. In many cases, however, quality tests are not done and milk may be accepted even when it is obviously adulterated with water or contains physical contaminants such as straw, hair, manure or flies.
- Milk is put in 50 litre aluminium cans, which are transported on open pick-up trucks over long distances (up to 400 km) to retail outlets in urban centres. Some of the milk is delivered to processing plants within the milk-shed.
- Traders usually take the milk on credit but in some cases cash is paid on delivery. Payment is based on volume of the milk delivered.

- The evening milk is not collected. It is either consumed by the producing household, used to make ghee or boiled, cooled, stored and added to the morning milk on the following day. Most milk traders and private dairy processors use this system of milk collection and transportation.

The system used by the formal marketing channel utilises well-established infrastructure for bulking and transportation of milk. There are three stages at which bulking and transportation is done. First, farmers transport warm milk in aluminium cans to the village milk collection centres (MCC) where it is cooled down immediately. Both the morning and evening milk is taken to the MCC. Standard quality tests are carried out before the milk is accepted. Only milk delivered in aluminium or stainless steel cans is accepted. Many MCCs now reject milk delivered in plastic containers. Payment for the milk is based on the volume delivered and farmers are paid after several weeks and sometimes months.

From the MCC, chilled milk is transported in 50L milk cans on open pick-up trucks to the Milk Chilling Plant/MCC or to the satellite collection centres with a larger capacity from where it is transported to the dairy-processing factory in milk tankers of 10,000-20,000L capacity. One dairy processing company, Sameer Agriculture Livestock Limited which took over facilities of the former government Parastatals called Dairy Corporation Limited has signed contracts with some dairy farmers' co-operative unions and companies, giving the latter the responsibility to collect and transport milk from the satellite centres to the processing plant in Kampala.

Most of the milk collection centres which were established by former government Parastatals (Dairy Corporation Limited) have been leased to Sameer Agriculture Livestock Limited. However, some traders have also established milk-bulking facilities in rural areas and have even acquired milk tankers, which are used to transport large volumes of chilled milk to sales outlets in the city. Out of a total of 236 coolers registered countrywide, only 87 (36%) are dedicated to milk collection, while the rest are installed in milk sales outlets in urban centres. Of the 87 active milk collection centres, 61 (70%) are found in the south-western milk shed

3.7.4 Rural Milk Collection and Transportation

The infrastructure for the rural milk collection is not well developed in most parts of the country except the South western region and to a less extent the Central region. The Eastern and Northern regions lack functional rural milk collection centres with cooling equipment. About 200 milk coolers with a total capacity of about 550,000 litres are installed in rural areas for milk collection. Most of these (75%) are found in the South Western region and 15% in the Central region. Chilled milk is delivered to the processing plants and the raw milk markets in insulated milk transport tankers.

3.8 Pricing of Milk and Milk Products

Following the liberalization of the economy, farm gate prices for milk have fluctuated, especially in areas with no cooperatives. The unit price of milk is very low. With exception of Western Uganda which has formed a strong cooperative movement, other parts of the country complain of the significant price fluctuation. Liberalization has led to;

Decline in real price

Following the privatization of Uganda Dairy Corporation and the opening up of the dairy sector to competition, there has been a decline in the real prices, particularly the farm gate for milk. Liberalisation/privatization of the dairy sector reduced farmers to price takers. The prevailing situation with exception of South Western Uganda is that the milk processors and the private buyers determine the farm gate price for milk without consideration for the farmers' cost of inputs and production. In South Western Uganda, the revival of the cooperative societies has helped dairy farmers improve their bargaining power. As long as they are assured of supply, the milk buyers always offer a lower price. Prior to liberalization, the farm gate price of raw milk averaged Ushs 200 (US cents 15) in 1995 while the consumer price in Kampala of pasteurized milk was Ushs 600/= (US cents 45). In 2008, the farm gate price of raw milk averaged Ushs 350 (US \$ 0.2) which sharply contrasts with the retail price for processed milk in Kampala which is Shs. 1,200 (US \$ 0.7) per litre.

The real price of milk has stabilised in South Western ranging between Shs.300-400 depending on the season, thanks to power of cooperative societies. However, in areas where cooperative don't exist, like Central region price fluctuations still exist.

Reduced fluctuations of farm gate prices

Apart from the decline in real prices, the collapse of the cooperative movement following the liberalization of the sector has increased the price fluctuations suffered by the farmers. With privatization of Dairy Corporation which was the sole buyer working together with the farmers' cooperatives, a buffer system was developed whose proceeds used to cushion the farmers from price drops especially during the flush seasons. Presently, the farmer farm gate prices have been stable especially in South Western and Central Uganda; farmers would almost pour more than half the milk yield away for lack of market. In all the interviews, farmers reported that prices of milk fluctuate between Shs.300 per litre and 400 per litre during the wet and dry seasons respectively.

Grace, the Chairman, Biharwe Farmers Association, a farmers' cooperative society in Mbarara District said that: "The price of milk is very stable; it is Shs.300 per litre during the wet season and Shs. 350-400 per litre in the dry season".

Farmer's cooperatives are addressing the problem of fluctuating prices. For instance BUDICO, a dairy farmer's cooperative society in Bushenyi district has signed contracts with major buyers which have helped to guarantee its members a price of Ugsh. 300 a litre for the whole year round in 2008. Other mushrooming farmers cooperatives are working hard to raise the farmers' voices and ensure farmers negotiate better prices for the milk.

Market conditions and prices which do not recognize differences in milk quality

The existing market conditions do not adequately motivate farmers to exploit their full productivity potential especially with regard to quality. For instance, the prices offered do not recognize differences in the quality of milk. While tests are often made for water content and microbial levels when milk is being sold, no tests for fat content and other nutritional characteristics of milk are made. For example, milk from local indigenous cattle tends to have higher nutritional value yet indigenous cattle produce less milk on average 5-10 litres per animal compared to the exotic breeds which produce twice to three times as much.

Farmers who have opted to maintain the indigenous cattle are worse off than their counterparts who introduced exotic breeds.

For example, some of the farmers in Bushenyi and Mbarara have elected to keep their indigenous herds with the result that the milk from this area has a high fat content with an impressive alcohol score (above 80%) making it the best milk for UHT production in East and Central Africa (*source: Dr. Geoffrey Bakunda DANIVA (2006), case study liberalization of dairy sector*). For among other reasons poor road infrastructure and distance, these farmers are penalized for their quality of milk with the lowest farm-gate prices in the region. Despite the high fat content of their milk, because of lack of capital, these farmers cannot engage in basic cottage value addition to turn their milk into ghee, butter, yoghurt etc. which would have earned them up to five times the price they are now offered for raw milk.

Although milk from local breeds seems to have more nutritional value, the market does not recognize such differences in quality. The western region of Uganda continues to remain a low cost-producing region of the country reflected in relatively low prices of the final products. In terms of input cost of packaging materials for UHT milk is seen to be a significant cost factor.

3.9 Pastures, Water and Animal feeds

Pastures

Forage resources in Uganda range from extensive natural grasslands supporting semi-nomadic pastoralism and un fenced communal grazing to perimeter fenced farms with paddocks of natural or planted grasses. Government through its plan for modernization (PMA) will support better pastures development and management practices through introduction and production of better pastures seed. This will improve pasture quality.

Water

Uganda has enough natural water bodies and receives enough rainfall (750-2000mm/year) to cater for its livestock. However water shortages may occur in some range lands and could be wild spread in cases of long droughts. Most parts of Uganda are savanna area and gets rain seasonally, normally twice a year. The rain falls in March to May and September to December. These are the seasons when the milk is plentiful because the grass is plentiful and the wells are full of water. During the dry season, however, which usually falls between June-August and January –March, the grass is scarce and there is no water in the wells. It is during these times that there is scramble for grass and water and the interference of some farmers into their neighbor's paddocks, creating conflicts. The common way of getting water for cows in the drier parts is through the digging of wells and water tanks. Wells and valley tanks keep water that is infested with bilharzias, a common cattle disease damaging lungs and livers of cattle.

Feed Mills

There are over 55 feed mills in Uganda producing high quality feed. Most of the feed mills are located in the central and eastern regions of Uganda. Farmers around Urban areas use concentrated from such mills as feed supplements. Some commercial farmers however prepare their own feed concentrates to supplement the forage supplies.

Most of the farmers visited did not offer their cattle supplementary feeds because of high cost of the feeds and transportation. Farms situated close to urban centres, the most common form of supplementary feeds is banana peels, with a small sack going for Ugsh 1,500 on average, during the rainy season and Ugsh 2,500 in the dry season. An average cow would normally require a sack of peels as a supplementary feed per day which goes to show how expensive even this type of feed is.

4.0 DAIRY SECTOR SUPPORT MARKETS/BUSINESS SERVICES MARKETS

The Establishment of the Dairy Development Authority, under the Dairy Industry Act, 1998 and liberalization of the sector, meant that the government is no longer the major provider of livestock marketing services in Uganda. The government is strengthening marketing cooperatives and private dairy enterprises, even in a liberalized economy with the objective of increased productivity and value addition. The dairy marketing cooperative are playing a significant role in providing the marketing service by buying milk from members and non members, chill it and sell it to processors, traders and/or local consumers.

4.1 Technology Adoption (Research and Breeding)

The National Agricultural Research Organization (NARO) is responsible for research and development in the livestock sector. Different NARO division do research and development in animal health, breeding and nutrition of livestock. The Animal Breeding Centre (ABC) also produces semen and offers artificial Insemination (AI) services to private farmers. Veterinary services in the country are now privatized and are easily available. The liberalization of the dairy sector has led to;

Improvement of the Dairy Herds

The breeds/type of cattle kept by farmers in Uganda include indigenous cattle (predominantly Ankole and Zebu), exotic cattle (Frisian, Guernsey and Jersey), and cross breed. The indigenous cattle account 82.7% of the herd population in Uganda. The number of crossbreed/exotic cattle is 1.3m (17.3%). The government's deliberate policy to support and encourage farmers to keep exotic and cross breeds inspired the development of the milk industry in all parts of Uganda.

There has been an improvement in the dairy herds in most of the dairy districts across the country. In the districts of Mbarara, Bushenyi, Ntungamo, Ibanda and Kamwenge, dairy farmers have taken measures to improve farm productivity with available land resources. Following liberalization of the sector, there has been increased demand and better prices brought about by increased competition. Farmers are encouraged by increased output to respond to the positive market signals. Four out of the twelve milk processing factories

are located in Mbarara and farmers know that the best way to increase output and make more money is to introduce exotic animals especially of the Friesian type whose output of milk is more than three times the output of local breeds. In the counties of Ngoma and Kajara, in Ntungamo over the last decade dairy farmers have become more settled and modernized with fewer of them being pastoral with improvements in their herds, pastures and pad docking. This is reflected in their increased yields of milk.

The exotic cattle however require higher maintenance costs and farmers are expected to cover these costs from higher prices and incomes.

Veterinary/Animal Health Services

Government had been responsible for delivering animal health and veterinary services. Until 1984, when it stopped importing and distributing subsidized veterinary drugs and chemicals to farmers. Since then to date, government only imports certain veterinary products for use in control programs of particular diseases and vectors such as tsetse flies and trypanosomosis. Importation of veterinary drugs and chemicals is now the responsibility of the private sector. Private drug companies are now at the forefront of importation and distribution of veterinary products. Government is still involved in the control of epidemic diseases of livestock and therefore continues to import all the necessary vaccines and fund vaccination programs.

Government also provides veterinary services to farmers by employing veterinary extension workers at local government level. However, since 1994, government has been encouraging veterinarians to leave public service and set up private veterinary practices by providing loans with support from the European Union sponsored Pan African Rinderpest Campaign (PARC) now Pan African Control of Epizootics (PACE) Project.

In 2001 the government launched the **National Agricultural Advisory Services (NAADS)** to provide advisory services to farmers. The NAADS programme facilitates farmers to hire private sector service providers of their choice through farmer forum. In the areas where the NAADS system is being implemented, all extension workers including veterinarians are retired from public service. The NAADS system is now being implemented in selected sub-counties. This study revealed that Government is still the major provider of animal health services.

4.2 Manpower development and training facilities

Uganda has a well- established skilled manpower, which is ably participating in the development and shaping of the Dairy Industry. The work force is composed of over 100 professionals in the field of food/dairy science and technology and 600 Veterinarians Medicines and Animal Scientists.

The number of people employed in the dairy sector in general and on dairy farms in particular has reduced despite the increase in production. This has seen an improvement in herds, with increasing numbers of farmers phasing out their indigenous animals and introducing high grade cross breeds. Farmers have fenced off their farms with improved pastures and abandoned the practice of having roaming herds.

The main education and training Institution for the Dairy Industry development are the Veterinary training Institute, Bukalasa; ABC Entebbe; and Makerere University s the Faculty of veterinary Medicine, Department of food science and Technology and Department of Animals Science. The institution offer both long and short professional courses.

The Dairy Development Authority on the other hand has also put in place the following: promotion of milk consumption in schools (schools milk programme) Uganda Crane Creameries Cooperative Union has started marketing and promoting milk consumption for children in school in South Western Uganda. They are carrying out this in collaboration with Land O Lakes; establishment of quality standard; registration and Licensing of milk of dealers, generic promotion of milk consumption; and the identification of export markets and beyond. The Dairy Development Authority conducts regular demonstration and training seminars for milk outlets in quality control especially in South Western Uganda, the most recent being the one done in 2007.

4.3 Farm Inputs and Extension Services

Although there is a modest increase in farm level productivity arising from use of improved herds, increased use of acaricides, planting of improved pastures, and a general improvement in farm management methods, further improvement in farm productivity is hampered by uncontrolled increases in input costs. The prices of farm inputs such as acaricides, farm equipment and others increased considerably limiting their usage. Most agricultural inputs including fertilizers are imported.

However, previously, agricultural input imports were handled by Uganda Farm Supplies Ltd, a wholly owned government company that supplied inputs at affordable prices. The liberalization of agricultural input imports and their distribution meant that the farmers had to purchase inputs at market prices as all forms of subsidies by the Uganda Development Corporation (UDC) were removed. Not only did it create uncertainty of access by farmers, it meant that farmers could only access inputs at higher market prices. Farmers have not been cushioned against market forces in connection to imported farm inputs. Field evidence shows that the prices of imported inputs have sharply risen under liberalization. For instance, field estimates show that the cost of fertilizers, drugs and acaricides have risen by more than 60% on average over the last five years. In some cases, the prices have more than doubled.

Apart from the rise in input costs, the farmers reported that they are not getting enough inputs and lack access to extension services.

In fact, the near total absence of extension services has worsened an already worse situation. Under liberalisation, all veterinary services were privatized and under the government Plan for Modernisation of Agriculture (PMA), this is likely to continue. While prior to liberalization, government used to offer training to dairy farmers, after liberalization, much of this training has been left to NGOs and Community Based Organizations (CBOs) which do not operate everywhere. Where the CBOs do not operate, extension services are none existent.

The absence of extension services and the high cost of inputs has forced many dairy farmers to resort to the use of generic drugs as opposed to branded ones which, more often, are not only less effective but also less cost effective. The costs of veterinary services are simply unaffordable by the ordinary farmers. Farmer evidence suggests that the increase in costs exceeded the increase in productivity, and subsequently eroded the farmers' investment in better breeds.

Mr. Geoffrey Katuffu, a farmer from Nyabushozi Mbarara District complained that:

"In fact, the inputs are very expensive, the acaricides and other drugs like de-wormers are more expensive than before. The expense on animals is high and earnings from milk are less. They give us shs.300=per litre. When you put this money to workers and buying acaricides and maintaining the farm, you realize we are losing".

The combination of low farm gate prices of milk together with the high input costs have made it difficult for farmers to break even. The minimal use of effective acaricides and other drugs have combined with poor extension services to hamper further increases in productivity. Farmers lack sensitization of animal feeding, treatment and yield improvement. Most animals therefore continue to produce milk below optimum yield levels.

In general, farm management has deteriorated. Most of the farmers visited reported that it was too expensive to maintain their farms in good order.

4.3.1 Constraints in the Use of Farm Inputs in the Dairy Sector

Lack of knowledge, information and basic skills

Farmers, small-scale processors and some stockists stationed in urban and rural areas lack information/knowledge on the importance and use of inputs for dairying as well as new developments in the dairying business. It has been cited for example that farmers still ask for old famous drug brands for treating their animals. Such dairy farmers due to loyalty to famous drug brands whose distribution if still available on the market may be a monopoly of one firm ignores the new and improved formulations.

Some wholesalers, stockists and small distributors at parish level lack the necessary technical knowledge to handle and market the inputs particularly drugs and other chemicals used in the sector. As a result they are unable to properly advise users of the products culminating in misuse and/ or mishandling.

A study done Kasirye (2006) for Land O'Lakes on dairy sector input suppliers cited poor attitude of users to using inputs as a constraint. The majority of farmers do not take farming as a business and some believe pastures grow naturally. They consider the use of inputs an unnecessary expense instead of taking it as an investment. Attitude of recipients therefore need changing for better delivery of input supply services.

In the same study, it's cited that farmers generally did not know the cost of producing one litre of milk. This is attributed to lack of record keeping. A farmer from Mukono district revealed that it cost between shillings 229 and 250 to produce one litre of milk and farm gate price for milk in this area was shilling 400-700 per litre. This explained why farmers in the central region purchased inputs, as they are able to get a better price for their milk.

Inadequate Regulation

Another challenge to use of inputs supplies was the lack and /or inadequate regulation in the input supply business. As a result, the market has a lot of expired adulterated or rejects from international markets. Such products tend to be ineffective. For example sweeteners rejected on the international are sold on the Ugandan market at very low prices. The situation is not aided by the fact that existing regulators, Uganda National Bureau of Standards (UNBS) for feeds and ingredients, National Drug Authority (NDA) for drugs and Dairy Development Authority (DDA) for dairy equipment and milk quality are thin on the ground and absent at grassroots level.

Regulators only stop at registration of new dealers and in case of animal drugs sampling products which came into the country but there was no follow up made on quality of inputs on shelf. The regulatory bodies not have sufficient numbers of inspectors to regulate the sector and in some cases were nonexistent.

There is no central registry for input suppliers of the dairy sector. Some are registered by national drug authority (NDA) others by the Agricultural Chemical Board. Equipment, animal feeds and ingredient suppliers are not registered at all. The users of inputs are many and scattered all over the country and input supplier follow suit. The linkage between recipients' service providers and input suppliers were weak. There was no central point of reference at which one would get information on all input suppliers in the dairy sector.

Low Price of Milk

Low prices of milk and other outputs from the farms were cited as a major constraint to use of inputs (feeds, drugs, cans, veterinary services). Farmers in Mbarara and Bushenyi today earn a net Uganda Shs. 300 to 350 per litre of milk depending on the buyer. Milk is sold to dairy processors, raw milk traders, hoteliers and individual consumers. The low price for outputs therefore does not motivate farmers to incur any extra cost on inputs to improve productivity. In many cases farmers are indebted by processors who take long to clear their debts. The farmers as a result resort to procuring a few inputs in small quantities, which they can afford.

Perceived high cost of inputs and services.

Affordability of inputs and services was cited as a constraint to the input supply businesses. The situation is not aided by the fact that outputs such as milk fetch a very low price in some areas. Even farmers with knowledge/awareness on the importance of using inputs such as feeds; drugs, pasture seeds or processing ingredients could not sustain the use of inputs because of the perceived high cost element. Processors cited high cost of dairy equipment as deterrent to use of inputs. The heavy taxes levied on such inputs contributed to high cost. It was noted that on paper, taxes on equipment such as milk cans had been waived but in practice it was not.

Because the cost of inputs was considered to be very high by users, recipients tended to go for substitutes that may not be as effective. For example, farmers use rock salt from Lake Katwe as a cheap alternative to mineral licks. The rock salt does not have the essential minerals needed for production and better performance of the animal. Middlemen also tend to inflate the price of inputs.

The cost of services is equally considered to be very high. As a result of low returns from the farming, farmers cannot sustain use of services such as artificial insemination (AI). Most end up dropping the services for cheaper conventional means (bull scheme). In Biharwe, Mbarara for example, none of the dairy farmers interviewed was using AI on their farms, whereas in Kigarama, Bushenyi; farmers who had used AI claimed that the cost varied and was very prohibitive. The extra cost in terms of repeat services made the exercise unpopular. Farmer cooperatives in South West had therefore taken the alternative of sponsoring the training of an AI technician and procurement of the necessary equipment. However, due to low pay, the trained AI technicians left for better paying job elsewhere.

Inaccessibility to inputs and services.

Lack of a one-stop shopping center for inputs and services was also cited as a constraint to stakeholders having access to inputs. In most instances, farmers/processors have to move from shop to shop when procuring inputs and services. Big dealers in inputs are located in Kampala and as result; supplies are not readily accessible to stockists and recipients especially those in rural areas. This is a challenge to the input supply business as well as users of inputs. In some instances, the dairy stakeholders have had to travel long distances to the capital to produce to procure required inputs which is an additional to the already highly priced inputs.

Scarcity and hard to source services were also cited as major constraints to use of inputs. Equipment, semen, liquid nitrogen (for AI), processing ingredients and veterinary services were among those pointed out as particularly difficult to procure. The poor road infrastructure makes matters worse. At times farmers in South Western region have had to travel long distances to Mbarara town to purchase such items. Furthermore, the embedded benefits from input suppliers such as free treatment of animals for bulk purchases or training are not accessible to the majority of dairy stakeholders.

The input suppliers offer very minimal after sale service. As a result, some farmers and processors end up using the input wrongly- either under dosing or over dosing the animals or even using the wrong chemicals/drugs. This translates into poor impact from use of the inputs discouraging further use of the particular input and other.

Availability of Inputs and Services

Input suppliers are demand driven and only stock items that have a quick turnover. According to Chipeta (2006) demand is defined as what people ask for, need and value so much so that they are willing to invest their resources, such as time and money in order to receive the service/input.

The main principles for demand driven delivery systems being:

- Services shall be driven by user demand
- Service providers shall be accountable to users
- Users shall have a free choice of service providers.

Chipeta further explains that experiences so far show that living up to these principles is easier said than done because it's hard for resource poor farmers to realize the benefits of demand driven services. This study revealed that most input suppliers and services providers are demand driven therefore supplies such as equipment and ingredients tended not to be easily available. In cases where the demand for a particular product is low, then the input would be in short supply even if it were urgently required. The firm, which has the dealership, would only make an order at such a time when the firm has raised enough money to re-order. Manufacturers and other players normally dictated product sustainability on the market. Shortage of brands due to monopoly of dealership was also listed as a constraint in the use of inputs in the dairy sector. This

affects the availability of some inputs (e.g. feeds, drugs etc) on the market. If an input such as a feed has not been on the market for a while, it impacts on its use and thus performance of the animals. Services such as refrigeration, sale and maintenance of sealing machines for yoghurt and pasteurized milk were also cited as being so scarce and quite costly. The same applied to ingredients and packaging material supplies for the small-scale processors.

Lack of Capital

The input suppliers cited the high cost of inputs as one of the factors that made it difficult to invest and run input supply enterprises. They had limited capacity to sustain promotions and sensitization in form of seminars, workshops and radio talk shows throughout the year. Interest rates on borrowed funds were very high. Consequently, sensitizations and promotions were only done occasionally. However, suppliers like Kweyayo Veterinary Pharmacy, who engaged in use of mass media (radio talk shows) and seminars, noted that although such activities had boosted sales and helped expand the market base for their enterprise, sustainability throughout the year is very difficult.

Lack of starter capital prevented farmers from setting up input supply shops alongside the milk collection centers or open at sub county level to benefit the farming communities for those who had set up supply shops at the cooperative union level. Despite the financial constraints, it is worth noting that with part funding from Agricultural Consultation and Sector Structuring Project (ACSS), some farmer owned input supply shops had been set up in Biharwe and Kigarama in Bushenyi district.

Group Formation

Failure of majority of farmers to form groups was a hindrance to using inputs. It was noted that information of farmers' groups, input suppliers, processors including location and contacts in the country was lacking. There was no single agency where this information could be sourced. It was noted that the few groups/cooperatives existing were also weak. This was aggravated by the fact that users of inputs were many and scattered all over the country. As individuals, users of inputs cannot enjoy discounts and economies of scale normally received on bulk purchases. For example Kweyayo Veterinary Pharmacy only gives its products at wholesale price to farmers' cooperatives. The same product sold to an individual farmer would be priced at a higher price or would get to the farmer after the distributor and retailer have included their costs and profit margins.

Limited Extension Service Provision

Extension services to the farmers were very minimal. Each sub-county has very few extension workers with an information desk where farmers are allowed to come and make consultations. The government extension workers do not get the necessary facilitation to enable them make individual farm visits. The farmer is thus at a loss on when and how to use inputs.

Government of Uganda put in place the National Agricultural Advisory Service (NAADS) programme designed on the premise that past efforts in agricultural development had limited success and long term effectiveness because of lack of ownership by the key stakeholders-farmers. It was noted that the NAADS programme did not cover the entire country and even in implementing districts, the programme was not in all sub counties. NAADS is demand driven but service provision has remained an imitation of the old system:

- Not all the NAADS coordinators at district and sub-county levels have the competencies that are needed to manage the whole process
- Service providers were contracted for very short periods and they do not get time within the short contractual period to visit each farmer's enterprise. This was further aggravated by the fact that the terms of reference for service provision did not require service providers to visit farmers.
- There were no clear extension packages.

Very few input suppliers provided extension services to their clients. It was noted that those who provided extension services were able to expand their market. However, there were limitations as noted by Unga Uganda Limited a supplier of feed supplements. It was not feasible for the company to go out and assess the effect of feed supplements for the different users and offer them individual advice. Whenever, the company could, it held seminars for groups of farmers. They lamented that in the past, the situation was much better because government had technical representatives who would visit the farmers. If funds were available to the company, more technical representatives would be deployed to sensitize users.

4.4 Finance Services

According to 2008/09 background to the budget report, between June 2007 and March 2008, commercial bank credit to the private sector grew by 43.3% from Ugsh 1,792 billion to Ugsh 2,569 billion. The year on year growth to March 2008 was 49.3%. Despite this growth of commercial bank credit due to the liberalization of the economy, it is not serving the dairy sector due to reason discussed below. There has been licensing of more deposit taking institutions in attempt to expand the market and minimize oligopolistic tendencies. The banking sector witnessed stability and grew considerably during calendar year 2007, both in terms of size and number of institutions. Following the lifting of the moratorium on the licensing of new banks, Bank of Uganda had by March 2008 approved five new private commercial banks to start their operations in the country. The five new banks licensed were: (i) Housing Finance Bank (HFB) Ltd., (ii) United Bank for Africa (UBA) Ltd, (iii) Kenya Commercial Bank (KCB Bank) Ltd, (iv) Global Trust Bank Ltd, and (v) Fina Bank (U) Ltd.

The entry of new banks has stimulated competition in the sector, resulting in expansion in the branch network from 160 branches in December 2006 to 213 branches by end March 2008. The bulk of loans and advances from credit institutions were for trade and commerce, representing 78.1% of total credit. The transport and communications accounted for 9.3% of total loans during the same period. Only 0.9% of the loans were advanced to agriculture where the dairy sector lies.

The 0.9% of loans advance to the agriculture is very low; however this is mainly due to long reproduction cycles of the species that result in long gestation period for the investment. These commercial banks have involved in credit service through government incentives for special programs and NGOs support. Effort is being made by government of Uganda through Ministry of Micro Finance to encourage farmers/rural poor to form groups "Savings Credit Cooperative Organizations (SACCOs) in order to access financial credit, otherwise not much has been targeting the dairy sector. The number of cooperatives and other member owned organizations supplying financial services are even larger than Micro-Finance Institutions. Review of agricultural finance by Richard L. Meyer and Richard Roberts 2004; show that as of October 2002, 6,580 cooperatives were registered with the registrar of cooperatives, of which 10.3% were SACCOs. It was estimated that at least 60% of Teir 4 MFIs, excluding money lenders are SACCOs. Member owned financial institutions generally face governance problems because they are member controlled. Partly due to shortcomings in governance, most are assumed to be weak and poorly managed. This market segment suffers due to lack of a strong support system to nurture, regulate and supervise it. In order to address the short comings, the government has come with the following intervention in the financial 2008/09

Strengthening and Expanding Rural Financial Services: With the appropriate institutional framework now in place, Government plans to focus its efforts in FY 2008/09 on consolidating the creation of a nationwide network of rural financial institutions. This will be done by:

- a. Strengthening Uganda Cooperative Savings and Credit Union (UCSCU) to deliver on its mandate including the establishment of 15 regional branches, following the attention accorded to its headquarters during FY 2007/08. These branches will subsequently be transformed into regional networks of UCSCU
- b. Supporting MSCL to strengthen its regional offices and to increase them from the current number of 12 to 15. Each of these offices will be given a credit loan of Ushs 500 million, and will have authority to approve and disburse loans of up to Ushs. 50 million to qualifying SACCOs at any one time.
- c. The Rural Financial Services Programme (RFSP) will also focus on the operationalization of the SACCO Specific Act 2008 and the SACCO Regulations 2008. The key area of attention will be the establishment and operationalization of the SACCO Regulatory Agency (SRA). A study will be carried out to determine the financial and human resource implications of the Agency. Thereafter, attempts will be made to operationalize

it. Furthermore, efforts will be made to ensure that SACCOs begin to comply with the new law once it takes effect.

d. The RFSP will also focus on the regulation of the remaining institutions under Tier 4, which include the Non-deposit taking MFIs, the micro finance NGOs, and the privately owned wholesale lending institutions. A framework will also be provided for the operations of the Rotating Village Savings and Credit Associations (ROSCAs) and the Village Savings and Loan Associations (VSLAs)

e. The RFSP will develop a monitoring and evaluation system that will help in reporting the progress of the programme. Specifically, a survey of all micro finance institutions will be carried out to determine its size and its impact on household income

The other major source of dairy credit service is Micro Finances Institutions (MFI), which provides the establishment, licensing and supervision of microfinance institutions. Micro finance institutions offer credit but it's mainly for short term investment hence little has been done to facilitate the dairy sector. Though most of the MFI are not specifically addressing the dairy sector, it is constrained by unfavourable loan size and period for sector, far too rural dairy producers and long loan procedure for smallholder dairy producer. The interest rate is high when compared to the development bank interest rate and the ceiling interest rate is still open to be decided by the board of directors. On top of this, the MFI are loosely linked to other actors in the service delivery system including government actors. This is because MFI are working independently once they got certificate from Bank of Uganda.

4.5 Hardware supplies

The availability of necessary hardware for milk collection, transport and processing and storage in required quantity and quality are decisive for the development of the dairy industry. The main equipment and ingredients are listed below. No dairy product can be produced both in quality and quantity in the absence of these equipment and ingredients.

The, private sector is playing a big role in ensuring availability of hardware supplies to farmers, however, the supplies are still very expensive and any investment into this sector would benefit dairy sector.

Dairy Ingredients and Hardware

Value chain links	List of equipment and ingredients
Milk collection centers	<ul style="list-style-type: none"> • Collection utensils • Stainless milk containers • Different equipment
Milk Transportation	<ul style="list-style-type: none"> • Isolated inox tank for milk transportation • Field equipment for milk measurement and acidity testing -alcohol probe or Ph meter • Milk transfer pump • Equipment for milk measurement
Laboratory	<ul style="list-style-type: none"> • Acidity testing equipment -Ph meter and titrated • Inhibitors and antibiotics testing equipment • Thermometers • Lactometers
Refrigeration unit for milk samples storage	<ul style="list-style-type: none"> • Containers for tacking milk samples • Milk receiving and storage • Milk pump with filter • Plate heat exchanger • Ice water

Isolated milk storage tanks	<ul style="list-style-type: none"> • Milk pasteurization unit • Temperature control • Continue temperature chart recorder • Divert valve • Holding tube • Homogenizer • Separator
Yogurt fermentation tanks	<ul style="list-style-type: none"> • Temperature probe • Isolation • Pasteurized milk tank • Isolation
Packing line for: Yogurt, set yogurt and pasteurized milk	<ul style="list-style-type: none"> • Cooling chambers • Isolated and easy clean • Data logger for temperatures recording • Track for distribution • Isolated • Temperature control • Data logger for temperature control
Cleaning in place (CIP) system*	<ul style="list-style-type: none"> • Acid (Nitric acid) • Caustic (Sodium chloride)
Dairy products production ingredients	<ul style="list-style-type: none"> • Starter culture for yoghurt making • Starter culture for butter making • Starter culture for cheese making • Rennet powder

Source: Author's Fieldwork July 2008

4.6 Refrigeration

With improved education and income of the people, the demand for hygienically produced and processed milk and dairy products is expected to improve. With increased refrigeration facilities at the retail outlets, the storage of chilled milk and frozen dairy products becomes easier.

Milk is traditionally collected un-chilled in the villages and brought to the collection centres for bulking and chilling. Establishment of milk collection centres in the milk pockets with chillers offer a good investment as the quality and quantity of milk procured will be improved. Most milk collection centre does have a cooler which costs about Ughsh 20 m to Ughsh 40m depending on the size.

4.7 OUTREACH AND PENETRATION OF DIFFERENT ORGANISATIONS.

4.7.1 East Africa Dairy Development (EADD) Project

The Bill and Melinda Gates Foundation has provided a grant of US\$ 42.8 million over a period of four years to implement the East Africa Dairy Development (EADD) Project in three countries namely Uganda, Kenya and Rwanda. The goal of the grant is to help one million people (179,000 families) living on small farms (1-5 acres) to uplift themselves out of poverty by providing them with opportunity to market milk in a more profitable way. The project which was announced at the end of January 2008 is being implemented by Heifer International Uganda in partnership with TechnoServe and the International Livestock Research Institute (ILRI). In Uganda, EADD project will develop and support a sustainable dairy value chain that will result in increased income, market share and market participation of smallholder farming households in 15 districts.

4.7.2 Heifer International Uganda

This is an International Non-Government Organization founded in 1944 in the United States of America. Heifer International (HPU) has been working in Uganda since 1982. HPU assists resource poor households

to work towards ending hunger, poverty and to care for the environment. The main activities of HPU include Livestock distribution and health care, training and education, enterprise development, livestock services and environmental management (agro-ecology). HPU mobilizes financial resources from various sources, both local and international. HPU is well known for providing dairy animals (in-calf heifers) to resource poor households, particularly women. Beneficiaries later pass on one female offspring to other beneficiaries as a gift.

4.7.3 TechnoServe Uganda

TechnoServe is an International no-profit economic development organization founded in the USA. TechnoServe helps entrepreneurial men and women in poor rural areas of the developing world to build businesses that create income, opportunity and economic growth for their families, their communities and their countries. Work in the dairy sector by TechnoServe is commencing with the grant from Bill and Melinda Gates Foundation.

4.7.4 Land O'Lakes Inc

Land O'Lakes Inc is a not for profit Organization founded in the USA. Since 1994, Land O'Lakes has been providing technical support to Uganda's dairy sector in the area of market development; processing, marketing, and distribution of value added products, milk bulking and handling, production, industry organization and policy reforms. For a period of three years, from 1st October 2001 to 30th September 2004, a consortium of three dairy sector NGOs namely Land O'lakes, Heifer Project International and World Wide Sires implemented the Uganda Private Sector Dairy Industry Development Activity funded by the United State Agency for International Development (USAID) to a tune of US\$ 5.8 million. Land O'Lakes is currently implementing an 18-month program to increase the productivity and competitiveness of Uganda's dairy sector with support from USAID and the United States Department of Agriculture (USDA). The program is expected to end in 2008 and Land O'Lakes will embark on a crop based food security program in the post conflict Northern Uganda.

4.7.5 Send A Cow Uganda

Send a Cow is a charity organization that has been providing dairy animals to poor households (women) since 1988. The organization was founded in 1988 in response to a plea from a Ugandan bishop to Christian Communities in the UK. Following a period of civil strife in the early 1980s, many people had lost their homes and cattle, and milk had become a luxury that few could afford. The Ugandan Bishop had heard that there was milk surpluses in the UK and appealed to British farmers for help. A group of Christian farmers based mainly in the West Country decided to send not milk, but long term help in the form of cows. The first plane-load of 32 in calf heifers left Gatwick Airport in June 1988 and arrived in Uganda 12 hours later. With the help of local church groups, the cows were distributed to poor women. Beneficiaries were also trained in caring for the animals and were also offered low cost veterinary services. Send A Cow Uganda continues to receive financial support through fundraising programmes in the United Kingdom and is currently implementing three programmes in Uganda: one in Eastern, Central and Northern regions. The core of each of the three programmes is similar. All beneficiaries get training in group work and organic farming. They are all given livestock, mainly dairy cows or goats.

4.7.6 DANIDA Support to Dairy Development Authority.

The Danish International Development Agency (DANIDA) is one of the development partners that have contributed substantially to development of Uganda's dairy industry since the end of war in 1986. Details of support provided by DANIDA and other Development Partners are outlined in the paper on Rehabilitation of the Dairy Industry in Uganda prepared by Okwenye A.A and published by FAO Document Repository on the internet: <http://www.fao.docrep/T3080T/t3080T04.htm>.

Under the Agricultural Sector Programme Support (ASPS II) of DANIDA, Dairy Development Authority received financial support to implement dairy sector regulations between 2004 and 2007. A total sum of Uganda Shillings 780.564 million approximately (US\$ 433,000) was provided through the Ministry of Agriculture, Animal Industry and Fisheries and was used to equip the milk quality laboratory, purchase vehicles and office equipment and implement field regulatory activities.

4.7.7 French ACSS Project

ACSS project funded by the French Development Agency through the Priority Solidarity Fund (PSF) was implemented over a period of 67 months until 31st December 2007. The total cost of the project was 2 million Euros including the cost of foreign technical assistance and the contribution from government of Uganda. The Priority Solidarity Fund contribution amounted to Euros 1.19 million. The objective of the project was to support implementation of the Plan for Modernization of Agriculture, by contributing to the process of strengthening the participation of farmers' organizations at local and national level, in economic activities and in agricultural policy design, by drawing experience from activities implemented in a particular sector (milk) and region (South Western). From July 2005 to December 2007, implementation of the project was entrusted to Dairy Development Authority.

4.7.8 Uganda National Agro-Input Dealers Association (UNADA)

The UNADA is the national apex organization for private dealers of agro inputs and offers extension service. It was registered in 2003 under the NGO statute. It operates in 10 UNADA regions in the country, using 5 program officers. The current operations assist the crop sector input suppliers –donor conditionality.

The objectives of the association are:

- To represent all agro-input dealers in the country and act as a negotiating body that speaks with one voice and support the interests of all members.
- To provide professional support and networking among agro-input dealers, encourage and support business development of individual members and to promote the exchange of ideas and skills in order to improve services to farmers
- To establish and enforce a code of fair business conduct for members and keep members informed of the legal codes of regulating industry.
- To actively contribute to modernization of Uganda's agriculture and participate in projects aimed at bringing development to the agricultural sector.

Membership of the association is open for different categories:

- Full members (active ago-input dealers)
- Associate members (interested individuals)
- Working partners (interested institutions, companies, organizations or businesses involved in related business)

4.7.9 Other NGOs and Community Based Organizations

There are several international and local charity organizations that provide livestock to resource poor households particularly in the war ravaged areas of Northern, Eastern and Western Uganda. In most cases, dairy animals are provided under the food security component of the charity with a view to improving the nutrition and income of the households. In addition to the animal gifts, the charities provide training and other livestock services to the beneficiary households. Examples of such organizations are Church of Uganda, CARITUS, Christian Children's Fund, Africa 2000 Network, World Vision and the Red Cross among others. In general, the scale of investment in the dairy sector is very limited.

5.0 MARKET AND MARKET POTENTIAL

5.1.0 Ugandan Market

Uganda itself has a market of about 31.1 million people. The greater market potential, however, lies within the regional market. The dairy industry in neighbouring countries of Southern Sudan, Rwanda, Burundi and the DR Congo are not well developed.

With the consolidation of democracy, peace and security in the Great Lakes Region in recent years, Uganda stands to benefit immensely from region trade especially with the Democratic Republic of Congo, Southern Sudan, Rwanda and Burundi. There is already evidence of significant exports of Uganda's agricultural based

commodities to these countries. Therefore, the challenge for future development planning is for the Government to invest more in strengthening the production base that must be expanded to meet the domestic, regional and international market demands. The export of milk and dairy products to these countries is therefore expected to continue. While Kenya is an important exporter of dairy products to these countries, Uganda has a competitive edge of lower transport and production costs.

Uganda has over the past decade reversed past the policy that caused destruction to the economy and investment climate. Through liberalization of the economy and privatization of state owned company has been achieved and exiled Asian business community invited back with their properties expropriated. These achievements have restored investor and donor confidence, and established Uganda as a haven for relative stability in the region a true Pearl of Africa. Uganda is the leading location for FDI in emerging regional market of East African Community (EAC).

Uganda's competitiveness will primarily be driven by the key productive sectors according to the *Competitiveness and Investment Climate Strategy 2006-2012*, which reflect Uganda's competitive advantage. Sectors which are able to successfully balance the advantages arising from Uganda's rich agro-based resources, with the disadvantages associated with, its landlocked location, are the ones which will be able to compete internationally and help to stimulate economic growth.

Given the need to apply limited resources (both human and financial), in the most effective manner, it is important to have a clear criteria for selecting sectors, which because of their competitiveness attributes, will have the greatest positive impact on economic growth. The criteria take into account both the need to gain competitiveness in the market place and the need to compete for regional investments.

The factors to be considered are as follows:

- The actual or (potential) capacity to generate significant export earnings,
- The capacity and/or potential to improve income generation and reduce poverty particularly.
- The capacity and /or potential to create new jobs on a sustainable basis.
- Products which reflect significant market potential.

In addition to the above, critical success factors for competitiveness which should also be taken into account are:

- Existence of opportunities for exploiting global and regional value chains.
- Existence of adequate resources (financial and human), within those sectoral clusters, which will have responsibility for implementing sectoral competitiveness strategies.

With respect to the productive sectors, it is preferred that the competitiveness agenda should be private sector driven, this highlights the importance of facilitating the development of effective public private partnerships (PPPs) within the various sectors of interest. Where possible, sectoral clusters will be used to identify priorities and devise strategies to address them. It should however, be recognized that while progress has been made over the past decade in developing PPPs, most sectoral clusters are in their infancy. The competitiveness agenda in the majority of subs-sectors has been identified in consultative processes where the above-mentioned emerging cluster, have taken a leading role or have participated. The priority actions identified by these groups inter-alia include:

- Rehabilitation of productive capacity
- Differentiation of export products and market diversification
- Facilitating access to affordable inputs and finance
- Facilitating development of Sectoral Clusters
- Harmonizing and building commitment for the implementation of sectoral development strategies

In the energy sector, the main focus will be on the improvement of the electricity situation. To reduce the electricity shortfall, Government will focus on both supply and demand measures:

The dairy sector key challenge is poor infrastructure. The government of Uganda is to improve the Stock of Infrastructure in the FY2008/09. The physical infrastructure needs of the Ugandan economy are growing tremendously and threaten to outstrip the current availability. Investment in infrastructure development is critical for improving competitiveness and output. Shortfalls in energy supply continue to hurt the economy, as manufacturers/processors and other commercial enterprises have had to provide their own sources of

energy in the absence of sufficient power from the grid. Majority have invested in generators. The higher cost associated with own sources of energy increases operational costs and reduces competitiveness of the country as a whole

In Uganda, for every 1% growth in GDP/capita, the poverty headcount falls by just 0.63%. This is a low ratio compared to China with a ratio of 1:1, Vietnam 1.4:1 and Thailand 2.6:1. The implication is that, in Uganda, there is a need for continuous improvements in productivity and competitiveness. Government will have to provide more investment incentives in stimulating growth, but should ensure that the incentives offered will result in a more efficient allocation of resources than would have occurred otherwise.

Building an export-oriented industry based on agro-processing and resource-based industrial development: Industrialization is essential because it raises the productivity of labour, creates employment, adds value to products, and enabling higher export revenues to be earned. To further support industrialization efforts, Government pledged to issue a bond to raise private capital for capitalization of Uganda Development Bank (UDB).

5.1.1 Investment Climate in Uganda

Uganda's Competitiveness and Investment Climate Strategy is improvement of the Investment Climate. The aim is to reduce the cost of doing business, and minimize delays associated with "bureaucratic red-tape." The government's action areas include:

- a) Undertaking key infrastructural investments aimed at ameliorating the power deficit.
- b) Improving transit trade facilitation and transport infrastructure on key import/export corridors
- c) Deepening the financial sector, in order to improve access to long term finance and diversity financing products
- d) Improving access to affordable financial services.
- e) Fast tracking of the revision process of key commercial laws.
- f) Completing reform of the business registries

5.1.2 Uganda's Competitive Advantage in the Dairy Sector

Since 1991, over 2000 enterprises of various sizes have committed in excess of US\$3.5 billion in actual investment into the country for projects that range from agriculture, manufacturing to transportation.

Compared to its neighbors, Uganda enjoys the following advantage;

Good natural resource base

- A natural resource base for dairy farming, a favourable climate and good soils in most parts of the country ensure good production of pastures for dairy herds. A number of crops are grown organically
- Less pressure on its land. This implies that more land can be available for dairy farming at a relatively lower cost of establishment.
- Unexploited mineral deposits and tourism opportunities. Confirmed deposits include Gold, Zinc, Wolfram, Petroleum, Diamond, Vermiculite, Silica etc

'Stable and attractive macro-economic and investment environment'

- Macro-economic stability, which is characterised by low inflation (with exception of post Kenyan election inflation), stable exchange rates and steady economic growth. These give the investors' confidence
- A liberalised economic environment where market forces determine prices. Almost all Uganda's economic activities are unrestricted. All sectors liberalized for investment and marketing, there is free inflow and outflow of capital, and 100% foreign ownership of investment permitted
- A package of investment guarantees which insure private investments in Uganda. These include the Multi-lateral Investment Guarantee Agency, Overseas Investment Insurance Scheme and the Overseas Private Investment Corporation to mention a few.

Good infrastructure

- Improved infrastructure. About half of the total national major road network in the country is surfaced (tarmac) which eases transportation. All the other roads are easily motor able.
- Uganda's telecommunications sector has been fully liberalised which has greatly improved the availability of telecommunication services. There are four cellular phone service providers including MTN Uganda, Celtel and Warid, with the fifth player Hits Telecom yet to come on the market. The Uganda Telecoms Ltd and MTN Uganda provide over 150,000 fixed telephone and fax lines. Private companies including Africa Online and Infocom provide Internet and related multimedia services. Telephone companies are equally providing internet service.
- The energy sector has also been liberalised which has improved energy service provision. Hydroelectric power has increased from 180 MW to 317 MW between 1994 and 2002, which has reduced power shortages. Power production is expected to increase with the construction of more generation stations.

Market Access:

Uganda enjoys a unique location at the heart of Sub-Saharan Africa within the East African region. The country is bordered by Sudan in the north, Kenya in the east, the United Republic of Tanzania in the south, Rwanda in the southwest and the Democratic Republic of Congo in the west. This location gives it a commanding base for regional trade and investment.

- Uganda is a member of the Common Market for Eastern and Southern African states (COMESA), a region with a market of over 300 million people in 20 countries
- Uganda is a member of the East African Community (EAC) comprising Burundi, Kenya, Rwanda, Tanzania and Uganda with a population of over 150 million people.
- Duty and quota free access into the US (AGOA) and EU (EBA) markets.

Government Commitment to Private Sector

- Government and private sector dialogue in policy formulation
- Continuous improvement in provision of infrastructure and other social services

Trainable Labour

- Uganda presently produces over 15,000 University graduates per year
- Quality of labour is one of the biggest attractions with the highest literacy levels in the region.
- Abundant skilled and unskilled labour for cheap production. Labour rates per hour in Uganda are US \$ 0.6 compared to 1.1 for Kenya, 0.7 for Zambia and 2.8 for Zimbabwe.

Security of Investment.

- Guaranteed under the Constitution and the Investment Code 1991
- Uganda is a signatory to major international investment related institutions
- Multi lateral Investment Guarantee Agency (MIGA)
- Overseas Private Investment Corporation (OPIC) of US
- Convention on the recognition and enforcement of foreign arbitral award (CREFAA)
- ICSID, TRIMS, GATS, and TRIPS.

5.1.3 Challenges facing Dairy Farmers in Uganda

The competitiveness challenges affecting the above sub-sectors are;

j) Constraints related to raw material resources and Productive Capacities

Within a number of traditional and non traditional export sectors, resource related issues are emerging as important constraints, both by limiting possibilities for expansion/ utilization of productive capacity and limiting the opportunity for productivity improvements. These constraints require interventions aimed at diversifying raw material sources; (e.g. the case for dairy farming in the dairy sector). A related issue for at

least two key export sectors is the pressing need to adequately fund and carry out agricultural research, aimed productivity improvements

ii) Production Costs and Capacity Utilization

The negative impact of poor infrastructure, (particularly roads) and power are concerns across all sectors of agriculture and are addressed, in the section on the business environment. In addition, to the above issues, low capacity utilization in agro-processing enterprises results in high unit cost of production, due to the fact that overhead are spread over smaller production volumes. Difficulties in accessing raw material due to the resource problems mentioned in (i) above, are significant contributing factors to lowered capacity utilization in the dairy, coffee, cotton and fish processing industries.

iii) Inadequate Storage and Distribution Facilities

Ugandan exports suffer cost and disadvantages related to the fuel related expenditures required to assure an adequate cold chain for fresh products. Inadequate storage and cargo space continue as key issues of concern and represent a key challenge to maintaining quality and shelf-life, particularly in the case of high-value exported products such as milk and milk products.

iv) Market Development and Diversification

The majority export in the dairy sector is UHT milk and yet Uganda produces a variety of milk products. The fact that a large portion of commodities continue to be exported as commodities means, that the economy is vulnerable to price changes dictated by changing international production or market trends. Market knowledge and marketing skills in a majority of sector are yet to be developed to a level, where initiatives can be made to take advantage of opportunities in various commodity value chains.

The development of capacities required to differentiate products, and to develop brands or appellations, is required if Uganda producers are to benefit from the premiums offered by speciality markets.

v) Quality Control and Export Standards

The introduction of more stringent standards particularly in the European Market is a continuing challenge if Ugandan exporters are to maintain and expand their markets. Among the issues of concern in emerging agro-based exports are the establishment of competent regulatory authorities and the building of capacities within the private sector for self regulation. Uganda has a dairy quality regulatory framework in place which is implemented by DDA and UNBS.

vi) Harmonization of Sectoral Competitiveness plans and mobilizing funding for their Implementation

The implementation of an effective competitiveness strategy is dependent on competitiveness plans, which are broadly owned by key stakeholders, and represents a strong consensus on sectoral development priorities. Plans which are broadly-owned have been developed in a number of sectors, (cotton, flowers and fish and dairy.)

5.1.4 Investment Incentives

In order for the government to promote investment in Uganda, it has come up with incentives which include;

a) Investment Capital Allowances

Initial Allowance on plant and machinery	50-75%
Start up cost spread over 4 years	25% p.a.
Scientific research expenditure	100%
Training expenditure	100%
Mineral exploration expenditure	100%

Initial Allowance on Hotel and Industrial Buildings	20%
Deductible annual Allowances (depreciable assets)	
Depreciation rates of assets range	20-40%
Depreciation rate for Hotels, Industrial Buildings and Hospitals	5%

b) Investors who register as investment traders are entitled to VAT refund on building materials for industrial/commercial buildings

c) Duty and Tax free import of Plant & Machinery

d) First Arrival Privileges in the form of duty exemptions for personal effects and motor vehicle (previously owned for at least 12 months) to all investors and expatriates coming to Uganda

e) Export Zones (Provisional)

- A ten year corporation tax holiday
- Duty exemption on raw materials, plant and machinery and other inputs
- Stamp duty exemption
- Duty drawback to apply on input of goods from domestic tariff area
- No export tax
- Exemption of withholding tax on interest on external loans
- Dividends repatriated to get relief from double taxation

5.1.5 Investment Process in Uganda

Foreign investors require a minimum of US\$100,000 in planned investment in order to secure an investment license from the Uganda Investment Authority, whereas for local investors, the minimum planned investment requirement is US\$50,000. Local investors, however, may proceed with their investment without licensing with the Uganda Investment Authority. The license is very crucial to foreign investors as it is the instrument that legalizes their investment in Uganda. Traders do not require a license from Uganda Investment Authority but must demonstrate operating capital of US\$ 100,000 before trading licenses and entry permits are issued by local authorities. The minimum requirements are gazetted in the investment code act which can only change when government enacts a new code.

5.1.6 Registering Investment in Uganda

Step 1 – Register your company in Uganda

Register your company in Uganda at the Uganda Registration Services Bureau (URSB) and obtain the Memorandum and Articles of Association, and a Certificate of Incorporation.

Step 2 – Get your Investment License

Apply for an investment license using Uganda Investment A Form 1 and attach the documents in step 1 plus a brief Business Plan. Normal processing time for an investment license is 2 – 5 days.

Step 3 – Secure necessary secondary clearances

Certain sectors require other secondary licenses e.g. for mining activity, air transport, banking, forestry. Uganda Investment Authority will assist you to secure these licenses within reasonable time. Uganda Investment Authority shall also assist you in obtaining suitable industrial land and work permits for your expatriate staff. Utilities like telephone, electricity and water can easily be secured from the relevant offices.

One-stop-shop

The one-stop-shop has now been implemented permitting investors to obtain all these services at the Uganda Investment Authority. This initiative saves the investors both time and money to have their projects licensed and implemented expeditiously. Representatives from Uganda Revenue Authority, Department of Immigration and Ministry of Lands are already housed at the Uganda Investment Authority for this cause

5.1.7 Regulation of Foreign Investment.

A foreign investor shall not operate a business enterprise in Uganda otherwise than in accordance with an investment license issued under this Code.

No foreign investor shall carry on the business of crop production, animal production or acquire or be granted or lease land for the purpose of crop production or animal production; but a foreign investor may- Provide materials or other assistance to Uganda farmers in crop production and animal production or Lease land for purpose of manufacturing or carrying out the activities set out in the second and third schedules to this act.

This section shall not be construed so as to deprive a foreign investor of any land acquired by or granted to him or her of any interest in land accrued to him or her before the commencement of this code.

The minister may on the advice of the authority and with the approval of cabinet, by statutory instrument, exempt any business enterprise or class of business activities from the provisions of this section where, in the opinion of the minister, it is necessary that for the purpose of ensuring a regular supply of raw materials the enterprise should lease land.

A foreign investor who is intending to engage in trade only shall not be required to comply with subsection (1) but shall-

Incorporate a company with registrar general as is required by law;

Deposit a sum of one hundred thousand United States dollars or its equivalent in Uganda shillings at bank of Uganda, which shall be specially used for importation or direct purchase of goods for the business.

Upon compliance with subsection (5), the bank of Uganda shall issue a certificate of remittance to the foreign investor.

A foreign investor who obtains a certificate of remittance under subsection (6) shall lodge an application, in writing, to the immigration department which contains the certificate of remittance and other information that may be required by the department.

Subject to compliance with the provisions of this section and the immigration laws, the immigration department may issue an entry permit to the foreign investor.

A foreign investor who obtains an entry permit under subsection (8) shall lodge an application, in writing, to the local authority where the business will principally be carried out for a trade license.

5.1.8 Application for an Investment License

An application for an investment license shall be made in writing to the executive director and shall contain the following information-

The name and address of the proposed business enterprise, its legal form, its bankers, the name and address of each director or partner as the case may be and name, address, nationality and shareholding of any shareholder who is not a citizen of Uganda.

The nature of the proposed business activity and proposed location where that activity is to be carried out;

The proposed capital structure amount of investments and the projected growth over the next five years or more;

The estimated number of persons to be employed;

The qualifications experience, nationality and other relevant particulars of the project management and staff

The incentives for which the application expect to qualify and the details of such qualifications;

Any other information relating to the viability of the project or other matter as the applicant considers relevant to his or her application.

Where an application under subsection (1) does not provide all the relevant information or if clarification is necessary, the applicant may be called upon to provide that information or clarification to complete the application

When the applicant for an investment license and the authority have agreed on the terms and conditions of the investment license and the incentives, if any, the authority shall issue to the applicant an investment license which shall-

Authority the holder of a license to make all arrangements necessary for establishing the business enterprise described in the license

Contain the terms and conditions of the investment license and incentives, if any;

Have a validity of not less than five years from the date of issue; and

Contain any other information or details as may be prescribed.

The executive director shall liaise with government ministries and departments, local authorities and other bodies as may be necessary in order to assist an investment license holder in complying with any formalities or requirements for obtaining any permission, authorizations, licenses, land and other things required for the purpose of the business enterprise.

5.2.0 The East African Market

The Uganda Investment Authority guide 2006/07 provide with the following vital information about the East African market

- This is a market of about 117 million (*CIA July 2008 Report*) people covered under the East African Community (EAC).
- There is a list of goods still being worked on to be subjected to a surcharge without reciprocity when imported from Kenya to Uganda or Tanzania or Rwanda.

- A list of manufactures that will attract a zero tariff rate for the tripartite trade is also being worked out.
- There has been an agreement in principle on establishing a Common External Tariff (CET) but its rate is not yet agreed upon. However at present, Uganda has the lowest customs tariff among the three countries.
- Rules of origin are not yet worked out, but it is proposed to use COMESA rules of origin.
- Unlike the defunct EAC, the current arrangement is market oriented and private sector driven.
- It has been agreed that the region has a comparative advantage in the agricultural sector and a study on the "Strategy on Agricultural Development" for the region is ongoing. The EAC and its focus on agricultural development, presents enormous chances for Uganda, because of the three countries, Uganda offers better avenues for agricultural development and agricultural related trade.

5.2.1 The COMESA Market

The Common Market for Eastern and Southern Africa (COMESA) is a regional economic co-operation group of 20 African countries with an estimated population of 370 million people.

The overall objective of COMESA is to promote regional integration through development of trade, natural and human resources. COMESA is one of the more successful regional economic groups in Africa. It has financial specialized institutions to support its activities namely:

- The Trade and Development Bank for Eastern and Southern Africa (PTA)
- The Leather and Leather Product Institute (LLPI).
- The Clearing House.
- The Re-insurance Company.
- Most of the co-operation progress has been made in trade liberalization.
- An Automated System for Customs Data and Management (ASYCUDA) is used in all COMESA member states.
- Agreement has been reached to implement a Common External Tariff (CET) by the year 2004 with a proposed CET of 0%, 5%, 15% and 30% on capital goods, raw materials, intermediate goods and final goods respectively.
- Agreement has been reached to transform COMESA into a Free Trade Area (FTA) based on reciprocity and some countries are already implementing 100% tariff reduction.

5.2.2 Market Developments in the region

The establishment of the East African Co-operation (EAC) is complete. This has paved way to the formation of a single market and investment area.

Some developments in the implementation of the EAC Treaty Programmes include, the member states adopting a single customs entry document in 1999. Forty-two (42) standards have been harmonised and adopted as East African Standards - three of the adopted East African Standards deal with milk and milk products. The East African Dairy Business Association (EADBA) regional interim committee was formed in 1999.

The EADBA seeks to enhance developments and trade in the dairy industry within the region.

5.2.3 Success Stories

The Bill and Melinda Gates Foundation has provided a grant of US\$ 42.8 million over a period of four years to implement the East Africa Dairy Development (EADD) Project in three countries namely Uganda, Kenya and Rwanda. The goal of the grant is to help one million people (179,000 families) living on small farms (1-5 acres) to uplift themselves out of poverty by providing them with opportunity to market milk in a more profitable way.

Uganda's Dairy Industry has already benefited from the EAC regional programmes. The East African Dairy Business Project was implemented in 1998. Some of the achievements under this project include, the DCL increased its milk sales by 15 per cent through new trade links with Brookside Dairies (Kenya). New packaging for yoghurt was introduced through trade links with Tech-Pack Industries (Kenya) subsequently;

package imports from Kenya have increased by 50 per cent implying increased production and sales of yoghurt. Brookside Dairies (Kenya) purchased shares in Western Highland Creameries (U) Ltd. BUDICO a co-operative society (Uganda) is linking up with a foreign company to set up a UHT milk plant.

5.3 SWOT Analysis of the Uganda Dairy Sector

The SWOT analysis is done from the perspective of investors in the dairy sub-sector to highlight key issues only. It is not exhaustive. Therefore, detailed analysis is not given here. It is based on the aforementioned chapters and given here as a summary.

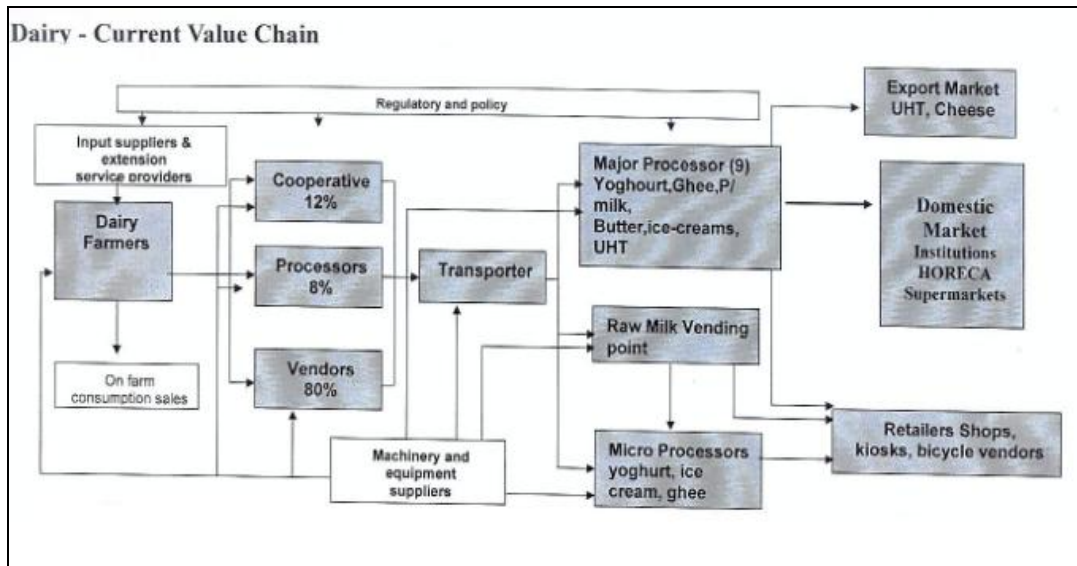
<p>STRENGTH</p> <ul style="list-style-type: none"> • Organized producer groups hence organized collection systems • Potential of high production (climate, soil fertility, existing skilled government technocrats) • High quality and rich in contents milk (4.2% fat content) • Existence of good regulatory and legal framework e.g. Dairy Development Authority, Uganda National Bureau of Standards. • Institutional network- Development Institutions, academic and research • Existence of dairy processors associations (Uganda Dairy Processors Association) 	<p>WEAKNESSES</p> <ul style="list-style-type: none"> • Low per capita consumption (50 litres) leading to low capacity utilisation, hence high cost of production and poor price competitiveness. • Deficits in human capital- dairy experts, extension workers. • Low productivity in North and Eastern Uganda (lack of organized groups, lack milk collection centres). • Inefficient information flow e.g. market information, regulatory. • Low marketing spends, advertising. • Limited facilitation of regulatory and enforcing agencies. • High cost of finance • Poor infrastructure • Poor milk handling practices at producer group and farm level. • Poor animal husbandry practices. • High cost of support factors of production (water, power unreliability, transport-high cost of diesel, packaging materials). • Seasonality of production- dry season vs. wet season.
<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> • Technology- modern facilities for competitiveness. • Export Market availability mainly in milk deficient neighbouring countries (DRC, Burundi, Kenya, Rwanda, Tanzania and Southern Sudan. • Strengthen Dairy Associations-Lobby for favourable trade policies and practices. • Expansion of local market to lead to economies of scale for efficient production. • Dry season feeding/Animal husbandry improvement. 	<p>THREATS</p> <ul style="list-style-type: none"> • Poor enforcement of import duties on dairy imports. • Epidemics • Internal and regional wars • Competitive beverages (black tea/coffee and juices from imported concentrates). • Premature implementation of EAC customs union lifting import duties for dairy products especially coming from Kenya.

6.0 INVESTMENT OPPORTUNITIES IN THE DAIRY INDUSTRY

6.1 Ease of entry into the Dairy sector

The dairy industry is essential for rural Uganda and it is potentially the largest rural employer in the South Western, North and North Eastern Uganda in the pastoral/ agro-pastoral areas. With continued urbanization, growing population size, demand for milk by the children and younger generation, it is expected that the dairy industry will become a major player in agricultural development and has further potential to contribute significantly towards increased income and employment.

Market Channel of Milk and Milk Products in Uganda



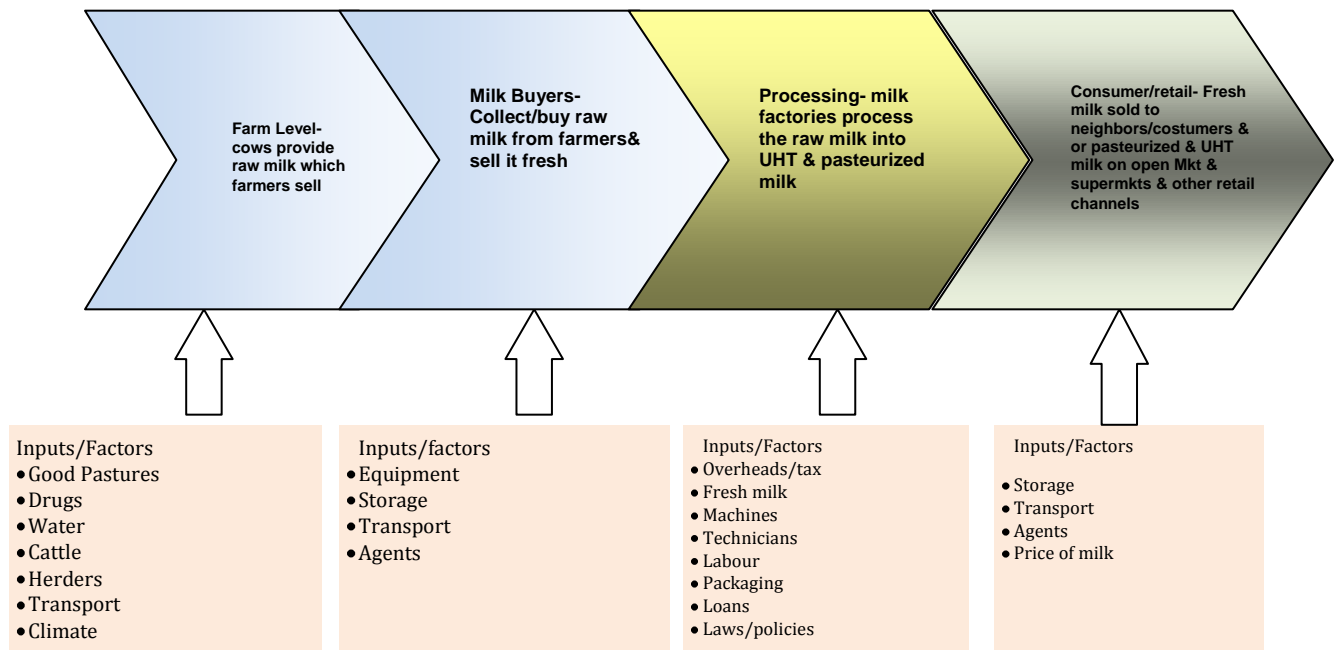
Source: Uganda National Export Strategy 2008-2012

The ultimate goal of the intervention in the dairy industry in general and Milk Value Chain in particular is to increase rural incomes by increasing the number of rural households deriving their livelihood from dairy business through managing high productivity enterprises, while delivering quality and affordable dairy products to the market. This study tries to identify the intervention points into Ugandan dairy industry along the milk value chain.

To build a successful and sustainable dairy industry, all parts of possible entry points across the milk value chain have to be identified and addressed; from cow to consumer. Different parts of the value chain need different kinds of support and intervention where the situation requires various case to case interventions. Several entry points could be identified across the dairy value chain with varied degree of resource requirement and level of competitions. Farmers need support and training to increase milk production in yields and quality. Dairies might need assistance in evaluating the feasibility of investments and financing for investment in equipment. The dairy industry that relies on a good milk supply and collection systems need to be put in place. Distributors and retailers to reach out to customers are also needed in sufficient number. Finally consumers need information on what the dairies offer and on the benefits of drinking good quality milk. The illustration below summarise the milk value chain from a 'milk supply chain' as a model for sustainable dairy development. Differential growth across geographical areas (regions) would be expected due to differences in production environment, infrastructure and other factors that facilitate or hinder growth.

The **low level of raw milk supply** which is critical at present especially in Eastern and Northern Uganda would be an entry point into the sector for investors. The number of investors and level of competition to get into the business of the dairy industry in the country is lacking. Quite a lot of incentive and support are available from the government at all level to ease the entry of investors into the dairy industry. Even the Uganda investment Authority doesn't consider dairy sector a priority sector.

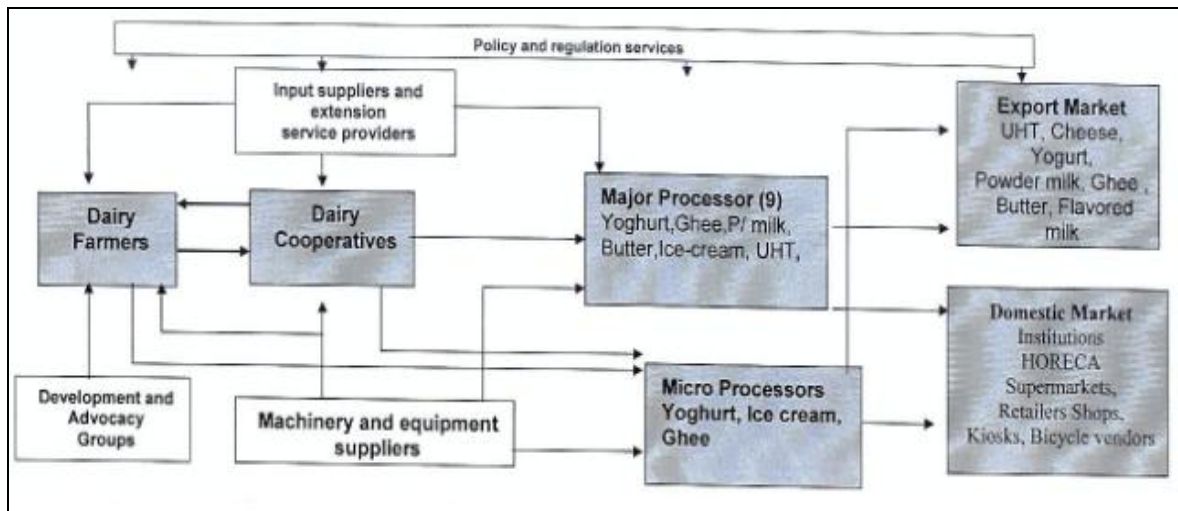
Milk Supply Chain for unprocessed & processed milk



Source: Author's Fieldwork July 2008

Possible interventions on the **supply side** could be strengthening of raw milk supply, improving milk collection centres, provision of feeds, logistics and breed improvement. In the processing chain quality improvement, business linkages, training, and technology transfer are important activities to be considered.

Future Value Chain



The collected raw milk is transported to the processing centre and used as main raw material to end up to pasteurized milk and other dairy products through various technological processes. In this value chain four intervention points are mapped. These are:

- Improving source of milk and sustainable milk supply

- Supporting possible sources of raw milk such as dairy small farmers
- Introduce milk collection centres with the necessary facilities that can help to increase the volume of milk supply- cooperatives
- Improve the packing technology and quality of finished product during processing

Currently, very little has been done to try and develop the dairy farmers in order to ensure consistent supply of milk. Apart from the South western Uganda where the cooperatives are advocating for increased role of the dairy farmer, most parts of the country this remains a potential opportunity for any key investor into this sector. Apart from this, entry in to dairy business is easy compare to other business interventions in the country, as a *joint venture* or as *Wholly Foreign Owned Investments*.

Financial services (savings and credit) need to be included in the overall microfinance systems, eventually supported by special credit in-kind schemes

6.2 Joint Ventures

Small scale and medium processors

A number of existing small and medium scale Dairy processors want to expand their operation but are limited by financial capital, equipment, technology and/or expertise such firms are interested in joint ventures with other private Investors. Some of the existing companies are also seeking for equity participation from foreign companies and individuals while other are considering outright purchase.

Promotion of Dairy Production, Value Addition and Marketing of the Milk Deficit in Northern and Eastern Regions.

Currently, 70% of the total national milk production comes from two of the five milk producing regions namely Central and South Western. The Eastern, Mid-Western and Northern regions together contribute only 30%. The Eastern and Northern regions continue to experience a shortage of marketable milk throughout the year although they have a better livestock keeping culture than other regions.

According to UBOS, 2007 the Northern and Eastern regions have the highest levels of poverty in the country. The Northern rural area with 64.2% was the highest in 2005/06 followed by the Eastern rural areas with 37.5%. The national average rate of poverty was 31.1% in 2005/06. In order to improve the household incomes and standard of living in the Northern and Eastern regions, it is necessary to stimulate production of milk as one of the key agricultural enterprises particularly under the government program of Prosperity for All (PFA).

6.3 Opportunities in Dairy Support Services

Establishment of Dairy Industry support services

With the fast growth registered in the dairy industry, there is need to establish firms that provide dairy related support services. Such services include artificial insemination; farm input supplies and market information.

Animal breeding and supply of stock

The artificial insemination business alone has grown from 10,000 inseminations in 1994 to over 25,000 inseminations in 1999. Individuals whose availability is limited to a few localities are currently providing these services and government is now keen to allow the private sector to take a key role in providing these services. Government breeding farms have been phased out creating a big vacuum in the provision of breeding stock prospective farmers.

Dairy farms are another investment opportunity that is not yet fully exploited. Uganda has adequate land for dairy farming and the climatic conditions are favorable this venture. A well-established dairy farm would produce milk and also breed in calf heifers for sale. With the growth registered in the dairy demand for in calf heifers is expected to increase. On the domestic market, an in –calf heifer costs not less than US\$ 800

Animal feeds processing and distribution

Installed commercial animal feed manufacturing comprises 28 mill operators with an installed capacity of 28,060 metric tons per annum. Several other small millers and hand mixers bring production capacity to about 148,000 metric tons. Actual utilization capacity is very low largely because most operators lack adequate capital to purchase and store feed ingredients in bulk when prices are low. Investment in this area is likely to further stimulate the dairy guaranteeing a stable market.

Establishing of collection centres and distribution facilities

Post-harvest milk losses are still high especially during the peak season when production is high. This is due to limited access to milk collection centres (MCC). While the South Western milk shed has a number of MCC set up by private firms and the Sameer Agriculture Livestock Limited, the Central milk shed still lacks enough collection facilities. The Central milk shed includes the districts of Jinja, Kampala, Mukono, Mpigi, Kalangala, Kamuli and Iganga all of which have registered increased milk production.

In addition, substantial amount of milk is in transit, this is due to the containers and mode of transport used which leads to delays and high temperature build up in the milk. Thus, Investment opportunities exist in establishing more and better managed MCCs as well reliable milk distribution facilities.

6.4 Opportunities in Milk Production

Powdered Milk Production

Uganda imports powdered milk that is used in the food industry and for domestic consumption. Annual consumption of powdered milk is currently estimated at 3000 MT and the ruling prices range from USD \$2.8 to USD \$6.0 per kilogram. Processing surplus milk into powdered milk would reduce post harvest losses and value to a product for both the domestic and regional market.

The ideal location for the powdered milk plant is the western milk shed/grid. This location would take advantage of the milk surplus in this production area, largely reduce transport costs for raw milk and has proximity to the regional market of Rwanda, Burundi, Tanzania and the DR Congo.

Processing of sweetened- condensed Milk

Sweetened-condensed milk offers a product that has longer shelf life without refrigeration and can be easily transported over distances. Refrigeration in Uganda is relatively expensive. Although sweetened milk is not very popular, it can easily find acceptance on the domestic market if it is well promoted.

Flavored and UHT Milk

The production of UHT milk has steadily increased since 1995. Two other dairy plants (GBK and Birungi Dairy Industry) besides Sameer Agriculture Livestock Limited produce, UHT milk. The total UHT milk production in the country is currently estimated at over 46 million litres per year, Only Sameer Agriculture Livestock Limited has been producing flavored UHT milk. The production of flavored milk by the Sameer Agriculture Livestock Limited has shown growth mainly due to the demand from schools and other educational Institutions. Although there are three plants producing milk in the country, there remains considerable Investment Opportunities in this market.

Production of Butter and Ghee

Although it produces butter, Uganda also imports considerable amounts mainly from Kenya, Zimbabwe (with exception of the recent inflation) and Europe. The Sameer Agriculture Livestock Limited and some private firms produce butter. The sales price is between USD \$6 to USD \$10 per kilogram.

Ghee is a popular product on the Local market with a considerable demand from Central Uganda. Although farmers mainly produce it on a small scale, the Sameer Agriculture Livestock Limited and GBK Dairies Ltd. produce and market considerable amounts of ghee.

Cheese production

Paramount Dairies, Gouda Gold and Nile Valley International foods are the only firms produce cheese as their principal product. However, Uganda still imports cheese. The market price of cheese is between USD \$

6 and USD \$10 per kilogram. Cheese Production provides yet another investments opportunity. Regional markets are underserved.

Yoghurt and cultured milk production

The Sameer Agriculture Livestock Limited is the leading yoghurt producing firm. However, other private firms produce and market yoghurt. Yoghurt quality has improved and sales have increased since 1997. The number of companies processing yoghurt has increased.

Cultured milk is very popular country wide and its demand is expected to grow. However, its production is by small-scale processors and the informal sector. Investment by the formal sector is required in order to exploit this market and develop it further. School milk project has not been fully exploited. It's being tested in Western Uganda on a small scale.

Cream and ice cream

The leading producers of cream and ice cream are Sameer Agriculture Livestock Limited, Jessa Dairy, White Nile Dairy, DairiBoard Uganda Limited and NIRMA food and dairy industries. Production of ice cream can be profitable because most of the ice –cream (a product made from cream) is imported to meet the local Market demand. Although most of the ice –cream producing firms is concentrated around Kampala, there is untapped market upcountry.

6.5 Small –scale milk processing

Small –scale milk processing plants in relatively low milk producing areas provide investment opportunities. These areas include the north, northeast and the, northwest parts. Such, small milk processing plants would exploit and develop the respective markets in those parts.

6.6 Others - School Milk Programme

There is a definite link between the government and the dairy industry in establishing a school milk programme. World school milk day is a good starting point for future endeavors. "Milk in schools" refers to the promotion of milk in schools. In Uganda UCCU, has started marketing and promoting milk consumption for Children in schools in South Western Uganda and it's done in collaboration with land O' Lakes. Children can either buy dairy products or parents pay an annual levy, alternatively government can set the standards and regulations but should not necessary be responsible for funds. Donor support and stakeholder partnerships can also ensure the success of the programme.

Critical Areas for Sustainable School Milk Programme

- Milk producers, processors, government departments, trade and industry and the private sector have to be involved to ensure success.
- Government can play a role in policies, standards, markers and certifications. School feeding initiatives should be accompanied by a school health policy, including a firm policy on school feeding.
- Nutritionists or dieticians should be available at a district or regional level to provide technical information on school feeding minus and balanced diets.
- An implementation mechanism should be well thought out and should involve a lot of planning. Details on infrastructure and necessary resources should also be included.
- Getting the community involved from the beginning and giving them ownership of school feeding greatly increases the chances of success and sustainability.
- If publicly financed, government should ensure that funds are provided on a regular basis to prevent interruption in the program.
- All Children should benefit. Schools should be monitored to ensure that they follow the laid down school feeding guidelines.

7.0 DAIRY SECTOR POLICIES AND REGULATIONS

7.1.0 Overview of Existing Dairy Sector Policies and Regulations

Broad National Development Policy Framework

i) Poverty Eradication Action Plan (PEAP)

Poverty in Uganda is mainly a rural phenomenon, with 48% of the population living in absolute poverty compared to 16% of the urban population. Poverty eradication is a fundamental objective in the government's strategy for rural development. The Government resolved to reduce the proportion of the population living in absolute poverty from the level of 44% in 1997 to below 10% by the year 2017 (revised version PEAP, 2005). The Poverty Eradication Action Plan (PEAP) is Uganda's comprehensive development framework, which has guided the formulation of government policies since its inception in 1997. Under this plan, Uganda is to be transformed into a modern economy and modernization of agriculture is central in the process of transformation.

ii) Plan for Modernization of Agriculture

The government's vision for rural development is embraced in the Plan for Modernization of Agriculture (PMA) which is a holistic, strategic and operational framework for eradicating poverty through multi-sectoral interventions enabling the transformation of the livelihood of the majority of subsistence farmers in Uganda (PMA, 2000).

The main objectives for PMA include:

- Increasing household incomes and improving the quality of life of the poor subsistence farmers through increased agricultural productivity and access to markets
- Improving household food security, providing gainful employment and Promoting sustainable use and management of natural resources

iii) The National Agricultural Research Policy

The National Agricultural Research Policy aims at focusing research services to address in a sustainable manner, the needs and opportunities of the poor in a market driven environment. The policy is to promote the delivery of high quality and efficient agricultural research services by enhancing the participation and coordination of the public as well as private service providers. The National Agricultural Research Organization (NARO) is the custodian of this policy.

iv) The National Agricultural Advisory Services (NAADS)

Until 2001 when the government established the National Agricultural Advisory Services (NAADS) by Act of Parliament, agricultural extension services were being provided almost entirely by government extension workers.

The government is now implementing the new NAADS Policy, which provides for a decentralized, farmer-owned, demand driven and private sector-led agricultural advisory service delivery system. Farmers working in-groups identify priority enterprises and are assisted by their local governments to contract services of the most competent private sector service providers. The government extension workers are retired from public service when the NAADS system is implemented in a particular area. The central government provides the funds for paying the private service providers at this stage of transition from the traditional agricultural extension system. In future, farmers will demand and pay for the services they require. The NAADS organization is mandated to oversee the transition from public funded to private sector funded agricultural advisory services.

v) Policy to Promote Strategic Exports

The government is implementing a program referred to as "Strategic Interventions to Promote Export of Selected Commodities". Its purpose is to enable the country to take advantage of new opportunities created by trading arrangements such as African Growth Opportunities Act (AGOA) of the USA, as well as bilateral

and multilateral regional arrangements such as COMESA and EAC. Milk is one of the commodities identified for this program.

7.2 Dairy-Related Livestock Sector Policies

i) Policy on Marketing of Livestock and Livestock Products

Some of the major challenges to livestock development are related to the nature of marketing and marketing infrastructure. Limited market opportunities, lack of storage and agro-processing facilities are key constraints in the marketing of agricultural produce. To improve the farmers' access to local and international markets, there is need to formulate an appropriate marketing policy. This has been identified as one of the priority areas for intervention under the PMA. A committee has been constituted to develop strategies for marketing and processing of agricultural produce.

ii) Animal Health Policies

Following the recent national policy changes including trade liberalization, privatization, and decentralization, there was a need to revisit policies and Acts related to the control of livestock diseases and delivery of veterinary services.

Accordingly, the following policies have been formulated:

- Policy on delivery of veterinary services
- National Veterinary Drug Policy

To give support to the above policies, the following Acts are being reviewed/formulated;

- Veterinary and Para-Veterinary Bill
- Animal Diseases Act
- The Animal (Prevention of Cruelty) Act
- Cattle Traders Act

iii) Animal Breeding Policy

Until recently, delivery of Artificial Insemination/ animal breeding services was the sole responsibility of government under the Animal Breeding Centre in the Ministry of Agriculture, Animal Industry and Fisheries. Government is now implementing a new animal breeding policy, which provides for a number of reforms in the provision of AI and animal breeding services.

The government has allowed private sector operators to import semen and AI equipment and to administer field AI services. The Animal Breeding Centre has now been transformed into a National Animal Genetic Resources Centre and Data Bank (NAGRC) by an Act of parliament. The new mandate of the centre is to promote, regulate and control as well as, import, export and market animal genetic material, including quality assurance. The organization is responsible for overseeing a transition from the current mainly public delivery of AI services to commercial private sector led delivery.

iv) The Dairy Master Plan

Following a severe decline in performance of the dairy sector in the 1970s and 1980s, a Dairy Master Plan was developed in 1993, in which a number of recommendations aimed at reviving the sector were made.

Some of the key recommendations include:

- Liberalization of the dairy industry
- Restructuring of the government owned dairy processing company, Dairy Corporation into a commercial company to be privatized later
- Establishment of a Dairy Board to take over the development and regulatory functions of the former Dairy Corporation.

v) Dairy Industry Act, 1998

Government liberalized the dairy industry in 1993 and about five years later; Parliament enacted the Dairy Industry Act, 1998, which provided the legal framework for establishment of a body to regulate the liberalized dairy industry. The Act established the Dairy Board as the regulatory body and the Dairy Development Authority (DDA) to implement functions of the Board. The Act also provided for restructuring of the government owned Dairy Corporation into a commercial company; Dairy Corporation Limited (DCL) owned 100% by government but later to be privatized. The privatization process is now in progress.

vi) Dairy Development Authority (DDA)

The Dairy Development Authority is a statutory body mandated to oversee development and regulation of the dairy industry. The objective for establishment of the Authority (DDA) was to provide proper co-ordination and efficient implementation of all government policies, which are designed to achieve and maintain self-sufficiency in the production of milk in Uganda. The Authority thus, promotes production and competition in the dairy industry and monitors the market for milk and milk products.

The secretariat of the Authority became operational in the year 2000 and is now implementing a number of reforms in the dairy sector aimed at improving the quality and marketing of milk and milk products in the country.

7.3 Quality, Standards and Regulations in the Dairy Industry

The Dairy Development Authority is responsible for promoting and monitoring quality in the dairy industry through enforcement of standards and regulations. In liaison with the Uganda National Bureau of Standards (UNBS), the Authority developed new and updated the existing standards in the dairy industry. The Authority (DDA) also produced the dairy industry regulations, which were gazetted as “The Dairy (Marketing and Processing of Milk and Milk Products) Regulations, 2003”, Statutory Instruments No. 26 of 2003.

In order to facilitate the enforcement and monitoring of standards and quality, in the dairy chain DDA registers and inspects all facilities and equipment used to handle, process and market milk and milk products throughout the country. Only operators whose facilities and equipment meet the minimum standards required are given licenses to operate. Registration of new operators is carried out continuously and inspection of facilities and equipment for all operators is carried out on a regular basis.

The Authority also promotes the training of dairy processors and traders on Good Manufacturing Practices (GMP), Hazard Analysis Critical Control Points (HACCP) and International Standards Organization (ISO) certification requirements. In order to enhance quality in the dairy chain, DDA, on behalf of government outlawed the use of certain receptacles/equipment to handle/transport milk, particularly plastic jerrycans and tanks. Most of the operators (traders/hawkers) in the informal channel have been using plastic jerrycans to transport milk on open pick-up trucks, motorcycles and bicycles. They have been advised to use aluminum or stainless steel cans instead.

Another problem that has been adversely affecting quality in the dairy chain is the boiling of milk for sale in the major urban centres. This practice was also outlawed.

The sale of loose unprocessed milk is currently the biggest challenge as far as quality in the dairy chain is concerned. Traders have been advised to begin selling bulk pasteurized milk. Some of the traders have already acquired the locally fabricated pasteurizers. Those without pasteurizers have been advised to contact dairy processing companies to pasteurize their milk at a fee and have it delivered to the coolers. Hawkers and vendors can then purchase the bulk pasteurized milk and sell it in the loose form. The cost of pasteurizing one ton of milk was estimated at

US \$ 25 but the traders bitterly objected to this arrangement, claiming that it would make the business unprofitable. DDA plans to encourage further negotiations between the traders and processing companies before the ban on sale of raw milk is considered.

7.3.1 Code of Hygienic Practice for Milk and Milk Products

DDA in liaison with UNBS developed the code of hygienic practice for Milk and Milk Products. The document provides guidelines for hygienic production and handling of milk and milk products at different stages of the dairy chain. The areas addressed include:

<p>a) Primary milk production include</p> <ul style="list-style-type: none"> i) Environmental hygiene ii) Nature of premises iii) Animal care iv) Milking and milk handling equipment v) Health and hygiene of handlers vi) Hygienic milking practices vii) Collection and storage of raw milk viii) Transport of milk 	<p>b) Handling and Processing Facilities include;</p> <ul style="list-style-type: none"> i) Location ii) Nature of premises iii) Facilities and equipment iv) Personnel v) Maintenance and sanitation vi) Pest control vii) Waste management
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<p>c) Control of Operations; i) Control of food hazards ii) Hygiene control system iii) Incoming material requirements iv) Processing v) Packaging vi) Laboratory control vii) Management, supervision, documentation and records viii) Recall procedures, transportation, and product information and consumer awareness</p>	<p>d) Sale of Milk and Milk Products. The document lays down provisions/requirements for vending outlets, health and hygiene of vendors, as well as transportation and selling of milk and milk products</p>
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7.3.2 The Dairy (Marketing and Processing of Milk and Milk Products) Regulations, 2003

This document lays down the regulations related to;

- i) processing of milk or milk products
- ii) marketing of milk or milk products
- iii) operating of a factory in which milk is processed or is intended to be processed
- iv) controlling a store used or intended to be used for storage of milk or milk products
- v) the business of transportation of milk or milk products and
- vi) dealing in dairy equipment. It is stipulated that a person shall not undertake any or all of the above activities unless that person is registered by the Authority and issued with a registration certificate. The document lays down the requirements/standards to be met by the applicant intending to process or control a store or cooler/freezer outlet as well as the requirements for registration as a transporter.

7.4 Other Policy Issues

7.4.1 Taxation

Traders who set up milk vending outlets are required to pay for a trading license issued by the local government in the area on annual basis. Even milk bulking facilities may be required by the local authorities (Municipal Councils, Town Councils or Sub-counties) to pay for an annual trading license. The fee varies from area to area and depends on the size of the facility but may be as high as US\$ 100 per year or more. Hawkers and vendors who sell milk in urban areas are obliged to pay a small fee ranging between 200/= (US\$ 0.1) and 500/= (US\$ 0.25) per day to the local authorities. In some areas such as Ntungamo town council, dairy farmers who deliver to bulking facilities within the town council are required to pay for an annual license ranging between U Shs 10,000/= and 20,000/= (US\$ 5 and 10) per year depending on the amount of milk delivered per day.

7.4.2 Other Fees

The Dairy Development Authority registers and inspects all facilities for handling and processing of milk and milk products. When a facility meets the minimum requirements, the owner is issued with a registration certificate after paying an annual registration fee. The schedule for the registration fees is as follows:

Category of Operator Amount in U. Shs per year

- Processing Plant - 500,000
- Small scale processing facility - 150,000
- Milk cooler - 75,000 per cooler
- Deep freezer (for milk vending) - 30,000 per freezer
- Milk equipment dealer - 500,000
- Milk transporter - 200,000

One US\$ is equivalent to U. Shs 1650

8.0 Way forwards for enhancing Dairy Investment of Uganda

Dairying is reckoned to be an instrument of social and economic change (Gopalakrishnan & Lal 2000). However, the many challenges facing farmers, traders and processors in this era of liberalization have provided major obstacles in developing an economically oriented dairy enterprise in Uganda. Similar to other sectors of the economy, the dairy sector in Uganda has gone through transition associated with political development of the country.

There has been a significant shift from the predominantly traditional, subsistence dairy production systems to mainly commercial (market oriented) dairy farming. More than 65% of the dairy farming households consume less than 20% of the daily milk production, which is an indication that milk is no longer produced only for feeding the family but as a source of income. Most of the farms are fenced and keep improved dairy cattle whose total number exceeds that of the local ones and are expected to produce more milk.

Integration of crossbred dairy cattle to the sector is imperative for dairy development in the country. This can be achieved in two ways:

(a) Through promotion of large private investment, which at the end will introduce new technology in the sector such as improved genotypes, feed and processing, and

(b) As smallholders will likely continue dominating the sector, government should also promote integration of crossbred cattle into the smallholder sector through improving their access to improved cattle breeds, artificial insemination service, veterinary service, and credit. Similarly, government should also take the lead in building infrastructure and providing technical service to smallholders through NAADs program. Low quality and seasonal unavailability of feed (especially during dry season) likewise remain as major constraints to livestock production in Uganda. These constraints need to be addressed and technological change be promoted to increase milk production.

Owing to poor infrastructure, concentration of milk producers in Kampala areas, seasonal fluctuation of demand for fresh milk, collection problems and perishability of milk, development and promotion of small-scale processing technologies is critical to increasing smallholder producers' participation in the dairy market. Smallholder producers are also facing many constraints which may be responsible for the low production and productivity, and lack of profitability of dairy farming enterprises for example shortage of land, high cost of labour and inputs, lack of capital and access to improved technologies and the generally poor management standards. There is a need for policies that will facilitate a sustainable increase in the productivity of smallholder dairy farms.

Dairy Farmers Co-operatives Unions and Farmer Primary Societies (MCCs) have facilitated the participation of smallholder in fluid milk markets in the South Western Uganda. Milk collection centres are a good example of an agro-industrial innovation, but they are only a necessary first step in the process of developing more sophisticated co-operative organizations and well-functioning dairy markets across different regions. The survival of the farmer primary societies that supply inputs and process and market dairy products will depend on their continued ability to capture value-added dairy processing and return that value-added to their members. Evidence from Kenya emphasizes the importance of milk collection organizations in improving access to market and expanding productive bases. On the other hand, there is a need to stimulate consumption of dairy products in the country through various mechanisms, including school milk programmes as more consumption increase demand for dairy produce and can potentially encourage production in the long run.

A closer look at the development of dairy sector in Uganda indicates that there is a need to have focused interventions more coherently. Development interventions should be aimed at addressing both technological gaps and marketing problems especially at farm level. If the appropriate producer price incentives are in place and input markets are allowed to operate freely, dairy production may respond positively. This has been demonstrated in the Kenyan dairy development that has to some extent similar agro-ecology and production systems.

A long-term solution calls for practical involvement of government in terms of new milk governance and policy support. Stakeholders, associations, donors, farmers, and the private sector should combine their efforts to address the challenges facing this sector. The challenge is to organize the collection of safe good quality milk and provide a constant supply of good quality milk and milk products to meet market demands. At the same time, the market demand for value added products for a range of income levels should be met.

The following are major recommendations for enhancing dairy investment opportunities in Uganda.

- An appropriate understanding of probable market trends and opportunities is needed for policy and planning in the dairy sub-sector. Because demand is highly conditioned by local perceptions and traditions regarding dairy consumption, this understanding should be realistic and based on local realities, not on assumed replication of trends observed elsewhere.
- Animal breed improvement has had dramatic impact on development and growth of the dairy sector in Uganda. The use of exotic and cross bred cattle genetics is a rapid and potentially sustainable path to higher productivity, even among small-scale and resource-poor farmers. At the same time, the failures caused by importing high-grade animals should be noted and avoided.
- Artificial insemination and local breeding strategies need to address the realities of climate and disease risk. Given appropriate breeding strategies and disease control measures, however, it is possible to develop and sustain cross-bred dairy production systems; such systems have often played a key role in dairy development. The production and distribution of crossbreed heifers, provision and distribution of dairy stocks, provision and strengthening of artificial insemination services, and/or bull service were major components of the dairy development projects in the past. Artificial Insemination service is provided only by a government institution, the Animal Breeding Centre (ABC) in Entebbe. The service, though not sufficient is available in urban, peri-urban and rural areas.
- Although it is difficult to capture the role of feed technology it is possible to demonstrate that planted feed technology played a key role in growth in dairy productivity in some parts of the country especially where zero grazing is practiced. Research has shown that the 'appropriateness' of intensive fodder production is much more likely to depend on availability of cheap labor, scarcity of land and good access to milk markets. Where land and labor is scarce intensive silage cultivation and feeding of crop residues to cattle should be practiced.
- Traditional/ informal milk markets have played a key role in dairy development in Uganda. Informal, small-scale markets control over 90% of marketed milk; there is no evidence that this basic structure will change significantly in the next few decades. These facts, which are often overlooked because traditional markets are generally not reflected in national dairy industry statistics, pose several important implications for dairy policy and development. Traditional informal markets have clearly provided an effective, functional link between farmers and consumers which responds to consumer demand: Moreover, such markets are generally those most often serving the needs of small-scale farmers and resource-poor consumers. Therefore, public policy-makers should engage constructively with traditional markets to link them with formal modern industry.
- Dairy Co-operative Societies played a significant role in promoting dairy development in the 1960s and currently in South Western Uganda, primarily by providing a stable market environment and delivering services to farmers. The case of UCCCU which is linking dairy farmers to processors, this same organization is in the final process of establishing a processing plant in Mbarara. Even though, they are not effective than other market channels in their business due to various administrative problems they played key role in linking poor farmers to input and output markets. Therefore, to make investment in dairy co-operative development effective and pro-poor - it should be well managed, placed outside strong political forces and linked to strong demand.
- There must be a link between agricultural research and growth in dairy development. Investment in dairy development through provision of appropriate credit and research technologies to smallholder producers will bring growth and shift producers towards greater commercial orientation, increasing their demand for improved technologies and innovations.
- Imports and exports, as well as macro policy and level of openness of the economy, can play a consistent role in the pace of dairy sector development. Import controls/ restrictions which is not for purposes of enforcing Sanitary Requirements and Food Safety Standards should be reduced or

abolished. By so doing the role of domestic market protection will be relegated to ratification of dairy products.

- Uganda dairy industry currently lacks some categories of products in terms of variety, quality and quantity. These include; milk ice, ice confection, chocolate milk, and fermented skim milk. The processors can seek ways to increase capacity, and invest aggressively in product development.
- The performance of the few milk producing co-operatives operating in South Western have shown that the quantity of locally produced milk currently available to processors and consumers could be increased significantly if effective collection (quality control- platform, chemical and microbiological) tests, transportation, cooling and marketing systems are put in place.
- Milk producer organizations should provide 'support services' to increase clean milk production. An effective and well trained animal health service should be available at any time to look after the health of animals, arrangements should be made for regular vaccination and checking against contagious diseases by the qualified veterinarians.
- Strengthening of the Dairy Development Authority especially at district level is important for the development of the dairy industry. Introduction of programs that will increase milk consumption (e.g. introduction of school milk program) price differentiation (i.e. premium price for high quality milk) are important for increasing milk production and consumption.
- Introduction of measuring facilities at milk collection centres (MCC) at national and regional level to agree on minimum standards for similar products, e.g. standard packaging for pasteurised milk, level of bacterial counts, etc.
- Introduction of packaging regulations which encourage use of hygienically safe milk collection and transportation utensils (metal instead of plastic containers) among informal traders for milk destined for the market through informal channels.
- Addressing milk quality concerns and transforming the informal milk markets based on the concept of business development services (BDS), and be supervised by national regulatory authorities
- To avoid spoilage, milk collection centres should be set up at locations where producers can easily access. Improve on the rural infrastructure.
- As in many African countries, knowledge of hygiene is often not sufficient. Thus, the most important support services regarding clean milk production is "Extension –Education".
- Scaling up of processing technology and sizes of firms may gradually evolve with general economic development of the country.

Uganda has the untapped but time requiring market i.e., its population. Local consumption needs to be improved and supplied at affordable price. With consumers' education, stimulating consumption and offering of milk and by products at an affordable price, the market is tremendous and overwhelming in the years ahead.

Opportunities for entrepreneurship and investment are wide. Production of value added dairy products (product diversification and development), improved animal feed supply, animal health services, animal breeding/heifer production, artificial insemination services, organizing milk collection services, and manufacturing of improved packaging materials are all among the top list to promote Ugandan dairy industry.

The value added dairy initiative addresses specific challenges facing Ugandan dairy industry. This initiative retains and grows farm business, dairy plants and creates good jobs for rural areas. Ugandan dairy producers and processors already have the passion to reinvest in their operations and develop new, innovative products for the neighbouring countries and to the rest of the world at large to enjoy. These initiatives supported by interested private investors provide assistance to compete successfully and build upon the state's strong market recognition and identity.

The private sector must become a key player by providing simple, sustainable technologies that will enable communities to create jobs, raise incomes and reduce poverty; by seeking ways of working together with the national partners pooling their resources (raw materials and human resources) and channelling their energies to achieve shared objectives; by actively involved in creating business that benefits both parties.

Overall, the way forward is building a competitive Ugandan dairy industry on private investment that generates employment and income for smallholder families and provides affordable, high quality, nutritious dairy products for Ugandan consumers. Private investment in the dairy sector requires a reliable source of high volumes of quality milk as raw material, available in concentrated geographic regions. Ugandan milk and milk products must not only be of the highest quality, but also available at prices competitive with imports

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