



BUSINESS PLAN
for
TADB INVESTMENT
FINANCING

Kahama Fresh Ltd -milk processing plant Kihanga –
Karagwe District

Lusato R. Kurwijila
DRAFT FOR COMMENT

**BUSINESS PLAN
FOR
TADB INVESTMENT FINANCING**

**MILK PROCESSING PLANT
KIHANGA - KARAGWE DISTRICT**

**CLIENT: KAHAMA FRESH LIMITED
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Executive Summary

1. Background

M/S Kahama Fresh Ltd (KFL) is a registered company engaged in cattle rearing at NARCO's subleased Kikulula Ranch. The Company has subleased three Blocks (Vitalu) with a total area of 3,500 hectares. The company rears both beef and dairy cattle. The company has capacity to produce about 2,000 to 5000 litres on their farm(s).

M/S Kahama Fresh Ltd. proposes to invest in a milk processing plant to be located at Kihanga in Karagwe District about 10 Kilometers from Kayanga town Centre on the highway to Bukoba Municipality. To this effect KFL has applied for a term loan from the Tanzania Agriculture Development Bank to the tune of about 1.75 Billion shs mainly for purchase of milk processing machinery.

2. SITUATION ANALYSIS

Market Demand: Tanzania is currently reported to have a per capita milk consumption of 49 liters per person per year. Total milk produced in the country stood at 2,452,959 liters by 2019/20. However, most of this milk is consumed at source and only about 10% is marketed off farm and about 3% of total production processed. The 2019/20 data show that demand for processed milk is about **112,771,374** liters per annum. There is a demand-supply gap for processed milk which is filled by imports. It is estimated that in 2019/20 the gap in processed milk in the country was about 110 million liters per annum. This gap is projected to increase due to population increase and rise in per capita income. Total demand for milk in the country is projected to reach 2,811,987,329 liters in 2024/25 (Tanzania Livestock Master Plan- MLF, 2017).

Market Competition: Several milk processing plants have been installed around the major urban cities. They include Tanga fresh in Tanga region, Dar Fresh in Dar es Salaam region, Azam in Dar es Salaam and Zanzibar, ASAS in Iringa region, Galaxy Dairy Food Ltd (Kilimanjaro Fresh) and Grand Deman Ltd. in Arusha. There are also numerous small scale milk processors in various parts of the country including, Kondiki and Nnornga Women Dairy Cooperative in Kilimanjaro Region, Shambani Milk in Morogoro, Njombe Milk Factory in Njombe and CHAWAKIMU in Cost region. Products manufactured include pasteurized milk, Mtindi, UHT and ESL milk, yoghurt and some cheese. Currently, the largest market for market milk (Pasteurized, UHT and ESL) is the major cities of Dar es Salaam, Dodoma and Arusha with Dar es Salaam accounting for more than $\frac{3}{4}$ of the market share. Some smaller cities and towns such as Bukoba, Geita, Shinyanga, Kahama and Mwanza are undersupplied with processed milk products.

Challenges/Threats: The big threats for Kahama Fresh milk and milk products includes in the Lake zone market and beyond includes imported milk and milk products, and unorganized local milk producers and informal milk traders who sell substandard raw milk to consumers and low productivity of smallholder cattle keepers/dairy farmers and seasonality of milk supply. Important to note is that the East African Customs protocol on milk and milk products between EAC members which came into effect in 2010 allows free import duties. Furthermore, imports outside of EAC are subject to import duties, CET and VAT, Milk and milk products except raw milk and pasteurized milk are subject to 18% VAT.

3. TECHNICAL AND OPERATIONAL PLANS

Land and related infrastructure: The factory will be built on a 64,000 m² plot located at Kihanga in Karagwe District. The buildings will comprise of factory building, utility and boiler room, cold rooms. Laboratory ,store, administration building and washrooms.

Building and Construction Cost: The Civil works Comprises of the main Production plant building, Raw material (packaging material) warehouse, administration block and site development (site clearance, fencing, paving and drainage system). Therefore, the total cost for civil works is estimated to be TZS 250,000,000. This cost will be met by the project promotor's own equity investment.

Machinery requirement: The plan will require various machines for processing raw milk into various milk and milk products. The total amount for purchase and installation of machinery and equipment is estimated to be **TZS 1.650 billion**(CIF inclusive).

4. MANAGEMENT STRUCTURE

Kahama Fresh Ltd dairy plant will comprise of five departments namely Production Department, Financial Department, Human Resource Department and Logistics and Marketing Department. The Plant will have a total number of about 30 employees. The plant will be managed by General Manager who will be the overall in charge of the plant day to day activities. The General Manager will be assisted by the Financial Manager, Production Manager, Marketing Manager, Human resource Manager and Logistics and Marketing Manager. Daily technical operation of the plant will be managed by the Technical personnel with in depth knowledge in milk processing Industries.

5. FINANCIAL ANALYSIS

Projected Financial Statements: The total investment cost is estimated to be 2,480,000,000TZS The project Finance assumes that the cost of land and buildings is covered by the promoter. The rest will be covered by bank loan for a period of 5 years at 15 % interest rate p.a. The promoter contribution is estimated to be 29.4%

while the rest 70.6% will be raised from the designated bank. Financial analysis shows the following:

At 15% discount rate, the project has:

- a) Net Present value (NPV) at 15% interest rate is 2,076,903.17TZS
- b) Internal rate of return of 17.9% which is above bank interest rate
- c) Payback period will be between 4 - 5 years which suit loan recovery within short time.
- d) Break even revenues during the first year is 4,905,377,000 and increases tremendously

Sensitivity Analysis: the sensitivity analysis is projected based on the changes in sales - which can also refer changes in price levels, keeping the costs of production and operations constant. Based on the various scenarios, it seems the project is viable up to 30% changes in profits - adversely.

Conclusion and Recommendation:

Based on technical and financial analysis, the project is technically and economically viable and will pay back withing a reasonably short period.

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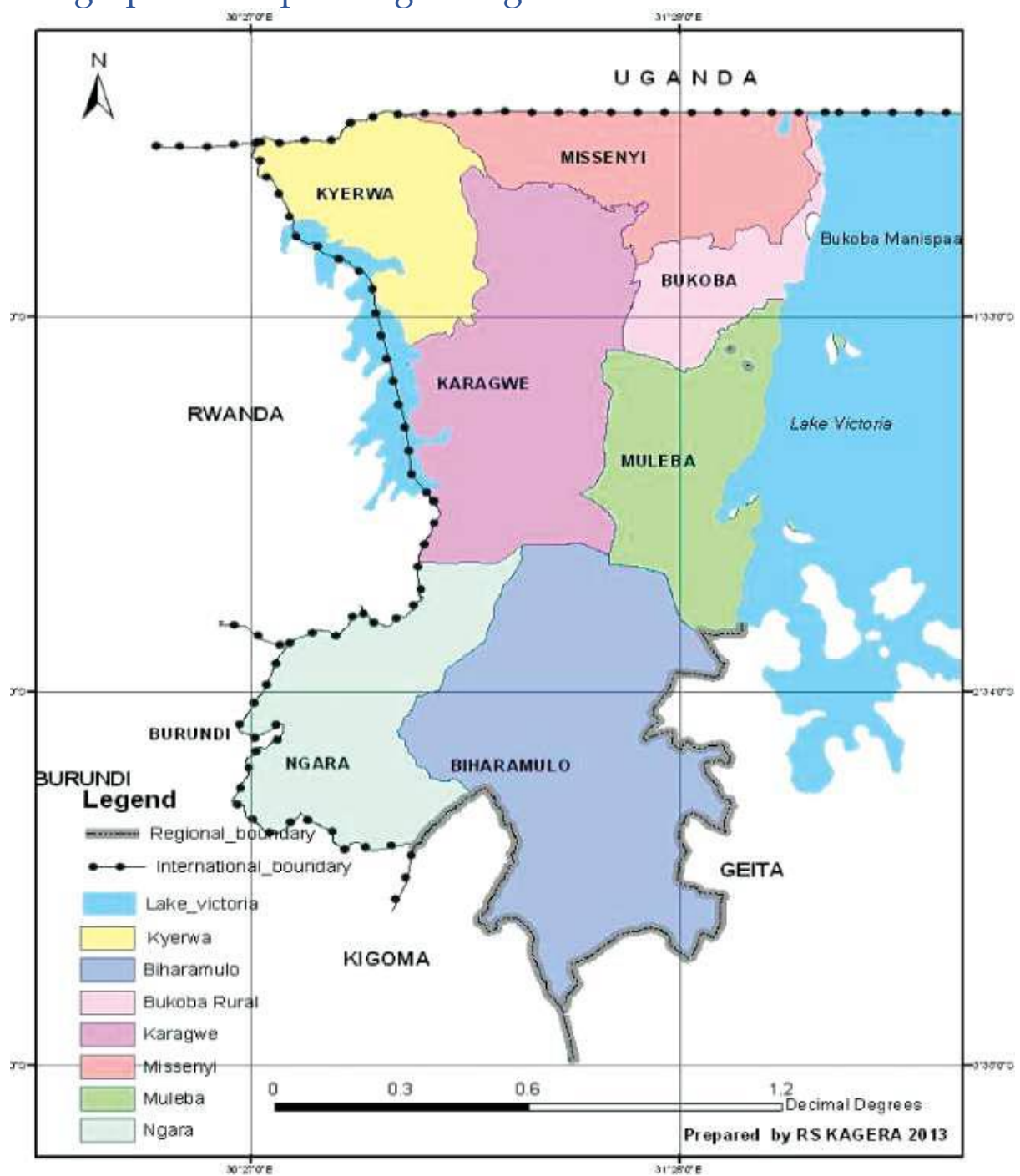
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List of Acronyms

ESL	Extended shelf life milk
IBT	Ice Bank Tank
IRR	Internal rate of Return
KFL	Kahama Fresh Limited
kVA	Kilovolt Amperes
LPD	Litres per day
MCC	Milk collection Centre
NARCO	National Ranching Company
NPV	Net Present Value
TADB	Tanzania Agricultural Development Bank
UHT	Ultra High Temperature

Geographical map of Kagera region



1. ORGANISATIONAL PLAN

1.1 Description of the business

1.1.1. Background

M/S Kahama Fresh Ltd is a registered company engaged in cattle rearing at NARCO's subleased Kikulula Ranch. Kahama Fresh Limited (KFL) was registered under Companies Act, 212 in 15th January 2018 as a Limited Liability Company with registration No. 140464 and TIN 136-818-295. The Company has subleased three Blocks (Vitalu) with a total area of 3500 hectares. The company rears both beef and dairy cattle. Through crossbreeding the company also produces a considerable number of heifers annually. Milk produced is currently sold in raw form to consumers in Karagwe and Bukoba Municipality. The company has thus far invested in a network of raw milk collection and distribution centres at various strategic locations in Karagwe, Bukoba Municipality and other locations.

1.1.2. Products and services

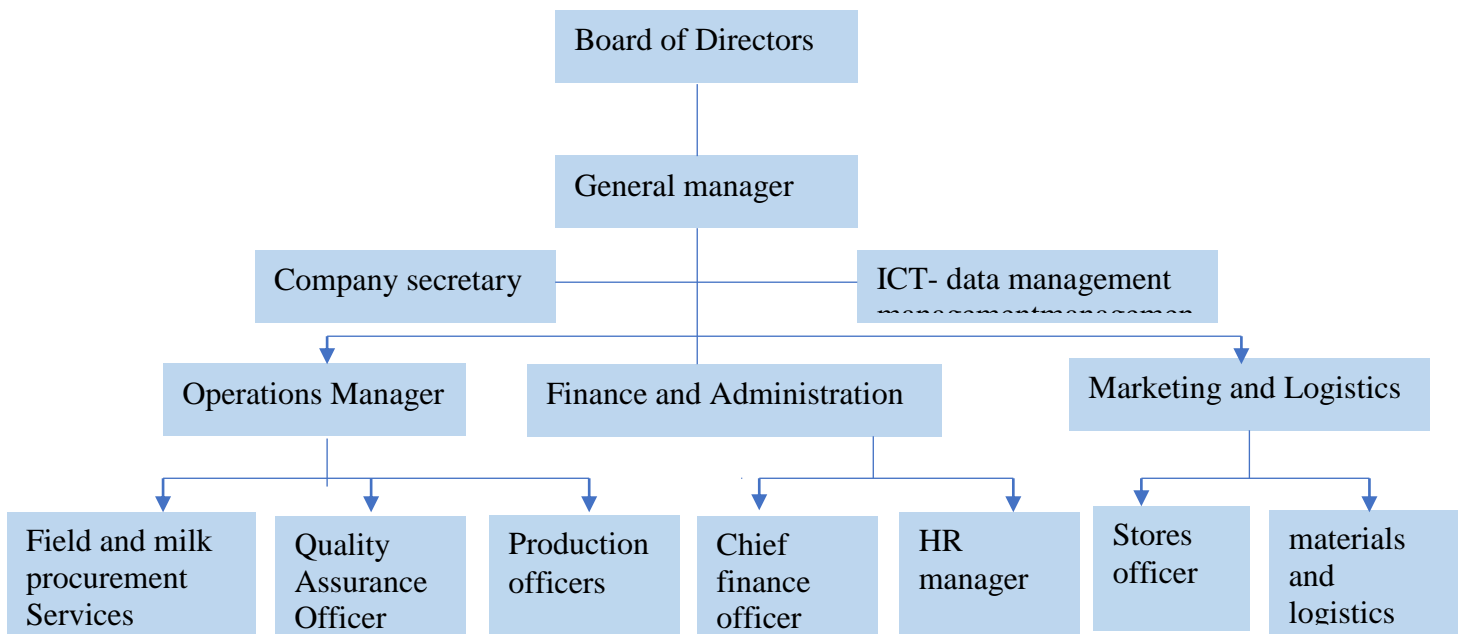
M/S Kahama Fresh Ltd. proposes to invest in a milk processing plant to be located at Kihanga in Karagwe District about 10 Kilometers from Kayanga town Centre on the highway to Bukoba Municipality. It is planned to process milk produced on their own farms (on average about 3,000 liters per day) and milk procured from other ranches in the area as well as smallholder dairy farmers. The proposed project entails construction and Installation of medium scale milk processing plant that will process raw milk into market fluid milk and other related milk products such as fermented milk ("*Mtindi*") and yoghurt. By products will include cream and butter or ghee from the excess milk fat. Milk processing will involve several important steps such as milk reception, quality testing, standardization, homogenization and pasteurization before being packed in various packaging materials. These processes will determine the scope of modern technologies and auxiliary associated equipment that will be employed. Pasteurization process intends to destroy pathogenic microorganisms without affecting the test and nutritional value of milk. The targeted market for the processed milk and milk products will be the local population in Bukoba Municipality and other Districts in Kagera Region, as well as neighbouring regions of Geita, Mwanza, Shinyanga, Simiyu, Manyara, Dodoma, Singida and Dar es Salaam. However, the products will be sold all over the country and also to the neighboring countries.

To this effect, the Company has applied for term loan financing of the proposed dairy plant from the Tanzania Agricultural Development Bank. This Business plan write up demonstrates the project's technical, economic, social and environmental viability and sustainability.

1.1.3. Management structure

KFL will be under the overall direction of a Board of Directors of the company constituted by shareholders and the company General manager as the Chief Executive Officer (CEO). The Board of the company will be responsible for policy guidance and control of the company affairs.

The GM will manage the day to day affairs of the company. He/she will be a Tanzanian or East African with at least 5 years' experience in managing a dairy enterprise or similar enterprise in the Tanzania or E. Africa region fluent in Kiswahili and English. The GM will have a postgraduate qualification in Business administration, Finance or marketing. A first degree in any process engineering or food engineering will be an added advantage. The GM will be assisted by three managers; Operations Manager, Finance and Administration and Marketing and Logistics. The organogram is show below.



1.1.4. Personnel requirement

KFL will employ both skilled and unskilled labor. There will be about 30 permanent employees. The total human resources requirement for the proposed milk plant is 29 permanent employees as shown in Table 1.

1.1.5 Job creation

The project will create about 59 direct jobs including casual employees and about 4 jobs more for every 100 litres processed and sold. i.e. a total of **400** more jobs along the value chain from production to retailing of milk and milk products.

1.1.6 Record keeping

All production and financial records will be maintained in a company's data base. As much as possible, all records and data will be computerized and an ICT and data management specialist will work directly under the GM.

Table 1: Estimated personnel requirement and their remunerations

S/N	Job title	No. of Persons	Monthly (TZS)	Annual (TZS)
1	Plant Manager	1	1,500,000	18,000,000
2	Finance / Admin Manager	1	1,000,000	12,000,000
3	Sales & Procurement Manager	1	700,000	8,400,000
4	Accounts Assistant	1	450,000	5,400,000
5	ICT and data manager	1	400,000	4,800,000
6	Shift Supervisors	1	400,000	9,600,000
7	Secretary	1	350,000	4,200,000
8	Plant Operators	6	200,000	14,400,000
9	Laboratory Staff	2	500,000	12,000,000
10	Procurement / Sales Staff	2	400,000	9,600,000
11	Mechanics	2	250,000	6,000,000
12	Drivers	2	250,000	6,000,000
13	Casual Laborers	2	100,000	4,800,000
14	Security Guards	2	150,000	10,800,000
15	Staff Benefits		1,515,000	18,180,000
16	Total	31	11,615,000	139,380,000

2. SITUATION ANALYSIS

This section comprises analysis of the business environment and the industry trends taking into account policy, laws and regulations concerned with and impacting the industry and the business community in country as whole. It further analyzes the market segments for milk and milk products demand in Tanzania.

2.1 PESTEL Environment scan

2.1.1 Policy and Institutional Environment

According to the East African Customs protocol milk and milk products are among the sensitive agricultural products and hence protected by a common external tariff (CET) of 60%. Accordingly, trade in milk and milk products between EAC members stated is free of import duties effected January 2010. This policy exposes the domestic industry to regional competition within EAC. Imports outside of EAC are subject to import duties, CET and VAT, Milk and milk products except raw milk and pasteurized milk are subject to 18% VAT.

The industry is regulated by various laws and regulations including, the Animal Diseases Act, the Tanzania Bureau of standards Act, The Dairy Industry Act and its regulations, Environmental Management Act, Occupational Health Act, Fire and Rescue Act, Weights and Measures as well as various local government (LGAs) by-laws which attract various fees and levies. The *Blue Print for Regulatory Reforms to Improve the Business Enabling Environment (BEE) in Tanzania* addressed some of the regulatory burdens arising out duplication of some of the regulatory mandates by various agencies in order to improve competitiveness and efficiency.

The Blue Print recommended rationalization and harmonization of Laws and regulations that impact negatively on the national BEE. A recent study commissioned by the Ministry of Livestock and fisheries development (MLF) showed that on average, regulatory burden of the consumer price of milk amounts to about TZS 200/litre. At the processor level the regulatory burden may be as high as TZS 137 /litre for a small-scale processor to about TZS 50 per litre for large scale processor (TAM-Project, SNV, 2019). Any investment in milk processing need to take into account this inevitable cost as it impacts negatively on business profitability.

2.1.2 Economic trends and impacts

The Tanzania economy has recorded impressive economic growth rates in the last several decades averaging at GDP growth of over 6%. The agriculture sector has been growing at an average of 3.2 %. The livestock sector contributed 7.1% of national GDP in 2017/2018. The dairy industry contributed 30% of the livestock sector GDP and 1.2% of the national GDP.

Tanzania is implementing its 2nd five-year development plan 2016-2021 whose main focus is industrialization of the economy. The dairy industry has shown great potential to contribute to the industrialization agenda. The number of industries has increased from 78 in 2015/16 to 99 in 2018/2019 (Table 2).

Table 2: Performance of Milk Processing Industry in Tanzania

Item	2015/16	2016/17	2017/18	2018/19
Number of dairy plants	78	81	82	99
Number of working	68	65	76	93
Installed capacity p.a. (x10 ⁶)	236.7		276.5	314.7
Processed/annum (x10 ⁶)	61.2	40.1	56.2	70.9
Installed capacity p.a. (000 l/d)	648.4		7575	862.1
Processed ('000 l/d)	167	112.3	154.1	194.3
Capacity utilization %	25		20.3	22.5

2.1.3 Ecological trends and impacts

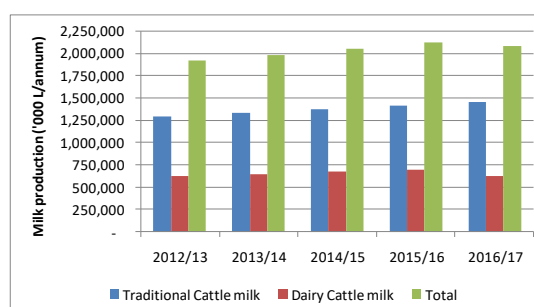
The dairy herd is predominantly held by smallholder farmers concentrated in the Northern Highlands, Southern Highlands and in the coastal zone (Tanga, Dar es salaam, Morogoro and Coast regions). Around the Lake Zone, Kagera region has the highest concentration of dairy cattle numbering about 20,438 head and a sizeable herd of indigenous cattle (730,000). There about 54 large scale dairy farms (LMP, 2016). The traditional cattle herd is concentrated in seven regions (Shinyanga, Morogoro, Arusha, Tabora, Singida, Manyara, Mara) which account for 65% of total cattle population; the highest cattle population density (70-100 head/km²) is found in Mwanza, Shinyanga and Manyara regions (NBS, 2012)

2.1.4 Social context and impacts

Milk production is a predominantly rural occupation involving hundreds of thousands of households. The sub sector is therefore a source of livelihoods and nutrition security for millions of households and generation 3-4 employment opportunities for every 100 liters of milk that is produced and processed. The potential poverty reducing impacts cannot be overemphasized.

2.1.5 Technological

Milk is produced from traditional cattle herd (28 million head) and improved crossbred dairy cattle (1.104 million head). Total milk production is estimated at 2.4 billion liters, 70% of which comes from the traditional herd. While the dairy herd accounts for 30% of total milk produced, it contributes 70% of milk marketed off-farm and reaching the urban markets. Figure 1 shows the trend of milk production from



the two production systems in the last 5 years.

The dairy herd is predominantly held by smallholder farmers concentrated in

Figure 1: Milk Production Trend in Tanzania

by the

Northern Highlands, Southern Highlands and in the coastal zone (Tanga, Dar es salaam, Morogoro and Coast regions). Around the lake Zone, Kagera region has the highest concentration of dairy cattle. There about 54 large scale dairy farms (LMP, 2016)

2.1.6 Legal environment

Since 1994/95 the government divested its interest in operation of milk processing and privatized the seven government owned plants operated by the defunct Tanzania dairies Ltd. (TDL). Since then all the investments in milk processing are being done by the private sector. The Government actively encourages and promotes private sector investors in the milk value chain. Kahama Fresh limited is therefore a registered and regally recognized entity that is responding to the government initiatives contributing to industrialization of the national economy in accordance with the 2nd Five Year Development Plan 2016-2021.

3. THE MARKETING PLAN

3.1. Market Analysis

Market for pasteurized milk, UHT milk, fermented milk and yoghurt have shown a growth trend during the last decade. Currently processed milk and milk product have attracted a good market in big cities of Dar es salaam, Arusha, Dodoma, Kilimanjaro and Mwanza where by 70% of the processed milk products is being sold through specialized agents and milk shops.

The urban markets are deficient in good quality processed milk. As a result, informal milk traders cover the gap by supplying adulterated, poor quality raw milk. Organized collection, processing and marketing of milk is done by very few dairy plants, especially in the Lake zone. The plan is to market **KahamaFresh** milk and milk product in urban areas and cities and towns of Bukoba, Geita, Mwanza, Kahama, Shinyanga, Bariadi, Singida as well as Dodoma and Dar es Salaam. For effective penetration of the target markets brand development and promotion strategies will be adopted.

3.2. Market Concentration and industry trends

According to recent study by the Tanzania milk processors association (TAMPA, 2016), the major products demanded in Tanzania are UHT milk followed by cultured milk while pasteurized milk which faces competition from raw milk sales occupies 3rd position.

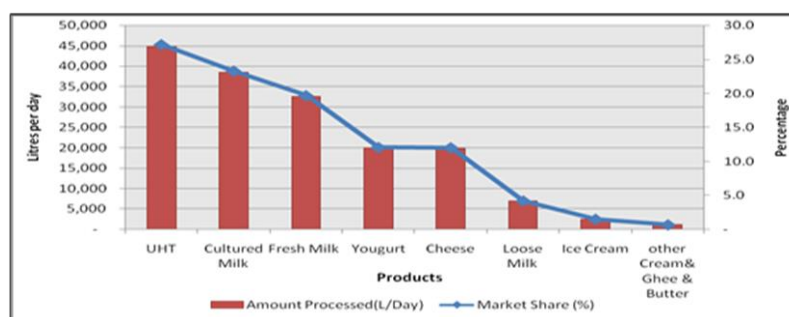


Figure 2.: Market Share of Dairy Products Processed in Tanzania Source: TAMPA, 2016

Five largest processors command over 50% of the market but none has a market share of more than 33%. This implies that there is no monopoly in the market. Hence smaller processors are

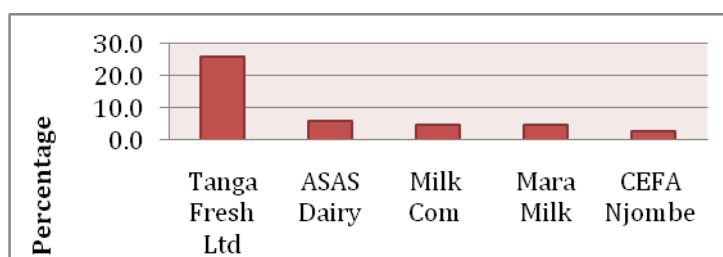


Figure 3: Top 5 Leading Milk Processing Companies Source, TAMPA 2016.

also able to compete for market share,

3.3. Competition and competitive advantage of Kahama Fresh Ltd.

Several milk processing plants have been installed around the major urban cities. They include Tanga Fresh in Tanga region, Dar Fresh in Dar es Salaam region, Azam in Dar es Salaam and Zanzibar, ASAS in Iringa region, Galaxy Dairy Food Ltd (Kilimanjaro Fresh) and Grand Deman Ltd. in Arusha. There are also numerous small-scale milk processor in various parts of the country including, Kondiki and Nnornga Women Dairy Cooperative in Kilimanjaro Region, Shambani Milk in Morogoro, Njombe Milk Factory in Njombe and CHAWAKIMU in Cost region. Recent reports by TDB (2020) indicate there are about 99 milk processors, most of theme micro and small-scale units.

Products manufactured include pasteurized milk, Mtindi, UHT and ESL milk, yoghurt and some cheese. Currently, the largest market for market milk (Pasteurised, UHT and ESL) is the major cities of Dar es Salaam, Dodoma and Arusha with Dar Es Salaam accounting for more than $\frac{3}{4}$ of the market share. Some smaller cities and towns such as Bukoba, Geita, Shinyanga, Kahama and Mwanza are undersupplied with processed milk products. However, some of the milk processing plants are also closed, mostly due to management problems.

Table3: Major Milk Processing Plants in Tanzania

S/NO	DAIRY PLANT	LOCATION	PRODUCT	CAPACITY L/DAY
1	Tanga fresh Ltd	Tanga	Fresh milk, Cultured milk, Yoghurt, Cream, Butter, Ghee and Cheese, UHT milk	120,000
2	ASAS DAIRIES	Iringa	Fresh milk, Culture milk, Yoghurt, Butter, Ghee and Fresh flavored milk, UHT milk, ESL Tetra Fino	100,000
3	Milk com Dairy (Dar fresh)	Dar	Fresh milk, Culture milk, Yoghurt, UHT milk and fresh flavored milk in Tetra Brick; ESL Tetra Fino	50,000
4	Azam Dairy	Dar /Zanzibar	UHT milk, low fat milk; full fat- 1 litre	150,000
5	Galaxy foods & Beverage	Arusha	Fresh milk, Cultured milk, Yoghurt, cream, ESL-Plastic pouch	50,000
6	Grand deman	Arusha	Fresh milk, Cultured milk, Yoghurt, cream,	30,000
7	CEFA njombe	Njombe	Fresh milk, Cultured milk, Yoghurt, cream, Cheese	30,000

In addition to the local competition, there are also other competitors from other countries such as New KCC, Brookside (Kenya), First choice (SA) and Latto (Uganda) which mainly export long life milk into Tanzania. A recent imposition of a import levy of TZS 2,000 per litres has offered an additional level of protection but the resulting price differential has not deterred competition from imports especially in niche markets.

3.4. Target market and positioning

Milk and milk products produced by Kahama Fresh Dairy Plant will be sold to the public through dedicated distributors and agents. Individual distributors will be identified to aid the selling of products to the final consumers. The primary targeted customers for milk and milk products will be the local population of Bukoba, Geita, Mwanza, Kahama, Shinyanga, Bariadi, Singida and Dodoma and other distant place for the long life, ESL milk products.

The products will be presented with the following attributes:

- High quality product- pure, genuine, fresh and unadulterated
- Readily available- when and where needed, close to the customer
- Fairly priced- through efficient milk collection, processing and marketing
- Benefitting the community- providing a ready market for their produce and offering fair prices to milk producers

3.5. Method of distribution and sales

The Kahama Fresh Ltd does not intend to have a complete control of sales and distribution of the company's products. Rather it will use a mix of direct sales through the company's retail outlets and through distributors and wholesaler agents. Due the perishability of some of the products distributors and wholesales will have to satisfy the company that they can maintain a cold chain including having cool boxes and backup electric generators in case of power outages.

Approximately 60% of the products will be sold through whole sale distributors and 40% through own retail outlets in and around Kayanga and Bukoba Municipality. There will be a dairy shop at the factory gate, where customers can purchase products at factory gate prices.

3.6. Value Proposition

To meet the demand for value added products and contribute to Tanzania industrialization agenda, a variety of products will be produced from on-farm produced milk and milk sources from local suppliers. These vertical and horizontal value chain integrations will create both economic and social benefits to Kahama Fresh Ltd and surrounding communities. A list of farmers and farmer groups willing and expecting to supply milk to Kahama Fresh Ltd is shown in Appendix 1.

3.7. Product Positioning and Promotion

Promotion and advertisement of the products will be done and consistently reviewed. Moreover, a very effective promotion network will be established through various media such as TV, Newspaper, Participation in Exhibitions (NaneNane, Saba Saba), Radio, Directory listings such as Yellow Pages and Social media among others. Product distribution vehicles will be branded to prominently distinguish Kahama Fresh Products in the market. KFL will use various

3.8. Product design

The packaging of the various products will be attractively designed so as to give KFL products a unique look and professional presentation. Efforts will be made not to imitate existing competitor's style. Attractive slogans will be coined to evoke customer emotions and sense of belonging towards our products.

3.9. Product Differentiation and Pricing

Kahama Fresh Ltd dairy plant is intended to produce various milk products as shown in Table 3.1. Pricing of milk and milk products will depend mainly on market value and production costs. There will be factory gate price, wholesale price and retailers' prices which will take into account distribution cost and retailers reasonable margin (Table 3.1)

Table 3: Types of Products and their price.

S/N	PRODUCTS	Unit	% OF PRODUCT	Factory gate selling price per unittzs	Selling price per litre, kg
1	Fresh milk- puch	½ litre	10%	795	1,600
3	Fresh milk (Bulk)	1-litre	15%	750	1,500
3	Cultured milk	½ litre	30%	825	1,650
5	Plain Yoghurt	150 mls	10%	330	2,200
6	Flavored Yoghurt	150 mls	15%	350	2,300
7.	Pasteurized milk- ESL	½ litre	12%	1150	2,300
8	Butter 400 grams	400 g	3%	11,500	28,750
9	Cream	175 mls	5%	1,100	6,285
			100.00%		

3.10. Market Segment and location

Although more than 80% of milk marketed in Tanzania is sold in raw form, the market for packaged pasteurized milk and milk products has shown a growth trend during the last two decades whereby locally processed milk has increased from about 40,000 litres per day in 1995 to about 200,000 l/day in 2019. The major market outlets include supermarkets and groceries, hotels and restaurants in all district towns in Kagera regions as well as Geita, Mwanza and other towns, cities and municipalities as well as rural settlements. The following market segments will be targeted.

Table 4. Market segmentation and targeting of products sales

Market segment	Targeted products	Packaging and mode of delivery
Low income earners	Pasteurized milk in pouches; in bulk; Mtindi in pouches	Bulk vending at own outlets, agent vending, street vending in bicycle boys/ girls
Middle income earners	Pasteurized milk in pouches, plain and flavored yoghurt in 150 mls cups bottles, butter	Retail outlets, supermarkets, grocery stores
High income earners	Pasteurized milk in pouches, ESL milk in pouches, yoghurt in 150ml cups	Supermarkets and grocery shops, home delivery
Institutions	Pasteurized milk, mtindi, yoghurt in cups, ESL milk in pouches/ HPDE bottles, cream in bulk	Home delivery in bulk, retail containers
Distant and export markets	ESL milk in pouches/ HDPE bottles, yoghurt in 160 cups, butter, cream	

3.11. Milk Demand and market trend

Tanzania is currently reported to have a per capita milk consumption of 49 liters per person per year. Total milk produced in the country stood at 2,452,959 liters by 2019/20. However, most of this milk is consumed at source and only about 10% is marketed off farm and about 3% of total production processed. The 2019/20 data show that demand for processed milk is about **112,771,374** liters per annum. There is a demand-supply gap for processed milk which is filled by imports. It is estimated that in 2019/20 the gap in processed milk in the country was about 110 million liters per annum. This gap is projected to increase due to population increase and rise in per capita income. Total demand for milk in the country is projected to reach 2,811,987,329 liters.in 2024/25 (Tanzania Livestock Master Plan- MLE, 2017).

Table 6: Estimated processed milk supply and demand in Tanzania in litres (including Imports)

2014	
Total Milk processed (l/day)	166,620
Less: Azam Dairies	45,000
Local milk processed (l/day)	121,620
Local milk processed (l/yr)	44,391,300
Add: total milk imports (l/yr)	68,775,066
Total Supply of marketable milk (l/yr)	113,166,366
Less: Exports	394,992
Total Domestic Consumption (Demand)(l/yr)	112,771,374

Source: TAMPA, UNCOMTRADE

3.12. Market Competition

Several milk processing plants have been installed around the major urban cities. They include Tanga fresh in Tanga region, Dar Fresh in Dar es Salaam region, Azam in Dar es Salaam and Zanzibar, ASAS in Iringa region, Galaxy Dairy Food Ltd (Kilimanjaro Fresh) and Grand Deman Ltd. in Arusha. There also numerous small scale milk processor in various parts of the country including, Kondiki and Nnornga Women Dairy Cooperative in Kilimanjaro Region, Shambani Milk in Morogoro, Njombe Milk Factory in Njombe and CHAWAKIMU in Cost region. Products manufactured include pasteurized milk, Mtindi, UHT and ESL milk, yoghurt and some cheese. Currently, the largest market for market milk (Pasteurised, UHT and ESL) is the major cities of Dar es Salaam, Dodoma and Arusha with Dar es Salaam accounting for more than $\frac{3}{4}$ of the market share. Some smaller cities and towns such as Bukoba, Geita, Shinyanga, Kahama and Mwanza are undersupplied with processed milk products.

3.13. Market Strategy and timing of entry

Tanzania annual demand for milk is estimated to be 2,257,932,645 liters in financial years 2016/17 while the actual processed milk was 58,400,000 liters/ year. Demand for processed milk standards at about 112 million litres including imported milk and milk products. The gap between local supply and demand for processed milk is provides an opportunity for investments in local milk processing. The market strategy would be to attract more consumers away from the informally marketed milk by offering quality and fairly priced processed milk products to consumers, especially the low income and middle-income segment. Hence the market outlook for processed milk is still very good given the prevailing growth in the economy of Tanzania.

Therefore, there is a ready market for amount of milk produced as long as the quality, quantity and selling prices of milk and milk products are right. However significant competitors are observed from outside suppliers who influence value and price. To penetrate such market, the project has to offer high quality milk and milk

products at prices and delivery packages that are competitive and attractive to consumers. Products will be introduced at a time of highest demand, i.e. During the dry season or during the festive season.

4. SWOC Analysis

4.1 Strength

KFL has a number of strengths which include own source of milk, full of skilled human resource, large and unsaturated local market in the lake region and neighboring areas. An already established raw milk distribution network in Kayunga and Bukoba represents a local presence and customer base that will form the foundation for KFL brand.

4.2 Weakness

Being a new entrant in the milk processing business, KFL is likely to be faced with the problem of consumer unfamiliarity with our products but these will be overcome through promotion, advertising, and customer care.

4.3 Opportunity

KFL will enjoy the pioneering market entry advantage as the first company to enter the market with experience from several years of producing and marketing milk in the area.

4.4 Challenges

The big threats for KFL Dairy Milk and milk products include well-known brands of imported milk and milk products. Lack of experienced personnel in milk marketing will be a challenge during the initial years of the project.

5. TECHNICAL REQUIREMENTS AND OPERATIONAL PLANS

The planned Kahama Fresh dairy plant will have a capacity of processing 1,250 litres per hour and therefore be able to process 10,000 litres per day based on one 8 working hours shift. In the following section we describe the technical requirements, design parameters and key processes that will be involved in the establishment and operation of the planned milk processing plant.

5.1. The cattle farming activities

The sub-leased land at Kikulula Ranch covers 3,590Ha of rangeland/farmland with an average livestock carrying capacity of 5-6 ha per Animal Unit (AU). Kahama Fresh Ltd cattle rearing business is a big success with over 4,000 cattle and 1000 head of sheep and goats. The farm(s) produce 2,000- 5,000 litres per day varying with season. The distributions are as follows:

Table 7: Livestock and milk offtake at Kahama milk ranches

SN	BREED	PARTICULAR S	QUANTITY-#	Animal units
1	Bonan/ Ankole	Cows	3,417	3,417
2	Friesian- Dairy	Cows	649	649
3	Calves	Both breeds	198	19.8
4	Goats	Indigenous	1,046	209
5	Sheep	Indigenous	46	9
TOTAL			5,356	4,303.8

The herd distribution at farm no 7 which specializes in Dairy cattle is as follows:

Table 8: Dairy Herd structure at Kahama Fresh Ltd. Unit 7

Herd structure	Number (Count)	Percentage	Standard for stable dairy herd
Total herd	812		
Lactating cows	135	16.63%	43.5%
Dry Cows	317	39.04%	8.70%
Pregnant Heifers	160	19.70%	17.4%
13 - 16 Months Old	53	6.53%	7.8%
7 - 12 Months Old	47	5.79%	11.30%
3 - 6 Months Old (female)	72	8.867%	5.7%
1 Day - 12 Weeks Old (Female)	28	3.448%	5.7%

The herd structure is below range of a well-managed dairy herd indicating a low calving rate and long calving intervals of mature cows. This has to be addressed immediately. Other performance indices such as combined calf mortality is below 10% and mature deaths stand at less than 5%. Disease challenges, especially Tick bone diseases (TBDs) are well managed through regular, twice a week application of acaricides using spray race.

Conclusion

The above analysis indicates that the contribution of own-farm milk (2,000-5000 LPD) is expected to be maintained over the lifetime of the project and poses no major risk to the performance of the project.

5.2. The milk distribution activities

The company owns and distributes milk through a number of milk collection and distribution centres fitted with milk cooling tanks of various sizes. All were visited and observed to be in good working condition and having a standby electricity generator.

Table 9: Investment in milk collection and distribution

Milk Cooling /Distribution centres	Tank Capacity (litres)	Value (TZ shs)	Current Amount received/distributed	% Capacity Utilization (Current)
Kayanga	3,000	15,000,000	2,800	0.93
Omulushaka	2,000	13,000,000	1,800	0.90
Mutukula	1,000	9,000,00	1,000	100.0
Rwamishenye-Bukoba 1	800	9,000,000	560	0.70
Bukoba 2	650	9,000,000	500	76.9
Bukoba 3	2,000	15,000,000	1,700	85.0
Total	9,450	61,090,000	8,360	88.5%

This is a considerable investment in raw milk collection and distribution assets worth about TZS 61 million. It indicates the level of commitment of the promoter to go beyond production of milk and forms a solid entry point into milk processing venture.

5.3. The Plant site and size

Kahama Fresh Ltd has secured a 63,000 m² piece of land at Kihanga area 10 km from Kayunga town centre along the Bukoba-Karagwe highway. The Project is located at Plot No. 19 & 20, Block 'A', Kihanga area Karagwe district, Kagera region.



The site is big enough to host several industrial projects compatible with milk processing and environmental standards. It potentially could become an "Industrial Park". Site development works are in-progress. A borehole has been sunk and the water is of potable quality requiring only additional filtration and treatment to make it suitable for use in industrial processing including steam generation using suitable steam boilers. There is electricity transmission line hence requiring only a step down transformer to be connected to the national electricity grid. The total cost in purchasing land is 150 Million TZS.

It is evident that the on-going works at the plant site is a clear indication of the commitment by the project promoter, using own funds to develop the site for the intended use of milk processing. For a 10,000 LPD plant, a building of 200-300 m² will be required and composed of:

Table 10: Inductive space requirement of 10,000 LPD milk processing plant

Section	Size (m ²)
1. Milk Reception dock	75 (5x 15)
2. Milk processing hall	200
3. Products packaging	100
4. Utility room machinery room (Boiler, Air Compressor, IBT	30
5. Cold room with freezer compartments	50
6. Materials and equipment Store	100
7. Dry Products store	50
8. Workshop and vehicle shed	150(detached)
9. Service wing (Changing rooms, Manager's office)	30
10. Laboratory space (Chemical and Microbiology)	30
11. Production Staff office	30
12. Administration building	60

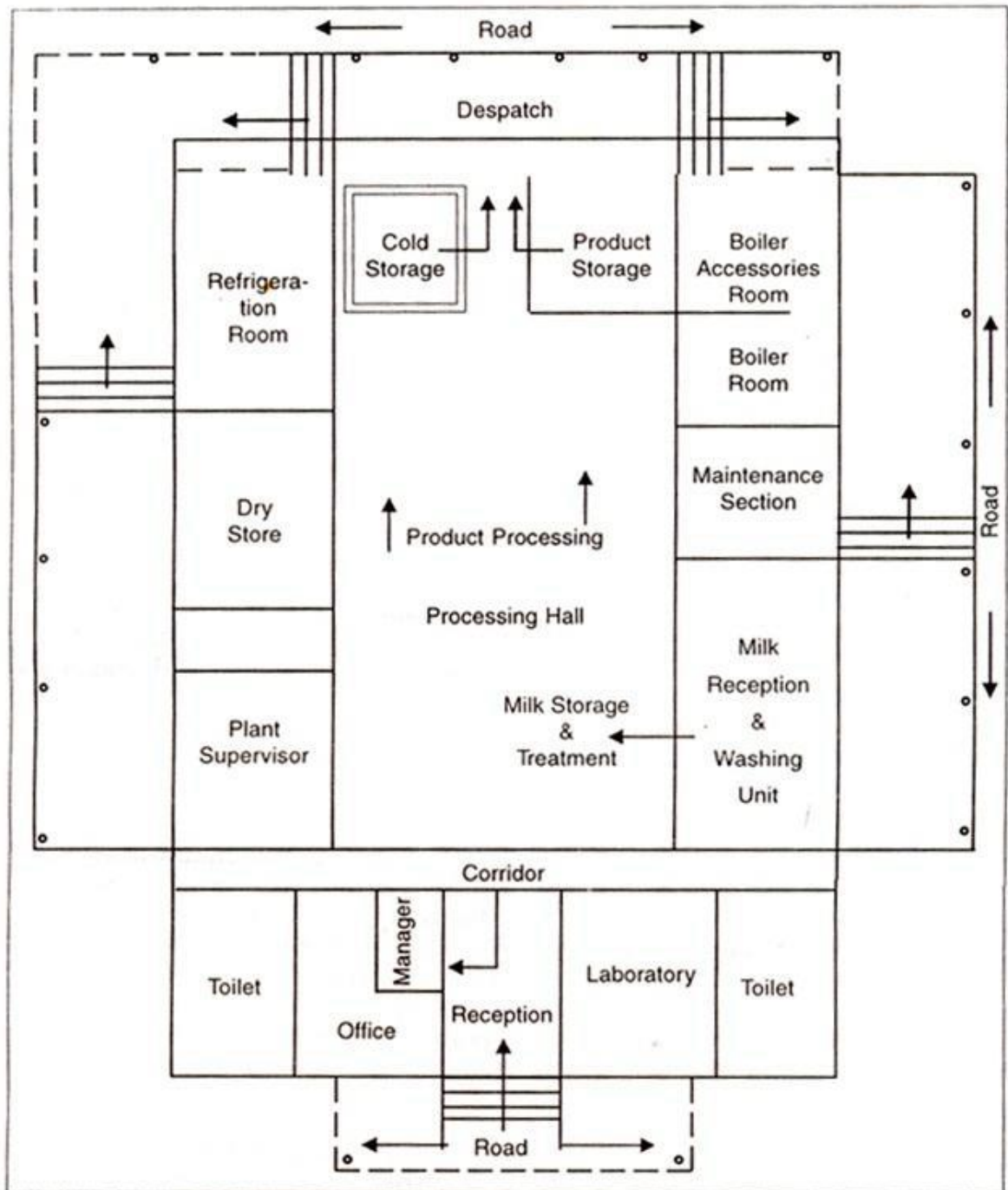
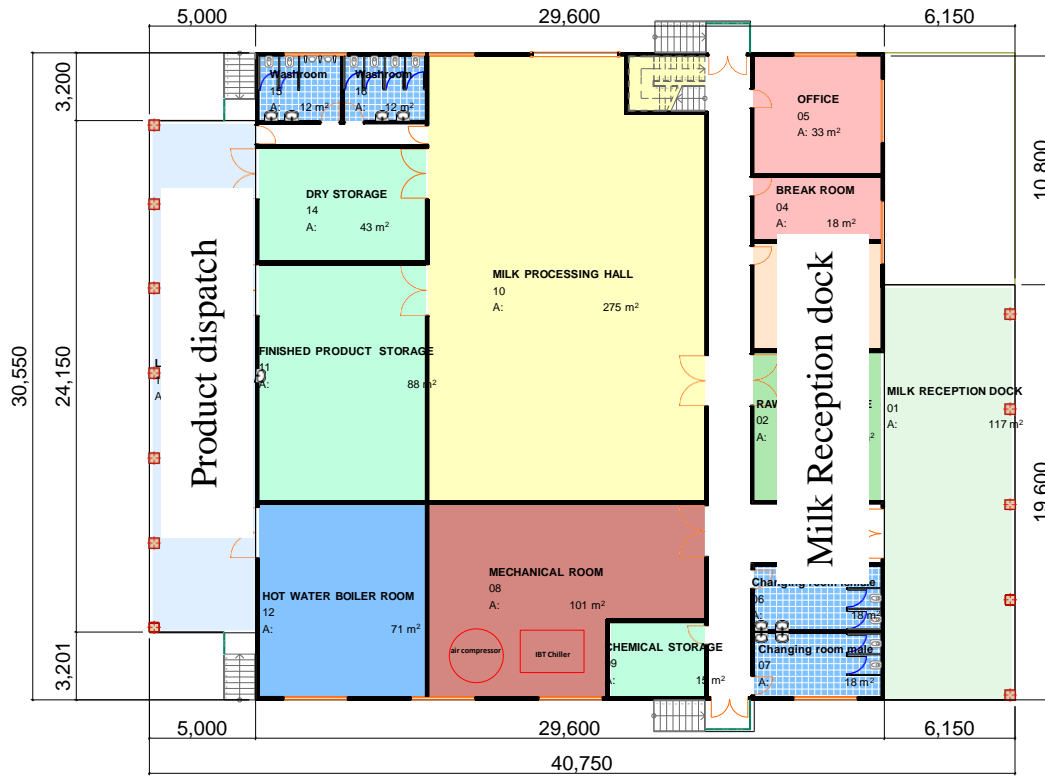


Fig 5: General layout concept of a dairy plant. Some of the offices could be on Mezanine floor overlooking the processing hall.

Fig. 6: Example of Dairy plant layout

PROJECT DETAILS

Plot Size: 3750sqm
 Built Up Area: 1150sqm
 Plot coverage: 30.6%



0. GROUND FLOOR PLAN 1:200

PROPOSED FRESH MILK PROCESSING FACTORY
 KARAGWE TANZANIA
 CLIENT: KAHAMA FRESH LIMITED
 Wednesday, September 23, 2020

DESIGN PROPOSAL Proposed by
 Ground Floor Plan
 1:200
A1.03 MLK

5.4. Operational plan

5.4.1. Milk procurement (supply side)

The supply of raw milk of sufficient quantity and quality is key to success of the project. Apart from the 2,000-5,000 litres of milk per day expected from the promotor's own farms, other sources will include other commercial ranchers in Kagera and out-grower smallholder farmers. Karagwe districts has several ranches that rear both beef and dairy cattle. The number of traditional and dairy cattle is shown in Table 11. From the herd size of both traditional and dairy cattle crossbreds, a calculation of the potential volume of milk produced per district is has been made. The estimates show that Kagera region has annual milk production of around 32 million litres of which about 25 million equivalents to 70,000 litres/day is marketed off farm (Table 11).

If we make a generous assumption that about 30% of this milk could enter the formal marketing channel, then about 22,000 litres/ day would be available for processing. If KFL can capture 50% of this market then a proposition to install a 10,000 litres per day plant is technically feasible and sustainable. KFL would procure about 2,000 - 5,000 of the amount from own farm product and the rest from out growers. A list of potential farmers willing and expecting to access milk market through supply to the planned KFL dairy plant is shown in Appendix 1. During the project cycle milk would be procured at a cost of TZS 600-800 per litre

District	Indigenous cattle	Indigenous cattle Milk offtake/annum ¹⁾	Improved dairy cattle	Improved cattle Milk offtake ²⁾	Total milk offtake/annum	Marketable milk ^{3)/4)}	marketable milk/ day	70% Informal	30% Milk available for processing/ day
Biharamulo	153,232	4,903,424	234	109,475	5,012,899	3,541,871	9,704	7,763.01	2,911.13
Bukoba Rural	44,793	1,433,376	2,769	1,295,449	2,728,825	2,298,812	6,298	5,038.49	1,889.43
Bukoba Urban	2,564	82,048	2,751	1,287,028	1,369,076	1,344,461	3,683	2,946.76	1,105.04
Karagwe	135,829	4,346,528	3,690	1,726,330	6,072,858	4,768,899	13,065	10,452.38	3,919.64
Kyerwa	72,955	2,334,560	1,972	922,580	3,257,140	2,556,772	7,005	5,603.88	2,101.46
Misenyi	69,724	2,231,168	1,686	788,778	3,019,946	2,350,596	6,440	5,151.99	1,932.00
Muleba	165,031	5,280,992	4,464	2,088,438	7,369,430	5,785,132	15,850	12,679.74	4,754.90
Ngara	86,315	2,762,080	2,872	1,343,636	4,105,716	3,277,092	8,978	7,182.67	2,693.50
Regional total	730,443	23,374,176	20,438	9,561,714	32,935,890	25,923,637	71,024	56,819	21,307
Note: 1) Assumption: 20% of indigenous cattle are lactating cows producing 160 litres per lactation year above calf requirement									
2) Assumption: 40% are mature cows of which 68.8% are lactating and produce 1,700 liter per lactation year (MALD, 1987)									
3) Assumption: 30% of indigenous cattle milk is marketed off-farm; (SUA/MoAC/ILRI, 1998)									
4) Assumption: 70% of improved dairy cattle is marketed off-farm (SUA/MoAC/ILRI, 1998)									
5) Assumption: 30% of marketable milk is collectable for milk processing									

Note: that the total number of livestock is lower than that of the 2003 figures which were reported to be 886,473 but higher than 575,926 reported for the year 2015 (Kagera Investment Guide, 2019: http://www.esrf.or.tz/docs/Kagera_investment_guide.pdf)

5.4.2. Milk collection, transportation and product distribution



Milk collection centres are needed whenever milk is to be collected from farmers. An indication of how many MCCs will be established is missing. For a plant processing 10,000 litres 5 milk collection centres with capacity of 2,000 litres per day. Establishing such centres will each cost at least 5 Million TZS including water supply (borehole) and standby generator Cost of building not included.

Related to this would be milk transport tankers or milk cans sufficient for the planned volume of 10,000 litres per day. Insulated and/or refrigerated product transport vehicles (at least two) would also be needed.

5.4.3. Milk Products Processing and Handling

After being received from milk collection centers, raw milk will be checked for quality, weighed and then poured into a dump tank and filtered and then chilled to $< 4^{\circ}\text{C}$ by means of a plate chiller (10,000 L/H). Ice water from ice bank tank (IBT) cooling system will circulate back through a cooling tower before returning to ice bank. This will save energy used in refrigeration. The chilled milk will be pumped (10,000L/H) into an insulated raw milk tank (10,000 L) located in the milk reception area. Thereafter, milk will be pumped to a plate heat exchanger pasteurizer and inline centrifugal cream separator, standardized into whole fat milk (3.25%) or low fat (2.5% fat) as per TBS/EAS standards.

The milk will then undergo pasteurization process. After pasteurization the milk is then pumped into processing tank ready for packaging. The packaged milk and milk products is stored in a cold room before being distributed to selling centers (Figure 4.1).

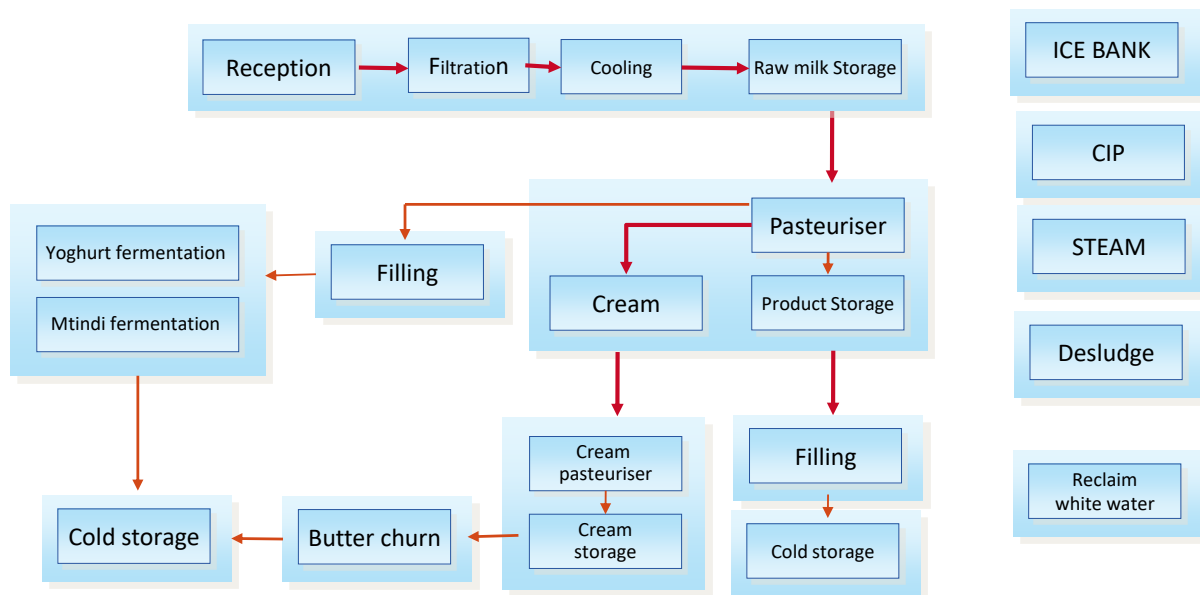


Figure 8: Processing Flow Chart for Pasteurised milk and fermented milks products and butter

5.4.4. Product Mix

Kahama Fresh Milk Plant will process raw milk into various milk products including Fresh pasteurized milk, Fresh flavored milk, cultured milk, plain Yoghurt, flavored Yoghurt, Cream, Butter and/or Ghee. The proportions of the various products will depend on market demand and the need to optimize revenue streams. Assuming 10,000 litres is received per day the quantity of milk products per day is shown in Table 12. An assumption of 1.5-2% of loss due to spillage, leakages and spoilage has been used to estimate final salable products quantities.

Table 12. Estimation of product yield according to product mix.

S/N	PRODUCTS	% Vol. of milk	Volume of milk (litres)	Yield factor	Product quantity (kg)
1	Fresh milk- pouch	10%	1,000	0.99	999
3	Fresh milk (Bulk)	15%	1,500	0.99	1,485
3	Cultured milk	30%	3,000	0.98	2,940
5	Plain Yoghurt	10%	1,000	0.98	980
6	Flavored Yoghurt	15%	1,500	0.98	1,470
7.	Pasteurised milk-ESL	12%	1,200	0.99	1,188
8	Butter 400 grams	3%	300	0.05	15
9	Cream	5%	500	0.125	63
10	Add skim milk, buttermilk (from 8 & 9)				722
		100.00%	10,000	0.9862	9,862

5.4.5. Choice of product to be manufactured

Currently KFL sells milk as raw milk. Hence the company's local consumer clientele is that of low cost milk products consumers. Moving to packaged pasteurized milk would certainly make the cost of packaged products out of the reach of this low-income customer base. A market segmentation analysis would indicate the need to retain this market segment by producing and marketing pasteurized milk in bulk vending tanks or milk cans through the existing milk distribution network for raw milk.



There would be a slight price increase of the pasteurized fresh milk. This would also help KFL to comply with milk marketing regulations which officially prohibit selling of raw milk to the final consumer in retail outlets for on-site consumption. During the survey it was learnt that some consumers purchase the raw milk for on-site consumption.

For the distant markets, longer shelf life products would be beneficial. ESL packaged in HPDE bottles has expected shelf life of 3 weeks only. An alternative is UHT -ESL milk packaged in seven-layer pouches with a shelf life of 3 months. This would enable KFL capture markets in Mwanza, Dodoma, Arusha and Dar es Salaam. Dar Fresh and Kilimanjaro Fresh are producing such a product which is cheaper than paper carton box UHT milk. It is recommended KFL opt for in-pouch UHT -ESL milk technology alongside bulk pasteurized milk, cultured milk and yoghurt during the first 5 years of the project and add on other products as the Kahama Brand gets established.

Other popular products would include cultured milk followed by yoghurt in lesser quantities. Any excess fat arising out of standardization of milk would be converted to table cream or butter. Some ghee may also be made as add-on products depending on the market trend.

5.4.6. Processing Machinery, Auxiliary equipment and Utilities

The factory will require a number of processing machinery, auxiliary equipment and utilities for its operation. The plate exchanger is the principle component (2,000 l/H) and is connected to a centrifugal cream separator and homogenizer and pumps (each 2,000 L/H). Product tank (5,000 x 2) and packaging units. Auxiliary equipment includes water supply equipment (for processing and sanitation); steam

for process heating and sanitation; electricity for powering processing equipment), product cooling, instrumentation, lighting, refrigeration and air conditioning, communication and general office use; compressed air and vacuum line for processing and instrumentation; Ice water plant for product cooling and storage. Another important service is that of waste management. In a dairy plant the majority the waste is in liquid form. This necessitates the use of waste water treatment systems. The quantification of utility requirements is normally based on many factors in addition to the anticipated process volumes and product quality standards. Environmental and geographical factors (temperature, humidity, location, rainfall) are usually taken into account when making such estimates. In this report industrial average values have been used for estimating utility needs .A full list of machinery and equipment and their cost is provided in the pro-forma invoice of one of the reputable suppliers (Appendix 1).

5.4.6.1. Energy requirement

Milk processing is an energy intensive undertaking that needs to be carefully analyzed. Approximately 80% of dairy plants energy needed is met by combustion of fossil fuels (coal, oil or gas) to generate steam and hot water for evaporative and heating processes. The amount of energy needed will depend on volume of milk processed and type of products manufactured, efficiency of insulation of steam and hot and ice water pipes.

Generally, a typical mixed dairy products plant uses 0.5-1.2 MJ/kg of milk processed. The energy consumption for the proposed dairy plant dairy plant has therefore been estimated at maximum of 12,000 MJ per day¹; 80% of which will be fossil fuel and 20% electricity. Twenty percent (3,334 kWh/day) of the energy requirement will be in the form of electricity. So, the electricity consumption for 240-300 days of processing will be 1,000,080 kWh/annum which has to be multiplied by TANESCO's energy cost per kWh.@ TZS 360 (US \$ 0.156) per kWh.

To the energy bill has to be added fuel cost at the equivalent of 80% of 12,000 MJ² which is about 316 litres of diesel per day or 95,000 litres per annum costing about 236 million per annum. Deriving costing in this way provides more realistic values than lumpsum estimates. Another cost element that has to be taken into account is standby diesel generator. For 10,000 LPD milk processing plant, a generator set of at least **125 kVA** would be needed. This will cost about TZS 60 Million.

5.4.6.2. Water requirement

Water is an essential utility in a milk processing plant. Experience from other countries shows that water consumption in dairy processing plants varies between 2.2 - 9.4 m³ per MT of milk processed in the 1970s. By using Cleaner Production

¹1mJ=0.2778 kW-hr.

²1 L diesel=45.0 MJ/kg=37.3 MJ/l (density 0.83 kg/l)

Methods (CPM), European dairies have reduced the water consumption to 1.3 -2.5 m³ per MT of milk processed by the 1990s. the estimated cost is 150Million TZS.

It is estimated that processing one ton of milk at proposed dairy plant would require about 4.0 m³ liters of water including water for heating, refrigeration (ice water), cleaning and sanitation. Therefore at full capacity of production the proposed dairy plant will require 40 m³ of water per day when processing at full capacity of 10,000 litres /day. This more realistic costing has to be incorporated in the financial analysis using current water authority rates which stand at TZS 1,600/m³.

Depending on the quality of the water, filtration and water softening (water treatment plant, 2,000 L/h) may be required. It is proposed an underground storage tank with a capacity equivalent to 5 days production, I.e. 300,000 litres be constructed and an overhead tank of 5,000 L at least 20 meters high will supply the treated water to the processing plant. A costing for water supply should be included in the financial analysis.

5.4.6.3. Refrigeration requirement

Cooling and refrigeration are an integral part of milk and milk products processing. Refrigeration is required for chilling of milk and cold storage of dairy products such as butter. The ice water requirement is met by Ice Bank Tank (IBT). The IBT will run at night for 16-18 hrs. Preparing ice water to be used in manufacturing processes. Cold storage is required for dairy products such pasteurized milk, yoghurt, ice cream etc. Sizing of the refrigeration load should take into account the peak load. Refrigeration temperatures range from -30 °C to -40 °C for ice cream to 1-4 °C for liquid milk cooling. The power requirement is included in the analysis presented above. IBT equipment is included in the quote.

5.4.6.4. Cleaning, sanitation and waste disposal

Milk processing results in considerable amount of effluents from water used in cleaning, cleaning agents such as acids and detergents, and spillage of products and discharge of unwanted by-products such as whey. Discharge of dairy effluents into the environment can therefore cause undesirable pollution. Milk loss to the effluent can amount to 0.5-2.5% of the milk intake and can be as high as 3-4% if cleaner production (CP) methods are not adopted. The handling of waste water must conform to standards and regulations under TBS and NEMC. Costing for CIP unit and waste water treatment is provided for the quote..A provision for chemicals cost (450 million/annum) is included in the financial analysis the estimated investment cost to TSF Pond waste disposal and related facilities is 60Million TZS

5.4.6.5. Packaging materials

The business plan describes different types of product portions such as yoghurt package in 0.2 L, 0.25 L, 0.5 L, 1L etc. In the financial analysis only 0.5 litre packages appear, both for fresh (ESL) milk and yoghurt. Depending on how much of each of the above products will be manufactured per year; an estimate of the cost of packaging materials has been included in the cash flow analysis.

Table 13: Cost of packaging

Item	Cost (Tshs)
Marketing and distribution cost per litre	100
Plastic pouch per litre	150
Tetra brick carton one litre	450
Yoghurt cup 150mls	160
Plastic bottles for yoghurt/litre	450
5-litre plastic gallon	1,500
Butter wrappers, 500g	200
Cheese wrapper, 1kg	100

5.4.6.6. Product manufacture schedule

The proposed 10,000 LPD plant will manufacture a mix of white milk products (market fluid milk products, pasteurized and ESL milk) and fermented milk products as well as cream and butter. It is envisaged that about 6000 litres will be received in the morning and about 4,000 in the evening.

Table 14 shows a typical day processing schedule for a 10,000 LPD plant (2,000 l/hr)

Step	Pocess	Start time	End time	Total time (hrs)
1	Sterilization of plant	7.30	8.30	1.00
2	Milk processing	8.30	13.30	5.00
3	CIP cleaning	13.30	15:15	1:45
3.1	Warm water rinsing	13.30	13.:45	00:15
3.2	Lye circulation	13.50	14.10	00:20
3.3	Hot water rinsing	14.15	14.30	00:15
3.4	Acid Circulation	14.35	14.50	00:15
3.5	Post rinsing (cold water)	14:55	15.15	00:20
Total				

Lyes (dilute Sodium hydroxide and dilute acids are used in cleaning of dairy equipment and machinery.

5.4.6.7. Laboratory equipment

Quality assurance requires a functional dairy laboratory having capacity to carryout both Chemical and Microbiological analysis of milk and milk products. A typical dairy laboratory will cost between US \$ 20,000-30,000. (The business plan estimate to 60,000,000TZS purchasing of equipments and 25,000,000TZS as building cost)

6. FINANCIAL PLAN

6.1. Financial projections

This section presents financial projections for the proposed Kahama Fresh Ltd's dairy plant at Kayanga, Karagwe District, in Tanzania. The financial projection are used as a tool to assess the viability of the proposed investment through term partial loan financing from the Tanzania Agricultural Development Bank, especially for the main capital items like plant machineries and equipment. The projections are based on market assumptions and operation parameters as per technical assessments presented in the previous sections. The financial assessment, on the other hand, provides valuable insights into the financial and economic viability of the project for the promoters.

The financial analysis approach to assess the viability consists of the following elements: Key drivers and assumptions, financial inputs and other resources required e.g. manpower and personnel and financing model, equity financing and bank borrowing; and the expected financial returns as shown by key indicators and ratios such as Discounted Internal rate of return (IRR) and Net Present value (NPV), Break even analysis, Payback period and Sensitivity Analysis

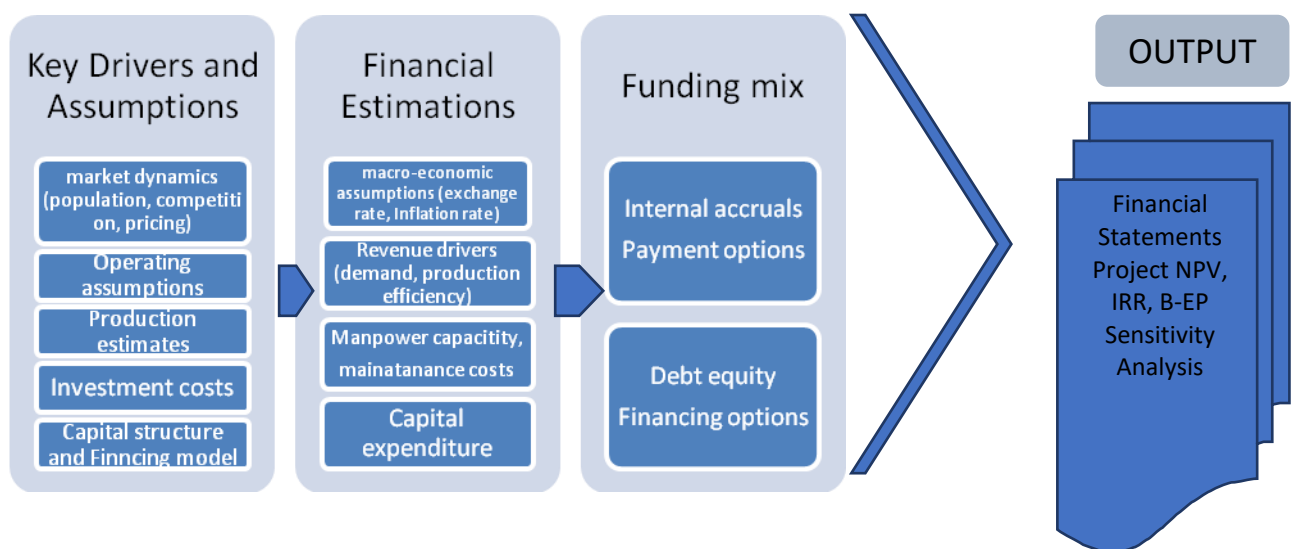


Figure 10: Financial Analysis Methodology

For the purpose of financial viability analysis, financial flows have been calculated based on the expected plant through put per day, with the assumption that the processing will at 7,000 LPD then increase annually at 6% reaching nearly full capacity by year 5. . Revenue assumptions at the retail level have been calculated on the basis of current prices of the products in the market. The revenue streams for the processor is based on prevailing x-factory prices of various dairy products.. The assumptions related to financial costs are drawn from study of prevailing cost of various inputs, accounting principles for factories and manufacturing firms and

aspects related to food industry. The key consideration for the assessment for the project includes:

- Component forming part of key assumptions related to costs are development assumptions of factory and administration components, capital expenditure, operating and financing costs assumptions.
- The machinery costs are met through bank financing option. Its is assumed long term loan at 15% p.a is required from this project from the Tanzania Agricultural development Bank..
- Further investments are considered to original from own equity financing.

The capital expenditure and operational expenditure have been considered for this project. Grace period of this project is six months from the date of funds disbursement as discussed with the financing bank. The indicators used to assess this project viability are: Break-even point, the net present value (NPV) and the internal rate of return (IRR). Any positive NPV shows that the project is viable and IRR above the cost of borrowing prevailing in the market is acceptable, and for this case is 15%.

6.2. Production cost estimates

6.2.1. Asset depreciation costs

The project financial assessment has been based on relevant parameters including:

(i) Life of main assets (ii) applicable regulations (iii) demand situation (iv) capacity of machinery and (v) one production shift of 8 hours.

Assumptions for depreciation used are:

- life of buildings is 40 years,
- processing machines 13 years,
- office furniture 13 years,
- computers and software 4 years and
- 10 years for all types of motor vehicles.

6.2.2. Project Costs

The cost assumptions have been considered based on the guideline provided by industrial experts and machinery suppliers are shown in table 1 (for more details see appendix 1)

Table 6.1: Project Costs

Descriptions	Proposed Investment	Financing	
		Equity	Loan
	(TZS)	(TZS)	(TZS)
Land and Building			
Land	150,000,000	150,000,000	-
Building - Construction	250,000,000	250,000,000	-
Plant and Machinery	1,650,000,000	-	1,650,000,000
Water facilities	150,000,000	150,000,000	-

Office Equipment & Furniture	30,000,000	30,000,000	-
Motor Vehicles + Generator, Operational Equipment	150,000,000	150,000,000	-
Total Fixed Assets	2,380,000,000	730,000,000	1,650,000,000
Working Capital (OD)	100,000,000	-	100,000,000
Total Project Costs	2,480,000,000	730,000,000	1,750,000,000
Percent		29.4%	70.6%

6.2.3. Detailed Project investment summary

Investment Summary	
Fixed Assets	All number in 000TZS
Land acquisition	150,000.00
Total	150,000.00
Buildings and structures	
Service wing (administration, changing room, meeting room etc)	20,000.00
Utility room (boiler, air compressor, IBT)	30,000.00
Cold room with freezer compartments	35,000.00
production packaging room	35,000.00
Milk processing room and reception dock	30,000.00
Laboratory	25,000.00
Material and equipment store	15,000.00
TSF Pond for waste management	60,000.00
Total	250,000.00
Machineries and Equipments	
Boiler, air compressor, IBT machines	350,000.00
Complete set of Lab Equipments	60,000.00
Milk processing machines and packaging	150,000.00
Milk collection faculties from collection point	300,000.00
refrigeration cooling system	229,000.00
Production mixing	200,000.00
production packaging machines	180,000.00
Generators	60,000.00
weighing scales and testing equipments	10,000.00
6 Milk reservoir tanks at collection points and their facilities	61,000,000
Other equipments	50,000.00
Total	1,650,000.00
Motor vehicles	
Motor Vehicles + Operational Equipment	150,000.00
Total	150,000.00

Other Facilities	
Furniture and fittings	30,000.00
Total	30,000.00
Other cost	150,000.00
Subtotal Fixed Assets	2,380,000.00
Current Asset	
Pre operational expenses	20,000.00
Initial working capital	80,000.00
Sub total current Assets	100,000.00
Total Investment	2,480,000.00
Equity	
Loan (70.6%)	1,750,880.00
Equity (29.4%)	729,120.00
Total Equity	2,480,000.00

6.2.4. Revenue projections

Revenue estimation is based on six products (fresh milk, cultured milk plain yoghurt, flavored yoghurt, cream and butter). Table provides more details

Table 15: Revenue Projection

Product	Package	Proportion	Year1	Year2	Year3	Year4	Year5
Fresh milk-puch	½ litre	10%	332,640,000	503,712,000	549,952,762	600,438,425	655,558,673
Fresh milk (Bulk)	1-litre	15%	467,775,000	708,345,000	773,371,071	844,366,535	921,879,383
Cultured milk	½ litre	30%	1,018,710,000	1,542,618,000	1,684,230,332	1,838,842,677	2,007,648,435
Plain Yoghurt	150 mls	10%	452,760,000	685,608,000	748,546,814	817,263,412	892,288,193
Flavored Yoghurt	150 mls	15%	710,010,000	1,075,158,000	1,173,857,504	1,281,617,623	1,399,270,121
Pasteurized milk-ESL	½ litre	12%	573,804,000	868,903,200	948,668,514	1,035,756,283	1,130,838,710
Butter 400 grams	400 g	3%	90,562,500	137,137,500	149,726,723	163,471,636	178,478,332
Cream	175 mls	5%	82,490,625	124,914,375	136,381,515	148,901,338	162,570,480
		100%	3,728,752,125	5,646,396,075	6,164,737,535	6,730,661,929	7,348,537,627
% increase				34.0	8.4	8.4	8.4

6.2.5. Production Related Costs

Production costs are related to the costs of revenue which include cost of raw materials and packaging materials, chemicals and ingredients. The cost of raw materials is estimated to be 64% of the revenue costs.

6.2.6. Operating Costs

The key operational costs comprise of staff for the management and facility operation, utilities based on the assumption, maintenance of the infrastructure, local government taxes and levies such as property tax and rent. Operating costs assumptions shown below have been taken as per prevailing industry norms and typical market practices relevant to similar projects.

Table 16: Operating Costs

	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue Gain	3,728,753	5,646,397	6,164,738	6,730,662	7,348,538
Salary and Wages	125,928	128,458	131,027	133,648	13,632
Electricity	360,000	360,000	360,000	360,000	360,000
Water	20,000	20,000	20,000	20,000	20,000
Fuels for steam boiler	236,000	236,000	236,000	236,000	236,000
Regulatory fees (TDB, TBS, NEMC, OSHA, FIRE, LGAs)	210,000	222,600	235,956	250,113	265,120
Payrol levy (3%)	3,708	3,782	3,858	3,935	4,014
Distribution Expenses	30,525	31,135	31,758	32,234	32,718
Motor Vehicle Expenses	45,178	11,294	11,520	11,693	11,869
Medical Expenses	5,850	4,973	5,072	5,148	5,225
Spare and Machines Maintenance	53,311	11,622	11,854	12,032	12,213
Directors remunerations	20,096	11,052	11,274	11,499	12,072
Branding and Labeling	13,859	10,394	10,602	10,814	11,355
Legal fees	7,335	6,235	6,359	6,487	6,811
Audit fees	8,501	7,226	7,370	7,518	7,892
Sales and Marketing	65,437	9,816	10,012	10,212	10,723
Rent for collection centre's	24,040	24,040	24,040	24,040	24,040
GRAND TOTAL (Rounded"000")	1,229,768	1,098,627	1,116,702	1,135,373	1,033,684
% of Revenue	33	26	24	21	20

Table 17: Cost of Revenue

	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue	3,728,752,125	5,646,396,075	6,164,735,235	6,730,657,929	7,348,532,327
Cost of Revenue					
Raw Milk (TZS)	1,470,000,000	1,604,946,000	1,752,280,042	1,913,139,350	2,088,765,543
Cost of packaging	751,000,000	751,300,000	751,609,000	751,927,270	752,255,088
Chemicals, ingredients	450,000,000	452,250,000	453,380,625	455,647,528	457,925,765.00
Total Cost of Revenues	2,671,000,000	2,808,496,000	2,957,269,667	3,120,714,148	3,298,946,396
% of Revenue	72%	50%	48%	46%	45%

6.2.7. Projected modelling and analysis

The main objective of the financial modelling and analysis is to setup a financial model framework for potential generated revenues and operational & maintenance costs for the full operation of the factory based on the assumptions taken for the Market Analysis, the plan for the facility development, unit production costs and other overhead and operational charges.

The scope consists of a financial model that will be used to analyse the potential financial viability of the project based on the assumptions taken for the concept and scope of the factory on the Market Analysis. The financial model has been developed in excel spread sheet and include information on costs, expenses and the subsequent sales revenue based on the average market prices and linked to the financial cash flow.

Table 19: Projected income statement

Income Statement Projections							
(all numbers in 000TZS)							
Revenue							
All figures in 000TZS	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Revenue Generated from sales of milk and milk products	-						
Fresh milk- puch		332,640	503,712	549,953	600,439	655,559	2,642,302
Fresh milk (Bulk)		467,775	708,345	773,371	844,367	921,880	3,715,738
Cultured milk		1,018,710	1,542,618	1,684,231	1,838,843	2,007,649	8,092,051
Plain Yoghurt		452,760	685,608	748,547	817,264	892,289	3,596,467
Flavored Yoghurt		710,010	1,075,158	1,173,858	1,281,618	1,399,271	5,639,915
Pasteurised milk-ESL		573,804	868,903	948,669	1,035,757	1,130,839	4,557,972
Butter 400 grams		90,563	137,138	149,728	163,473	178,479	719,381
Cream		82,491	124,915	136,382	148,902	162,571	655,261
Total Operating Revenue	-	3,728,753	5,646,397	6,164,738	6,730,662	7,348,538	29,619,087
Expenses							
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Salaries and wages + pension contribution		125,928	128,458	131,027	133,648	13,632	532,693
Raw Milk Purchase		1,470,000	1,604,946	1,752,280	1,913,139	2,088,765	8,829,130
Cost of packaging		751,000	901,200	1,081,440	1,297,728	1,557,274	5,588,642
Chemical ingredients		450,000	452,250	453,381	455,648	457,926	2,269,205
Electricity		360,000	360,000	360,000	360,000	360,000	1,800,000
Water		20,000	20,000	20,000	20,000	20,000	100,000
Fuels for steam boiler		236,000	236,000	236,000	236,000	236,000	1,180,000
Distribution Expenses		30,525	31,135	31,758	32,234	32,718	158,370
Medical expenses		5,850	4,973	5,072	5,148	5,225	26,268
Spare and Machines Maintenance		53,311	11,622	11,854	12,032	12,213	101,032
Motor Vehicle Expenses		45,178	11,294	11,520	11,693	11,869	91,554

director numerations		20,096	11,052	11,274	11,499	12,072	65,993
Branding and Labeling		13,859	10,394	10,602	10,814	11,355	57,024
Legal fee and audit		15,836	15,836	15,836	15,836	15,836	79,180
sales/ marketing and rental collection point		89,477	33,856	34,052	34,252	34,763	226,400
Payrol levy (3%)		3,708	3,782	3,858	3,934	4,014	19,296
Regulatory fees (TDB, TBS, NEMC, OSHA, FIRE, LGAs)		210,000	222,600	235,956	250,113	265,120	1,183,789
Total Operating Costs		3,900,768	4,059,398	4,405,910	4,803,718	5,138,782	22,308,576
Operational Net Earnings before Depreciation, Interest & Tax		(172,015)	1,586,999	1,758,828	1,926,944	2,209,756	7,310,512
<i>%age Gross Contribution</i>		<i>(5)</i>	<i>28</i>	<i>29</i>	<i>29</i>	<i>30</i>	<i>1</i>
Depreciation at 12.5 %		(15,051)	138,862	153,897	168,608	193,354	657,946
Net Earnings before Tax & Interest		(156,964)	1,448,137	1,604,930	1,758,336	2,016,402	6,652,566
Tax (30%)		(51,641)	476,437	528,022	578,493	663,396	2,194,707
Net Earnings		(367,955)	748,020	898,024	1,052,474	1,284,878	3,615,441

Table 20: Projected cash flow Kahama Fresh Ltd. (TZS'000)

Cash Flow statement from Investing Activities for five years					
(all numbers in 000TZS)	Year 1	Year 2	Year 3	Year 4	Year 5
<u>CASH FLOW FROM OPERATING ACTIVITIES</u>					
Cash receipts from Sales	3,728,753	5,646,397	6,164,738	6,730,662	7,348,538
Cash paid to suppliers and employees	(3,900,768)	(4,059,398)	(4,405,910)	(4,803,718)	(5,138,782)
Cash generated from operations	(172,015)	1,586,999	1,758,828	1,926,944	2,209,756
Dividends received*	0	0	0	0	0
Interest received	0	0	0	0	0
Interest paid	(262,632)	(223,680)	(178,884)	(127,370)	(68,128)
Tax paid	51,641	(476,437)	(528,022)	(578,493)	(663,396)
Net cash flow from operating activities	(383,006)	886,883	1,051,921	1,221,081	1,478,232
<u>CASH FLOW FROM INVESTING ACTIVITIES</u>					
Replacement of equipment	0	0	0	0	0
Proceeds** from sale of equipment	0	0	0	0	0
Net cash flow from investing activities	0	0	0	0	0
<u>CASH FLOW FROM FINANCING ACTIVITIES</u>					
Proceeds from capital contributed	1,750,880	0	0	0	0
Proceeds from loan	1,750,880	0	0	0	0
Payment of loan	(259,683)	(298,635)	(343,430)	(394,945)	(454,187)
Net cash flow from financing activities	3,242,077	(298,635)	(343,430)	(394,945)	(454,187)
<u>NET INCREASE/ DECREASE IN CASH</u>	2,859,071	588,248	708,491	826,136	1,024,045
Cash at the beginning of the period	(367,955)	748,020	898,024	1,052,474	1,284,878
Cash at the end of the period	2,491,117	1,336,268	1,606,515	1,878,610	2,308,923

Table 21: projected balance sheet and financial indicators

Pro forma balance sheet					
(all numbers in 000TZS)	Year 1	Year 2	Year 3	Year 4	Year 5
ASSET					
Current asset	(367,955)	748,020	898,024	1,052,474	1,284,878
Fixed asset	2,380,000	2,427,600	2,476,152	2,525,675	2,576,189
Liquidity	(172,015)	1,586,999	1,758,828	1,926,944	2,209,756
TOTAL ASSET	1,840,030	4,762,620	5,133,004	5,505,093	6,070,823
NET ASSET MINUS DEPRECIATION	1,855,082	4,623,757	4,979,106	5,336,485	5,877,469
EQUITY & LIABILITIES					
Equity	2,480,000	2,545,472	2,771,103	3,016,733	3,284,136
Reserves					
Total Own Equity	2,480,000	2,545,472	2,771,103	3,016,733	3,284,136
Provisions	(1,080,541)	940,671	1,003,769	1,050,337	1,214,268
Long term loan	522,315	522,315	522,315	522,315	522,315
Short term Liabilities	(66,692)	615,300	681,919	747,100	856,750
Total Equity & Liabilities	1,855,082	4,623,757	4,979,106	5,336,485	5,877,469
NET FA/CL	4.56	4.65	4.74	4.84	4.93
CL/CA	0.18	0.82	0.76	0.71	0.67
DEBIT/CAPITAL RATIOS	-0.34	0.45	0.44	0.43	0.44
ROI	-14.8	29.4	32.4	34.9	39.1
BREAK EVEN POINT	-13.84	1.53	1.41	1.31	1.17
BREAK EVEN RATIO	(25.33)	3.27	3.19	3.15	2.95
EQUITY/TOTAL LIABILITIES	134	55	56	57	56
Break-Even Point Revenues	4,905,377	4,914,263	5,025,588	5,225,733	5,375,298

Table 22. Loan payment schedules Kahama Fresh Ltd. (TZS'000)

All numbers in 000'TZS		Loan Information and Payment Schedule			
Loan Data		Loan Summary			
Original Principal	1,750,880.00	Scheduled Payments	522,314.73		
Loan Term (Years)	5.00	Scheduled number of payment	5.00		
Annual Interest Rate 15%	0.15	Actual number of payment	5.00		
Payments per Year	1.00	Total Early Payment	-		
Payment	522,314.73	Total Interest	,470,885.00		

Year	Payment	Interest	Cumulative Interest	Principal	Balance
-					1,750,880.00
1.00	522,314.73	262,632.00	262,632.00	259,682.73	1,491,197.27
2.00	522,314.73	223,679.59	486,311.59	298,635.14	1,192,562.12
3.00	522,314.73	178,884.32	665,195.91	343,430.42	849,131.70
4.00	522,314.73	127,369.76	792,565.66	394,944.98	454,186.73
5.00	522,314.73	68,128.01	860,693.67	454,186.73	(0.00)
Total		860,693.67	NPV Cul. 2,076,903,17		

Table 23. Loan payment schedules Kahama Fresh Ltd. (TZS'000)

IRR for the Project		
	(all numbers in 000TZS)	
	Initial Investment	-2,480,000
Year 1	Additional Annual Net Profit	-367,955
Year 2	Additional Annual Net Profit	748,020
Year 3	Additional Annual Net Profit	898,024
Year 4	Additional Annual Net Profit	1,052,474
Year 5	Additional Annual Net Profit	1,284,878
	IRR (in 5years)	17.90%
The IRR above indicates that the expected return on the TZS 2,480,000,000 initial investment after 5 years is 17.9%.		

Table 24. project payback period for Kahama Fresh Ltd. (TZS'000)

Payback Period Analysis				
	Year	Beginning Balance	Net Cash Flows	Ending Balance
Cost of investment	0.00	2,480,000.00	0.00	2,480,000.00
	1.00	2,480,000.00	(367,954.63)	2,847,954.63
	2.00	2,847,954.63	748,020.30	2,099,934.33
	3.00	2,099,934.33	898,023.88	1,201,910.45
	4.00	1,201,910.45	1,052,473.78	149,436.67
	5.00	149,436.67	1,284,877.98	1,135,441.31
Payback Period = 5.00 Years				

6.2.8. Project Sensitivity Analysis

The objective of the scenario and sensitivity analysis exercise is to examine the resilience of the financial viability of the Project to changes in key assumptions in the above undertaken financial analysis. Commonly, as part of sensitivity analysis, the sensitivity of project indicators is tested on key variables and decision scenarios. For the purpose of this submission, the sensitivity analysis is projected based on the changes in sales - which can also refer changes in price levels, keeping the costs of production and operations constant. Based on the various scenarios, it seems the

project is viable up to 15% changes in profits – adversely. The following are financial indicator to measure project worthiness,

- ❑ Total investment of project is 2.48Billion TZS, which include Debit equity ratio is 29.4% to 70.6%, equivalent to 729,120,000TZS by promoter and 1.750,880,000TZS as bank loan
- ❑ Revenue gained 3.728,752,125 TZS while total cost 3,900,768,000TZS during the first year of production which lead to Negative profit before and after tax. The plant generate profit from the second year to the fifth years where as percentages gross contribution increased,
- ❑ Cash generated from operation and net cash from operational activities increases positively during the second year of project (see cash flow sheet)
- ❑ Return on investment is positive during the second years (29.4%) of operation and increases tremendously,
- ❑ Depreciation of fixed assets and amortization of the pre-operational expenses rates used are as follows: land 5%, Civil Works/ Structures/Buildings 5.00% on straight line basis, Plant Machinery & Technical Equipment 12.50% on straight line basis, Motor Vehicles. 20.00% on straight line basis. The business plan use 12.5% as depreciation factors,
- ❑ Salaries and Wages have been based on the prevailing scales in the industry. There is provision of 20% to cover company contribution to NSSF (10%) and other social welfare (10%). Included to the total amount (see Income statement)
- ❑ Corporate Tax is fixed at 30% of taxable profits.
- ❑ The business plan has an assumption all loan-able amount will be recovered annually with yearly repayment of 522,314,730TZS at an interest rate of 15%. The project will pay bank interest of 860,693,670TZS for the whole project economic life, with the NPV of 2,076,903,170TZS,
- ❑ The Return on Investment is anticipated to 17.9% which is above bank interest rate, while project payback period is within 4 to 5years to recover a cost of investment.

7. SOCIAL, ECONOMIC AND ENVIRONMENTAL IMPACTS

▪ **Project Linkage and Impact to Small Holders Farmers**

- ❑ The company create market to smallholder farmer involved in dairy farming in Kagera region by purchasing raw milk from smallholders for Fresh Pasteurised Milk, Mtindi and Yogurt processing.
- ❑ The company will map and mobilize smallholder farmers, be trained in animal husbandry, quality management, and will be availed with access to the ranch veterinary and hybrid bulls to improve on their livestock.
- ❑ This project is expected to impact over 400 smallholder farmers especially women, improve tremendously on gender balance by providing them with

200 heifers (cows) on credit, and train them on animal husbandry to boost raw milk production.

- ❑ The bank will map and link smallholder farmers with heifer international to get cows/heifer on credit to boost raw milk production for the factory and empower economic livelihood of more than 400 smallholder farmers in Kagera.
- ❑ The project will provide ready market for raw milk from smallholder cattle keepers.

- **Economic Impact**

The project entails processing and production of fresh pasteurized milk, mtindi and yogurt for sale to the local market. It will therefore, have the following economic impact:-

Tax payment.

The project is source of tax to the Government.

- **Social Impact**

Employment

The company will employ more than 59 permanent workers in permanent basis and over 41 casuals. The project is expected to provide direct employment to a minimum of 100 people.

- **Environmental Impact:**

The envisaged project will ensure environmental protection. The National Environmental Management Council have been involved and has begun the process to certify the project.

8. PROJECT RISKS AND MITIGATION

Potential Risk	Who is at Risk	Existing control Measure	Risk Rating	Preventive Measures/Mitigation	Responsibilities
Animal Disease	Dairy farmers and ranchers	Regular control of tickbone diseases and vaccinations	Medium	Adherence to animal diseases measures by the veterinary department	District livestock Office and Kahama Fresh Ltd
Insufficient milk production	Dairy farmers and ranchers	Rain water harvesting Pasture establishment	Medium	Acquiring more land for ranching Establish more water harvesting	Kahama Fresh Lts
Insufficient milk quality	Potential consumers	Formal milk value chain establishment	High	Enforcement of standards and standard hygienic practices	District authorities, TDB and Kahama Fresh Ltd.
Less loan provision opportunities	Milk processors	Short term loans	Medium	Provision of long term loans	Tanzania Agricultural Development Bank
Low demand for processed milk	Consumers	Enforcement of quality standards	Low	Promotion and advertising	Kahama Fresh Ltd District authorities

9. CONCLUSIONS AND RECOMMENDATIONS

- The project is sufficiently based on existing cattle and dairy farming activities and readiness of farmers to supply milk to the factory.
- The Reproductive performance of the dairy cattle herd need to be improved.
- The current supply of milk is already 80% of the planned throughput of 10,000 LPD
- The financial analysis shows project is viable and sustainable and therefore qualifies for consideration for term loan financing by the designated development bank.
- The second quote which is of similar quality, includes a water treatment unit and is of higher capacity (2000 L/h) is more competitive than the first quote 1,000L/h).
- Funding is therefore strongly recommended.