Financial, Economic, and Stakeholder Analysis of Milk Processing Plant in Ethiopia

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ABSTRACT

Milk is one of the main sources of income for many pastoralists around the world. The Somali Region in Ethiopia is famous for its high density of livestock, implying that is has a significant potential for milk production. The perishable nature of the milk and the absence of the milk processing facilities are two of the main factors that reduce this region's ability to utilise the opportunity of milk production, which imposes significant economic losses on the community as a whole. This study assesses the financial and economic feasibility of the milk processing plant in Ethiopia region, Jijiga city, and analyses alternatives for the implementation of the milk processing plant using the integrated method of investment appraisal. Distributive analysis is also used to estimate the allocation of benefits to the government of Ethiopia, the pastoralists and traders supplying milk to the plant, the labour that is employed by the facility, the Jijiga city community and lastly the private entrepreneur. Sensitivity analysis is used to assess potential risk factors facing the facility.

The results of the analysis showed that the financial net present value of the project is positively promising that the benefits would be greater than its costs. The implementation of such an intervention significantly increases the annual income of the pastoralists and decreases the risks of investment for the private sector. It also will increase the demand for the pasteurization of milk and decrease the amount of raw milk available for the locals which is extremely dubious in that area.

The economic analysis reveals that the economic net present value is also positive and not only reduces the risk for the private entrepreneur and stakeholders but will be also benefit the economy of Ethiopia. The project is proposed with the motive to develop and promote the Ethiopian agricultural business by leading it to a market oriented level. An improvement in the lifestyle of the locals is expected to follow, as a result of the creation of more job opportunities, improvement of nutrition, and the development of the dairy system of that region. Several stakeholders such as the suppliers of the milk, milk traders, the private entrepreneur, employees, the community, and the government will benefit from the implementation of the project.

Keywords: Investment Appraisal, financial analysis, economic analysis, stakeholder analysis, milk processing plant, camel's milk, cow's milk, dairy, Ethiopia

ÖZ

Dünya çapinda, geçimini hayvancılıkla sağlayanların temel gelir kaynaklarından biri süttür. Etiyopya'nın Somali bölgesi besi hayvancılığın çok yaygın olmasından dolayı kayda değer süt üretme potansiyeline sahiptir. Fakat, sütün çabuk bozulan yapısı ve sütü işleme olanaklarının yokluğu nedeniyle sektörde tam verimlilik sağlanamamakta ve bu gerçek ciddi ekonomik kayıplara yol açmaktadır.

Bu çalışma Etiyopya'nın Jijiga şehrindeki bir süt işleme tesisinin finansal ve ekonomik fizibilitesini değerlendirmektedir. Süt işleme tesisini hayata geçirmenin yatırım projeleri değerlendirme yöntemleriyle analizi yapılmıştır. Bu bağlamda, sözkonusu projenin net gelirinin Etiyopya hükümeti, geçimini hayvancılıkla sağlayanlar, sütü tesise taşıyan tüccarlar, tesiste çalışan işçiler, Jijiga halkı ve özel girişimci arasında nasıl paylaşıldığı hesaplanmıştır. Son olarak, projenin karşı karşıya olduğu potansiyel risk faktörleri duyarlılık analizi kullanılarak hesaplanmıştır.

Anahtar Kelimeler: Yatırım Değerlendirmesi, Finansal Analiz, Ekonomik Analiz, Paydaş Analizi, Süt İşleme Tesisi, Deve Sütü, İnek Sütü, Sütçülük, Etiyopya.

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LIST OF ABBREVIATIONS

ADSCR	Annual Debt Service Coverage Ratio
ANCFADS	Annual Net Cash Flow Available for Debt Service
AP	Account payables
AR	Account receivables
CIF	Cost, Insurance and Freight
ADSCR	Annual Debt Service Capacity Ratio
CSCF	Commodity Specific Conversion Factor
Ext	Externalities
ENPV	Economic Net Present Value
EOC	Economic Opportunity Cost
EOCFE	Economic opportunity cost of foreign exchange
ETB	Ethiopian Birr
FEP	Foreign Exchange Premium
FDRE	Federal Democratic Republic of Ethiopia
FNPV	Financial Net Present Value
FtF	Feed the Future
GDP	Gross Domestic Product
LLCR	Loan Life Coverage Ratio
OCL	Opportunity cost of Labor
PV	Present Value
PRIME	Pastoralists Resilience Improvement & Market Development
IRR	Internal Rate of Return
VAT	Value Added Tax
UHT	Ultra-high-temperate
USD	United States Dollar

USA	United States of America
USAID	The United States Agency for International Development

Chapter 1

INTRODUCTION

1.1 Background

Ethiopia has a population of approximately 95 million people (USAID statistics), which is the second largest in Africa. Ethiopia not only faces an increase in the demographic pressure resulting from a high birth rate, but it also struggles with persistent malnutrition According to UN data, at least 5 percent of the population needs humanitarian aid, even during the country's most prosperous years.

In 1999, USA and Russia forgave the 5 billion USD debts that Ethiopia owed them, which halved the external debt of the country. Later, in November 2007, *The Economist* disclosed that auditing revealed numerous cases of corruption in the distribution of foreign aid. Although there is data showing an improvement in the quality of life in certain regions, millions of Ethiopians still live in extreme poverty. With an annual income of $50-$70 per capita, Ethiopia remains as one of the poorest countries in Africa.

The average African inhabitant consumes 26 kg of dairy product per year, while
The Ethiopian average consumption is 17 kg (Gebrewold et al 1998). Furthermore, according to FAO, half of the Ethiopian population is malnourished.

Some of Ethiopia's major issues are addressed when its dairy sector is developed. Firstly, job opportunities are created for householders, and the national milk supply is

increased, hence the availability of milk and other dairy products for poorer communities is increased as well.

The Federal Democratic Republic of Ethiopia (FDRE) is located in the Horn of Africa with a warm and humid climate, which is favorable for agriculture. Its geographical are also has the potential to facilitate a high livestock population. Approximately 85 percent of local people are employed in the agricultural sector, meaning that agriculture plays a vital role in the agroindustry since it contributes to the primary and essential input of raw materials in the country. Although dairy produce and milk itself are principal components of the Ethiopians daily diet, the technology and supply of the dairy sector are poorly developed. This is the main reason why 35 percent of milk is wasted or used to feed calves, leaving only 65 percent to be consumed by people as fresh, soured, or fermented milk (as it was revealed by the team visited the field).

1.2 The Importance of Consuming Milk

The significance of dairy produce in child development is well known, however, it could be said that their importance in the diet of adults is not given the same emphasis. Calcium and vitamin D in milk help to reduce the risk of colon cancer, and act as cholesterol reducing agents in the blood. Similarly, calcium regulates hypertension and overall, with the daily and sufficient intake of milk, the risk of developing cardiovascular diseases and osteoporosis is decreasing.

The advised daily intake of dairy produce for an adult is either two cups of milk, 500 ml yoghurt, or 50 gr of cheese- all equating to 1000 mg of calcium.

1.3 Processed milk

Raw milk may contain some pathogenic microorganisms, and simply boiling the raw milk destroys most of its nutritional content, instead sterilizing it completely.

Boiling was first used as a sterilization method for milk in the 1800s, when it proved to reduce milk borne diseases and thus infant mortality. Following the industrial revolution of the 18th century in Europe, the production of milk was dramatically increased, leading to the spread of milk borne illnesses, such as scarlet fever, diphtheria, typhoid fever, septic sore throat, and diarrheal diseases. The combination of pasteurization with the improvement of management in farms significantly eliminated these illnesses. In the year of 1938, around 25 percent of all waterborne and food related diseases were spread due to dairy products. Fortunately, nowadays, less than one percent of these diseases are associated with dairy produce.

The pasteurization process was developed in 1864 by Louis Pasteur to improve the quality of wine. In Europe and United States, milk became commercial in the late 1800s and early 1900s, respectively.

The process of pasteurization is heating the respective liquid to just below its boiling point, which kills enough microorganisms within the liquid to make it safe enough to consume. After it is quickly cooled, processed milk can be used to make yoghurt, cheese, and butter which increases the shelf life and the value of milk. Processing milk and making milk by-products gives a higher cash flow to the small-scale producers rather than selling milk as a raw product, while giving them a good opportunity to enter both regional and urban markets. Likewise, problems inflicted on the market due to the seasonal fluctuation of milk supplies can be solved by milk processing. Off-

farm jobs in marketing, processing, transportation, and collection also result from pasteurized milk.

Few of the advantages of pasteurized milk are as follows;

- Its nutritional content (e.g. vitamins) is preserved until expiration
- Households can buy large quantities of pasteurized milk and store it for a longer period of time without cooling
- Creates more employment
- Generates steady income
- Elevates nutrition and food safety

Typically, milk production is imbalanced and varies from season to season. For this reason, the supply of milk needs to increase for household consumption, and also to stabilize incomes for farmers that produce milk.

1.4 Benefits of Camel milk

Camel's milk has its own light taste- slightly salty, refreshing, and filling with a smooth texture. When people taste it for the first time, they are generally surprised since they do not know what to expect. Once they taste it, they say, "Wow it's just like milk!"

For many generations, camel milk was, and to an extent still is a staple food for Bedouin and Nomad communities. For centuries, these cultures were the only consumers of camel milk that used it as a main source of sustenance. However, in the recent years, the discovery of the numerous benefits of camel milk (as listed below), compared to that of ordinary cow's milk, has led to the major expansion of camel

farming in several countries such as the United States, and those in Africa, Asia and the Middle East.

Compared to ewe, cattle, or buffalo milk, camel milk contains:

- Less cholesterol
- High content of immunoglobin, mineral, and vitamin
- Lower lactose
- High levels of zinc, iron, potassium, copper, magnesium, manganese, and sodium
- It is rich in insulin, so it could serve as an alternative treatment for diabetics
- The absence of milk allergens very beneficial for people that are allergic to milk and its by-products

It contains a high number of components that are needed for a strong immune-system, which improve the body's ability to fight diseases such as multiple sclerosis, Crohn's disease, and diseases where the immune-system kills its body tissues[1]Camel milk has a composition closest to that of humans, as it provides the ideal nutritive components for the human body. According to *The Huffington Post*, the vitamin C concentration in camel milk is three times, and the iron concentration is ten times more than that of cow's milk. Similarly, camel milk contains many nutrients that stimulates and strengthens the immune system. It is hardly a surprise that babies that are in a critical condition due to starvation are fed camel milk, if available, as first resort to keep them alive in many impoverished regions across the world.

[1]According to observations of Dr. Reuven Yagil, Professor of the Faculty of Medicine, Tel Aviv University

Apart from the health benefits, camel farming is also more environmentally friendly- unlike goats and cows, camels do not need vast amounts of grassland, therefore the relative carbon and methane footprint from camel herding is less.

For many countries, especially for those that are suffering from drought, camel farming could be the best alternative for cattle dairy farming. This is because camels are well adapted to dry environments, hence do not require frequent watering, and their maintenance overall requires less electricity.

It is known that, in the past, entire tribes have managed to survive the harsh living conditions of the desert, simply by feeding on camel milk and few dry foods like dates. Based on the assessed value of nutrition of camel milk, the UN forecasted a tremendous growth of its consumption, with the condition that it becomes more affordable and accessible.

In a study conducted by The Saint Louis Institute for Conservation Medicine (ICM), it was concluded that raw camel's milk contains more pathogens compared to raw cow's milk, which is the reason why at least ten percent of people in Kenya who drink raw camel's milk are under the risk of being afflicted by water and milk borne illnesses. It goes without saying that the pasteurization of camel's milk is critical in order to avoid the contraction of contagious milk and water borne diseases.

With this, an associate clinical professor of pediatrics at Albert Einstein College of Medicine strongly claims, "I don't recommend raw milk at all, whether it's from cow, goat, or camel or any other animal. There is a reason for pasteurization."

1.5 Thesis Structure

This thesis contains eight chapters that are arranged as follows;

Chapter 2 provides a synopsis of the project. It gives a description of the milk processing plant and the importance of the project to the federal Democratic Republic of Ethiopia.

In Chapter 3, the applied methodology is reviewed. The method implemented is called the integrated approach to investment appraisal, which includes financial and economic appraisal, and determines the impact and benefits to the stakeholders. Likewise, this methodology analyses the variable risks that the project could be affected by during its lifespan, determining all potential outcomes from different perspectives.

Chapter 4 and 5 represent the financial aspect and the stakeholder analysis of the project, which are based on financial modeling. The model begins with the table of inputs and continues onto the development calculation of the cash flow statements. It also analyzes the financial sustainability of the entire project by calculating criteria such as financial net present value, internal rate of return, annual debt service coverage ratio, and loan life coverage ratio. The stakeholder analysis determines the net of the beneficiaries and losers, which is based on the statement of externalities.

In Chapter 6, many of the possible risks that the project may experience, is discussed. The sensitivity test was used to identify the variables and their impact on the FNPV of the project.

Chapter 7 analyzes the viability of the project from the economic point of view, by developing an economic cash flow statement. The obtained results from the ENPV and EIRR are determining factors whether the undertaking project adds any value to the economy or not.

Chapter 8 is the conclusion of the research with some recommendation on whether or not the milk processing project is feasible and necessary, based on the results of the integrated approach of the investment appraisal.

Chapter 2

PROGRAM AND PROJECT OVERVIEW

2.1 USAID Contribution to the Project

The United States Agency for International Development (USAID) was established by President John F. Kennedy in 1961. The initial goal of the agency was to improve the living standards of the developing world by providing civil foreign help. Its mission calling is "To partner to end extreme poverty and to promote resilient, democratic societies while advancing the security and prosperity of the United States".

The US government believes that any unsteady situation around the globe could adversely affect the national security of the USA.

USAID spends about one percent of its federal budget as aid for more than 100 countries in Middle East, Africa, Latin America and Caribbean, Asia, Europe and Eurasia. The agency works to:

- Improve broad-scale economic well being
- Promote democracy and improve dominion
- Strengthen global health
- Preserve human rights
- Develop agriculture
- Promote international peace
- Advocate for human rights

- Offer humanitarian assistance to the victims of various disasters

USAID creates trading partnerships between developing countries and facilitates good will overseas in effort to improve global living standards.

In terms of international aid, the development of Africa is the most prominent target that the US is engaged in today. Africa in composed of 42 countries and USAID works with each of them in a unique way by applying well-tailored strategies. For instance, one of their many programs established by USAID is Feed the Future, with which it strives to eradicate poverty and stimulate the economy of individual countries by boosting their agricultural productivity and arable land. It is important for USAID, that Africans are not treated simply as receivers of aid, but as the architects of the success and development of their countries.

The most extensive projects implemented by USAID are within Ethiopia, and as a result, the country has experienced a rise in education, food and health security levels during the last decade.

In 2012 USAID/Ethiopia commenced the implementation of the five-year $52 million (US) Pastoralists Resilience Improvement & Market Development (PRIME) project. According to Mercy Corps PRIME's goal is to encourage innovation, in order to develop competitiveness, profitability, and steadiness in the pastoralism and livestock sector. This would in return increase household revenue for 250 thousand households in the Somali, Afar and Oromia regions, ease the adjustment and management needed to accommodate for ongoing climate change, and to assist local institutions to increase their capacity with entrepreneurship in the agricultural and pastoral communities and market linkage.

2.2 Project Overview and its Impact

The milk processing plant “Berwako” is a project that is most suited for implementation in countries like Ethiopia, where the market system of dairy products still remains at the subsistence level, and receive s almost no support from any institution. In order for the production of any good to be developed from subsistence level to the level oriented in the market, some key methods of intervention have to be implemented. Primarily, investment adds more value to certain parts of the product chain (which is the dairy chain in this case). The development of market-oriented production also requires the readjustment of the entire system of production, so that it is efficient, responsive, and based on the advanced informative support from institutions.

Berwako, in Jijiga city, Ethiopia, will play an important role in the development of market-oriented dairy production. Essentially, the Berwako project is the PRIME project, funded and supported by USAID. Working with these kinds of businesses have proven to benefit the agro-pastoralist areas of Africa most significantly. The aim of PRIME is to develop the agro business and lifestyle of local people, with the transformation of the whole system through the creation of more jobs, improved nutrition, and increased cash flow for dairy producers. PRIME’s resources are oriented so that the output of raw cow’s and camel’s milk from at least 3,000 local households is increased, and over 10,000 liters of milk is processed every day. USAID PRIME also aims to maintain quality standards and achieve operational efficiency, thereby providing all participants of the supply chain, such as women’s groups, milk traders and consolidators, and processors with their network with technical assistance. “USAID’s PRIME helps me to make my dreams come true,” says Amir Mukhtar, the owner of Berwako. Both the society and economy will experience a significantly

positive outcome, such as greater access to the market with the stimulation of productivity, increased income of households as a result of regular access to the fair market, and a boost in the improvement of livestock productivity and its quality, which leads to the further improvement of households' welfare and nutrition. The project also allows for exportation of dairy produce to neighboring countries like Addis Ababa and Hargessa in Somalia, where demand is high.

Ethiopia has a favorable climate thus a considerable potential for agriculture, and animal husbandry has been a source of income for local farmers for many centuries. It is estimated that there are approximately 59 million cattle, and that ten million of them are dairy cows, which produce about three billion liters of milk per year in Ethiopia.[2]

The climate of Ethiopia allows pastoralists to graze cattle freely without any additional feeding. Families of pastoralists consume milk throughout their day since milk is abundant for them. In fact, in regions where cattle farming is a common trade, there is a surplus of raw milk. Unfortunately, however, only half of the milk that is produced reaches collectors, while the rest is wasted.

In Ethiopia, cow's and camel's milk is collected from specific locations, and transported to the processing plant. Households that produce milk deliver it in plastic jerricans, which are smoked frequently for sterilization. This gives the milk a particularly different taste. To avoid the tinted taste and implement more hygienic

[2]Negassa, Rashid, and Gebremedhin, 2011

means of storage, the project will replace the jerricans with containers that are better suited for storing milk.

The constant demand for milk (that is often bought in bulk) encourages traders to sell the milk to the plant at a discount price. The Berwako milk processing plant is a pioneer project for camel's milk pasteurization, but it is expected to supply the market with domestically pasteurized camel's and cow's milk, and also provide a good substitute for imported UHT milk with the by-product from the domestic milk. The investment will be partially financed by a subsidy from USAID, with the aim to create economic links between impoverished and more developed regions in Ethiopia.

The purpose behind this study is to depict the given project to a basic level, and analyze the influence of a potential contribution from PRIME. The contribution would be made to reduce the risks inflicted on the private sector, which are quite significant in the underdeveloped Ethiopian economy.

In order maintain reliability and accuracy, the initial data was collected directly from the field, carefully studied and then compared with reliable sources and publications. The data was adjusted to the applied data of parameters, and conversion factors were used to transform financial prices into economic values, allowing for integrated financial, economic, and stakeholder analysis to be conducted. The following information was provided by field visits to the plant in Jijiga city, Somali:

1. The raw-milk is collected by the milk-processing plant from more than ten milk collection centers.
2. The Somali region has a large supply of raw milk. The local traders at the milk collection locations stated that they can only purchase around 55% of the milk that

pastoralists bring to the milk-collection center. They also claimed that during the dry season, additional 4,000 liters of raw milk can be collected daily, while collection is unlimited during the wet season of the year.

3. No limitation on the supply of raw milk was mentioned by either the pastoralists or the traders.
4. Pastoralists use plastic jerricans[3] for raw milk storage when transporting the milk to the milk-collection site. The only way to disinfect jerricans is by smoking, which doesn't effectively disinfect the jerricans and changes the taste of the milk. The market price for both camels and cow's raw milk is ETB 65.00 for a five-liter jerrican, or USD 3.61 per jerrican (USD 0.72 per liter). The milk-processing plant constantly demands a large amount of raw milk, and due to the economies of scale, traders have agreed to supply milk at a discount price equal to ETB 55.00 per jerrican, or USD 3.05 per can (USD 0.61 per liter).
5. Although there is a surplus of raw milk in the vicinity of the Somali region, imported UHT milk is still sold at local markets of Jijiga city. With the Berwako plant, local processed milk could be consumed instead, substituting the import.
6. It's a cultural habit and preference for most Africans that live in rural areas to drink milk during the day, since milk processing is not accessible to them and raw milk is only available in the morning and evening.
7. The establishment of a milk-processing plant is a pioneer project in the Somali region.

[3]Jerrican is a five liters' plastic can

8. Camel's milk is generally preferred over cow's milk by the communities of surrounding regions, and the project aims to address their demand as well.
9. Both cow's and camel's milk will be processed, 35 percent and 65 percent respectively. Additionally, 40 percent of camel's milk will be exported to Hargessa city, Somalia.

The instability and underdevelopment of the Ethiopian economy pose the main risk that discourages private investors from investing in the Somali region. PRIME will play a significant role in the economy by reducing this risk. Not only will the implementation of the project demonstrate the potential of the economy for other potential investors, but it will also bring net benefit to the households as demand increases. The increased demand stimulates a rise in supply of raw milk from households, which decreases the wastage of milk since selling the milk becomes more profitable.

Chapter 3

METHODOLOGY

3.1 Introduction

The methodology that has been applied to the research is based on an integrated approach which differs from the traditional approach. This method was developed in 1998 by Glenn P. Jenkins, Chun-Yan Kuo, and Arnold C. Harberger.[4]The integrated method approach, unlike the traditional, evaluates cost-benefits for both the financial and the economic appraisal. It also determines the impact experienced by stakeholders, and the distribution among them. Projects in the future are expected to face many uncertainties due to considerable risk, which becomes evident with the financial analysis. This influences the economic analysis as well. The method of the integrated approach allows for the assessment of the investment through four important analyses; financial, economic, risk, and stakeholder.

3.2 Financial Modeling

Financial modeling is used to construct a model of the financial aspect of a situation. This model is mathematical, developed to determine investment performance. It is also used to forecast the future of the project with an Excel Model format, which is simple to use when executing scenario analysis.

[4]Jenkins, G., Harberger, A.C., & Kuo, C.-Y. (2014). *Cost-Benefit Analysis for Investment Decisions*

The term financial modeling has a broad meaning which differs in quantitative and corporate finance applications. Normally, financial modeling has a quantitative nature in corporate finance and/or asset pricing. Videlicet, financial modeling, translates the hype setting of market behavior and/or agents into predictions with numerical values.

Normally, modelers use spreadsheets, and the most common and suitable software for financial model construction is MS Excel. There are certain guidelines in financial modeling that should be addressed during development. They are as follows;

- The model should be simplistic and transparent. Although simplifying the model may be time and effort consuming, it is important to ensure that the model is easy to comprehend for those that may not be familiar with modeling. Transparency allows for the model to undergo alteration, adaptation and for it to be shared with reduced complication.
- The model must be self-explanatory. All relevant variables must be included and the conclusions derived from the model should be evident from the model itself.
- The model should be flexible, meaning that it should be able to undertake sensitivity analyses and addition of data.
- All business data should be disclosed directly and accurately.
- It should be well structured, in order to give the model continuity over the time that it takes for one to be structured. This is helpful during the maintenance period.
- Inputs have to be grouped according to their respective category, such as financing, costs, revenues etc.
- Complicated formulas are not preferable. A good model can be achieved by using clear and simple formulas, in order to avoid over-designing. It is advisable to use flags and to include “nested IF” functions.

- The linkage used in a model is supposed to be from the original source. This is especially important for when some of the blocs with calculations need to be deleted, so that it can be done without concern that there may be some broken links in the model. It also allows for the model to be simply edited and maintained.
- All columns in each row have to be constant and appropriate titles should be given to each row.
- These guidelines ensure that the model is easy to understand, use, alter and maintain. Furthermore, using these guidelines enables one to construct the model without calculating specific values.

3.3 Financial Analysis

The first analysis that should be done is the financial analysis, since it determines the viability of the project in financial terms, and thus is the foundation of the project investments.

3.3.1 Data

The financial analysis starts with the data module, which is the content of inputs and outputs that compose the basis of the financial flows of the project projected in the data module. Similarly, it involves the statement of financial cash flow development based on collected content, including accounts payable, accounts receivable and changes in cash balances.

The results of the cash flow statements represent the projecting financial receipts and financial expenses, which is the net cash flow of the invested project over its life span. Information used for the financial appraisal is a base for both the profit statement and the loss statement, hence it is important to keep the golden rule, “Garbage in garbage out” in mind while working with project data.

3.3.2 The Financial Cash Flow Statement

The timing of the repayments and cash receipts of the project are critical, since they determine the viability of a project. These variables must be given special attention in financial forecasting, so that financial analysts are prepared to deal with future liquidity crises or periods of potential illiquidity. Since there are constant price changes, the cash flow statement is built by adjusting prices of inputs and outputs to the forecasting future changes. Expected changes in future exchange rates, prices and inflation have also been taken into account.

While advancing the financial cash flow statement, it is necessary to include items such as inventories, prepaid expenses, accounts payable, accounts receivable, and changes in cash balances. It is crucial to have thorough knowledge on the tax policies of the country that the project is taking place in. All expected changes in tariff norms and taxes need to be applied into the profile of the project.

Generally, at the projected end of the evaluation phase, the project still has its assets. In this case, the assets' future market values, or in other words, the residual values must be incorporated as a net benefit of the last year of the project. For the most part, to calculate the residual values, different types of assets should be applied to the depreciation rates of its economic life.

The results of the financial cash flow statement allow for the assessment of the project's potential viability. Since there are different kinds of stakeholders who are involved, each interested in their own profits, it is advisable to generate a financial cash flow statement for each category of perspective (owner, banker, government etc.).

From the owner's perspective, only capital expenses from the owner's equities are considered. The loan is treated as a cash inflow and payments of amortization are treated as cash outflows.

From an overall (or banker's) point of view, the projected receipts and outlays should be analyzed. Equity and debt capital should be summed up as a base of investment, and creditors and equity holders should be able receive their portions from the annual cash flows.

While analyzing from the government's point of view, it must be made certain that the government has enough resources and is able to meet its financial obligations.

3.3.3 Evaluation

There are a few criteria used to determine the financial viability of the project. The most widely accepted criterion is the Net Present Value (NPV). The project is financially viable if the discounted NPV of its cash flow is greater than zero. When its NPV is less than zero, the project is not considered for implementation, since the rate of return for the investors is not going to be equal to its potential use of funds.

Another criterion analysts use to evaluate the strength of the project is the Internal Rate of Return (IRR). This is a discount rate which equates the NPV of the project to zero.

$$\sum_{J=0}^{n}[(B_j - C_j) / (1+ p)] = 0$$

B_j is a cash inflow in a year j

C_j is a cash outflow in a year j

p is a discount rate

The higher IRR of the project, the more feasible the project is.

Debt service coverage ratio, benefit-cost ratio, and pay-back period are criteria used in modern business. All these ratios have their flaws, yet the annual debt service coverage ratio (ADSCR) and loan life coverage ratio (LLCR) are the main determinants of the capacity to pay for all expenditures, along with the obligatory debt imposed by the project.

$$\text{ADSCR} = \frac{\text{Annual Net Cash Flow Available for Debt Service } (ANCFADS_t)}{\text{Annual Total Debt Service } (ATDS_t)}$$

ADSCR shows the real proportion of annual cash flows that the milk processing plant generates and uses to cover its debt obligations to the total annual project's debt service.

$$\text{LLCR} = \frac{\text{Present Value of } (ANCFADS_t)}{\text{Present } (ATDS_t)}$$

The ratio LLCR is a sum of the present value of ANCFADS with the present value of ATDS over the term of the current year to the final year of loan repayment. If some years do not generate enough net cash flow to meet its debt service obligations, then the LLCR ratio indicates whether or not there is sufficient NCF expected in the coming years for a bridge financing.

3.4 Economic Analysis

The economic analysis studies the influence of the milk processing plant on the whole society and determines the extent of expansion that is expected to be experienced in the total net economy of the entire society.

Economic analysis determines all costs and benefits and identifies the participants that benefit or lose from the undertaken project, and the extent to which they are affected (Jenkins, Harberger, &Kuo, 2014). In most cases, financial benefits and losses do not differ from the economic values, and the only difference that may occur is in the case where there is value added taxes, import tariffs, corporate and personal income taxes, or production subsidies. These distortions will certainly to affect the economic valuation of goods and services, foreigner exchange, and capital. This impact has to be assessed in a proper way and integrated into the economic analysis.

For instance, while measuring the benefits of the outputs produced by the project, the demand price plus taxes should be considered, instead of the market price defined by the financial analysis.

Likewise, in financial analysis, all costs and benefits should be reflected in the economic analysis and the participants that they accrue to should be determined. After economic costs and benefits have been computed, the values of expenditures and receipts from FCFS are replaced by the calculated economic values.

The conversion factor can be found by a simple calculation, which is the ratio of economic values (benefits or costs) to its respective financial values (benefits or costs). The financial values are then multiplied by the conversion factors to derive economic costs and economic benefits in order to build the economic cash flow statement.

In the economy, goods and services are classified as tradable and non-tradable. While analyzing tradable goods, customs duties imposed on inputs that are imported by the project, and imported items replaced by the project's output, should be included as

distortions. Another kind of distortion that should be accounted for by the economic appraisal is export tax (or subsidy) on the project's output. Generally, the economic prices of tradable goods are the same as their border price, including the exchange rate that affects the EOCFE.

There are some cases where consumers are willing to pay, and may pay more than the price in the predominant market. The increase in consumer surplus resulting from this has to be considered as an added economic benefit and included in the economic cash flow statement of the project.

3.4.1 Evaluation

After constructing the ECFS, the economic NPV can be estimated by using the economic discount rate. The economic opportunity cost (EOC) of capital[5] is the relevant discount rate.

Likewise, the economic NPV has criteria- for instance, if NPV is greater than zero, it means that the project is overall beneficial, and that the economic benefits are higher than when the same resources are normally used elsewhere in the economy. Furthermore, if the net present value is zero or less, the project has to be rejected since the same resources could be invested in the capital market instead, where they would generate more advantageous results.

3.4.2 Economic Analysis of Traded and Non-Traded Goods

When evaluating economic benefits and costs, it is necessary to differentiate between tradable goods and services and those that are non-tradable. It is also important to determine the impact on prices of commodities that is coming from domestic or

[5]EOC of Ethiopia

foreign markets. Tradable commodities increase exports and reduce imports when there are imported substitutes of domestically produced goods. Even so, non-tradable goods' (and services') prices are lower than their CIF and higher than the FOB which discourages both imports and exports. The additional demand and supply are the key factors which determine the economic price of non-tradable goods and services of the input/output of any project.

3.5 Stakeholder Analysis

Firstly, for the project to be sustainable, those that benefit, and others that experience negative affects resulting from the milk processing project over its lifespan, must be determined. The basic data necessary for estimating the impact on stakeholders, can be obtained from the financial and economic appraisals. There are few parties affected in the financial analysis, and by analyzing the benefits and costs experienced by each group, comparisons can be made on the magnitude of benefits and losses experienced by the groups, as a result of the project. This analysis should be done in terms of present value and with the discount rate of the EOCK. The benefits and costs to the participating stakeholders are represented with the subtraction of economic costs and benefits from the financial costs and benefits. The financial NPV, economic NPV, and externalities are calculated using the EOCK as discount rate over the life span of the project. It is necessary to ensure the validity of the complete integrated appraisal by reconciling both financial and economic flows with the distributional impact. In the case of reconciliation, the benefits of economic NPV should be equal to the benefits of financial NPV, plus the summation of the PV of all externalities. The formula is represented in the equation below:

$$ENPV = FNPV + \Sigma PV_{Ext}$$

ENPV= Net present value of benefits from economic point of view

FNPV= Net present value of benefits from financial point of view

ΣPV_{Ext}= Sum of the PV of externalities

All are discounted with the same EOCK[6]

For the Stakeholder analysis, the distributive method should be applied in order to determine the parties that benefit and lose from the project, and the magnitude of their benefit or loss.

3.6 Risk Analysis

Sensitivity analysis is the foundation of the risk analysis. It assesses the vulnerability of the essential variables that affect the project's financial, economical, and distributive outcomes. This analysis is very important, as it determines all the variables that affect the project in both positive and negative ways. There are many uncertainties in the forecasting of financial, economic, market, and distributive analysis. The project perforce can be improved from the results of risk analysis.

[6]Jenkins et al., 2014

Chapter 4

FINANCIAL ANALYSIS

4.1 Introduction

The integrated Cost-Benefit Analysis of the project begins with a financial analysis. The financial analysis is used in order to determine the sustainability of the project and its ability to finance its investment and operating costs, while identifying financial shortfalls that may occur while running the project. The identification of the shortfalls before the implementation of the project could create an opportunity to preplan methods of overcoming these short falls, as it is very important to ensure that the project is able to cover all of its costs during the running of the project.

Another reason why financial analysis is necessary is because it is needed to estimate the financial profitability from the investor's perspective. It may also be essential when the government aims to encourage private investors to launch the projects. Apart from the positive economic rate of return, the government also needs to evaluate financial sustainability in order to stimulate the private sector to undertake the project.

If both economic and financial returns are positive, then the government will be interested in designing a special policy or provide grants or loans in order to attract private sector investment.

Another reason for conducting financial evaluation is to be able to assess the impact of project distribution.

4.2 Technical Characteristics

Timing

According to the scenario, the project's life span is 20 years. It starts in year 2012 with one year of construction period. Therefore, the operation phase is from 2013 to 2031. Year 2031 is the end of evaluation of the project and liquidation of the plant will take place.

Table 1: Timing

Evaluation period	Years	20
Construction start date	Date	2012
Construction period	Years	1
Operation start date	Date	2013
Beginning of evaluation period	Date	2012
End of evaluation period	Date	2031

Project Output

Cow's and camel's milk will be pasteurized in the milk processing plant, along with some cow's milk by-products such as cheese, butter, and yoghurt.

Financing

The project milk processing plant is financed by three parties:

1. Equity 35%
2. Loan 35%
3. USAID contribution 30%

The Ethiopian Development bank will lend the loan to the project at an annual nominal interest rate of 8.5 percent, with one year of grace period and 8 years of loan repayment.

Vehicles

The current analysis predicts that with USAID contributions, the project will be able to purchase five refrigerator trucks within the first year. The investment cost of vehicles is ETB 6,336 thousand during the first year, and due to its ten-year life span, the replacement of the trucks will take place in year 2022 at a nominal price of EBT 39,231 thousand.[7]

[7]While doing a financial appraisal of any project it is important to project the expectation of the outputs and inputs prices of the project. Nominal prices are simply current market prices. It is easy to obtain historical prices although future market (nominal) prices of services and goods need to be forecasted in a sequential manner, which is a difficult issue. The nominal price builds on two economic bricks: the first is inflation (general price level), and the second one is the demand and supply equilibrium, which is a subject of price movement in the marketplace. This analysis is more a set of sequential assumptions rather than predictions. The inflation-adjusted principle is used in current analysis in order to estimate the cash flows of the project in nominal values. It can be calculated by equation (1):

$$P_i^{t+1} = P_i^t (1+gP_{iR}^{t+1}) (1+gP_I^{t+1}) \qquad (1)$$

Where: $P_i^{t+1\ nominal}$ price in year $t+1$; P_i^t is nominal price of good (i) in year t; gP_{iR}^{t+1} is a growth of real price in period of year t and t+1; gP_I^{t+1} is growth of price index in period of year t and t+1

Production Coefficients

The produce resulting from one liter of cow's milk:

Table 2. Production coefficients

Production	Units	Quantity
Pasteurized milk	liters	0.72
Cheese	gram	8.57
Yoghurt	gram	60.00
Butter	gram	11.40

Packaging

One liter of pasteurized will be stored within two 500 milliliters plastic containers, while four 250 grams of paper packaging will be used for one kilogram of butter and cheese. Two different kinds of containers, 250 milliliters and 500 milliliters, will be required for yogurt packaging, in a ratio of 3 to 7, respectively.

Production Potential Utilization

It is predicted that the milk processing plant will start operating with 25 percent of capacity utilization in 2013, and will have a constant capacity utilization growth rate of 25 percent per year for a period of three years until its production capacity utilization reaches 100 percent.

Once the plant reaches100 percent of production capacity utilization, this level of capacity utilization will stay constant for the rest of the operation period, until the end of the project. Production potential utilization is introduced in Table 3.

Table 3. Production potential utilization

Production potential utilization			2012	2013	2014	2015	2016
Initial capacity utilization	%`	25%					
Capacity utilization growth rate	%	25%					
Timing delay before capacity utilization growth starts	Year		-				
Period of capacity utilization growth	Year	3					
Capacity utilization growth start	Date	2014					
Capacity utilization growth end	Date	2016					
Annual capacity utilization	%		0%	25%	50%	75%	100%
Machinery and equipment	Year	20					
Vehicles service life	Year	10					
Borehole	Year	50					

4.3 Table of Parameters and Assumptions.

The financial model is devised based on the project's input data which is represented in the table of parameters.

4.4 Timing

The evaluation period of the project is 20 years, which begins in year 2012 and ends in 2031. The construction period is one year, and takes place in 2012. It is assumed that the operation of the project will take place from2013 until 2031, which is the year when the assets of the plant will liquidate.

4.5 Investment Cost of the Project

The total cost of the investment of the plan is USD 959,747 (EBT 23,607 thousand) during the first year (2012). The equipment, machinery, and vehicles used by the milk processing plant are bulky and expensive, making up74 percent of the total investment cost. The cost of a single vehicle is 70.4 thousands of dollars. The milk processing plant requires the purchase of five trucks, which cost 354 (000'USD). Since the life span of the vehicles is only 10 years, an additional USD 354,000 has to be invested in year 2022 to replace all five trucks.

Investment items that have liquidation values are also included in the analysis. Table 4 represents components of the costs of project investments.

Table 4. Investment Coast of the Project

INVESTMENT COST	Unit	Amount
Land	US $	25,000
Connection of Electricity	US $	13,900
Buildings	US $	105,600
Borehole	US $	67,000
Machinery and equipment	US $	354,000
Generator	US $	25,000
Local transportation of the machinery to the project site	US $	247
Office furniture	US $	17,000
Vehicles	US $	352,000
Investment cost over-run factor	%	-
Total investment cost	US $	959,747

4.6 Project Financing

There three parties that are involved in the financing of the total investment expenditures. USAID will cover 30 percent of the total investment while the remaining 70 percent are equally divided between private equity and bank loan. The loan disbursed by the Ethiopian Development bank, and it charges a subsidized 8.5 percent nominal interest rate, compared to the commercial bank's nominal interest rate of 20 percent. The whole amount of the loan is disbursed once in the first year, in 2012, with the grace period of a year and 8 years of loan tenor.

Table 5 is a profile of the loan repayment builder, illustrated in a flexible and dynamic manner which easily allows for the adjustment of the loan schedule according to any loan structure changes, if there are any.

Table 5. Loan Structure

Loan dısbursement	Date	2012
Nominal interest rate	%/year	0.085
Commercial interest rate	%/year	0.2
Loan tenor	Year	8
Grace period	Year	1
Number of installments	Year	7
Payments per annual	payments/year	1
Loan repayment start date	date	2013
Loan repayment end date	date	2019

The following two tables 6 and 7 represent the loan schedule of the project with different interest rates. Table 6is modeled with the subsidized8.5 percent interest rate, which is the actual rate that the Ethiopian Development bank provided the loan with to the project. In table 7, the commercial interest rate is used in order to analyze and determine the benefit that the project receives from the subsided interest rate. According to both schedules, 6,046 (000'ETB) is disbursed in year 2012, and in terms of the contract, regarding the principal repayment with the bank, it requires annual equal installments of principal repayment. The structure of repayment of the loan is such that, while the project repays the annual portion of principal, the annual amount of interest payments is decreasing.

Under condition of the subsidized interest rate, the project should repay the total amount of interest payment equal to 2,056 (000'ETB), which is2,781 (000'ETB) less than it would have been if the loan was to be with a commercial interest rate.

Table 6. Loan schedule with the subsidized 8,5 percent interest rate

Loan schedule (nominal) Subsidized int. rate										
Total			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Nominal interest rate	%		0.085	0.085	0.085	0.085	0.085	0.085	0.085	0.085
Beginning debt	000'ETB	24,186	-	6,046	5,183	4,319	3,455	2,591	1,728	864
Loan Disbursement	000'ETB	6,046	6,046	-	-	-	-	-	-	-
Interest accrued in year	000'ETB	2,056	-	514	441	367	294	220	147	73
Principal paid	000'ETB	6,046	-	864	864	864	864	864	864	864
Interest paid	000'ETB	2,056	-	514	441	367	294	220	147	73
Total debt repayment	000'ETB	8,102	-	1,378	1,304	1,231	1,157	1,084	1,011	937
Outstanding debt at end of year	000'ETB	24,186	6,046	5,183	4,319	3,455	2,591	1,728	864	-

Table 7. Loan schedule with the commercial 20 percent interest rate

Loan schedule (nominal) Commercial int. rate		**Total**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Nominal interest rate	%		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Beginning debt	000'ETB	24,186	-	6,046	5,183	4,319	3,455	2,591	1,728	864
Loan Disbursement	000'ETB	6,046	6,046	-	-	-	-	-	-	-
Interest accrued in year	000'ETB	4,837	-	1,209	1,037	864	691	518	346	173
Principal paid	000'ETB	6,046	-	864	864	864	864	864	864	864
Interest paid	000'ETB	4,837	-	1,209	1,037	864	691	518	346	173
Total debt repayment	000'ETB	10,884	-	2,073	1,900	1,728	1,555	1,382	1,209	1,037
Outstanding debt at the end of the year	000'ETB	24,186	6,046	5,183	4,319	3,455	2,591	1,728	864	-

4.7 Sources and uses of Funds

The sources of funds for the milk processing plant project is provided by; The Ethiopian Development bank as a debt of 6,046 (000'ETB), as a contribution from USAID as much as 5,179 (000' ETB), and 6,046 (000'ETB) as a private equity holder. Also, the analyses revealed that, in 2013, the project could have 2,752 (000'ETB) of loss, in which case, the loss would be taken forward to the next year and covered by the cash flow of the year 2014. In order to meet unforeseen increase of investment costs, all projects have to provision the fund for cost over-run. In the case of the milk processing plant, the fund sources finance the total investment cost of 17,271 (000'ETB). The following table shows the sources for funds of the plant and their uses.

Table 8. Sources and uses of funds

Sources of funds		
Loan (Debt)	000'ETB	6,046
USAID	000'ETB	5,179
Cash Flow from 2014	000"ETB	2,752
Equity	000'ETB	6,046
Cost over-run	000'ETB	-
Total sources of funds	000'ETB	**20,023**
Uses of funds		
Investment cost	000'ETB	17,271
Losses in year 2013	000"ETB	2,752
Cost over-run	000'ETB	-
Total uses of funds	000'ETB	**20,023**
Check	*000'ETB*	-

In the case of the milk processing plant, operations start after the full completion of the plant construction. Investment expenses all occur during the construction stage. If a project was to start operating before construction is completed, there is a critical

need for the provision of a budget overrun, to be able to finance the working capital of the project.

4.8 Production

Production Disposition and Losses

The proportion of pasteurized cow's and camel's milk is 35 percent and 65 percent, respectively. 60 percent of the pasteurized camel milk will be sold in domestic markets, while the other 40 percent will be sold in export markets.

It is assumed that the loss of raw milk is equal to one percent. [8]

4.9 Costs

4.9.1 Cost of Outputs

Costs of outputs are represented below:

Table 9. Cost of outputs

Cow's milk		
Domestic market		
Pasteurized milk (500 ml)	ETB/pc	11
Cheese (250 ml)	ETB/pc	42
Butter (250 mg)	ETB/pc	40
Yogurt (250ml)	ETB/pc	13
Yogurt (500ml)	ETB/pc	15
Camel's milk		
Domestic market		
Pasteurized milk (500ml)	ETB/pc	13
Export market		
Pasteurized milk (500ml)	US$/pc	0.97

[8]Appendix J represents calculation of the Annual Capacity Utilization and Losses

4.9.2 Cost of Inputs

The direct and indirect production costs are shown in the following table:

Table 10. Cost of inputs

DIRECT COST		
Cost of milk		
Raw cow's milk	EBT/liter	12.00
Raw camel's milk	EBT/liter	12.00
Packaging materials		
Yogurt cup	ETB/unit	1.71
Milk containers	ETB/unit	1.15
Butter packaging	ETB/unit	0.25
Cheese packaging	ETB/unit	0.18
Transportation cost		
Cost of milk collection	ETB/liter	0.5
Cost of delivery to markets	ETB/liter	2.00
INDIRECT COST		
Utilities		
Electricity tariff	ETB/kWh	0.69
Fixed electricity	kWh/year	10,000
Variable electricity	kWh/year	48,000
Fuel consumption by generator	liter/hour	20.00
Generator usage	hours/year	800.00
Fuel price	ETB/liter	18.00
Other indirect cost		
Office supplies and other expenses	ETB/year	844,000
Chemicals and other imported inputs	US $/year	14,596

4.9.3 Labor Cost

The current plant requires 146 employees for 14 types of positions, where nine are skilled and five are unskilled. The total wage rate per year is 5,657,700 ETB, which is 26.23 percent of the total annual operating cost.

The group of skilled laborers includes the general manager, the deputy manager, the finance manager, accountants, cashiers, drivers, quality controllers, machinery deputy

head, and laboratory technician. The unskilled workers are processing and packing workers, milk receptionists, cleaners, security workers and purchasers. The following Table 11 introduces required labor and its rates of wages.

Table 11. Labor and required annual wage

Position	Number of employees	Monthly wage rate (ETB)	Wage rate ETB/year
Skilled			
General manager	1	14,000	168,000
Deputy manager	1	10,000	120,000
Finance manager	2	10,000	240,000
Accountant	4	7,200	28,800
Cashier	2	3,375	81,000
Machinery Dep't Head	2	7,200	14,400
Laboratory thech.	4	3,600	168,000
On collection center quality controller	20	3,000	720,000
Driver	5	3,375	202,500
Total skilled	**41**		**2,222,700**
Unskilled			
Processing and packing	40	3,375	1,620,000
Milk receptionist	20	2,250	540,000
Cleaner	20	2,250	540,000
Security	5	2,250	135,000
Purchaser	20	2,500	600,000
Total unskilled	**105**		**3,435,000**
Total	**146**		**5,657,700**

4.9.4 Inventory

Due to the high demand for the milk and perishability of the dairy by-products, it is assumed that there is no need for an inventory for the current project.

4.10 Exchange Rate and Inflation

In 2012, the real exchange rate was EBT 18 to 1 USD. The foreign and domestic inflations were 2.5 and 20 percent, respectively. It is also expected that inflation rates will stay constant until the end of evaluation period of the project.

4.11 Working Capital

Account receivables (AR) is the amount of cash that the project/company is yet to receive shortly from its customers in exchange for goods that they have received. Since AR is referred to as a non-cash item, and does not impact the Cash Flow Statement, it is not included into the Cash Statement. Although, changes in AR are cash items and have to be included in the building of the Cash Flow Statement.[9]

It is assumed that the AR of sales revenue is equal to 10 percent during the entire operating period of the project. Accounts payable (AP) is represented by the amount of cash the project/company owes for the purchasing inputs. AR accounts in the Cash Flow Statement by the same method as AP. The difference is that a decrease in AP decreases and an increase in AP increases the figure of net cash flow. It is assumed

[9]Changes in account receivables are the difference between the AR at the beginning and the AR at the end of the period. Any increase or decrease in account receivable will affect the net cash flow. A decrease in AR decreases the result of net cash flow of the project.

that the account payable of total operating expenses[10]is 10 percent during the entire operating period of the project.

In order to avoid any kind of shortages in day to day transactions, the project requires a cash balance. It is assumed that 10 percent of cash of annual sales revenue must be kept for daily operations. At the end of evaluation period, the project receives the cash which was set for daily usage as a Cash balance.

4.12 Depreciation

4.12.1 Economic Depreciation

The economic service life of building, office furniture, fittings, equipment, and machinery is twenty years. The economic service life of borehole is fifty years, and the trucks service life is just ten years, which means that they need to be replaced halfway through the project life. The worth of fixed assets at the end of the project life was found by modeling the residual value table, and the straight line method was used in order to derive the residual values of the assets. That method depreciates the cost of assets by dividing/sharing a certain percentage through the economic life of the assets. To derive the residual values of the assets, one needs subtract the summation of depreciable values over the operation period of the project from the cost of the assets. The evaluation period of the project is twenty years. At the end of the evolution period, all assets are supposed to be liquidated and recorded as a cash inflow in year 2031.The residual value is adjusted according to the inflation changes of that year. It is assumed

[10]Labor cost is not included

that the plant does not increase nor decrease the value of the land, hence at the end of project's life span the residual value of land will remain the same as the initial value. Table 12 represents the residual values of the assets at the end of the project life, which is equal to 4,847 (000'ETB). This figure includes the liquidated values of buildings, the borehole, machinery, equipment, the generator and the value of land.

Table 12. Residual Values

Asset	Units	Residual Values
Land	000'ETB	450
Buildings	000'ETB	246
Borehole	000'ETB	772
Machinery and equipment	000'ETB	637
Generator	000'ETB	45
Vehicles	000'ETB	-
Account receivables	000'ETB	(7,192)
Account payables	000'ETB	2,697
Cash Balance	000'ETB	7,192
Total residual value	000'ETB	**4,847**

Since the project pays 7,192(000'ETB) of its debts from the previous year, the figure of the account receivable is recorded as outflow in the table of residual values. Moreover, another 7,192 (000'ETB), which was set aside for day to day expenses is returned back into account and added to residual values of the project.

4.12.2 Tax Depreciation

The tax depreciation is an amount of expenses used by the project on a tax return. It is an important accounting figure and is used to calculate the expense in order to reduce the liability of the income tax of the project.

Buildings and borehole are 5 percent depreciable during the whole operating period of the project. Machinery and equipment, office furniture, fittings, and motor vehicles are 20 percent depreciable over the operating period of the project.

The following Table 13 represents the depreciation schedule of the fixed assets of the project. In calculation the tax depreciation the straight line method has been applied.

Table 13. Depreciation Schedule

Annual Depreciation Rate for Income Tax		
Buildings and borehole	%	5%
Machinery and equipment	%	20%
Office furniture, fittings, and equipment	%	20%
Motor vehicles	%	20%

Economic Service Life		
Buildings, office furniture, fittings	year	20
Machinery and equipment	year	20
Vehicles service life	year	10
Borehole	year	50

The depreciation allowance per annum is showed in Table 14 below.

Table 14. Annual depreciation tax allowance

Year	Depreciation
2013	1121.67
2014	1121.67
2015	1121.67
2016	1121.67
2017	1121.67
2018	1121.67
2019	1121.67
2020	1121.67
2021	1121.67
2022	1121.67
2023	1121.67
2024	1121.67
2025	1121.67
2026	1121.67
2027	1121.67
2028	1121.67
2029	1121.67
2030	1121.67

4.13 Taxation

According to the tax law in Ethiopia, the rate of VAT is 15 percent. It will be applied for both items, inputs and outputs. Net VAT payments made by the milk processing plant is found by subtracting VAT credits from inputs, from the VAT collected from project outputs. Calculated net VAT payment was subtracted from the project's total revenues in order to compute the tax liabilities.

Appendix O represents project's VAT payments.

4.14 Total Investment or Bankers Point of View

The current statement presents the calculated set of results from the entire project. It is developed in nominal figures to determine the expected effect of inflation on the project's cash flow over its life span. Appendix B "Cash Flow Statement" represents financial cash flows in real terms.

The inflows of the milk processing plant consist of both domestic and export sales of production, residual values of the assets, and changes in AR.

The outflows of the statement include investment cost, all operation costs of the plant, skilled and unskilled labor, changes in AP and in CB, and net VAT and corporate tax liability on the milk processing plant.

The purpose behind analyzing the project from the bankers' perspective is not to determine the NPV but to determine whether or not the plant is able to meet its debts. Bankers are interested in finding out how bankable the project is, and the net present value of the project is their second priority. The main criteria used to assess the project from the total investment or bankers' perspective could be concluded from the ADSCR ratios which indicate the ability to meet both interest and principal payments.

4.14.1 Annual Debt Service Coverage Ratios

The first of the two ratios that concern bankers, is the ADSCR. This ratio determines the project's ability to generate a sufficient amount of cash that is needed to cover the interest and principal of the loan over its life.

Secondly, the loan life coverage ratio (LLCR) is important for indicating the project's ability to generate enough net CF during the following years, in order to apply bridge

financing if adequate cash flow (required to repay the debt) is not generated during some of those years.

According to the scenario, the project receives 35 percent of the total financing as a debt from the lender. The primary goal of financial institutions is avoiding loan defaults in order to lend money to a creditworthy project. The ADSCR is the benchmark ratio bankers are interested in, which determines the debt capacity of the project. The net CF is found by subtracting cash inflows from the cash outflows before financing. This is applicable for defining ADSCR ratios.

The calculated ADSCR is a part of the project analysis, and should be placed above as a benchmark. The ADSCR of the first year of the milk-processing operation entity is negative, meaning that the net CF of the project is not enough to repay the loan. This is because the plant's annual capacity utilization is 25 percent, which is not enough to cover all of its obligations fully. The losses that occur in year 2013 equate to 2,752.41 (000'ETB), and are taken forward onto the next near. The taxable income of the year 2014 is 4,246 (000'ETB), which is enough to cover the losses of the previous year. The ADSCR of the second year (2014) is equal to 3.93, which is calculated as an unpaid loan from the previous year, plus the debt service of 2014. It is assumed that the Development Bank will not charge any penalties from the project for the late repayment. From the second year until the end of the loan period, the project is not expected to have any difficulty with the loan repayments since the ADSCR for these years are much higher than the benchmark.

The following table represents these ratios for the milk processing plant.

Table 15. Annual Debt Service Ratios

			2013	2014	2015	2016	2017	2018	2019
Net Cash Flow before financing	000'ETB	160,003	159	5,127	12,238	22,016	33,203	39,720	47,539
Total debt repayment	000'ETB	8,102	1,378	1,304	1,231	1,157	1,084	1,011	937
PV Annual Net Cash Flows (NCF)	000'ETB	724,388	112,030	121,380	126,134	123,577	110,193	83,535	47,539
PV Annual debt repayment	000'ETB	26,241	6,560	5,623	4,686	3,749	2,812	1,874	937
ADSCR			**-**	**1.12**	**7.26**	**15.46**	**14.9**	**17.38**	**20.38**
LLCR			**8.17**	**11.19**	**14.23**	**16.71**	**17.27**	**18.76**	**20.38**

The minimum ADSCR value of the project is 0.12, which is not a satisfactory ratio for bankers. However, the average ADSCR is 22.0, which is a good indicator of the project's ability to cover its debt. It results from the annual production potential capacity utilization growth rate of 25 percent. On the other hand, the results of LLCR of the project, on average are 17.1 and 33.3 respectively, proving that the project is able to generate enough CF while obtaining the bridge finance during the following years.

4.15 Equity Holder's Point of View

The returns of the CF statements of bankers and equity holders are similar, as the financing aspect is the only difference between them. Both statements are the same until the financing component is derived and both of them are calculated in nominal, and converted to real terms. Domestic price index was used to define values in real terms (Appendix A). When it comes to the CF statement, according to the equity holders, cash from the bank loan and USAID contribution are recorded as inflows and loan repayments as outflows. Thus, 6,046 (000'ETB), the equivalent of 335(000'USD) landed by the Development Bank as loan disbursement, and the 5,181(000'ETB) granted by USAID to the milk processing project in 2012 are recorded as cash inflows. The repayments of principal and interest of the loan, which started after the grace period in year 2013, are recorded as outflows during the loan span life in order to define the real NCF after the financing.

Once the real NCF after financing is obtained, the net worth of the milk processing project is defined. NPV and IRR are the two other criteria that are used in investment appraisal in order to calculate the net worth of the project. The positive FNPV and IRR of 60,747 (000'ETB) thousand (3,375 (000'ETB)) and 64 percent respectively, were derived by using the calculated real NCF after financing and a discount rate of

return of 12 percent (which is the required rate of return). The obtained findings indicate that the milk processing project is efficient and able to generate enough NCF during the project's life span to cover all operating expenses including capital investment cost. It is also sufficient enough to result with a rate of return that is 52 percent higher than the required rate of 12 percent for the equity holders. Based on the results of FNPV and IRR, it can be concluded that the milk processing project is financially viable, and that the project should be undertaken by the equity holders since the investment in milk processing project yields a higher return than investments in the capital market. The financial cash flow statements from the owner's and bankers' perspective are represented in Appendix A and B.

Chapter 5

STAKEHOLDER ANALYSIS

5.1 Scope of the Stakeholder Analysis

The stakeholder analysis evaluates the project's influence on the interests of different groups involved in its implementation. Also, the analysis determines the net of the beneficiaries and losers. In this case, the distributive analysis is conducted based on the statement of the externalities. The differences between financial values of the inputs and outputs and economic values of the inputs and outputs are externalities of the project. Defined differences are either benefits or losses of the involved stakeholders. Afterwards, distributive analysis allocates the identified externalities among affected stakeholders. There are few sources of externalities, such are production substitutes, tariffs, taxes, excise and export taxes, and sales taxes. The PV of the externalities[11]are calculated by discounting economic, financial and externalities using a discount rate equal to the EOCC. After spreading the externalities among all stakeholders, the statement of reconciliation of financial, the financial CF statement and statement of economic resources were reconciled according distributional impacts. It is necessary to make sure that this approach is valid. In this case, the sum of the financial NPV and PV of the externalities should be identical to the economic benefits' NPV.

[11] Jenkins, Harberger&Kuo, 2014

$$NPV_{ECON\ @\ EOCK} = NPV_{FIN@EOCK} + \Sigma\ PV_{EXT@EOCK}$$

ETB 51,351 = ETB 38,299+ETB 13,052[12]

According to the statement of reconciliation, the externality is equal to **13,052 (000'ETB)**. The difference between the economic NPV and financial NPV of 51,351 (000'ETB) and 38,299 (000'ETB) gives that result.

5.2 Identification of Externalities

In order to define the externalities of the project, the statement of externalities has to be prepared. This statement is based on results obtained from the subtraction of economic values from the financial values. Afterwards, the PV of each item is found using the discount rate equal to the EOCK. The calculated externalities have to be distributed among all groups of the stakeholders.

5.3 Beneficiary and Stakeholder Analysis

There are seven main stakeholders in the value chain that determine those that will be affected by the implementation of the project:

1. Households and farms supplying raw caw and camel milk
2. The milk traders
3. The entrepreneur
4. Employees of the plant
5. Local community
6. The government
7. USAID

[12]thousand

1. Households and farms supplying raw caw and camel milk

The amount of produced milk by farmers and households exceeds the amount of raw milk can be sold domestically. Currently, around fifty percent can be sold and the rest is either wasted or used for feeding the calves. The project will play the main role in the dairy market by creating a constant demand for a large amount of raw milk. Aluminum cans are expected to be distributed by the entrepreneur, in order to improve the quality of the raw milk supplied to the households. Also, it is assumed that milk suppliers' total net benefit is twenty percent of the total raw milk supplied.

2. The Milk Traders

The price at which traders sell raw milk is equal to ETB 65.00/can[13] or ETB13.00/liter, which is USD 0.72[14]/liter. Given the proximate operational costs, traders forecast a net benefit that is around five to ten percent of total value of the milk (this approximate number is included in the OCL). In the analysis it is assumed that traders' net benefit is equal to five percent of the total value of the sold milk.

3. The Entrepreneur

The benefit of the private entrepreneur is primary due to the USAID financial subsidy. The subsidy will help to cover a part of the investment costs and will create the return on it.

4. Employees of the Plant

In order to engage the labor force, the project will pay a salary that is at a higher rate than the set wage rate of the market.

5. Local Community

[13] Can is equal to five liters

[14] Exchange rate EBT to USD is 18

The local community will receive five percent from the total sales of the processed milk. The plant will also contribute to other businesses by establishing good relations with the suppliers, fostering a culture of trust in the community.

6. The Government

The government will benefit from the implementation of the project as follows:

- Berwako is the first milk processing plant for camel milk in Ethiopia. The project will export camel milk to Somalia, its neighboring country, since it has a high demand for camel milk. The economy will benefit from the earnings from exports 1.065 times the market exchange rate.[15]
- The employees hired by the newly established plant will contribute to the government cash flow in the form of income tax.
- By implementing the project, the supply of the pasteurized milk will be increased; hence the imported UHT milk will be partially replaced in the domestic market. So, the economic cost of each dollar spent on imported dairy product will be equal to 1.065 times the market exchange rate.
- The lifespan of the project is 20years. Starting from year 6(after a five-year tax holiday period) the project will pay a tax of 30 percent on its income. Also, additional cash inflow from other types of taxes will be generated from tradable inputs (such as fuel) used by the project. However, fuel is a tradable good which requires foreigner exchange, so it is costly for the economy. It is 6,5 percent and its financial cost is lower than economic cost.

7. USAID Investment costs are partially covered by USAID;

[15]The Foreign exchange premium for Ethiopia is equal to 6.5 percent (Kuo, 2011)

Chapter 6

RISK ANALYSIS

6.1 Introduction

The future is usually full of the uncertainties, and the future for the next 20 years is practically unpredictable. Risk analysis, however is the study of identifying, managing, and maintaining anticipated risks. One of the tests used by risk analytics is the sensitivity test.

6.2 Sensitivity Analysis

The first step required by the sensitivity test is identifying the risky variables. Sensitivity analysis assesses if and which outcomes of the project are sensitive to any changes at a time. These kinds of variables can be financial and economic NPVs, gains or losses to different groups of stakeholders.[16] For instance, if the price of raw milk changes by a certain percentage, the way in which the financial NPV is influenced, will change. This is why sensitivity analysis is alternatively called the 'what if' analysis. Likewise, it is possible for the price of milk to significantly affect the FNPV, while it may have a comparatively insignificant impact on the Economic NPV.

[16]Jenkins, Harberger, &Kuo, 2014

The main variables that could be subjected to change are:

1. Cow's and camel's milk purchase price
2. Sales prices of the cow's and camel's milk in the domestic market
3. Sales price of the cow's milk products in the domestic market
4. Sales price of the camel's milk for the export
5. The milk losses
6. Increase of the transportation cost
7. The simultaneous change in both domestic price and exchange prices of the pasteurized milk

1. The plant will process both cow's and camel's milk, and the purchase price for both types of milk is ETB 12.00 per liter, and it is assumed that there will still be a correlation between their prices in the future. The table below shows how a change in the raw milk will affect the Financial Net Present Value of the project.

   Table 17, the impact on the FNPV by the purchase price of the raw milk

Table 17. Purchase price of raw milk (Cow's and Camel's)

PRICE (ETB)	NPV (000'ETB)
	40,318
10.00	49,978
11.00	45,148
12.00	40,318
15.00	25,829
18.00	11,340
20.00	1,680
20.11	1,170
20.30	231
Break-even point	**20.30**

The analysis has been done based on the current price of the raw milk which is ETB 12/liter. During the visit to the field, traders stated that they will supply the milk at a discount price (EBT 11 per liter) since the project will demand large amounts of milk. If so, then FNPV will change from 40,318 (000'ETB) to 45,148 (000'ETB), which is a 4,830 (000'ETB) increase. However, if the price for raw milk increases up to ETB 15 per liter, the FNPV will be still acceptable since it is a positive number. The break-even point for the purchase price of raw milk is 20.30 ETB.

2. The processed milk will be packaged in 0.5-liter plastic containers and supplied to both the domestic and the export market. However, Berwako will export only camel's milk, and only 40 percent of the processed amount. This means that cow's milk and its by-products, along with sixty percent of the camel milk will be sold domestically. The domestic price of cow's milk is ETB 11.00 per 0.5 liter and camel's is ETB 13.00 per 0.5 liter. While testing the impact of changes in domestic prices of pasteurized milk, it is assumed that the relationship between pasteurized camel's and

cow's milk will remain unchanged in the future. [17]

Table 18. The impact of the sale price of the cow's milk on the FNPV of the project

	PRICE (ETB)	NPV (000'ETB)
		40,318
	6.67	(29,591)
	8.50	(54)
	9.00	8,020
	9.50	16,095
	10.00	24,169
	10.50	32,244
	11.00	40,318
	11.50	48,393
	12.00	56,467
Break-even point		**8.50**

According to the scenario, the sale price of the pasteurized cow's milk is ETB 11.00 per 0.5 liter and camel's milk price will have 18 percent premium regardless of the price level. At the base analysis, the FNPV is 40,318 (000'ETB).

If the sale price rises up to ETB 12.00 per 0.5 liter, then FNPV would increase until 56,467 (000'ETB). The break-even point for the sale's price of the cow's milk is 8.50 EBT.

3. Sensitivity test shows that if there are any changes in the prices of cow's milk products, the FNPV will not be affected significantly.

[17]The pasteurized camel's milk will get 18 percent of premium

Table 19. The impact of the sale price of the cow's milk by-products on the FNPV of the project

Cheese (250 gr pack)

Price	NPV(000'ETB)
	40,318
39	39,910
40	40,046
41	40,182
42	40,318
43	40,455
44	40,591

Butter (250 gr pack)

Price	NPV (000'ETB)
	40,318
37	39,775
38	39,956
39	40,137
40	40,318
41	40,500
42	40,681

Yoghurt (250ml pack)

Price	NPV(000'ETB)
	40,318
9.00	39,174
10.00	39,460
12.00	40,032
13.00	40,318
14.00	40,604
15.00	40,891

Yoghurt (500 ml pack)

Price	NPV(000'ETB)
	40,318
12	39,317
13	39,651
14	39,984
15	40,318
16	40,652
17	40,986

4. It is assumed that around one percent of raw milk will be lost during processing and transportation. Nevertheless, the sensitivity analysis has tested the changes in FNPV if losses of the milk were to increase.

The following table represents the results.

Table 20. The impact of the milk losses on the FNPV of the project

Losses %	NPV (000'ETB)
	40,318
1%	40,318
2%	37,618
3%	34,918
4%	32,217
5%	29,517
6%	26,817
7%	24,116

The sensitivity test shows that if the losses increase from one percent to two, the FNPV will be reduced by six percent. It also reveals that the resulting FNPV values are still positive even when the losses increase to seven percent.

5. Amir Mukhtar, the private entrepreneur, mentioned to the visiting group that exported pasteurized milk can be sold at USD 1.50 per 0.5liter. As it was mentioned before, the stated price is not acceptable by the project due to the ten percent sales tax, ten percent VAT, and additional tax for imports while passing the border[18]. After taking into consideration all taxes on imported productions in Somalia, the pasteurized camel's milk sold price will be USD 0,97 per 0.5 liter.

The table below represents the impact of the change of the export prices on FNPV.

[18] There will be a tax on imported production (imposed on trucks crossing the border from Somalia) which is $ 1,000 per truck.

Table 21. The impact of the changes in export sales price

	40,318
0.70	7,066
0.75	13,224
0.80	19,382
0.85	25,539
0.90	31,697
0.95	37,855
0.97	40,318
1.00	44,013
1.25	74,802
1.50	105,591
2.00	167,170

The result of the test shows that FNPV would be strongly affected by changes of the export prices. For example, the FNPV will drop by 82,5 percent if the price decreases to USD 0.70 per 0.5 liter, and although the FNPV is still positive, it is 7,066 (000'USD)

6. Collection costs for collecting raw milk from the milk collection points, the delivery to the plant and delivery of the dairy products to the markets will also be reflected on the FNPV of the project. Hargessa city, Somalia (where the camel milk will be exported to), is located relatively near the processing plant. It is estimated by the analysis that the transportation cost of collection and delivery milk is ETB 0.50 and 2.00 per liter of milk, respectively. The next table represents the impact on the FNPV resulting from the changes of the transportation costs.

Table 22. The impact of the changes in transportation costs

Price	NPV(000'ETB)
	40,318
1.50	46,482
1.80	42,784
2.00	40,318
2.10	39,086
2.50	34,155
3.00	27,992
3.50	21,828

The test result shows that even if the transportation costs were to double, the FNPV of the project would be still positive.

7. It is also reasonable to take into consideration and to test how the FNPV could be affected by any simultaneous changes in both the domestic price and export prices of the pasteurized milk. The next table represents the result of the test.

Table 23. Joint impact of the domestic and export pasteurized milk prices

40,318	**0.61**	**0.75**	**0.8**	**0.85**	**0.9**	**0.95**	**0.97**	**1**	**1.25**	**1.5**	**2**
8.00	(52,465)	(35,223)	(29,065)	(22,907)	(16,749)	(10,592)	(8,128)	(4,434)	26,355	57,145	118,723
8.50	(44,390)	(27,149)	(20,991)	(14,833)	(8,675)	(2,517)	(54)	3,641	34,430	65,219	126,797
9.00	(36,316)	(19,074)	(12,916)	(6,758)	(601)	5,557	8,020	11,715	42,504	73,294	134,872
9.50	(28,242)	(11,000)	(4,842)	1,316	7,474	13,632	16,095	19,790	50,579	81,368	142,946
10.00	(20,167)	(2,925)	3,233	9,391	15,548	21,706	24,169	27,864	58,653	89,442	151,021
10.50	(12,093)	5,149	11,307	17,465	23,623	29,781	32,244	35,939	66,728	97,517	159,095
11.00	(4,018)	13,224	19,382	25,539	31,697	37,855	**40,318**	44,013	74,802	105,591	167,170
11.50	4,056	21,298	27,456	33,614	39,772	45,930	48,393	52,087	82,877	113,666	175,244
12.00	12,131	29,373	35,531	41,688	47,846	54,004	56,467	60,162	90,951	121,740	183,319

According to the scenario, the sale price of the exported camel's milk is US$ 0.97 (or ETB 17.46) per 0.5 liter and the domestic price of the milk is ETB 11.00 per 0.5 liter. The FNPV of the project is 40,318 (000'ETB). The applied sensitivity analysis' result reveals that the FNPV would be still positive even if the export price of the pasteurized milk were to drop to US$ 0.75. However, if the export price drops to ETB 11.00 (USD 0.61), which is the same level as the current domestic price per liter, then the FNPV of the project would be negative.

8. Another variable that might affect the FNPV of the project is the supply of the raw cow's and camel's milk during the dry periods. The traders stated that despite seasonable fluctuations, they will be able to supply the required amount of milk to the plant without any changes in prices.

Chapter 7

ECONOMIC ANALYSIS

7.1 Introduction

7.1.1 National Parameters

While financial analysis focuses on the benefits of equity holders and bankers, the economic analysis's main focus is the welfare of the country and society as a whole. In order to evaluate the economic benefits, analysts generally look for the good and services in the market, and the information needed to measure economic values can be collected from the analyzing consumers' and producers' choices of that market.

Analyzing the project from the economic perspective helps to pinpoint the groups (apart from the owners of the project) that gain or lose from the project. For instance, if the project pays its labor higher wages than wages of the predominate market, the surplus is a benefit to the group of workers, therefore such a benefit should be incorporated in the economic analysis. Income tax paid by the project is a cost to the owners of the project, but it is a benefit to the government, and it should be estimated by the economic analysis. For analyzing the milk processing project from the country's standpoint, additional financial assumptions have been made in further economic parameters, which should be taken into account.

- The foreign exchange premium is 6.5 percent [19]

- The economic opportunity cost of capital for Ethiopia is 12 percent

Table 24. National parameters

VAT	%	0.15
Import duty	%	0.3
Export subsidy	%	0
Foreign exchange premium	%	0.0664
Non-tradable premium	%	-0.0025
Real exchange rate	ETB/US$	18
Vehicle local transportation cost	ETB	4000

7.1.2 Taxes

- VAT rate is 15 percent, which is charged on both imported and local non-operating materials used by the plant

- All imported equipment required for the operations by the project attract zero tax (VAT)

[19]According to Jenkins, G. P., Kuo, C. Y., Salci, S., estimates of the foreign exchange premium and the premium for non-tradable outlays for twenty countries in Africa. SAJE 2014

- Imported inputs as well as locally supplied equipment used by the milk processing plant attract 15 percent of VAT
- No export tax is imposed on camel's milk exports
- Non-tradable goods and services used by the project are: civil work, transportation, electricity, communication, and construction. However, a 15 percent VAT is levied on electricity which is generated domestically and used by the plant. Also, 15 percent VAT is attracted by non-tradable items utilized by the project

7.2 Classification of Goods

In an economy, there is the distinction of goods and services as either tradable or non-tradable. When the prices of goods are affected by the forces of demand and supply in the domestic market, these goods are said to be non-tradable. On the other hand, the prices of non-tradable goods are not affected by the forces of demand and supply in the domestic market but rather due to the international market impact.

Tradable goods fall under two categories of commodities- they are either importable or exportable. Importable commodities are imported goods and import substitutes are produced domestically. Exportable commodities include exportable goods and their substitutes.

All inputs and outputs of the project have been categorized as either importable or exportable, and the project's importable goods include camel's milk and cow's milk with their by-products. The camel's milk produced by the project is also considered to be an exportable output. The table below displays the classification of the goods.

Table 25. Classification of the goods

Tradable	**Non-tradable**
Importable inputs	***Non-tradable Inputs***
Machinery	Direct cost
Vehicle	Indirect cost
Container/Packages	Milk
	Electricity
Importable Outputs	***Non-tradable Outputs***
Milk	Milk (cow's and camel's)
Yoghurt	
Cheese	
Butter	
Exportable	
Camel milk	

To define the economic values of inputs and outputs of the project, the conversion factor for each element of financial cash flow has to be calculated.

Table 26 List of CSCF for each item of the project

Pasteurized cow's milk (Domestic sale)	0.93
Pasteurized camel's milk (Domestic sale)	0.93
Pasteurized camel's milk (Export sale)	1.07
Raw milk	0.85
Yoghurt (500ml)	0.71
Yoghurt (250ml)	0.71
Cheese (250 gr)	0.71
Butter (250 gr)	0.71
Change in account receivable	0.93
Land	1.00
Buildings	1.00
Machinery and equipment	0.91
Vehicles	0.92
Generator	0.91
Borehole	1.00
Loan	0
USAID Subsidy	0
Transportation cost	0.85
Utilities	0.90
Yoghurt cup	0.71
Milk container	0.71
Butter package	0.71
Cheese package	0.71
Skilled workers	0.82
Unskilled workers	0.67
Direct cost	0.93
Indirect cost	0.93
Change in account payable	0.85
Change in cash balance	1.00
VAT payment	0.00
Loan debt cervices	0.00
Corporate income tax	0.00
Contribution to community	0.00
Gross sales	0.93

The cash flow statement from the economic perspective of the milk processing plant is built based on the financial CF statement from Bankers', or total investment viewpoint.

All figures in the financial CF statement are taken from the total investment standpoint and adjusted using its CSCF, which is introduced in the table below.

Table 27. CSCF for the project items

Receipts	**CSCF**
Gross sales	0.93
Changes in account receivables	0.93
USAID contribution	0.00
Liquidation values	
Land	1.00
Buildings	1.00
Machinery and equipment	0.91
Generator	0.91
Vehicles Residual Value	0.92
Net cash inflow	
Expenditures	
CapEx	
Land	1.00
Buildings	1.00
Borehole	1.00
Machinery and equipment	0.91
Generator	0.91
Vehicles	0.92
OpEx	
Cow's milk	
Direct cost	0.93
Indirect cost	0.93
Labor cost	1.49
Camel's milk	
Direct cost	0.93
Indirect cost	0.93
Labor cost	1.49
Working capital	
Change in A/P	0.85
Change in cash balance	1.00
Net VAT payment	0.00
Corporate income tax	0.00

Adjusting items of the financial CF statement with conversion factors derive values to the economic equivalents.

The sale of cow's milk, its by-products and camel's milk to the local market and camel's milk to the foreign markets act as revenue items.

All operating and investment cost items that are required for operating the project are included within the economic cost. Also, changes in AP and in CB are included as additional outflows. In the economy, any taxes paid to the government is considered as simply a shift of resources from the payer to the government, therefore the net VAT liability of the project and corporate taxes of the project are not included as outflow items.

The net economic benefit of the project can be defined by the subtraction of economic costs from the economic benefits, discounted by using the EOCK of 12 percent real over the span life of the operating period of the project.

The result of the economic analysis shows that the project's ENPV is positive and it generates 51,351 (000'ETB).

Overall, it can be concluded that the project is beneficial for the economy.

Chapter 8

CONCLUSION

The CBA of the milk-processing plant which is PRIME's project implemented by the USAID/Ethiopia) has been implemented based on the framework of integrated investment appraisal. In order to determine the feasibility and sustainability of the project, it needs to be assessed from different points of view, such as financial and economic. There is also a need for different types of analyses, such as stakeholder and risk, to be done.

The project is proposed with the motive to develop and promote the Ethiopian agricultural business by leading it to a market oriented level. An improvement in the lifestyle of the locals is expected to follow, (especially within the poorest segment of the country) as a result of the creation of more job opportunities, improvement of nutrition, and the development of the dairy system of that region. Several stakeholders such as the suppliers of the milk, milk traders, the private entrepreneur, employees, the community, and the government will benefit from the implementation of the project.

The results of the CBA showed that the financial net present value of the project is positively promising that the benefits would be greater than its costs. The implementation of such an intervention significantly increases the annual income of the pastoralists and decreases the risks of investment for the private sector.

While visiting the field of the proposed project, the team could not retrieve any information regarding the willingness of consumers in Somalia (particularly in Hargessa city) to pay for the imported pasteurized camel's milk. The export price used in the analysis was presumed to be USD 0.97 by the private entrepreneur during the interview. Although the price was adjusted to the relevant imported taxes in Somalia, it still appears to be quite high. One of the recommendations made to the PRIME project was to try to obtain a more reliable price for the exported camel's milk.

The local community is used to drinking milk during the day but the raw milk is available only in the mornings and evenings. The quality of the raw milk is also extremely dubious. The implementation of such a project will increase the demand for the pasteurization of milk, which decreases the amount of raw milk available for the locals. As a result, the local consumers will have no choice but to buy the pasteurized milk from the market. This improves the local community's health in return.

Furthermore, when raw milk is not available, the local cafeterias substitute it with powdered milk. Since the water that the cafeterias use could potentially be contaminated, there is a health risk imposed on the pastoralists. By improving the accessibility of pasteurized milk, this issue could also be ameliorated.

The domestic price of pasteurized milk is ETB 11.00 per 0.5 liter. The export price, however, is questionable, the reason being that the current price of raw milk is ETB 13.00 per liter, which is ETB 4.5 lower than that of pasteurized milk. It is recommended to review the price of the product and the willingness of the customers to pay for it.

According to the CBA, the project may have insufficient cash flow during year one, which could cause some difficulties in repayment of loans. In this case, USAID's contribution would play a significant role in overcoming this issue as well as increasing the returns of the project.

Since the capacity utilization of the first year is 25 percent, the project will be able to cover its losses. These losses would be taken forward to the next year, during which there will be enough cash flow to meet all of its obligations. It is assumed that the bank will not charge penalty for the delay of repayment loan and interests.

The results of the sensitivity test have revealed that during the dry period of the year, the project will be able to overcome the shortage of the raw milk by fluctuating both purchasing and selling prices.

The economic analysis reveals that the ENPV is positive, generating 51,351 (000'ETB),or 2,853 (000'USD) which will not only reduce the risk for the private entrepreneur and stakeholders but it will be also benefit for the economy of Ethiopia.

Another potential market for pasteurized camel's milk that was considered by the entrepreneur is Addis Ababa. Unfortunately, the project cannot enter this market due to the high prices of the raw milk in Ethiopia. The plant will purchase the raw milk at a price

ETB 11.00 per liter, while the price for raw milk in Addis Ababa ranges from ETB 5.00 to ETB 8.50 per liter.[20]

[20] The price depends on the area. The information is from the year 2012

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APPENDIX

APPENDIX A: Cash Flow Statement

FINANCIAL CASH FLOW STATEMENT: OWNER INVESTMENT PERSPECTIVE (000'ETB, Real)													
	NPV	**Total**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2031**
Receipts													
Gross sales	474,922	1,305,278	-	19,777	39,554	59,331	79,108	79,108	79,108	79,108	79,108	79,108	-
Changes in account recievables	(8,943)	(19,058)	-	(1,978)	(2,157)	(2,337)	(2,517)	(719)	(719)	(719)	(719)	(719)	7,192
US AID contribution	5,417	5,914	5,181	-	-	-	-	-	-	-	-	-	-
Liquidation values													
Land	52	450	-	-	-	-	-	-	-	-	-	-	450
Buildings	29	246	-	-	-	-	-	-	-	-	-	-	246
Machinery and equipment	74	637	-	-	-	-	-	-	-	-	-	-	637
Generator	5	45	-	-	-	-	-	-	-	-	-	-	45
Vehicals Residual Value	-	-	-	-	-	-	-	-	-	-	-	-	-
Net cash inflow	**471,556**	**1,292,135**	**5,181**	**17,799**	**37,396**	**56,994**	**76,591**	**78,389**	**78,389**	**78,389**	**78,389**	**78,389**	**8,570**
Expenditures													
CapEx													
Land	(450)	(450)	(450)	-	-	-	-	-	-	-	-	-	-
Buildings	(2,457)	(2,457)	(2,457)	-	-	-	-	-	-	-	-	-	-
Borehole	(1,206)	(1,206)	(1,206)	-	-	-	-	-	-	-	-	-	-
Machinery and equipment	(6,372)	(6,372)	(6,372)	-	-	-	-	-	-	-	-	-	-
Generator	(450)	(450)	(450)	-	-	-	-	-	-	-	-	-	-
Vehicles	(8,376)	(12,672)	(6,336)	-	-	-	-	-	-	-	-	-	-
OpEx													
Cow's milk													
Direct cost	(103,314)	(283,949)	-	(4,302)	(8,605)	(12,907)	(17,209)	(17,209)	(17,209)	(17,209)	(17,209)	(17,209)	-
Indirect cost	(2,885)	(7,177)	-	(393)	(395)	(397)	(399)	(399)	(399)	(399)	(399)	(399)	-
Labor cost	(12,983)	(34,141)	-	(1,594)	(1,626)	(1,659)	(1,692)	(1,726)	(1,760)	(1,796)	(1,832)	(1,868)	-
Camel's milk													-
Direct cost	(196,171)	(539,156)	-	(8,169)	(16,338)	(24,507)	(32,676)	(32,676)	(32,676)	(32,676)	(32,676)	(32,676)	-
Indirect cost	(7,475)	(18,599)	-	(1,017)	(1,023)	(1,029)	(1,035)	(1,035)	(1,035)	(1,035)	(1,035)	(1,035)	-
Labor cost	(33,645)	(88,474)	-	(4,132)	(4,215)	(4,299)	(4,385)	(4,473)	(4,562)	(4,653)	(4,746)	(4,841)	-
Working capital													
Change in A/P	3,356	4,416	-	980	719	776	834	267	268	268	269	270	(2,697)
Change in cash balance	(8,943)	(11,866)	-	(1,978)	(2,157)	(2,337)	(2,517)	(719)	(719)	(719)	(719)	(719)	7,192
Net VAT payment	(31,512)	(86,960)	-	(1,185)	(2,552)	(3,919)	(5,287)	(5,287)	(5,287)	(5,287)	(5,287)	(5,287)	-
Corporate income tax	(20,374)	(64,228)	-	0	0	0	0	(5,103)	(5,095)	(5,082)	(5,054)	(5,024)	-
Net cash outflow	**(433,258)**	**(1,153,741)**	**(17,271)**	**(21,790)**	**(36,192)**	**(50,279)**	**(64,367)**	**(68,360)**	**(68,476)**	**(68,588)**	**(68,689)**	**(68,790)**	**4,494**
Net Cash Flow before financing	**38,299**	**146,963**	**(12,090)**	**(3,990)**	**1,204**	**6,715**	**12,223**	**10,029**	**9,913**	**9,800**	**9,700**	**9,599**	**13,064**
Loan Disbursement	6,046	6,046	6,046	-	-	-	-	-	-	-	-	-	-
Total debt repayment	(4,027)	(5,770)	-	(1,252)	(1,078)	(925)	(791)	(673)	(570)	(481)	-	-	-
NCF After Financing		147,239	(6,043)	(5,243)	126	5,790	11,433	9,355	9,343	9,319	9,700	9,599	13,064
NFC After Financing (USD)		8,180	(336)	(291)	7	322	635	520	519	518	539	533	726
NPV Owner's point		**40,318**											
NPV (USD)		**2,240**											
IRR		**43%**											

APPENDIX B: Cash Flow Statement

FINANCIAL CASH FLOW STATEMENT: TOTAL INVESTMENT PERSPECTIVE (000' ETB,Real)														
	NPV	**Total**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2031**
Receipts														
Gross sales	474,922	1,305,278	-	19,777	39,554	59,331	79,108	79,108	79,108	79,108	79,108	79,108	79,108	-
Changes in account	-8,943	(19,058)	-	- 1,978	(2,157)	(2,337)	(2,517)	(719)	(719)	(719)	(719)	(719)	(719)	7,192
Liquidation values			-	-										
Land	52	450	-	-	-	-	-	-	-	-	-	-	-	450
Buildings	29	246	-	-	-	-	-	-	-	-	-	-	-	246
Machinery and equip	74	637	-	-	-	-	-	-	-	-	-	-	-	637
Generator	5	45	-	-	-	-	-	-	-	-	-	-	-	45
Vehicals Residual V	0	(0.00)	-	-	-	-	-	-	-	-	-	-	-	- 0
Net cash inflow	466,375	1,286,953	-	17,799	37,396	56,994	76,591	78,389	78,389	78,389	78,389	78,389	79,121	8,570
Expenditures														
CapEx														
Land	-450	-450	(450)	-	-	-	-	-	-	-	-	-	-	-
Buildings	-2,457	-2,457	(2,457)	-	-	-	-	-	-	-	-	-	-	-
Borehole	-1,206	-1,206	(1,206)	-	-	-	-	-	-	-	-	-	-	-
Machinery and eq	-6,372	-6,372	(6,372)	-	-	-	-	-	-	-	-	-	-	-
Generator	-450	-450	(450)	-	-	-	-	-	-	-	-	-	-	-
Vehicles	-8,376	-12,672	(6,336)	-	-	-	-	-	-	-	-	-	(6,336)	-
OpEx														
Cow's milk														
Direct cost	-103,314	-283,949	-	(4,302)	(8,605)	(12,907)	(17,209)	(17,209)	(17,209)	(17,209)	(17,209)	(17,209)	(17,209)	-
Indirect cost	-2,885	-7,177	-	(393)	(395)	(397)	(399)	(399)	(399)	(399)	(399)	(399)	(399)	-
Labor cost	-12,983	-34,141	-	(1,594)	(1,626)	(1,659)	(1,692)	(1,726)	(1,760)	(1,796)	(1,832)	(1,868)	(1,906)	-
Camel's milk														-
Direct cost	-196,171	-539,156	-	(8,169)	(16,338)	(24,507)	(32,676)	(32,676)	(32,676)	(32,676)	(32,676)	(32,676)	(32,676)	-
Indirect cost	-7,475	-18,599	-	(1,017)	(1,023)	(1,029)	(1,035)	(1,035)	(1,035)	(1,035)	(1,035)	(1,035)	(1,035)	-
Labor cost	-33,645	-88,474	-	(4,132)	(4,215)	(4,299)	(4,385)	(4,473)	(4,562)	(4,653)	(4,746)	(4,841)	(4,938)	-
Working capital														
Change in A/P	3,356	4,415.89	-	980	719	776	834	267	268	268	269	270	270	(2,697)
Change in cash bala	-8,943	(11,866.17)	-	(1,978)	(2,157)	(2,337)	(2,517)	(719)	(719)	(719)	(719)	(719)	(719)	7,192
Net VAT payment	-31,512	(86,960.06)	-	(1,185)	(2,552)	(3,919)	(5,287)	(5,287)	(5,287)	(5,287)	(5,287)	(5,287)	(5,287)	-
Corporate income tax	-20,374	(64,227.70)	-	-	-	-	-	(5,103)	(5,095)	(5,082)	(5,054)	(5,024)	(4,992)	-
Net cash outflow	-433,258	**(1,153,741)**	**(17,271)**	**(21,790)**	**(36,192)**	**(50,279)**	**(64,367)**	**(68,360)**	**(68,476)**	**(68,588)**	**(68,689)**	**(68,790)**	**(75,227)**	**4,494**
NCF	33,117	**141,782**	**(17,271)**	**(3,990)**	**1,204**	**6,715**	**12,223**	**10,029**	**9,913**	**9,800**	**9,700**	**9,599**	**3,894**	**13,064**
NCF USD	1,840	**7,877**	**(960)**	**(222)**	**67**	**373**	**679**	**557**	**551**	**544**	**539**	**533**	**216**	**726**

APPENDIX C: Recourse Flow Statement

RESOURSE FLOW STATEMENT FROM ECONOMY POINT OF VIEW (000'EBT, REAL)														
Receipts	**CSCF**	**NPV**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2031**
Gross sales	0.93	440,398	-	18,339	36,678	55,018	73,357	73,357	73,357	73,357	73,357	73,357	73,357	-
Changes in account recie	0.93	(8,293)	-	(1,834)	(2,001)	(2,167)	(2,334)	(667)	(667)	(667)	(667)	(667)	(667)	6,669
USAID contribution	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
Liquidation values														
Land	1.00	52	-	-	-	-	-	-	-	-	-	-	-	450
Buildings	1.00	29	-	-	-	-	-	-	-	-	-	-	-	246
Machinery and equipment	0.91	68	-	-	-	-	-	-	-	-	-	-	-	581
Generator	0.91	5	-	-	-	-	-	-	-	-	-	-	-	41
Vehicals Residual Value	0.917	-	-	-	-	-	-	-	-	-	-	-	-	-
Net cash inflow			-	**16,505**	**34,678**	**52,850**	**71,023**	**72,690**	**72,690**	**72,690**	**72,690**	**72,690**	**72,690**	**7,987**
Expenditures														
CapEx														
Land	1.00	(450)	(450)	-	-	-	-	-	-	-	-	-	-	-
Buildings	1.00	(2,457)	(2,457)	-	-	-	-	-	-	-	-	-	-	-
Borehole	1.00	(1,206)	(1,206)	-	-	-	-	-	-	-	-	-	-	-
Machinery and equipment	0.91	(5,814)	(5,814)	-	-	-	-	-	-	-	-	-	-	-
Generator	0.91	(411)	(411)	-	-	-	-	-	-	-	-	-	-	-
Vehicles	0.92	(7,682)	(5,811)	-	-	-	-	-	-	-	-	-	(5,811)	-
OpEx														
Cow's milk														
Direct cost	0.93	(95,804)	-	(3,989)	(7,979)	(11,968)	(15,958)	(15,958)	(15,958)	(15,958)	(15,958)	(15,958)	(15,958)	-
Indirect cost	0.93	(2,675)	-	(364)	(366)	(368)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	-
Labor cost	1.49	(19,345)	-	(2,376)	(2,423)	(2,472)	(2,521)	(2,572)	(2,623)	(2,675)	(2,729)	(2,784)	(2,839)	-
Camel's milk														
Direct cost	0.93	(181,910)	-	(7,575)	(15,150)	(22,726)	(30,301)	(30,301)	(30,301)	(30,301)	(30,301)	(30,301)	(30,301)	-
Indirect cost	0.93	(6,932)	-	(943)	(949)	(954)	(960)	(960)	(960)	(960)	(960)	(960)	(960)	-
Labor cost	1.49	(50,131)	-	(6,157)	(6,280)	(6,405)	(6,533)	(6,664)	(6,797)	(6,933)	(7,072)	(7,213)	(7,358)	-
Working capital														
Change in A/P	0.85	2,853	0	833	611	660	709	227	227	228	229	229	230	- 2,293.00
Change in cash balance	1.00	(8,943)	0	(1,978)	(2,157)	(2,337)	(2,517)	(719)	(719)	(719)	(719)	(719)	(719)	7,192.00
Net VAT payment	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
Corporate income tax	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
Net cash outflow			**(16,148)**	**#####**	**(34,694)**	**(46,571)**	**(58,452)**	**(57,317)**	**(57,501)**	**(57,689)**	**(57,881)**	**(58,076)**	**(64,086)**	**4,899**
Net resourse flow (ETB)			**(16,148)**	**(6,043)**	**(16)**	**6,279**	**12,571**	**15,373**	**15,189**	**15,001**	**14,809**	**14,614**	**8,604**	**12,886**
Net resourse flow (USD)			(897)	(336)	(1)	349	698	854	844	833	823	812	478	716
ENPV (ETB)	**51,351**													
ENPV (USD)	**2,853**													
EIRR	**33%**													

APPENDIX D: Direct Expenditures

DIRECT OPERATING EXPENDITURES (000'EBT, Normal)													
Cow's milk	**Total**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2031**
Domestic market													
Raw cow's milk	609,794	-	3,465	7,623	12,578	18,448	20,292	22,322	24,554	27,009	29,710	32,681	-
Yogurt cup	13,420	-	76	168	277	406	447	491	540	594	654	719	-
Milk containers	82,731	-	470	1,034	1,706	2,503	2,753	3,028	3,331	3,664	4,031	4,434	-
Butter packaging	574	-	3	7	12	17	19	21	23	25	28	31	-
Cheese packaging	310	-	2	4	6	9	10	11	12	14	15	17	-
Cost of milk collection	25,408	-	144	318	524	769	846	930	1,023	1,125	1,238	1,362	-
Cost of delivery to markets	100,616	-	572	1,258	2,075	3,044	3,348	3,683	4,051	4,457	4,902	5,392	-
Total	**832,854**	**-**	**4,732**	**10,411**	**17,179**	**25,196**	**27,715**	**30,487**	**33,536**	**36,889**	**40,578**	**44,636**	**-**
Camel's milk													
Domestic market													
Raw camel's milk	679,485	-	3,861	8,494	14,015	20,556	22,612	24,873	27,360	30,096	33,106	36,416	-
Milk containers	128,932	-	733	1,612	2,659	3,900	4,291	4,720	5,192	5,711	6,282	6,910	-
Cost of milk collection	28,312	-	161	354	584	856	942	1,036	1,140	1,254	1,379	1,517	-
Cost of delivery to markets	112,115	-	637	1,402	2,313	3,392	3,731	4,104	4,514	4,966	5,462	6,009	-
Export market													
Raw camel's milk	452,990	-	2,574	5,663	9,344	13,704	15,074	16,582	18,240	20,064	22,070	24,277	-
Milk containers	85,955	-	488	1,075	1,773	2,600	2,860	3,146	3,461	3,807	4,188	4,607	-
Cost of milk collection	18,875	-	107	236	389	571	628	691	760	836	920	1,012	-
Cost of delivery to markets	74,743	-	425	934	1,542	2,261	2,487	2,736	3,010	3,311	3,642	4,006	-
Total	**1,581,406**	**-**	**8,986**	**19,769**	**32,619**	**47,841**	**52,625**	**57,888**	**63,677**	**70,044**	**77,049**	**84,754**	**-**
Total Direct Cost	**2,414,260**	**-**	**13,718**	**30,181**	**49,798**	**73,037**	**80,341**	**88,375**	**97,212**	**106,933**	**117,627**	**129,389**	**-**

INDIRECT OPERATING EXPENDITURES (000'ETB, Nominal)													
Utilities	**Total**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2031**
Fixed electricity	346	-	8	8	9	10	11	12	13	15	16	18	-
Variable electricity	1,603	-	9	20	33	48	53	59	65	71	78	86	-
Cost of running generator	14,446	-	317	348	383	422	464	510	561	617	679	747	-
Other indirect cost													
Office supplies and other expenses	42,334	-	928	1,021	1,123	1,236	1,359	1,495	1,645	1,809	1,990	2,189	-
Chemicals and other imported inputs	13,178	-	289	318	350	385	423	465	512	563	619	681	-
Total Indirect Cost	71,907	-	1,551	1,716	1,899	2,101	2,311	2,542	2,796	3,075	3,383	3,721	-

OPEX BY PRODUCTION LINE (000'ETB, Nominal)													
	Total	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**20222**	**2031**
Cow's milk													
Direct cost	832,854	-	4,732	10,411	17,179	25,196	27,715	30,487	33,536	36,889	40,578	44,636	-
Indirect cost	20,022	-	432	478	529	585	643	708	778	856	942	1,036	-
Labor cost	99,785	-	1,754	1,968	2,208	2,477	2,780	3,119	3,499	3,926	4,405	4,942	-
Camel's milk													
Direct cost	1,581,406	-	8,986	19,769	32,619	47,841	52,625	57,888	63,677	70,044	77,049	84,754	-
Indirect cost	51,885	-	1,119	1,238	1,370	1,516	1,667	1,834	2,017	2,219	2,441	2,685	-
Labor cost	258,586	-	4,545	5,100	5,722	6,420	7,203	8,082	9,068	10,174	11,415	12,808	-
Total Production Cost	**2,844,537**	**-**	**21,568**	**38,964**	**59,626**	**84,035**	**92,634**	**102,117**	**112,575**	**124,109**	**136,830**	**150,861**	**-**
Check		-	-	-	-	-	-	-	-	-	-	-	-

WORKING CAPITAL (000'ETB, Nominal)													
	Total	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2031**
Accounts receivable [% of Sales Revenue]	382,853	-	2,175	4,786	7,897	11,582	12,740	14,014	15,416	16,957	18,653	20,519	-
Accounts payable [% of Total Input Cost]	142,227	-	1,078	1,948	2,981	4,202	4,632	5,106	5,629	6,205	6,842	7,543	-
Cash balance [% on Sales Revenue]	382,853	-	2,175	4,786	7,897	11,582	12,740	14,014	15,416	16,957	18,653	20,519	-
Change in A/R		-	(2,175)	(2,611)	(3,111)	(3,685)	(1,158)	(1,274)	(1,401)	(1,542)	(1,696)	(1,865)	43,983
Change in A/P		-	(1,078)	(870)	(1,033)	(1,220)	(430)	(474)	(523)	(577)	(636)	(702)	16,496
Change in cash balance		-	2,175	2,611	3,111	3,685	1,158	1,274	1,401	1,542	1,696	1,865	(43,983)

RECONCILIATION OF FINANCIAL, ECONOMIC, AND EXTERNALITIES STATEMENT (Real)					
Receipts	**FINANCIAL**	**EXTERNALITIES**	**FINANCIAL+EXTERNALITIES**	**ECONOMIC**	**CHECK**
Gross sales	474,922	(34,525)	440,398	440,398	OK
Changes in account r	(8,943)	650	(8,293)	(8,293)	OK
USAID contribution	5,417	(5,417)	-	-	OK
Liquidation values					
Land	52.25	-	52.25	52.25	OK
Buildings	28.53	-	28.53	28.53	OK
Machinery and equip	73.98	(6.48)	67.50	67.50	OK
Generator	5.22	-	4.77	4.77	OK
Vehicals Residual Val	-	-	-	-	OK
Net cash inflow	471,556	(39,299)	432,257	432,257	OK
Expenditures					
CapEx					
Land	(450)	-	(450)	(450)	OK
Buildings	(2,457)	-	(2,457)	(2,457)	OK
Borehole	(1,206)	-	(1,206)	(1,206)	OK
Machinery and equip	(6,372)	558	(5,814)	(5,814)	OK
Generator	(450)	39	(411)	(411)	OK
Vehicles	(8,376)	694	(7,682)	(7,682)	OK
OpEx					
Cow's milk					
Direct cost	(103,314)	7,510	(95,804)	(95,804)	OK
Indirect cost	(2,885)	210	(2,675)	(2,675)	OK
Labor cost	(12,983)	(6,362)	(19,345)	(19,345)	OK
Camel's milk					
Direct cost	(196,171)	14,261	(181,910)	(181,910)	OK
Indirect cost	(7,475)	543	(6,932)	(6,932)	OK
Labor cost	(33,645)	(16,486)	(50,131)	(50,131)	OK
Working capital					
Change in A/P	3,356	(503)	2,853	2,853	OK
Change in cash balan	(8,943)	-	(8,943)	(8,943)	OK
Net VAT payment	(31,512)	31,512	-	-	OK
Corporate income ta	(20,374)	20,374	-	-	OK
Net cash outflow	**(433,258)**	**52,351**	**(380,907)**	**(380,907)**	OK
Net resourse flow	**38,299**	**13,052**	**51,351**	**51,351**	OK

INCOME TAX STATEMENT (000'ETB, Nominal)													
Revenue	**Total**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2031**
Sales	3,828,527	-	21,755	47,860	78,969	115,822	127,404	140,144	154,159	169,575	186,532	205,185	-
Net VAT	(255,546)	-	(1,303)	(3,088)	(5,217)	(7,741)	(8,515)	(9,366)	(10,303)	(11,333)	(12,466)	(13,713)	-
Expenses													
OpEx	(2,844,537)	-	(21,568)	(38,964)	(59,626)	(84,035)	(92,634)	(102,117)	(112,575)	(124,109)	(136,830)	(150,861)	-
EBITAD	728,444	-	(1,117)	5,808	14,126	24,046	26,255	28,661	31,281	34,133	37,236	40,611	-
Depreciation expense	(20,190)	-	(1,122)	(1,122)	(1,122)	(1,122)	(1,122)	(1,122)	(1,122)	(1,122)	(1,122)	(1,122)	-
EBIT	708,254	-	(2,238)	4,687	13,005	22,925	25,134	27,540	30,159	33,011	36,114	39,490	-
Interest expense	(2,056)	-	(514)	(441)	(367)	(294)	(220)	(147)	(73)	-	-	-	-
Taxable income	706,199	-	(2,752)	4,246	12,637	22,631	24,913	27,393	30,086	33,011	36,114	39,490	-
CFL used			-	(2,752)	-	-	-	-	-	-	-	-	-
Taxable Income Post CFL		-	-	1,494	12,637	22,631	24,913	27,393	30,086	33,011	36,114	39,490	-
Corporate income tax	(193,357)	-	-	-	-	-	(8,218)	(9,026)	(9,903)	(10,834)	(11,847)	(12,948)	-
Net Income	**512,842**	**-**	**-**	**1,494**	**12,637**	**22,631**	**16,696**	**18,367**	**20,183**	**22,177**	**24,267**	**26,541**	**-**
Net after tax in $US	12,439	-	-	72	568	948	652	668	684	700	714	728	-
Carry Forward Loss Balance													
Openning CFL Balance	2,752	-	-	2,752	-	-	-	-	-	-	-	-	-
Losses used	(2,752)	-	-	(2,752)	-	-	-	-	-	-	-	-	-
Losses added	2,752	-	2,752	-	-	-	-	-	-	-	-	-	-
Closing SFL Balance	2,752	-	2,752	-	-	-	-	-	-	-	-	-	-

ANNUAL CAPACITY UTILISATION & LOSSES (000'liters)													
	Total	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2031
Cow's milk													
Raw cow's milk	17,325	-	263	525	788	1,050	1,050	1,050	1,050	1,050	1,050	1,050	-
Milk losses	173	-	3	5	8	11	11	11	11	11	11	11	-
Cow's milk available	17,152	-	260	520	780	1,040	1,040	1,040	1,040	1,040	1,040	1,040	-
Camel's milk													
Raw camel's milk	32,175	-	488	975	1,463	1,950	1,950	1,950	1,950	1,950	1,950	1,950	-
Milk losses	322	-	5	10	15	20	20	20	20	20	20	20	-
Camel's milk available	31,853	-	483	965	1,448	1,931	1,931	1,931	1,931	1,931	1,931	1,931	-

PRODUCTION FOR SALE														
	Units	**Total**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2031**
From cow's milk														
Domestic market														
Pasteurized milk	000'liter	12,264	-	186	372	557	743	743	743	743	743	743	743	-
Cheese	000'kg	147	-	2	4	7	9	9	9	9	9	9	9	-
Butter	000'kg	196	-	3	6	9	12	12	12	12	12	12	12	-
Yogurt	000'kg	1,029	-	16	31	47	62	62	62	62	62	62	62	-
From camel's milk														
Domestic market														
Pasteurized milk	000'liter	19,112	-	290	579	869	1,158	1,158	1,158	1,158	1,158	1,158	1,158	-
Export market														
Pasteurized milk	000'liter	12,741	-	193	386	579	772	772	772	772	772	772	772	-

FINISHED GOODS PRODUCTION (000'Pack)													
	Total	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2031**
Cow's milk													
Domestic market													
Pasteurized milk (500 ml)	24,527	-	372	743	1,115	1,486	1,486	1,486	1,486	1,486	1,486	1,486	-
Cheese (250 ml)	588	-	9	18	27	36	36	36	36	36	36	36	-
Butter (250 mg)	782	-	12	24	36	47	47	47	47	47	47	47	-
Yogurt (250ml)	1,235	-	19	37	56	75	75	75	75	75	75	75	-
Yogurt (500ml)	1,441	-	22	44	65	87	87	87	87	87	87	87	-
Camel's milk													
Domestic market													
Pasteurized milk (500ml)	38,224	-	579	1,158	1,737	2,317	2,317	2,317	2,317	2,317	2,317	2,317	-
Export market													
Pasteurized milk (500ml)	25,483	-	386	772	1,158	1,544	1,544	1,544	1,544	1,544	1,544	1,544	-

ANNUAL VALUE OF PRODUCTION (000'ETB, Nominal)

	Total	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2031
Cow's milk													
Domestic market													
Pasteurized milk (500 ml)	791,345	-	4,497	9,893	16,323	23,940	26,334	28,967	31,864	35,051	38,556	42,411	-
Cheese (250 ml)	72,431	-	412	905	1,494	2,191	2,410	2,651	2,917	3,208	3,529	3,882	-
Butter (250 mg)	91,762	-	521	1,147	1,893	2,776	3,054	3,359	3,695	4,064	4,471	4,918	-
Yogurt (250ml)	47,088	-	268	589	971	1,425	1,567	1,724	1,896	2,086	2,294	2,524	-
Yogurt (500ml)	63,388	-	360	792	1,307	1,918	2,109	2,320	2,552	2,808	3,088	3,397	-
Camel's milk													
Domestic market													
Pasteurized milk (500ml)	1,457,495	-	8,282	18,220	30,063	44,093	48,502	53,352	58,687	64,556	71,011	78,113	-
Export market													
Pasteurized milk (500ml)	1,305,018	-	7,415	16,314	26,918	39,480	43,428	47,771	52,548	57,802	63,583	69,941	-
Total Sales Revenue	3,828,527	-	21,755	47,860	78,969	115,822	127,404	140,144	154,159	169,575	186,532	205,185	-

TAX DEPRECIATION (000'ETB, Nominal)													
	Total	**2,012**	**2,013**	**2,014**	**2,015**	**2,016**	**2,017**	**2,018**	**2,019**	**2,020**	**2,021**	**2,022**	**2,031**
Buildings	2,211	-	123	123	123	123	123	123	123	123	123	123	-
Borehole	434	-	24	24	24	24	24	24	24	24	24	24	-
Machinery and equipment	5,735	-	319	319	319	319	319	319	319	319	319	319	-
Generator	405	-	23	23	23	23	23	23	23	23	23	23	-
Vehicles	11,405	-	634	634	634	634	634	634	634	634	634	634	-
Total annual depreciation	20,190	-	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	-

VAT (000'ETB, Nominal)													
	Total	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2031**
Total Revenue on Domestically Sold Output	2,523,509	-	14,339	31,546	52,051	76,342	83,976	92,374	101,611	111,772	122,949	135,244	-
Total Production Cost of Domestically Sold Output (except Labor)	564,326	-	4,349	7,872	12,056	16,997	18,697	20,567	22,624	24,886	27,374	30,112	-
VAT credit	329,153	-	1,870	4,115	6,789	9,958	10,953	12,049	13,254	14,579	16,037	17,641	-
VAT debit	73,608	-	567	1,027	1,572	2,217	2,439	2,683	2,951	3,246	3,571	3,928	-
Net VAT Liability	**255,546**	**-**	**1,303**	**3,088**	**5,217**	**7,741**	**8,515**	**9,366**	**10,303**	**11,333**	**12,466**	**13,713**	**-**