A Financial and Economic Appraisal of Capital Investment in Jijiga Export Slaughter House, Somali Region, Ethiopia, Using FAST Modeling Standards

Amirreza Botlani Esfahani

Submitted to the
Institute of Graduate Studies and Research,
in partial fulfillment of the requirements for the degree of

Master of Science
in
Banking and Finance

Eastern Mediterranean University
February 2016
Gazimağusa, North Cyprus

Approval of the Institute of Graduate Studies and Research

Prof. Dr. Cem Tanova
Acting Director

I certify that this thesis satisfies the requirements as a thesis for the degree of Master of Science in Banking and Finance.

Assoc. Prof. Dr. Nesrin Ozatac
Chair, Department of Banking and Finance

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Master of Science in Banking and Finance.

Prof. Dr. Glenn P. Jenkins
Supervisor

Examining Committee

1. Prof. Dr. Glenn P. Jenkins

2. Prof. Dr. Hatice Jenkins

3. Asst. Prof. Dr. Hasan Ulaş Altıok

ABSTRACT

This paper presents a financial and economic appraisal of an investment for the construction of a slaughterhouse facility in Faafan village, Somali region, Ethiopia. Sustained political unrest has hampered private-sector activity in the region. As such, this first-mover investment could be critical to attract more capital to the region if successful. Success of this project can be a turning point for the region and new investments can take the area out of the economic backwardness.

The financial modeling undertaken in this study is based on the FAST (Flexible, Appropriate, Structured, and Transparent) approach, which increases model readability and decreases the incidence of error. This is followed by an integrated economic and beneficiary analysis.

An important conclusion is that the project will generate significant FNPV and ENPV (US$ 9.42 million and US$ 65.32 million, respectively), sufficient to attract other investors to the Somali region.

A positive ENPV indicates that in addition to being of benefit to pastoralists, the presence of a commercial slaughterhouse facility will be helpful to the broader, national economy.

On the other hand, first-mover status means that the facility has assumed a number of risks in isolation, including local resistance, regional instability, and foreign-market risk.

The project stakeholders comprise of the private investor, smallholder livestock producers, livestock traders, slaughterhouse workers, the Faafan village community, and the Government of Ethiopia, who are also major project beneficiaries.

Keywords: financial and economic analysis, FAST modeling, Somali region, Slaughterhouse, FNPV, ENPV.

ÖZ

Bu calisma Etiyopyada, Somali bölgesinde Faafan köyünde, bir kesimhane kurmak üzerine önerilen yatirim´in mali ve ekonomik degerlendirmesini yürütmektedir. Bu alanda özel sektörün bölgesel gelismesi siyasiden gelen huzursuzluklar tarafindan engellendi. Somali bölgesinde ilk nakliye yapan kesimhane budur. Bu alanda olasi bir basari bölgeye daha fazla sermayeyi cekmek acisindan kritik bir yatirim olarak görülmektedir. Bu projenin basarisi bu bölge icin bir dönüm noktasi olabilir ve yeni yatirimlari ile bu bölgeyi ekonomik kriz´den kurtarabilir.

FAST modelleme yaklasimi entegre edilmis ekonomik ve yararlanici analizi ile birlikte finansal modellemesini tamamlamak icin kullanimdadir. FAST (Esnek, Uygun, Yapisal, ve Seffaf) standartlari modellerin okunabilirligini gelistirmeyi ve ayni zamanda hata oranini düsürmeyi amaclayan bir kurallar dizisi´dir.

Bu calismanin en önemli sonuclarindan biri projenin Somali bölgesinin diger yatirimcilarinin ilgisini cekebilecek büyük miktarda olan FNPV ve ENPV´sidir. (FNPV ABD$ 9.42 Million Dolar ve ENPV ABD$ 65.32 Million Dolar´dir.)

Diger tarafta bölgenin ilk nakliyecisi olarak bu kesimhane insanlarin olumsuz yaklasimi ve Somali bölgesinin degiskenligi gibi bir cok risk faktörlerinin üstesinden gelmesi gerekmektedir.

Cikan sonuclara göre ENPV olumlu gözükmektedir. Göcebe cobanlarina avantaj saglamasi yani sira, ticari kesimhanenin varligi tüm ülkenin ekonomisi icin faydali oldugunu gösterir.

Proje paydaslarin´in birkac gruplari vardir: özel yatirimci, kücük ölcekli hayvancilik üreticileri, ve hayvancilik tüccarlari, kesimhane calisanlari, Faafan köy halki ve Etiyopya hükümeti.

Anahtar kelimeler: mali ve ekonomik degerlendirme, FAST modelleme, Somali bölgesi, kesimhane, FNPV, ENPV, paydaslar

DEDICATION

To my dearest Mom and Dad

With love and respect

ACKNOWLEDGMENT

I would like to thank my supervisor Prof. Dr. Glenn Paul Jenkins for his advice and valuable support. I am also grateful to Mikhail Miklyaev, who provided valuable suggestions and comments during my work.

TABLE OF CONTENTS

LIST OF TABLES

TABLE of FIGURES

LIST of EQUATIONS

LIST OF ABBREVIATION

CBA	Cost-Benefit Analysis
CF	Conversion Factor
ENPV	Economic Net Present Value
ETB	Ethiopian Birr (Currency)
FEP	Foreign Exchange Premium
FNPV	Financial Net Present Value
FOB	Free on Board
FtF	Feed the Future
GDP	Gross Domestic Product
NCF	Net Cash Flow
NPV	Net Present Value
PRIME	Pastoralists Resilience Improvement and Market Development
VAT	Value Added Tax
USD	United States Dollar
USAID	United States Agency for International Development

Chapter 1

INTRODUCTION

1.1 Introduction

The Federal Democratic Republic of Ethiopia is situated in Eastern Africa, surrounded by Eritrea, Djibouti, Somalia, Sudan and Kenya. Ethiopia is the second-most densely populated nation in Sub-Saharan Africa (World Bank, 2014). The most populated region of Ethiopia is the Somali region, the capital of which is Jijiga.

The Somali region is Ethiopia's least developed area. The local economy is dominated by farming and trade in livestock (FAO, 2014). Livestock is mainly marketed near the border with Somalia, generating significant income for livestock proprietors, dealers, and marketing specialists. However, Ethiopian pastoralists have little power in the business, which is controlled by traders from neighboring countries (Devereux, 2006).

The key livestock value chains are those of cattle, camels, sheep, and goats. Livestock products include live animals, meat, milk, hides, skins and leather. The trade in livestock is subject to numerous challenges, predictable and unpredictable. Animals are transported for long distances under difficult conditions, risking weight loss, injury, and death, all of which reduce pastoralists' and household income.

The risk of weight loss and death is particularly high in small ruminants, such as sheep and goats. However, there is little domestic demand for such livestock and small ruminants are therefore the dominant livestock traded. In order to reduce the risks of livestock injury or death, and to maximize returns, pastoralists often wait several years in order to sell their animals at a higher weight.

The establishment of a slaughterhouse in the region will enhance demand for small ruminants. The concomitant reduction in herd size will ensure more and better quality pasture, such that animals will gain weight in a shorter period of time.

Meat produced by the abattoir will be sold in the Middle East-a new market for the region's pastoralists. The abattoir has also raised pastoralists' income in drought years when herds are de-stocked, helping to minimize pastoralists' losses and to cover the cost of feeding the rest of the herd.

Before the construction of the slaughterhouse, there was no commercial abattoir in the Somali region of Ethiopia. Indeed, political instability in the region has prevented private-sector investment in the area for some time.

The Pastoralists Resilience Improvement and Market Development (PRIME) is a USAID program, which operates projects that aim to improve the resilience of pastoralists in Ethiopia. The PRIME program forms part of the larger Feed the Future (FtF) program, which supports sustainable investments in profitable and relatively simple interventions in agricultural value chains, to diminish destitution, poverty, and hunger (Mercy Corps, 2015).

The success of projects such as the abattoir facility can play a critical role in enhancing general well-being in the district, as well as in attracting new investors.

1.2 Aim of the Study

This study aims to determine the feasibility of an investment to construct a slaughterhouse in Faafan village in the Somali region of Ethiopia—the Jijiga Export Slaughterhouse (JESH). The ex-ante financial and economic returns and net benefits to project stakeholders are also presented.

JESH project stakeholders comprise the private operator, smallholder livestock producers, livestock traders, labor employed by the facility, and the Government of Ethiopia.

The study uses data obtained by others in the course of site visits, to construct cost-benefit analysis (CBA) models of the intervention. The CBA models are designed to assess the financial and economic outcomes of the intervention, i.e. financial net present value (FNPV), economic net present value (ENPV), and financial rate of return (FIRR).

1.3 Methodology

The financial and economic models are based on a new approach called FAST modeling—flexible, appropriate, structured and transparent. FAST financial modeling relies on a series of principles to guide the structure and design of effective spreadsheets (fast-standard, 2014).

After constructing the model, sensitivity analysis is carried out to determine the impact of crucial input variables on various outputs, highlighting potential distinctive effects of critical and risky variables.

1.4 Structure

A brief structure of the study is as follows:

The main focus of the study has been explained in chapter I.

Chapter II presents the project background, providing insight into the current situation in the Somali region, and reasons for establishing the JESH facility.

Chapter III provides a brief overview of the methodology used in this study, including financial, economic and risk analysis. This chapter also explains the FAST Modeling Standard, how it works, and its benefits.

Chapters IV and V and VI present the results of the financial and the economic analysis, respectively, along with a discussion of essential findings.

Chapter 2

LITERATURE REVIEW

2.1 Background

The Federal Democratic Republic of Ethiopia is situated in Eastern Africa, covering an area of 1,250,000 Km2. The population of Ethiopia is 84 million (World Bank, 2012), with over 84% of the population residing in zones dominated by agriculture (Hare, 2007).

Figure 2.1: Map of Ethiopia and Neighboring Countries

According to (World Bank, 2012) estimates over 30 percent of Ethiopians live in poverty. Average annual per capita income of $390 is low compared to other sub-Saharan African countries (GNI, Atlas Method).

Ethiopia's economy is predominantly agrarian with the greatest number of livestock in Africa—including 31 million sheep and 35 million goats (Negassa, Shahidur and Gebremedhin, 2011). In many areas, livestock is the main or only source of household income. As a consequence, livestock is a key contributor to the farming sector as well as to overall GDP, accounting for 12 to 15 percent of GDP and around 25 to 30 percent of agricultural GDP (Deressa, 2006). The key livestock value chains are cattle, camels, sheep, and goats.

There are two climate sub-systems in Ethiopia: the highlands, which are 1500 meters above sea level and account for 40 percent of the country's territory and around 60 percent of its livestock (Legese et al, 2014); and the lowlands, home to some 12 million pastoralists, who rely on livestock for their living (Negassa and Jabbar, 2008).

Somali region is located in the lowlands and covers one-third of the country (Eid, 2014). The region is dominated by four groups: pastoralists, which account for 60% of the population, agro-pastoralists, farmers, and urban residents (Abdirahman et al., 2012). The primary occupation of pastoralists in this region is the cross-border trade of animals with neighboring countries such as Kenya and Djibouti (Jenkins and Miklyaev, 2013). (See Figure 2.2 for location of Somali region.)

Figure 2.2: Location of Somali Region, Ethiopia

2.2 Livestock Market

The trade in livestock is generally carried out through market chains, which transfer livestock from producers to consumers of animal products (Amaledegn**,** 2011). The key market is near the border area. Before offering animals for sale, pastoralists seek information from neighbors and other traders regarding potential buyers and market preferences in terms of animal condition, weight, and age. This information is critical in determining pastoralists' decisions on when and what to sell, to whom (Legese et al., 2014).

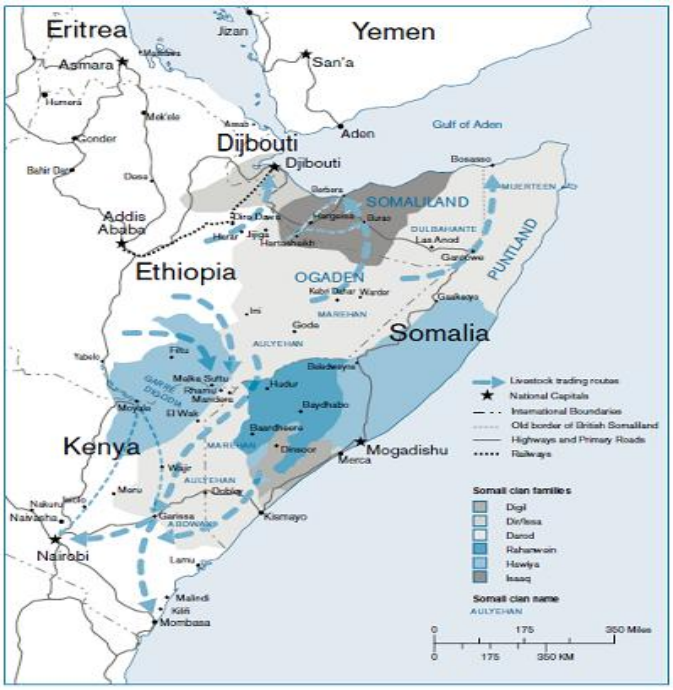

Figure 2.3: Animal Trade Paths on Ethiopia Borderland

2.2.1 Market Conditions

Despite the great quantity of livestock raised in Ethiopia, the country's animal sector continues to fail to meet expectations (Gebremedhin, B. & Hoekstra, D., 2007; Negassa et al. 2011). Key market weaknesses manifest in the Somali region include:

1. Conventional production of livestock

2. Lack of organized, commercial facility for the slaughter of sheep and goats, resulting in weak/inadequate marketing of animal products (Solomon et al, 2003)

3. Unsatisfactory infrastructure, including lack of weighing facilities, shade, or water in most markets, such that ruminants are purchased on the basis of appearance (Amaledegn, 2011)

4. Lack of marketing to boost demand for kids and lambs means pastoralists prefer to sell older, heavier ruminants, resulting in lower quality meat

5. Cross-border trade controlled by neighboring-country traders who keep prices down, to the disadvantage of Ethiopian pastoralists (Jenkins & Mikleaev, 2013)

6. Lack of integration of pastoralists in the marketing chain, leaving them vulnerable to changes in trading routes due to conflict or drought, and unable to sell their livestock (Devereux, 2006)

7. Lack of efficient destocking mechanism (abattoir) to support pastoralists in times of drought, when small ruminants lose weight or die, impacting pastoralist and household income.

8. Distance to market, leading to weight loss and death of ruminants trekked or trucked in difficult conditions

2.2.2 Livestock Transportation

Livestock for sale must be delivered to market, by trekking, trucking or a combination of both—a journey that can take from several hours to several days (Jabbar & Ayele, 2004).

2.2.2.1 Livestock Transportation Problems and Consequences

The transport and handling of livestock presents a number of challenges with adverse consequences:

1. Sub-standard roads and trekking routes lead to animal injury and weight loss, as well as increasing transportation costs and reducing pastoralists' and household income (Pavanello, 2010)

2. Lack of vehicles appropriate to the transport of live animals (Yami, 2010)

3. Lack of driver and handler knowledge on avoiding livestock losses, injury, and stress

4. Lack of training in the loading and unloading of live animals and lack of infrastructure such as ramps (Yami, 2010).

Figure 2.4: Examples of Livestock Loading and Unloading

5. Lack of water, feed, or rest during animal transport, often at high temperatures, leading to death by dehydration or exhaustion, reduced quality of animal products, and lower pastoralists' profit

2.2.3 Actors in the Livestock Value Chain

"The livestock value chain involves different actors and agents: pastoralists (producers), domestic buyers (small traders, wholesalers, and butchers), abattoir facilities, livestock exporters, brokers, and consumers" (Legese et al., 2014).

2.2.3.1 Brokers

Brokers are one of the most important actors in the market for livestock, connecting pastoralists (sellers) to consumers (buyers). The role of a broker varies by location. In Somali region, each pastoralist is a member of a clan and should give his livestock to the clan broker, who is obliged to offer the animals at the predominant market price in return for a fixed amount per animal as commission (Aklilu & Catley, 2010). The Somali region livestock market is controlled by (buyers') brokers from neighboring countries who, naturally, try to keep prices low. In addition, buyers' and sellers' brokers often conspire to conceal the final sale price from the producer (Jenkins & Miklyaev, 2013).

2.2.3.2 Export Abattoirs

Of the 11 export slaughterhouses once operational in Ethiopia, six have closed while the remaining five operate at less than 50 percent of capacity (ITAB-CONSULT PLC, 2006). This underperformance restricts Ethiopia's potential foreign-exchange earnings.

Export abattoirs purchase livestock at the slaughterhouse gates or through their own agents, exporting processed products mainly to the Middle East and North Africa. Animals are purchased by weight, after resting for a day in the slaughterhouse holding area. This delay reduces the common practice of over-watering livestock in order to increase their weight. Pastoralists are paid 24 hours after purchase, with higher prices paid to producers who can provide the abattoir with a large number of livestock within a period of less than a week (Fadiga, 2014).

2.3 USAID PRIME Program

"A five-year USAID activity in Ethiopia called PRIME has as its main goal is to improve the lifestyle of the people in Ethiopia and enhance households' income. The USAID Ethiopia PRIME venture is part of the more extensive strategy of the Feed the Future (FtF) programs. FtF's aim is to diminish destitution, poverty and hunger. The PRIME program plans to contribute about one third of the investment cost needed to start construction of a new abattoir facility" (Mercy Corps, 2013).

2.4 Jijiga Export Slaughterhouse

The Jijiga Export Slaughterhouse aims to provide a world-class commercial abattoir and animal-fattening facility, with the goal of improving the livelihoods of Ethiopian pastoralists (Jeshplc, 2012). In addition to improving market linkages for more than

500,000 livestock producers, the facility will also create between 100 and 1,000 new job for people of the region (Business Portal, 2011).

The JESH facility will have the capacity to process 200 large animals (i.e., cattle) and 2,000 small animals (i.e. sheep and goats) per shift, operating two shifts per day during periods of drought. The facility will have a storage capacity of over 300 tons—far greater than that of existing abattoirs. Facilities for the slaughter of camels are also to be introduced over the course of the project (Jeshplc, 2012). Output of red meat, carcasses, skin/hides, and edible offal will be sold to neighboring countries as well as Asia, with possible additional markets in Italy, Sweden, and Denmark.

In addition to world-class facilities, the success of the JESH project hinges on land. The project has secured 285 hectares of fertile land, over half of which will be used to grow fodder for livestock held for fattening before slaughter.

Figure 2.5: Land Dedicated to Growing Fodder

2.4.1 Challenges faced by JESH

Despite the fact that 90 percent of livestock and pastoralists live in the lowlands, there is no commercial abattoir in the region (Business Portal, 2011). Three main issues have restricted private-sector investment, posing challenges to JESH:

1. Political instability and conflict in Ethiopia and the Somali region in particular have destabilized the local economy for over a decade (Gathege, 2012)
2. Extremely limited regional transport infrastructure will require JESH to provide livestock producers with new road access, without which herds must be trekked, resulting in weight loss and lower meat quality
3. Religious strictures against the taking of loans and the payment of interest limit the JESH facility investor's access to capital

2.4.2 JESH Benefits

The JESH facility presents major potential benefits for the regional economy, as well as significantly improving pastoralists' lives and livelihoods, by:

1. Generating reliable local demand for livestock, decreasing transport costs and increasing pastoralists' profit through off-take contracts (Jenkins and Miklyaev, 2013)
2. Establishing an export market in the Middle East, where demand for small ruminants (21-25 kg) is high compared to the local market
3. Operating double-shifts during periods of drought so that pastoralists can rapidly destock, using earnings to fatten remaining livestock
4. Contributing 2.5 percent of revenue to the community, bolstering the local economy and gaining people's trust

5. Additional incentives for pastoralists who can provide large numbers of livestock within short periods of time

Chapter 3

METHODOLOGY

3.1 Introduction

This study conducts a cost-benefit analysis (CBA) of the proposed intervention to assess its financial and economic outcomes in terms of financial net present value (FNPV), economic net present value (ENPV), and financial rate of return (FIRR). This is followed by a sensitivity analysis. FAST modeling standards are employed throughout.

3.2 Financial Analysis

The financial analysis of a venture is undertaken to determine whether a given project is financially feasible over its planned lifetime. Using cost-benefit analysis to assess financial feasibility reduces the possibility that an unviable project is pursued, while providing insights to improve project profitabilty.

3.3 Costs-Benefit Analysis (CBA)

Cost-benefit analysis (CBA) facilitates financial and economic decision-making, by assessing the potential costs of a new project compared to anticipated benefits to determine project viability.

3.3.1 Price Index and Exchange Rates

The output values of a project are usually expected to change over the project's lifetime. These changes, which can be in nominal or real terms, must be consider at each stage of the project. Unanticipated changes in prices and costs are likely to have a serious impact on project outcomes.

A basic task in financial modeling is to build an estimation of nominal prices, taking account of expect rates of inflation as well as anticipated changes in real prices. The financial model used in this study calculated price indices over the life of the project, using annual base rates of inflation and changes in items' real values, reducing the chance of error due to inconsistent assumptions regarding prices in calculating project outcomes.

3.3.2 Cash-flow Statements

A cash-flow statement indicates annual cash flows generated by project operations. In general, the cash-flow statement is used to illustrate the financial position of a business. In this case, JESH project cash-flow statements are prepared in nominal and real terms over the 20-year lifetime of the project. Real-price cash-flow statements are derived for each year by dividing annual nominal cash flows by the price index for that year.

3.3.3 Financial Evaluation Criteria

Projects can be appraised according to a variety of criteria, of which net present value (NPV) and internal rate of return (IRR) are the most reliable and commonly used in business evaluations.

3.3.3.1 Net Present Value (NPV)

Net present value is the estimated discounted value of a particular stream of future cash flows, expressed in present-day corresponding currency values (Equation 3.1). Net present value is obtained by comparing the initial investment cost to the value of future net project cash flows.

In this study, net present value is calculated in real terms, from two perspectives: total investment and the owner's points of view.

$$\mathbf{NPV^0} = \sum_{\mathbf{t=0}}^{\mathbf{n}} \frac{(\mathbf{B_t} - \mathbf{G_t})}{(\mathbf{1} + \mathbf{r})^{\mathbf{t}}}$$

Equation 3.1: Net Present Value

3.3.3.2 Internal Rate of Return (IRR)

The second criteria used in evaluating a proposed project is internal rate of return (IRR)—an approach commonly used in both private- and public-sector projects. Similarly to NPV, IRR is calculated in real terms, from the perspective of total investment and the owner's point of view. However, IRR alone cannot provide a reliable indicator for investment decision-making.

3.3.4 Sensitivity Analysis

The first step in analyzing business risk is to identify key risk variables—parameters susceptible to small changes with significant effects on model outcomes for values such as FNPV or ENPV.

The financial analysis conducted for this study incorporated sensitivity analysis for ten critical variables and line items, to establish their impact on project FNPV and FIRR.

3.4 Economic Appraisal

Similarly to financial analysis, economic analysis is a means of assessing all project costs and benefits. However, rather than just considering the project owner's perspective, economic analysis considers the impact of a project on society as a whole.

The model's economic appraisal consists of an economic resource-flow statement, a statement of economic externalities, and the reconciliation of the economic, the financial, and externalities, followed by distributive analysis, and stakeholder and beneficiary analysis, in order to determine the project effect on the broader society.

3.4.1 Economic Externalities

The outcomes of financial and economic analyses differ, because some externalities are not included in financial values. Such externalities include:

1. Taxes are levied on domestically sourced inputs as well as on the foreign-exchange earnings on exported output, resulting in a change in total government tax collections
2. Provision of a reliable, local, easily accessible market for small ruminants is likely to increase the price for small ruminants, to the pastoralists' net benefit

3.4.2 Beneficiary Analysis

There are seven groups of stakeholders who will benefit from the JESH facility:

1. Government of Ethiopia, in terms of

a. taxes on production inputs

b. foreign exchange earned from exports

c. taxes on income earned by 133 workers JESH employees

d. 8 percent social insurance on workers' wages, payable by JESH

e. sales tax on livestock sold to JESH (levied at 10 ETB/head for small ruminants and 100 ETB/head for large ruminants)

2. Pastoralists, who gain access to reliable, local facility, and rapid cash payment for livestock

3. Laborers, who are to be paid above-market rates

4. Traders, who will be rewarded for providing large numbers of livestock to JESH within short time periods, increasing the number of traders active in the region

5. Community of Faffan village, which will receive 2.5 percent of operational income each year, building trust with local pastoralists and securing JESH access to livestock

6. USAID, which is contributing one-third of project costs

7. Private investors, who benefit from decreased financing risk as a result of USAID involvement

3.5 FAST Modeling Standards

FAST modeling standards are a set of rules that help to ensure that a model is transparent, well structured, and easily understood by the various organizations involved in its construction and use. FAST is:

Flexible: design and procedures must permit model to be both flexible in the short-term and adjustable in the long-term. Model must permit different users to apply new data and different scenarios, and to make adjustments over an extended period as new data becomes available.

Appropriate: model must indicate key business presumptions specifically and precisely without being over-constructed, and must not include non-essential information.

Structured: strict consistency in model format and association, in order to maintain logic and consistency over time and between users.

Transparent: use straightforward and simple equations easily understood by modelers and non-modelers alike. Suggestions that enhance transparency of the model will also help the model to be more flexible.

3.5.1 Workbook Design Rules

Workbooks should be divided according to the following:

1. Foundation

a. Two sheets dedicated to inputs—input constant and input series

b. One timesheet, incorporating flags, start date, end date, and other critical dates and periods

c. One temporary sheet

2. Workings (Model Engine)

All calculations are conducted in and results obtained from the model engine.

3. Presentation

Includes statements, charts and inputs. When the model is completed, inputs move to the input sheet, and all links are replaced.

4. Controls

Includes track sheet, check box, and control for sensitivities.

3.5.2 Worksheet Rules

A number of rules should be followed in the worksheet, as discussed below.

3.5.2.1 Worksheet Design

According to FAST standards, each worksheet is divided into two—columns A-I on the left, and columns J onwards on the right. Each column is dedicated to a unique purpose. Columns A, B, C, and D are dedicated to section and sub-section labels, column F to line labels. Constant numbers, units, and row totals apply to columns F, G, and H, respectively. Columns J onwards are used for calculations.

FAST modeling also makes consistent use of color: links are blue; exported links are red; and counter-flows are gray.

3.5.2.2 Calculation Blocks

The calculation block is a key min feature of the FAST modeling approach. Used to increase model readability, the calculation block contains all the components (equations) of the formula used in model calculations.

3.5.2.3 Check Box

A check box is linked to every sheet, tracking all calculations in order to assess if the model is working correctly. This function enables the modeler to spot miscalculations and fix the problem in each section.

3.5.3 Multiple Worksheets

Another principle of FAST modeling is to establish separate sheets for the calculation of tax, investment cost, financial statement, sensitivity analysis, and so on, enabling the modeler to easily locate and fix problems. This approach also takes advantage of the Excel program function to flag and recall selected areas of given sheets. The approach is not recommended in the case of complicated models, however, as the number of sheets created may be unmanageable.

Chapter 4

FINANCIAL ANALYSIS

4.1 Introduction

This study undertakes a financial and economic appraisal of investment to build the Jijiga Export Slaughterhouse (JESH) in Faafan village in the Somali region of Ethiopia—a facility that could have an important impact on the future of the region and country as a whole.

4.2 Project Description

The aim of this study is to determine the financial and economic outcomes associated with the establishment of a commercial slaughterhouse in the Somali region of Ethiopia, through cost-benefit analysis using data gathered in the course of field visits (Jenkins and Miklyaev, 2013).

The private investor in the JESH facility is an observant Muslim who, in accordance with religious strictures, is unwilling to pay interest on a loan. (There is no Islamic bank serving the region.) The project is therefore not financed by a loan: instead, USAID will grant the private investor one-third of the investment cost—a sum of USD 1,387,177—while the Ethiopian government has agreed to install the electricity required, at a cost of USD 320,555. (Currencies used in this study are the Ethiopian Birr (ETB) and United States dollar (USD).) See Table 4.1 for sources and uses of funds

Table 4.1: Sources and Uses of Funds

Line Item	Investment Cost (US$)
Land	200,000.00
Electricity and road connection, transformers and etc.	320,555.00
Security Fence, boreholes and etc.	116,971.00
Buildings	1,214,238.00
CIF cost of Machinery and Equipment	1,567,265.00
Vehicles	740,000.00
Office furniture, fittings and equipment	30,960.00
Preliminary Administrative Expenses	182,298.00
Local transportation of the machinery to the project site	8,890.00
Total investment cost	**4,381,177.00**
Total USAID Investment required (thousands US$)	**1,381,177.00**
Equity(thousands US$)	**3,000,000.00**

4.3 Project Modeling

The CBA model used in this study is constructed according to FAST standard rules, according to which each section of the model is allocated a separate worksheet. Worksheets and corresponding tables are provided below.

4.3.1 Timing

1. Model is built using annual cash flows

2. Model start date is May 1st 2012

3. Calculations cover 20 years

4. Financial year starts on May 1st and ends following April 30th

5. Assumed to be 300 working days per year

6. Abattoir working at full capacity from 2015

4.3.2 Price Index and Exchange Rates

In 2012 the inflation rate in Ethiopia was 20 percent while US inflation was 2.5 percent. Inflation in both countries is assumed to remain constant over the project's life. The expected ETB/USD exchange rate is obtained by multiplying the real exchange rate (18 ETB/USD) by the annual relative price index. The nominal

exchange rate in 2012 was 18 ETB/USD. Table 4.2 presents price index calculations for each year.

Table 4.2: Price Index and Exchange Rates

Price Index and Exchange Rates									
Model period beginning					01 May 2012	01 May 2013	01 May 2014	01 May 2030	01 May 2031
Model period ending					30 Apr 2013	30 Apr 2014	30 Apr 2015	30 Apr 2031	30 Apr 2032
Financial year					2012	2013	2014	2030	2031
Model column counter	Constant	Unit	Total		1	2	3	19	20
Price Index and Exchange Rates									
Domestic Inflation	0.20	%/Year							
First model column flag (Forcast Flag)	-	Flag	1	-	1	-	-	-	-
Domestic Price Index		Index			1.00	1.20	1.44	26.62	31.95
US Inflation	0.025	%/Year							
First model column flag (Forcast Flag)	-	Flag	1	-	1	-	-	-	-
US Inflation Index		Index			1.00	1.03	1.05	1.56	1.60
Domestic Price Index		Index			1.00	1.20	1.44	26.62	31.95
US Inflation Index		Index			1.00	1.03	1.05	1.56	1.60
Relative Price Index		Index			1.00	1.17	1.37	17.07	19.98
Real Exchange Rate	18.00	ETB/USD							
Relative Price Index		Index			1.00	1.17	1.37	17.07	19.98
Expected Exchange Rate		ETB/USD			18.00	21.07	24.67	307.26	359.72

4.3.3 Project Potential Utilization

The abattoir facility started operation in 2013, with full capacity utilization from 2015—that is one 8-hour shift per day outside drought periods. Table 4.3 presents annual capacity utilization. Table 4.4 presents numbers of animals slaughtered before and after 2015.

Table 4.3: Production Capacity Utilization

PRODUCTION POTENTIAL UTILIZATION		
Year 2012	0.00%	%
Year 2013	50.00%	%
Year 2014	90.00%	%
Year 2015 and after	100.00%	%
Year 2015 and after (Adjusted for de-stocking)	105.88%	%

Table 4.4: Annual Capacity Utilization

Annual Capacity Utilization											
Model period beginning					01 May 2012	01 May 2013	01 May 2014	01 May 2015	01 May 2029	01 May 2030	01 May 2031
Model period ending					30 Apr 2013	30 Apr 2014	30 Apr 2015	30 Apr 2016	30 Apr 2030	30 Apr 2031	30 Apr 2032
Financial year					2012	2013	2014	2015	2029	2030	2031
Model column counter	Constant	Unit	Total		1	2	3	4	18	19	20
ANNUAL CAPACITY UTILIZATION											
SMALL RUMINANTS PRODUCTION											
Number of working days in year	300	Days									
Small ruminants production capacity	2,000	Heads/shift									
Phase I (May2013-January 2014) percentage of the full year	0.67	% p.a.									
Producation utilization	-	%	-	-	-	0.50	0.90	1.00	1.00	1.00	-
Establishment phase flag	-	Flag	1	-	-	1	-	-	-	-	-
Small ruminants		Heads			-	200,000	540,000	600,000	600,000	600,000	-
LARGE RUMINANTS PRODUCTION											
Number of working days in year	300	Days									
Large ruminants production capacity	200	Heads/shift									
Phase II (September 2013-January2014) percentage of the full year	0.33	% p.a.									
Producation utilization	-	%	-	-	-	0.50	0.90	1.00	1.00	1.00	-
Establishment phase flag	-	Flag	1	-	-	1	-	-	-	-	-
Large ruminants		Heads			-	10,000	54,000	60,000	60,000	60,000	-

4.3.4 Investment Cost

Total project investment costs are estimated to be USD 4,381,177 in 2012, equivalent to around ETB 78.86 million (see Table 4.5). Investment costs are calculated in both real and nominal terms (see Table 4.6 for total investment costs in real terms).

Table 4.5: Investment Costs in Dollar Terms

INVESTMENT COST			
Land	200	USD'000s	
Electricity and road connection, transformers and etc.	320.555	USD'000s	
Security Fence, boreholes and etc.	116.971	USD'000s	
Buildings	1,214.238	USD'000s	
CIF cost of Machinery and Equipment	1,567.265	USD'000s	
Vehicles	740	USD'000s	
Office furniture, fittings and equipment	30.96	USD'000s	
Preliminary Administrative Expenses	182.298	USD'000s	
Local transportation of the machinery to the project site	8.89	USD'000s	
Total investment cost	4,381.177	USD'000s	
Investment cost over-run factor	0.00%	Factor	

Table 4.6: Investment Costs (Million ETB, Real)

Investment Cost						
Model period beginning					01 May 2012	01 May 2013
Model period ending					30 Apr 2013	30 Apr 2014
Financial year					2012	2013
Model column counter	**Constant**	**Unit**	**Total**		1	2
INVESTMENT COST (Real, Million ETB)						
Real Exchange Rate	18.00	ETB/USD				
ETB/USD to ETB/USD000s conversion factor	0.001	Factor				
First model column flag (Forcast Flag)	-	Flag	1	-	1	-
Land	200	USD'000s				
Land		ETB'000000s	3.60		3.60	-
Electricity and road connection, transformers and etc.	320.555	USD'000s				
Electricity and road connection, transformers and etc.		ETB'000000s	5.77		5.77	-
Security Fence, boreholes and etc.	116.971	USD'000s				
Security Fence, boreholes and etc.		ETB'000000s	2.11		2.11	-
Buildings	1214.238	USD'000s				
Buildings		ETB'000000s	21.86		21.86	-
CIF cost of Machinery and Equipment	1567.265	USD'000s				
CIF cost and Machinery and Equipment		ETB'000000s	28.21		28.21	-
Vehicles	740.00	USD'000s				
Vehicles		ETB'000000s	13.32		13.32	-
Office furniture, fittings and equipment	30.96	USD'000s				
Office Furniture, fittings and equipment		ETB'000000s	0.56		0.56	-
Preliminary Administrative Expenses	182.298	USD'000s				
Preliminary Administrative Expenses		ETB'000000s	3.28		3.28	-
Local transportation of the machinery to the project site	8.89	USD'000s				
Local transportation of the machinery to the project site		ETB'000000s	0.16		0.16	-
Land	-	ETB'000000s	3.60	-	3.60	-
Electricity and road connection, transformers and etc.	-	ETB'000000s	5.77	-	5.77	-
Security Fence, boreholes and etc.	-	ETB'000000s	2.11	-	2.11	-
Buildings	-	ETB'000000s	21.86	-	21.86	-
CIF cost and Machinery and Equipment	-	ETB'000000s	28.21	-	28.21	-
Vehicles	-	ETB'000000s	13.32	-	13.32	-
Office Furniture, fittings and equipment	-	ETB'000000s	0.56	-	0.56	-
Preliminary Administrative Expenses	-	ETB'000000s	3.28	-	3.28	-
Local transportation of the machinery to the project site	-	ETB'000000s	0.16	-	0.16	-
Total Investment Cost (In Real terms)		**ETB'000000s**	**78.86**		**78.86**	**-**

In 2012 exchange rate is 18 ETB/USD which is equal to real exchange rate.

4.3.5 Production and Losses

The JESH facility produces carcasses, skins/hides, and edible offal, from small and large ruminants. Exports are expected to comprise mainly of the edible offal of small ruminants, for which demand is high in China. Around 90 percent of large-animal carcasses and beef cuts will also be exported. The remainder will be marketed domestically, along with the edible offal of large ruminants, skins, and hides.

Livestock losses are estimated at 0.2 percent for small ruminants (sheep and goats) and 1 percent for large ruminants (cattle). Tables 4.7 and Table 4.8 present annual production and prices.

Table 4.7: Annual JESH Production

Annual Production										
Model period beginning					01 May 2012	01 May 2013	01 May 2014	01 May 2015	01 May 2029	01 May 2030
Model period ending					30 Apr 2013	30 Apr 2014	30 Apr 2015	30 Apr 2016	30 Apr 2030	30 Apr 2031
Financial year					2012	2013	2014	2015	2029	2030
Model column counter	Constant	Unit	Total		1	2	3	4	18	19
ANNUAL PRODUCTION										
SMALL RUMINANTS										
Small live ruminants weight	25	Kg								
Small live ruminants carcass share/Beef cuts	0.45	%								
ETB/USD to ETB/USD000s conversion factor	0.0010	Factor								
Small ruminants available for production		Heads	-	-	-	199,600	538,920	598,800	598,800	598,800
Total carcass of small ruminants		Metric Ton			-	2,245.50	6,062.85	6,736.50	6,736.50	6,736.50
LARGE RUMINANTS										
Large live ruminants weight	264	Kg								
Large live ruminants carcass share/Beef cuts (Between 3	0.32	%								
ETB/USD to ETB/USD000s conversion factor	0.0010	Factor								
Large ruminants available for production		Heads	-	-	-	9,900	53,460	59,400	59,400	59,400
Total carcass of large ruminants		Metric Ton			-	836.35	4,516.30	5,018.11	5,018.11	5,018.11
EXPORT SHARE OF PRODUCTION										
Share of carcasses and beef cuts sales for export	0.90	%								
Total carcass of small ruminants		Metric Ton	-	-	-	2,245.50	6,062.85	6,736.50	6,736.50	6,736.50
Carcass of small ruminants for export		Metric Ton			-	2,020.95	5,456.57	6,062.85	6,062.85	6,062.85
Total carcass of large ruminants		Metric Ton	-	-	-	836.35	4,516.30	5,018.11	5,018.11	5,018.11
Red meat of Large ruminants for export		Metric Ton			-	752.72	4,064.67	4,516.30	4,516.30	4,516.30
DOMESTICALLY SOLD SHARE OF PRODUCTION										
Share of carcasses and beef cuts sales to domestic marl	0.10	%								
Total carcass of small ruminants		Metric Ton	-	-	-	2,245.50	6,062.85	6,736.50	6,736.50	6,736.50
Carcass of small ruminants domestically sold		Metric Ton			-	224.55	606.29	673.65	673.65	673.65
Total carcass of large ruminants		Metric Ton	-	-	-	836.35	4,516.30	5,018.11	5,018.11	5,018.11
Red meat of large ruminants domestically sold		Metric Ton			-	83.64	451.63	501.81	501.81	501.81
SKINS										
Small ruminants available for production		Heads	-	-	-	199,600	538,920	598,800	598,800	598,800
Skins production		Unit			-	199,600	538,920	598,800	598,800	598,800
HIDES										
Large ruminants available for production		Heads	-	-	-	9,900	53,460	59,400	59,400	59,400
Hides production		Unit			-	9,900	53,460	59,400	59,400	59,400
EDIBLE OFFAL										
Small ruminants available for production		Heads	-	-	-	199,600	538,920	598,800	598,800	598,800
Edible offal of small ruminants production		Unit			-	199,600	538,920	598,800	598,800	598,800
Large ruminants available for production		Heads	-	-	-	9,900	53,460	59,400	59,400	59,400
Edible offal of large ruminants production		Unit			-	9,900	53,460	59,400	59,400	59,400

Table 4.8: Price of Products Produced by the Facility

Red meat of small ruminants	5.20	USD/Kg
Red meat of large ruminants	4.40	USD/Kg
Skins	40	ETB/Skin
Hides	120	ETB/Hide
Edible offal of small ruminants	57.50	ETB/Head
Edible offal of large ruminants	190.00	ETB/Head

4.3.6 Labor Costs

Project labor costs for 2013 are associated with two operational phases: Phase I—the slaughter of small ruminants (eight-month period), and Phase II—the slaughter of large ruminants (four-month period).

Phase I required skilled and unskilled laborers, with additional laborers required for Phase II. The number of laborers increases in drought periods, when the abattoir operates two six-hour shifts instead of the single eight-hour shift. (See Table 4.6 for number of skilled and unskilled labors in Phase I, and total number of laborers.)

The wages paid to laborers employed by JESH will increase by 5 percent each year—above the average wage increase rate in Ethiopia. In addition, the private investor is committed to contributing a further 8 percent in social insurance. (See Tables 4.9 and 4.10 for real average labor costs and annual labor costs, respectively.)

Table 4.9: Number of Laborers

Number of labors		
Number of skilled labor in phase one	27	#
Number of unskilled labor in phase one	40	#
Skilled labor	68	#
Unskilled labor	65	#
Total number of labors	133	#

Table 4.10: Real Average Labor Cost

Real average labor cost		
Skilled labor	60.71029	ETB'000s/Year
Unskilled labor	30.11538	ETB'000s/Year
Average real increase in labor wages in Ethiopia	2.00%	%/Year
Change in real labor wages	5.00%	%/Year
Social insurance contribution by the employee	8.00%	%/Year

Table 4.11: Annual Labor Cost

Annual Labor Cost

Model period beginning					01 May 2013	01 May 2014	01 May 2029	01 May 2030	01 May 2031
Model period ending					30 Apr 2014	30 Apr 2015	30 Apr 2030	30 Apr 2031	30 Apr 2032
Financial year					2013	2014	2029	2030	2031
Model column counter	Constant	Unit	Total		2	3	18	19	20
ANNUAL LABOR COST USING 2% REAL INCREASE IN WAGES (Real, Million ETB)									
Number of skilled labor in phase one	27	#							
Skilled labor	68	#							
ETB/USD to ETB/USD000s conversion factor	0.0010	Factor							
Phase I (May2013-January 2014) percentage of the full year	0.67	% p.a.							
Skilled labor cost using 2% real increase in wages		ETB'000s	-	-	60.71	61.92	83.34	85.01	-
Establishment phase flag		Flag	1	-	1	-	-	-	-
Annual skilled labor cost using 2% real increase in wages		ETB'000000s			1.09	4.21	5.67	5.78	-
Number of unskilled labor in phase one	40	#							
Phase II (September 2013-January2014) percentage of the full year	0.33	% p.a.							
Unskilled labor	65	#							
Unskilled labor cost using 2% real increase in wages		ETB'000s	-	-	30.12	30.72	41.34	42.17	-
Annual unskilled labor cost using 2% real increase in wages		ETB'000000s			0.40	2.00	2.69	2.74	-
Social insurance contribution by the employee	0.08	%							
Annual skilled labor cost using 2% real increase in wages		ETB'000000s	-	-	1.09	4.21	5.67	5.78	-
Annual unskilled labor cost using 2% real increase in wages		ETB'000000s	-	-	0.40	2.00	2.69	2.74	-
Social insurance contribution by employer		ETB'000000s			0.12	0.50	0.67	0.68	-
Annual skilled labor cost using 2% real increase in wages		ETB'000000s	-	-	1.09	4.21	5.67	5.78	-
Annual unskilled labor cost using 2% real increase in wages		ETB'000000s	-	-	0.40	2.00	2.69	2.74	-
Social insurance contribution by employer		ETB'000000s	-	-	0.12	0.50	0.67	0.68	-
Total labor cost		**ETB'000000s**			**1.61**	**6.70**	**9.02**	**9.20**	**-**
ANNUAL LABOR COST USING 2% REAL INCREASE IN WAGES (Nominal, Million ETB)									
Domestic Price Index		Index	-	-	1.20	1.44	22.19	26.62	31.95
Annual skilled labor cost using 2% real increase in wages		ETB'000000s	-	-	1.09	4.21	5.67	5.78	-
Annual skilled labor cost using 2% real increase in wages		ETB'000000s			1.31	6.06	125.73	153.90	-
Annual unskilled labor cost using 2% real increase in wages		ETB'000000s	-	-	0.40	2.00	2.69	2.74	-
Annual unskilled labor cost using 2% real increase in wages		ETB'000000s			0.48	2.88	59.62	72.97	-
Social insurance contribution by employer		ETB'000000s	-	-	0.12	0.50	0.67	0.68	-
Social insurance contribution by employer		ETB'000000s			0.14	0.72	14.83	18.15	-
Annual skilled labor cost using 2% real increase in wages		ETB'000000s	-	-	1.31	6.06	125.73	153.90	-
Annual unskilled labor cost using 2% real increase in wages		ETB'000000s	-	-	0.48	2.88	59.62	72.97	-
Social insurance contribution by employer		ETB'000000s	-	-	0.14	0.72	14.83	18.15	-
Total labor cost		**ETB'000000s**			**1.94**	**9.65**	**200.18**	**245.02**	**-**

4.3.7 Cost of Inputs

There are three types of project production input costs:

1. Direct costs (fuel, packaging of livestock, utility costs)

2. Indirect costs (uniforms, CIF of chemicals)

3. Overheads (bank charges, office expenses)

Table 4.12 presents costs of inputs.

Table 4.12: Production Input Costs

OTHER DIRECT COSTS		
Transportation cost of Chilled meat delivery to Addis-Ababa	1.70	ETB/Kg
Transportation charge for delivery of frozen beef to Djibouti	2.00	ETB/Kg
Packaging of small ruminants	9.00	ETB/Carcass
Packaging of large ruminants	2.00	ETB/Kg
UTILITIES		
Cost of Electricity	0.69	ETB/KWh
Fixed electricity consumption	152,000	KW
Electricity consumption Large ruminants	6.94	KWH/Head
Electricity consumption small ruminants	0.14	KWH/Head
Generator Fuel consumption	63.00	Liters/Hour
Number of hours running generator	48.00	Hours/Year
Fuel Cost	18.00	ETB/Liter
INDIRECT COSTS		
Cost of uniforms	135	ETB'000s/Year
Telephone and Postage (First Year)	180	ETB'000s/Year
Telephone and Postage (Second Year)	540	ETB'000s/Year
Printing and Stationery	18	ETB'000s/Year
CIF Cost of chemicals	18	ETB'000s/Year
OVERHEADS COSTS		
Certifications and Licenses	18	ETB'000s/Year
Health Insurance for Employees	100	ETB'000s/Year
Site insurance	110	ETB'000s/Year
Bank Charges (TT transactions)	135	ETB'000s/Year
Other office expenses	600	ETB'000s/Year

4.3.8 Working Capital

One reason for the underperformance of slaughterhouse facilities in Ethiopia is weak market linkages with livestock producers. Sustaining a high volume of slaughterhouse output depends on a steady supply of livestock, which in turn

depends on strong linkages with producers. The JESH facility aims to secure supply by increasing cash-based payments.

Accounts payable are assumed to be 5 percent of the value of the animal purchased by the slaughterhouse, while accounts receivable are assumed to be 1 percent of sales value. The figure for accounts receivable is low, because Ethiopian law requires all importers of meat from Ethiopia to deposit in a local bank an amount equal to the value of their order. (See Table 4.13 for accounts receivable, accounts payable, cash balance, and inventory; see Table 4.14 for changes in working capital.)

Table 4.13: Working Capital

WORKING CAPITAL		
Accounts payable (Percentage of the cost of livestocks)	5.00%	%
Accounts receivable (Percentage of net sales)	1.00%	%
Cash balance (Percentage of the value of the sales)	10.00%	%
Livestock Inventory (Percentage of the livestock purchased)	7.50%	%

Table 4. 14: Changes in Working Capital

Working Capital										
Model period beginning				01 May 2012	01 May 2013	01 May 2014	01 May 2029	01 May 2030	01 May 2031
Model period ending				30 Apr 2013	30 Apr 2014	30 Apr 2015	30 Apr 2030	30 Apr 2031	30 Apr 2032
Financial year				2012	2013	2014	2029	2030	2031
Model column counter	Constant	Unit	Total	1	2	3	18	19	20
WORKING CAPITAL (Nominal, Million ETB)									
Accounts receivable (Percentage of net sales)	0.01	%							
Total sales revenue (Gross sales)		ETB'000000s	- -	-	358.74	1,431.78	24,510.50	29,412.60	-
Accounts receivable (Percentage of net sales)		ETB'000000s		-	3.59	14.32	245.11	294.13	-
Accounts payable (Percentage of the cost of livestocks)	0.05	%							
Total costs		ETB'000000s	- -	-	46.13	166.03	2,836.91	3,404.29	-
Accounts payable (Percentage of the cost of livestocks)		ETB'000000s		-	2.31	8.30	141.85	170.21	-
Cash balance (Percentage of the value of the sales)	0.10	%							
Total sales revenue (Gross sales)		ETB'000000s	- -	-	358.74	1,431.78	24,510.50	29,412.60	-
Cash balance (Percentage of the value of the sales)		ETB'000000s		-	35.87	143.18	2,451.05	2,941.26	-
Accounts receivable (Percentage of net sales)		ETB'000000s	- -	-	3.59	14.32	245.11	294.13	-
Change in accounts receivable		ETB'000000s		-	(3.59)	(10.73)	(40.85)	(49.02)	294.13
Accounts payable (Percentage of the cost of livestocks)		ETB'000000s	- -	-	2.31	8.30	141.85	170.21	-
Change in accounts payable		ETB'000000s		-	(2.31)	(6.00)	(23.64)	(28.37)	170.21
Cash balance (Percentage of the value of the sales)		ETB'000000s	- -	-	35.87	143.18	2,451.05	2,941.26	-
Change in cash balance		ETB'000000s		-	35.87	107.30	408.51	490.21	(2,941.26)

4.3.9 Tax

The JESH facility has been granted a 5-year tax holiday, after which a number of taxes will be levied on income. The slaughterhouse facility is liable for value-added tax (VAT) on domestic sales; export sales are zero-rated (see Table 4.15).

Table 4.15: Tax Rates

TAX		
Tax holiday	5	Years
Income tax (Year 2013-2017)	0.00%	%
Income tax (Year 2018-after)	30.00%	%
Import duty (chemicals)	10.00%	%
VAT	15.00%	%
Small ruminants sale tax	10.00	ETB/Head
Large ruminants sales tax	100.00	ETB/Head

4.3.10 Microeconomic Parameters

Table 4.16 presents the economic data relevant to a cost-benefit analysis of the JESH facility.

Table 4.16: Economic Parameters

MACRO INFORMATION		
INFLATION RATES		
Domestic Inflation	20%	%/Year
US Inflation	2.50%	%/Year
DISCOUNT RATES		
Financial Discount Rate	12%	%/Year
Economic Discount rate	12%	%/Year
EXCHANGE RATE		
Real Exchange Rate	18.00	ETB/USD
NATION PARAMETERS		
Foreign Exchange Premium	6.50%	%
Non-tradable Premium	-0.25%	%

4.3.11 Residual Values

The value of JESH facility assets depreciates over the project's lifetime. However, at the end of the operation period, most of those assets have salvage value. Notable exceptions are land, the market value of which is equal to its book value unless increased or decreased by project operations, and motor vehicles, the useful life of which is less than the project operation period. The JESH project replaced motor vehicles in the middle of operation period, treating the cost as an investment. (See Tables 4.17 and 4.18 for figures on useful life of assets and residual values, respectively.)

Table 4.17: Project Assets' Useful Life

ECONOMIC SERVICE LIVES			
Buildings	50	Years	
Machinery and equipment	20	Years	
Office furniture, fittings and equipment	5	Years	
Motor Vehicles (Pool Method)	10%	%	

Table 4.18: Project Assets' Residual Values

RESIDUAL VALUE (Nominal, Million ETB)								
Domestic Price Index		Index	-	-	1.00	1.20	26.62	31.95
Real residual value of land		ETB'000000s	-	-	-	-	-	9.37
Nominal residual value of land		ETB'000000s			-	-	-	299.35
Real residual value of buildings	-	ETB'000000s	-	-	-	-	-	13.55
Nominal residual value of buildings		ETB'000000s			-	-	-	432.92
Real residual value of machinery and equipments	-	ETB'000000s	-	-	-	-	-	1.41
Nominal residual value of machinery and equipment		ETB'000000s			-	-	-	45.06
Real residual value of motor vehicles	-	ETB'000000s	-	-	-	-	-	5.73
Nominal residual value of motor vehicles		ETB'000000s			-	-	-	183.18

4.3.12 Tax Depreciation Rates

A number of methods can be used to calculate depreciation, such as the straight-line (SL) method, units-of-production depreciation, and the pool method. This study used the SL method for buildings, and the pool method for other assets. (See Table 4.19 for tax depreciation rates and Table 4.20 for depreciation as calculated for tax.)

Table 4.19: Depreciation Rates for Income Tax

DEPRECIATION		
ANNUAL DEPRECIATION RATE FOR INCOME TAX		
Buildings	5.00%	%/Year
Machinery	20.00%	%/Year
Office furniture, fittings and equipment	20.00%	%/Year
Motor vehicles	20.00%	%/Year

Table 4.20: Depreciation for Tax Purposes

Depreciation									
Model period beginning					01 May 2012	01 May 2013	01 May 2014	01 May 2029	01 May 2030
Model period ending					30 Apr 2013	30 Apr 2014	30 Apr 2015	30 Apr 2030	30 Apr 2031
Financial year					2012	2013	2014	2029	2030
Model column counter	Constant	Unit	Total		1	2	3	18	19
DEPRECIATION FOR TAX PURPOSES									
Buildings	0.05	%							
Buildings		ETB'000000s	22	-	21.86	-	-	-	-
After 2012 and Before 2031 flag		Flag	18	-	-	1	1	1	1
Buildings annual deprecian		ETB'000000s			-	1.09	1.09	1.09	1.09
Machinery	0.20	%							
CIF cost and Machinery and Equipment		ETB'000000s	28	-	28.21	-	-	-	-
Local transportation of the machinery to the project site		ETB'000000s	0.16	-	0.16	-	-	-	-
Establishment phase flag		Flag	1	-	-	1	-	-	-
After 2012 and Before 2031 flag	-	Flag	18	-	-	1	1	1	1
Machinery and equipment		ETB'000000s			-	28.37	22.70	0.80	0.64
Machinery and equipment annual depreciation		ETB'000000s			-	5.67	4.54	0.16	0.13
Office furniture, fittings and equipment	0.20	%	-	-	-	-	-	-	-
Office Furniture, fittings and equipment		ETB'000000s	0.56	-	0.56	-	-	-	-
Office Furniture, fittings and equipment		ETB'000000s			-	0.56	0.45	0.02	0.01
Office Furniture, fittings and equipment annual depreciation		ETB'000000s			-	0.11	0.09	0.00	0.00
Motor vehicles	0.20	%							
Vehicles		ETB'000000s	13.32	-	13.32	-	-	-	-
Vehicles		ETB'000000s			-	13.32	10.66	0.37	0.30
Vehicles annual depreciation		ETB'000000s			-	2.66	2.13	0.07	0.06
Buildings annual deprecian		ETB'000000s	-	-	-	1.09	1.09	1.09	1.09
Machinery and equipment annual depreciation	-	ETB'000000s	-	-	-	5.67	4.54	0.16	0.13
Office Furniture, fittings and equipment annual depreciation	-	ETB'000000s	-	-	-	0.11	0.09	0.00	0.00
Vehicles annual depreciation	-	ETB'000000s	-	-	-	2.66	2.13	0.07	0.06
Total annual depreciation		ETB'000000s			-	9.54	7.85	1.33	1.28

4.3.13 Income Tax Statement

The JESH facility has been in operation since 2013, during which period net income has increased. However, a large drop in net income is seen from 2018, when the facility becomes liable for income tax (see Table 4.21 for income tax statements).

Table 4.21: Income Tax Statement (Nominal, Million ETB)

Income Tax Statement												
Model period beginning					01 May 2012	01 May 2013	01 May 2014	01 May 2016	01 May 2017	01 May 2018	01 May 2019	01 May 2030
Model period ending					30 Apr 2013	30 Apr 2014	30 Apr 2015	30 Apr 2017	30 Apr 2018	30 Apr 2019	30 Apr 2020	30 Apr 2031
Financial year					2012	2013	2014	2016	2017	2018	2019	2030
Model column counter	Constant	Unit	Total		1	2	3	5	6	7	8	19
INCOME TAX STATEMENT (Nominal, Million ETB)												
REVENUE												
Total sales revenue (Gross sales)		ETB'000000s	-	-	-	358.74	1,431.78	2,290.85	2,749.02	3,298.82	3,958.58	29,412.60
NET VAT PAYMENT		ETB'000000s	-	-	-	0.05	3.32	5.38	6.46	7.75	9.30	69.14
Net sales (Net of VAT)		ETB'000000s			-	358.69	1,428.46	2,285.46	2,742.55	3,291.07	3,949.28	29,343.47
OPERATING EXPENSE												
Total cost of goods sold	-	ETB'000000s	-	-	-	253.80	1,053.73	1,670.91	2,005.09	2,406.11	2,887.33	21,453.08
Total feeding cost		ETB'000000s	-	-	-	32.69	114.62	183.39	220.07	264.08	316.90	2,354.57
Total other direct costs		ETB'000000s	-	-	-	11.02	48.51	77.59	93.10	111.72	134.07	996.15
Total labor cost		ETB'000000s	-	-	-	1.94	9.65	14.46	17.70	21.67	26.52	245.02
Total annual depreciation		ETB'000000s	-	-	-	9.54	7.85	5.42	4.55	3.86	3.31	1.28
Total indirect costs		ETB'000000s	-	-	-	1.26	1.51	2.18	2.61	3.13	3.76	27.94
Total overhead costs		ETB'000000s	-	-	-	1.16	1.39	2.00	2.40	2.88	3.45	25.64
Total operating expense		ETB'000000s			-	311.40	1,237.27	1,955.94	2,345.52	2,813.45	3,375.33	25,103.68
Income from operations		ETB'000000s			-	47.28	191.19	329.52	397.03	477.62	573.94	4,239.79
Interest expense		ETB'000000s										
Pre-tax income		ETB'000000s			-	47.3	191.2	329.5	397.0	477.6	573.9	4,239.8
Income tax (Year 2013-2017)		%/Year										
Income tax (Year 2018-after)	0.30	%/Year										
Pre-tax income		ETB'000000s	-	-	-	47.28	191.19	329.52	397.03	477.62	573.94	4,239.79
Income tax holiday flag		Flag	-	-	1	1	1	1	1	-	-	-
Income tax payment		ETB'000000s			-	-	-	-	-	143.28	172.18	1,271.94
Pre-tax income		ETB'000000s	-	-	-	47.28	191.19	329.52	397.03	477.62	573.94	4,239.79
Income tax payment		ETB'000000s	-	-	-	-	-	-	-	143.28	172.18	1,271.94
Net after tax income		ETB'000000s			-	47.28	191.19	329.52	397.03	334.33	401.76	2,967.85
Expected Exchange Rate		ETB/USD	-	-	18	21	25	34	40	46	54	307
Net after tax income		ETB'000000s	-	-	-	47	191	330	397	334	402	2,968
Net after tax income		USD'000000s			-	2.24	7.75	9.75	10.03	7.21	7.40	9.66

4.3.14 Cash-Flow Statements

This study presents cash-flow statements from the perspective of the owner and that of total investment, along with net present value (NPV) and internal rate of return (IRR). (See Tables 4.22 and 4.23 for cash flow statements from the total investment and the owner perspective, respectively).

Table 4.22: Cash Flow Statement: Total Investment Point of View (Real, Million ETB)

Financial Cash flow Statement										
Model period beginning				01 May 2012	01 May 2013	01 May 2014	01 May 2015	01 May 2030	01 May 2031
Model period ending				30 Apr 2013	30 Apr 2014	30 Apr 2015	30 Apr 2016	30 Apr 2031	30 Apr 2032
Financial year				2012	2013	2014	2015	2030	2031
Model column counter	Constant	Unit	Total	1	2	3	4	19	20
FINANCIAL CASHFLOW STATEMENT: TOTAL INVESTMENT PERSPECTIVE (Real, Million ETB)									
Domestic Price Index		Index	- -	1.00	1.20	1.44	1.73	26.62	31.95
Receipts									
Total sales revenue (Gross sales)		ETB'000000s		-	298.95	994.29	1,104.77	1,104.77	-
Change in accounts receivable		ETB'000000s		-	(2.99)	(7.45)	(2.76)	(1.84)	9.21
LIQUIDATION VALUE									
Real residual value of land		ETB'000000s		-	-	-	-	-	9.37
Real residual value of building		ETB'000000s		-	-	-	-	-	13.55
Real residual value of machinery and equipment		ETB'000000s		-	-	-	-	-	1.41
Real residual value of motor vehicles		ETB'000000s		-	-	-	-	-	5.73
Total Cash Inflow		**ETB'000000s**		**-**	**295.96**	**986.84**	**1,102.01**	**1,102.93**	**39.27**
EXPENDITURES									
INVESTMENT COST									
Land		ETB'000000s		3.60	-	-	-	-	-
Electricity and road connection, transformers and etc.		ETB'000000s		5.77	-	-	-	-	-
Security Fence, boreholes and etc.		ETB'000000s		2.11	-	-	-	-	-
Buildings		ETB'000000s		21.86	-	-	-	-	-
CIF cost of Machinery and Equipment		ETB'000000s		28.21	-	-	-	-	-
Vehicles		ETB'000000s		13.32	-	-	-	-	-
Office furniture, fittings and equipment		ETB'000000s		0.56	-	-	-	-	-
Preliminary Administrative Expenses		ETB'000000s		3.28	-	-	-	-	-
Local transportation of the machinery to the project site		ETB'000000s		0.16	-	-	-	-	-
OPERATING COST									
LIVESTOCK COST									
Small ruminants		ETB'000000s		-	162.33	438.28	486.98	486.98	-
Large ruminants		ETB'000000s		-	65.04	351.20	390.23	390.23	-
FEEDING COST									
Small ruminants		ETB'000000s		-	25.00	67.50	75.00	75.00	-
Large ruminants		ETB'000000s		-	2.24	12.10	13.44	13.44	-
OTHER DIRECT COSTS									
Transportation cost of Chilled meat delivery to Addis-Ababa		ETB'000000s		-	3.82	10.31	11.45	11.45	-
Transportation charge for delivery of frozen beef to Djibouti		ETB'000000s		-	1.67	9.03	10.04	10.04	-
Packaging of small ruminants		ETB'000000s		-	1.80	4.85	5.39	5.39	-
Packaging of large ruminants		ETB'000000s		-	1.67	9.03	10.04	10.04	-
Fixed electricity consumption		ETB'000000s		-	0.10	0.10	0.10	0.10	-
Electricity consumption small ruminants		ETB'000000s		-	0.02	0.05	0.06	0.06	-
Electricity consumption large ruminants		ETB'000000s		-	0.05	0.26	0.28	0.28	-
Cost of running generator		ETB'000000s		-	0.05	0.05	0.05	0.05	-

INDIRECT COSTS									
Cost of uniforms		ETB'000000s		-	0.14	0.14	0.14	0.14	-
Telephone and Postage		ETB'000000s		-	0.54	0.54	0.54	0.54	-
Printing and Stationery		ETB'000000s		-	0.02	0.02	0.02	0.02	-
Cost of chemicals		ETB'000000s		-	0.36	0.36	0.36	0.36	-
OVERHEAD COSTS									
Certifications and Licenses		ETB'000000s		-	0.02	0.02	0.02	0.02	-
Health Insurance for Employees		ETB'000000s		-	0.10	0.10	0.10	0.10	-
Site insurance		ETB'000000s		-	0.11	0.11	0.11	0.11	-
Bank Charges (TT transactions)		ETB'000000s		-	0.14	0.14	0.14	0.14	-
Other office expenses		ETB'000000s		-	0.60	0.60	0.60	0.60	-
TOTAL LABOR COST (ANNUAL WAGES AND SOCIAL INSURANCE)									
Annual skilled labor cost using 2% real increase in wages		ETB'000000s		-	1.09	4.21	4.30	5.78	-
Annual unskilled labor cost using 2% real increase in wages		ETB'000000s		-	0.40	2.00	2.04	2.74	-
Social insurance contribution by employer		ETB'000000s		-	0.12	0.50	0.51	0.68	-
WORKING CAPITAL									
Change in accounts payable		ETB'000000s		-	(1.92)	(4.16)	(1.59)	(1.07)	5.33
Change in cash balance		ETB'000000s		-	29.89	74.52	27.62	18.41	(92.06)
NET VAT PAYMENT									
NET VAT PAYMENT		ETB'000000s		-	0.04	2.30	2.60	2.60	-
Total Cash Outflow		**ETB'000000s**		**78.86**	**295.43**	**984.14**	**1,040.53**	**1,034.22**	**(86.74)**
Total Cash Inflow		ETB'000000s	- -	-	295.96	986.84	1,102.01	1,102.93	39.27
Total Cash Outflow		ETB'000000s	- -	78.86	295.43	984.14	1,040.53	1,034.22	(86.74)
Net Cash flow (Before Tax and Financing)		**ETB'000000s**		**(78.86)**	**0.53**	**2.70**	**61.47**	**68.71**	**126.01**
Corporate income tax		ETB'000000s		-	-	-	-	47.78	-
Net Cash flow (Before Tax and Financing)		ETB'000000s	- -	(78.86)	0.53	2.70	61.47	68.71	126.01
Corporate income tax		ETB'000000s	- -	-	-	-	-	47.78	-
Net Cash Flow (After tax, Before Contribution To The Community)		**ETB'000000s**		**(78.86)**	**0.53**	**2.70**	**61.47**	**20.94**	**126.01**
Contribution to the community		ETB'000000s		-	0.01	0.07	1.54	0.52	3.15
Net Cash Flow (After tax, Before Contribution To The Community)		ETB'000000s	- -	(78.86)	0.53	2.70	61.47	20.94	126.01
Contribution to the community		ETB'000000s	- -	-	0.01	0.07	1.54	0.52	3.15
Net Cash Flow (After tax, After Contribution To The Community)		**ETB'000000s**		**(78.86)**	**0.52**	**2.63**	**59.94**	**20.41**	**122.86**
Real Exchange Rate	18	ETB/USD							
Net Cash Flow (After tax, After Contribution To The Community)		ETB'000000s	- -	(78.86)	0.52	2.63	59.94	20.41	122.86
Net Cash Flow (After tax, Before Financing)		**USD'000000s**		**(4.38)**	**0.03**	**0.15**	**3.33**	**1.13**	**6.83**
Financial Discount Rate	0.12	%/Year							
NPV		**ETB'000000s**		**144.48**					
NPV		**USD'000000s**		**7.72**					
IRR		**%**		**33.87%**					

Table 4.23: Cash Flow Statement: Owner's Point of View (Real, Million ETB)

Financial Cash Flow Statement										
Model period beginning				01 May 2012	01 May 2013	01 May 2014	01 May 2015	01 May 2030	01 May 2031
Model period ending				30 Apr 2013	30 Apr 2014	30 Apr 2015	30 Apr 2016	30 Apr 2031	30 Apr 2032
Financial year				2012	2013	2014	2015	2030	2031
Model column counter	Constant	Unit	Total	1	2	3	4	19	20
FINANCIAL CASHFLOW STATEMENT: OWNER'S PERSPECTIVE (Real, Million ETB)									
Domestic Price Index		Index	-	1.00	1.20	1.44	1.73	26.62	31.95
RECEIPTS									
Total sales revenue (Gross sales)		ETB'000000s		-	298.95	994.29	1,104.77	1,104.77	-
Change in accounts receivable		ETB'000000s		-	(2.99)	(7.45)	(2.76)	(1.84)	9.21
LIQUIDATION VALUE									
Real residual value of land		ETB'000000s		-	-	-	-	-	9.37
Real residual value of building		ETB'000000s		-	-	-	-	-	13.55
Real residual value of machinery and equipment		ETB'000000s		-	-	-	-	-	1.41
Real residual value of motor vehicles		ETB'000000s		-	-	-	-	-	5.73
USAID contribution to cover investment cost		ETB'000000s		24.86	-	-	-	-	-
Government support		ETB'000000s		5.77	-	-	-	-	-
Total Cash Inflow		**ETB'000000s**		**30.63**	**295.96**	**986.84**	**1,102.01**	**1,102.93**	**39.27**
EXPENDITURES									
INVESTMENT COST									
Land		ETB'000000s		3.60	-	-	-	-	-
Electricity and road connection, transformers and etc.		ETB'000000s		5.77	-	-	-	-	-
Security Fence, boreholes and etc.		ETB'000000s		2.11	-	-	-	-	-
Buildings		ETB'000000s		21.86	-	-	-	-	-
CIF cost of Machinery and Equipment		ETB'000000s		28.21	-	-	-	-	-
Vehicles		ETB'000000s		13.32	-	-	-	-	-
Office furniture, fittings and equipment		ETB'000000s		0.56	-	-	-	-	-
Preliminary Administrative Expenses		ETB'000000s		3.28	-	-	-	-	-
Local transportation of the machinery to the project site		ETB'000000s		0.16	-	-	-	-	-
OPERATING COST									
LIVESTOCK COST									
Small ruminants		ETB'000000s		-	162.33	438.28	486.98	486.98	-
Large ruminants		ETB'000000s		-	65.04	351.20	390.23	390.23	-
FEEDING COST									
Small ruminants		ETB'000000s		-	25.00	67.50	75.00	75.00	-
Large ruminants		ETB'000000s		-	2.24	12.10	13.44	13.44	-
OTHER DIRECT COSTS									
Transportation cost of Chilled meat delivery to Addis-Ababa		ETB'000000s		-	3.82	10.31	11.45	11.45	-
Transportation charge for delivery of frozen beef to Djibouti		ETB'000000s		-	1.67	9.03	10.04	10.04	-
Packaging of small ruminants		ETB'000000s		-	1.80	4.85	5.39	5.39	-
Packaging of large ruminants		ETB'000000s		-	1.67	9.03	10.04	10.04	-
Fixed electricity consumption		ETB'000000s		-	0.10	0.10	0.10	0.10	-
Electricity consumption small ruminants		ETB'000000s		-	0.02	0.05	0.06	0.06	-
Electricity consumption large ruminants		ETB'000000s		-	0.05	0.26	0.28	0.28	-
Cost of running generator		ETB'000000s		-	0.05	0.05	0.05	0.05	-

INDIRECT COSTS									
Cost of uniforms		ETB'000000s		-	0.14	0.14	0.14	0.14	-
Telephone and Postage		ETB'000000s		-	0.54	0.54	0.54	0.54	-
Printing and Stationery		ETB'000000s		-	0.02	0.02	0.02	0.02	-
Cost of chemicals		ETB'000000s		-	0.36	0.36	0.36	0.36	-
OVERHEAD COSTS									
Certifications and Licenses		ETB'000000s		-	0.02	0.02	0.02	0.02	-
Health Insurance for Employees		ETB'000000s		-	0.10	0.10	0.10	0.10	-
Site insurance		ETB'000000s		-	0.11	0.11	0.11	0.11	-
Bank Charges (TT transactions)		ETB'000000s		-	0.14	0.14	0.14	0.14	-
Other office expenses		ETB'000000s		-	0.60	0.60	0.60	0.60	-
TOTAL LABOR COST (ANNUAL WAGES AND SOCIAL INSURANCE)									
Annual skilled labor cost using 2% real increase in wages		ETB'000000s		-	1.09	4.21	4.30	5.78	-
Annual unskilled labor cost using 2% real increase in wages		ETB'000000s		-	0.40	2.00	2.04	2.74	-
Social insurance contribution by employer		ETB'000000s		-	0.12	0.50	0.51	0.68	-
WORKING CAPITAL									
Change in accounts payable		ETB'000000s		-	(1.92)	(4.16)	(1.59)	(1.07)	5.33
Change in cash balance		ETB'000000s		-	29.89	74.52	27.62	18.41	(92.06)
NET VAT PAYMENT									
NET VAT PAYMENT		ETB'000000s		-	0.04	2.30	2.60	2.60	-
Total Cash Outflow		**ETB'000000s**		78.86	295.43	984.14	1,040.53	1,034.22	(86.74)
Total Cash Inflow		ETB'000000s	- -	30.63	295.96	986.84	1,102.01	1,102.93	39.27
Total Cash Outflow		ETB'000000s	- -	78.86	295.43	984.14	1,040.53	1,034.22	(86.74)
Net Cash flow (Before Tax and Financing)		**ETB'000000s**		**(48.23)**	**0.53**	**2.70**	**61.47**	**68.71**	**126.01**
Corporate income tax		ETB'000000s		-	-	-	-	47.78	-
Net Cash flow (Before Tax and Financing)		ETB'000000s	- -	(48)	1	3	61	69	126
Corporate income tax		ETB'000000s	- -	-	-	-	-	48	-
Net Cash Flow (After tax, Before Contribution To The Community)		**ETB'000000s**		**(48.23)**	**0.53**	**2.70**	**61.47**	**20.94**	**126.01**
Contribution to the community		ETB'000000s		-	0.01	0.07	1.54	0.52	3.15
Net Cash Flow (After tax, Before Contribution To The Community)		ETB'000000s	- -	(48)	1	3	61	21	126
Contribution to the community		ETB'000000s	- -	-	0	0	2	1	3
Net Cash Flow (After tax, After Contribution To The Community)		**ETB'000000s**		**(48.23)**	**0.52**	**2.63**	**59.94**	**20.41**	**122.86**
Real Exchange Rate	18	ETB/USD							
Net Cash Flow (After tax, After Contribution To The Community)		ETB'000000s	- -	(48)	1	3	60	20	123
Net Cash Flow (After tax, Before Financing)		**USD'000000s**		**(2.68)**	**0.03**	**0.15**	**3.33**	**1.13**	**6.83**
Financial Discount Rate	0.12	%/Year							
NPV		**ETB'000000s**		**175.11**					
NPV		**USD'000000s**		**9.42**					
IRR		**%**		**49.52%**					

Project NPV from both the total investment and owner's perspective is positive. (See Table 4.24 for NPV and IRR at 12 percent discount rate in real terms, from the investment and owner's perspectives.)

Table 4.24: Financial Results

Total Investment Point of View, Real	
NPV (Million ETB)	**144.48**
NPV (Million USD)	**7.72**
IRR (%)	**33.87 %**
Owner's Point of View, Real	
NPV (Million ETB)	**175.11**
NPV (Million USD)	**9.42**
IRR (%)	**49.52 %**

Chapter 5

SENSITIVITY ANALYSIS

5.1 Introduction

This chapter presents the results and a discussion of sensitivity analysis, conducted to identify project risk variables.

5.2 Sensitivity Analysis

Sensitivity analysis is widely used in the private sector, in order to identify the key risk variables associated with project outcomes.

Although only one parameter can be modified at a time, sensitivity analysis nonetheless remains a practical means of identifying critical project variables. A further challenge in the context of this study was that, according to FAST standards, inputs and sensitivity analysis should be recorded on two separate Excel spreadsheets. However, Excel cannot run sensitivity analysis if inputs are not included. As a result some required inputs were transferred to the sensitivity spreadsheet.

5.3 Results and Interpretations

The following section identifies a number of potential risk variables, presenting the impact of each selected parameter on project FNPV and FIRR.

Table 5.1: Impact of Average Cost of Small Ruminants on FNPV and FIRR (Million USD)

Price ETB/Head	FNPV (USD)	FIRR
	9.42	**49.52%**
650.00	29.85	113.18%
675.00	24.99	98.80%
700.00	20.12	84.05%
755.00	9.42	49.52%
770.00	6.49	39.05%
780.00	4.53	31.59%
790.00	2.58	23.56%
800.00	0.62	14.84%

The cost of small ruminants (sheep and goats) has a significant impact on project FNPV and FIRR. In the base scenario, the average price per head is ETB 755.00, with FNPV of USD 9.42 million and FIRR of 49.52 percent. If the price per head increases by 6 percent to ETB 800, FNPV falls but remains positive at USD 0.62 million, while FIRR decreases to 14.84 percent. If the price per head price falls by 6 percent to ETB 700, FNPV and FIRR increase to USD 20.12 million and 84.05 percent, respectively. The project break-even point for small-ruminant average cost per head is ETB 803.39.

Table 5.2: Impact of FOB Price of Lamb on FNPV and FIRR (Million USD)

Price (USD/Kg)	FNPV (USD)	FIRR
	9.42	**49.52%**
4.80	(4.40)	-4.77%
5.00	2.54	23.45%
5.10	5.98	37.22%
5.20	9.42	49.52%
5.30	12.84	60.90%
5.40	16.27	71.77%
5.50	19.69	82.26%

The FOB price of lamb also has a significant impact on project outcomes. The baseline FOB price of lamb is USD 5.20/kg with FNPV of USD 9.42 million and FIRR of 49.52 percent. The results of sensitivity analysis indicate that if the price falls to USD 4.8/kg FNPV will be less than zero with a FIRR of -4.77 percent. If the

price increases to USD 5.50/kg, FNPV is USD 19.69 million with a FIRR of 82.26 percent.

Table 5.3: Impact of Average Cost of Large Ruminants on FNPV and FIRR (Million USD)

Price ETB/Head	FNPV (USD)	FIRR
	9.42	**49.52%**
5,250.00	24.57	92.96%
5,500.00	19.84	80.36%
5,800.00	14.15	64.22%
6,050.00	9.42	49.52%
6,250.00	5.62	36.28%
6,400.00	2.76	24.87%
6,500.00	0.86	16.17%
6,600.00	(1.06)	6.92%

The price of large ruminants (cattle) has a significant impact on project outcomes. The baseline price for large ruminants is ETB 6,050 per head, with an FNPV of USD 9.42 million and FIRR of 49.52 percent. Sensitivity analysis indicates that an 8 percent increase in the average price of large ruminants to ETB 6,600 per head results in a negative FNPV and FIRR of 6.92 percent. However, if the average cost per head falls by 6 percent, FNPV remains above zero (at USD 0.86 million) with a FIRR of 16.17 percent. If the price falls by 6 percent to ETB 5,800, FNPV would be USD 14.15 Million and FIRR would be 64.22 percent. The project break-even point for average price per head of cattle is ETB 6,547.23.

Table 5.4: Impact of Price of Beef on FNPV and FIRR (Million USD)

Price (USD/Kg)	FNPV (USD)	FIRR
	9.42	**49.52%**
4.00	(0.56)	9.27%
4.10	1.95	21.31%
4.20	4.44	31.84%
4.30	6.93	41.10%
4.40	9.42	49.52%
4.50	11.90	57.33%
4.60	14.38	64.73%

The price of beef has a crucial impact on project feasibility (see Table 5.4 for the results of sensitivity analysis for the price of beef). At a price of USD 4/kg, FNPV is negative and FIRR is 9.27 percent. At a price of USD14.38/kg, FNPV increases significantly, to USD 14.38 million and FIRR rises to 64.73 percent.

Table 5.5: Impact on FNPV and FIRR of Changes in Small Ruminants' Average Carcass as Proportion of Live Weight (Millions USD)

%	FNPV (USD)	FIRR
	9.42	**49.52%**
42.00%	(2.35)	1.91%
43.00%	1.60	19.31%
44.00%	5.51	35.44%
45.00%	9.42	49.52%
46.00%	13.31	62.42%
47.00%	17.21	74.67%

Small ruminants' average carcass weight, as a share of live weight, is a highly significant risk variable. A fall of one percentage point, from 46 percent to 45 percent, results in a USD 3.91 million decrease in FNPV, and a decrease in FIRR of 14.08 percent. A 3-percentage point drop takes FNPV below zero.

Table 5.6: Impact of Change in Weight of Average Beef Cuts as Proportion of Large Ruminant Live Weight, on FNPV and FIRR (Million USD)

%	FNPV (USD)	FIRR
	9.42	**49.52%**
30.00%	2.87	25.41%
31.00%	6.15	38.30%
32.00%	9.42	49.52%
33.00%	12.68	59.69%
34.00%	15.94	69.20%
35.00%	19.20	78.23%

Similarly, changes in average weight of beef cuts as a proportion of large ruminant live weight have a significant impact on project outcomes. Baseline average weight of beef cuts, as a share of live weight, is 32 percent, with an FNPV of USD 9.42 million and FIRR of 49.52 percent. A one-percentage point fall in the average

proportion of beef cuts to 31 percent of live weight, results in an FNPV of USD 6.15 million and FIRR 38.30 percent. An increase of one-percentage point boosts FNPV to USD 12.68 million, with an FIRR of 59.69 percent.

Table 5.7: Impact of Livestock Inventory on FNPV and FIRR (Million USD)

%	FNPV (USD)	FIRR
	9.42	**49.52%**
2.50%	24.20	87.78%
4.00%	19.77	77.05%
5.00%	16.81	69.62%
6.00%	13.85	61.91%
7.50%	9.42	49.52%
8.00%	7.94	45.04%
8.50%	6.45	40.29%

Changes in livestock inventory level have a significant impact on project FNPV and FIRR. At a baseline livestock inventory of 7.5 percent, FNPV is USD 9.42 million with a FIRR of 49.52 percent. A one-percentage point increase to 8.5 percent results in a decrease in both FNPV, to USD 6.45 million, and FIRR, to 40.29 percent. Conversely, a 1.5-percentage point decrease in inventory to 6 percent results in an increase in FNPV increases by USD 4.43 million to USD 13.85 million, and an increase in FIRR to 61.9 percent.

Table 5.8: Impact of Small Ruminant Purchase Price and FOB Price on FNPV (Million USD)

		Purchase Price of Small Ruminants (ETB/Head)							
	9.42	650.00	675.00	700.00	755.00	770.00	780.00	790.00	800.00
(FOB) Price of small ruminants' meat (USD/Kg)	**4.20**	(4.50)	(9.45)	(14.44)	(25.41)	(28.41)	(30.40)	(32.40)	(34.40)
	4.30	(1.02)	(5.97)	(10.92)	(21.90)	(24.90)	(26.89)	(28.89)	(30.88)
	4.40	2.43	(2.49)	(7.44)	(18.39)	(21.38)	(23.38)	(25.38)	(27.37)
	4.50	5.87	0.98	(3.96)	(14.88)	(17.87)	(19.87)	(21.86)	(23.86)
	4.60	9.30	4.42	(0.47)	(11.37)	(14.36)	(16.36)	(18.35)	(20.35)
	4.70	12.73	7.86	2.98	(7.88)	(10.85)	(12.84)	(14.84)	(16.83)
	4.80	16.15	11.29	6.42	(4.40)	(7.36)	(9.34)	(11.33)	(13.32)
	4.90	19.58	14.71	9.85	(0.91)	(3.88)	(5.86)	(7.84)	(9.82)
	5.00	23.00	18.14	13.27	2.54	(0.40)	(2.38)	(4.36)	(6.34)
	5.10	26.43	21.56	16.70	5.98	3.05	1.09	(0.88)	(2.86)
	5.20	29.85	24.99	20.12	9.42	6.49	4.53	2.58	0.62
	5.30	33.28	28.41	23.55	12.84	9.92	7.97	6.02	4.06
	5.40	36.70	31.84	26.97	16.27	13.35	11.40	9.46	7.50
	5.50	40.13	35.26	30.40	19.69	16.77	14.83	12.88	10.93

Baseline prices for small ruminants are USD 5.20/kg FOB and ETB 755/head. If the FOB price falls to USD 5.1/kg, the cost of small ruminants rises to ETB 790/head and project FNPV becomes negative. At a FOB price of USD 5/kg the small-ruminant purchase price is ETB 770/head with negative FNPV. The project best-case scenario is a small-ruminant FOB price of USD 5.50/kg giving a purchase price of ETB 650/head, giving an FNPV of USD 40.13 million. The project worst-case scenario is a FOB price of USD 4.80/kg giving a purchase price of ETB 800/head, resulting in negative FNPV of USD -3.32 million.

Table 5.9: Impact of Large Ruminant Purchase Price and FOB Price on FNPV

		Purchase Price of Large Ruminants (ETB/Head)							
(FOB) Price of large ruminants' meat (USD/Kg)	9.42	5,250.00	5,500.00	5,800.00	6,050.00	6,250.00	6,400.00	6,500.00	6,600.00
	3.50	2.22	(2.58)	(8.35)	(13.20)	(17.08)	(19.99)	(21.94)	(23.88)
	3.60	4.71	(0.05)	(5.83)	(10.65)	(14.54)	(17.45)	(19.39)	(21.34)
	3.70	7.20	2.44	(3.31)	(8.12)	(11.99)	(14.91)	(16.85)	(18.79)
	3.80	9.68	4.94	(0.79)	(5.60)	(9.46)	(12.36)	(14.30)	(16.25)
	3.90	12.16	7.43	1.72	(3.08)	(6.93)	(9.82)	(11.76)	(13.70)
	4.00	14.65	9.91	4.21	(0.56)	(4.41)	(7.30)	(9.22)	(11.16)
	4.10	17.13	12.39	6.70	1.95	(1.89)	(4.78)	(6.70)	(8.63)
	4.20	19.61	14.87	9.19	4.44	0.63	(2.25)	(4.18)	(6.10)
	4.30	22.09	17.35	11.67	6.93	3.13	0.27	(1.66)	(3.58)
	4.40	24.57	19.84	14.15	9.42	5.62	2.76	0.86	(1.06)
	4.50	27.05	22.32	16.63	11.90	8.11	5.26	3.35	1.45
	4.60	29.53	24.80	19.12	14.38	10.59	7.75	5.85	3.94

At a purchase price for large ruminants above ETB 780/head, the FOB price drops to USD 4.30/kg resulting in negative project FNPV. The project best-scenario is a FOB price of USD 4.60/kg and purchase price ETB 650/head, resulting in an FNPV of USD 34.81 million. The project worst-scenario is a purchase price of ETB 800/head, at which the FOB price drops to USD 4/kg giving an FNPV of USD 9.48 million.

5.4 Risk Management

The JESH project incorporates a number of measures to manage risks associated with the investment:

1. Improve market linkages to diversify supply and avoid price increases associated with monopoly providers, buying small quantities of animals from different suppliers

2. Maintain livestock inventory to control costs while ensuring continuous production, even when market prices are high

3. Secure access to water and land for fodder, to sustain increased livestock inventory during periods of drought

4. Provide two-week fattening facilities for underweight animals before slaughter

Chapter 6

ECONOMIC ANALYSIS

6.1 Introduction

This chapter provides a summary of economic statements, followed by an analysis of results.

6.2 Conversion Factors

Conversion factors are used to convert financial values to economic values, which may be greater or lesser than financial values. The following section examines the approach used to obtain conversion factors, referring to a number of examples. (See Tables 6.1 and 6.2 present for examples of conversion factors for exportable and importable project inputs, respectively; see Table 6.3 for a list of all conversion factors used.)

Table 6.1: Conversion Factor for Exportable Project Input (Small Ruminants)

Exportable Project Input (Small Ruminants)						
Real Exchange Rate	ETB/USD	18.00				
Foreign Exchange Premium	%	6.50%				
Evaluation period after full capacity is meet	Years	17				
Net benefits of the households due to the project	%	10.00%				
Net traders margin	%	2.00%				
		Financial Value	**CF for NT Services**	**Unadjusted Ev**	**FEP Value**	**Adjusted Ev**
FOB price of small ruminants	USD/Head	36.95				
FOB price of small ruminants	ETB/Head	665.18			43.24	708.42
Export subsidy	ETB/Head	-				
Price at port	ETB/Head	665.18				708.42
CF at port	Factor	1.07				
Net households' benefit	ETB/Head	66.52	0.00			0
Net traders' margin	ETB/Head	13.30	0.00			0
Selling tax	ETB/Head	10.00	0.00			0
Total	ETB/Head	755.00				708.42
CF	**Factor**	**0.94**				

1. Foreign-exchange premium for Ethiopia is estimated to be 6.5 percent, meaning that the economic value of exported goods will be 1.065/USD.

2. Ethiopian pastoralists are liable to sales tax of ETB 10/head for small ruminants and ETB 100/head for large ruminants

3. Net traders' margin—the sum of money transferred between animal suppliers and traders—is 2 percent of animal value

4. Net household benefit is assumed to be 10 percent—comparatively low, due to lack of demand for small animals, and high rates of loss due to drought and attack by wild animals

The conversion factor for exportable project inputs (small ruminants) is 0.94, derived by dividing total adjusted value by total financial value. The economic cost of each dollar spent on the JESH facility project is therefore USD 0.94.

Table 6.2: Conversion Factor for Importable Project Input (Vehicles)

Importable Project Input (Vehicles)						
Real Exchange Rate	ETB/USD	18.00				
Foreign Exchange Premium	%	6.50%				
Local transportation cost to Somali borderland	ETB000s	20				
		Financial Value	**CF for NT Services**	**Unadjusted Ev**	**FEP Value**	**Adjusted Ev**
Vehicles	USD000s	740				
Vehicles	ETB000s	13,320			865.80	14,186
Local transportation cost to Somali borderland	ETB000s	20	0.92			18.40
Price at the border of Somalia	ETB000s	13,340				14,204
Total		13,340.00				14,204.20
CF		**1.06**				

A conversion factor of 1.06 for vehicles indicates that the financial cost of vehicles is greater than their economic cost, such that every dollar spent on vehicles has an economic benefit for the project of USD 1.06.

Table 6.3: List of Conversion Factors

SUMMARY OF CONVERSION FACTORS	
Carcass of small ruminants (Export)	1.07
Red meat of large ruminants (Exports)	1.07
Skins	1.07
Hides	1.07
Edible offal of small ruminants	1.07
Edible offal of Large ruminants	1.07
Changes in accounts receivable	1.07
Land	1.00
Buildings	1.00
Machinery and equipment	1.06
Motor Vehicles	1.06
USAID Contribution to cover the investment cost	-
Government Support	-
Livestock (small ruminants)	0.94
Livestock (large ruminants)	0.94
Livestock Feed	1.07
Transportation	0.92
Packaging of small ruminants	1.07
Packaging of large ruminants	1.07
Electricity	0.90
Fuel for generator	0.79
Cost of uniforms	1.00
Telephone and Postage	1.00
Printing and Stationery	0.71
Cost of chemicals	0.97
Certifications and Licenses	-
Health Insurance for Employees	1.00
Site insurance	1.00
Bank Charges (TT transactions)	-
Other office expenses	1.00
Unskilled Workers	0.83
Skilled workers	0.93
Annual Labor wages over-run during de-stocking	0.67
Changes in accounts payable	1.07
Changes in cash balance	1.00
Corporate income tax	-
Contribution to the community	-
Electricity and road connection, transformers and etc.	1.00
Preliminary Administrative Expenses	1.00

6.3 Statements and Results

Financial results are slightly different than economic results, due to externalities. For more on externalities, see Chapter three of this study (3.4.1 Economic Externalities).

6.3.1 Economic Resource Flow

Table 6.4 presents a summary of the economic resource flow statement. (See Appendix for economic resource flow statement and statement of economic externalities; see Table 6.3 for conversion factors used in calculations.)

Table 6.4: Economic Resource Flow Statement

Resource Flow Statemant

Model period beginning					01 May 2012	01 May 2013	01 May 2014	01 May 2015	01 May 2030	01 May 2031
Model period ending					30 Apr 2013	30 Apr 2014	30 Apr 2015	30 Apr 2016	30 Apr 2031	30 Apr 2032
Financial year					2012	2013	2014	2015	2030	2031
Model column counter	CF	Unit	PV		1	2	3	4	19	20
ECONOMIC RESOURCE FLOW STATEMENT (Real, Million ETB)										
Total resources Inflow		ETB'000000s	7,681.60	-	-	317	1,055	1,178	1,179	40
Total resources outflow		ETB'000000s	6,505.92	-	82	282	934	985	977	(86)
Net Resources Flow (Before TAX and Financing)		ETB'000000s	1,175.68		(81.69)	34.85	121.27	193.14	201.42	126.73
Corporate income tax		ETB'000000s	-		-	-	-	-	-	-
Net Resources Flow (Before TAX and Financing)		ETB'000000s	1,175.68	-	(81.69)	34.85	121.27	193.14	201.42	126.73
Corporate income tax		ETB'000000s	-	-	-	-	-	-	-	-
Net Resources Flow (After TAX, Before contribution to the community)		ETB'000000s	1,175.68		(81.69)	34.85	121.27	193.14	201.42	126.73
Contribution to the community		ETB'000000s	-		-	-	-	-	-	-
Net Resources Flow (After TAX, Before contribution to the community)		ETB'000000s	1,175.68	-	(81.69)	34.85	121.27	193.14	201.42	126.73
Contribution to the community		ETB'000000s	-	-	-	-	-	-	-	-
Net Resources Flow (After TAX, After contribution to the community)		ETB'000000s	1,175.68		(81.69)	34.85	121.27	193.14	201.42	126.73
Real Exchange Rate	18	ETB/USD								
Net Resources Flow (After TAX, After contribution to the community)		ETB'000000s	1,175.68	-	(82)	35	121	193	201	127
Net Resources Flow (After TAX, After contribution to the community)		USD'000000s	65.32		(4.54)	1.94	6.74	10.73	11.19	7.04
Financial Discount Rate	0.12	%/Year								
NPV		ETB'000000s			1,175.68					
NPV		USD'000000s			65.32					
IRR		%			112.93%					

According to the cost-benefit analysis, ENPV is positive at ETB 1,175.68 million, equivalent to USD 65.32 million. The economic internal rate of return (EIRR) is 112.93 percent.

6.4 Stakeholder Analysis

Seven groups of stakeholder benefit from the JESH project: the private investor, the Government of Ethiopia, labors employed by the facility, USAID, traders and pastoralists who supply livestock to the abattoir, and the Faafan village community. (See Table 6.5 for a distributive analysis of the project.)

Table 6.5: Distributive Analysis

Distributive Analysis	Constant	Unit	Total	EXTERNALITIES	GOVERNMENT	LABOR	COMMUNITY	USAID	HOUSEHOLDS SUPPLYING LIVESTOCK	TRADERS SUPPLYING LIVESTOCK	CHECK
DISTRIBUTIVE ANALYSIS (Real,Million ETB)											
Net Resources Flow (Before TAX and Financing)		ETB000000s		825.57	238.40	9.33	-	(24.86)	502.27	100.45	0.0
Corporate income tax		ETB000000s		(175.00)	(175)						0.0
Net Resources Flow (After TAX and before countribution to the comm		ETB000000s		1,000.57	413.40	9.33	-	(24.86)	502.27	100.45	0.0
Countribution to the community		ETB000000s		(5.58)			(5.58)				0.0
Net Resources Flow (After tax and after contribution to the community		ETB000000s		1,006.16	413.40	9.33	5.58	(24.86)	502.27	100.45	0.0
Real Exchange Rate	18	ETB/USD									
Net Resources Flow (After tax and after contributic	-	ETB000000s		1,006.16	413.40	9.33	5.58	(24.86)	502.27	100.45	0.0
Net Resources Flow (After tax and after contribution to the community		USD000000s		55.90	22.97	0.52	0.31	(1.38)	27.90	5.58	0.0

ENPV is the sum of FNPV and externalities. (See Table 6.6 for a summary of stakeholder impact.)

Table 6.6: Stakeholder Impact (Million USD)

	Net Benefits
ENPV = FNPV + Externalities	**65.32**
• **FNPV (Private Investor)**	**9.42**
• **Externalities**	**55.90**
1. Government of Ethiopia	**22.97**
2 Labor	**0.52**
3. Faafan village community	**0.31**
4. USAID	**-1.38**
5. Trader	**5.58**
6. Households (Pastoralists)	**27.90**

6.4.1 Sensitivity Analysis

This section presents the results of sensitivity analysis on externalities, including tables detailing the impact of changes in the price of meat and purchase price on project ENPV.

Table 6.7: Impact of Changes in Price of Small Ruminants' Meat and Purchase Price on ENPV (Million USD)

		Purchase Price of Small Ruminants (ETB/Head)							
(FOB) Price of small rumiannts meat (USD/Kg)	65.32	650.00	675.00	700.00	755.00	770.00	780.00	790.00	800.00
	4.20	42.38	36.85	31.32	19.17	15.85	13.64	11.43	9.22
	4.30	46.99	41.47	35.94	23.78	20.46	18.25	16.04	13.83
	4.40	51.61	46.08	40.55	28.40	25.08	22.87	20.66	18.45
	4.50	56.22	50.70	45.17	33.01	29.69	27.48	25.27	23.06
	4.60	60.84	55.31	49.78	37.63	34.31	32.10	29.89	27.68
	4.70	65.45	59.93	54.40	42.24	38.92	36.71	34.50	32.29
	4.80	70.07	64.54	59.01	46.86	43.54	41.33	39.12	36.91
	4.90	74.68	69.16	63.63	51.47	48.15	45.94	43.73	41.52
	5.00	79.30	73.77	68.24	56.09	52.77	50.56	48.35	46.14
	5.10	83.91	78.39	72.86	60.70	57.38	55.17	52.96	50.75
	5.20	88.53	83.00	77.47	65.32	62.00	59.79	57.58	55.37
	5.30	93.14	87.62	82.09	69.93	66.61	64.40	62.19	59.98
	5.40	97.76	92.23	86.70	74.55	71.23	69.02	66.81	64.60
	5.50	102.37	96.85	91.32	79.16	75.84	73.63	71.42	69.21

The baseline small ruminant purchase price and FOB price of meat are ETB 755/head and USD 5.2/kg, respectively. As shown in Table 6.7, project ENPV remains positive even at a purchase price as high as ETB 800/head and a meat price as low as USD 4.2/kg. In the baseline scenario, if the purchase price falls to ETB 650/head and the price of meat increases to USD 5.50/kg, ENPV is USD 102.37 million.

Table 6.8: Impact of Changes in Price of Large Ruminants' Meat and Purchase Price on ENPV (Million USD)

		Purchase Price of Large Ruminants (ETB/Head)							
(FOB) Price of large ruminants' meat (USD/Kg)	65.32	5,250.00	5,500.00	5,800.00	6,050.00	6,250.00	6,400.00	6,500.00	6,600.00
	3.50	52.42	47.04	40.57	35.19	30.88	27.65	25.50	23.35
	3.60	55.77	50.38	43.92	38.54	34.23	31.00	28.85	26.70
	3.70	59.11	53.73	47.27	41.89	37.58	34.35	32.20	30.04
	3.80	62.46	57.08	50.62	45.23	40.93	37.70	35.54	33.39
	3.90	65.81	60.42	53.96	48.58	44.27	41.04	38.89	36.74
	4.00	69.15	63.77	57.31	51.93	47.62	44.39	42.24	40.08
	4.10	72.50	67.12	60.66	55.27	50.97	47.74	45.58	43.43
	4.20	75.85	70.47	64.00	58.62	54.31	51.08	48.93	46.78
	4.30	79.20	73.81	67.35	61.97	57.66	54.43	52.28	50.13
	4.40	82.54	77.16	70.70	65.32	61.01	57.78	55.63	53.47
	4.50	85.89	80.51	74.05	68.66	64.36	61.13	58.97	56.82
	4.60	89.24	83.85	77.39	72.01	67.70	64.47	62.32	60.17

Project ENPV for large ruminants under the baseline scenario is USD 65.32 million. As in the case of small ruminants, ENPV remains positive even in the worst-case

scenario of a FOB price of USD 23.35/kg of large-ruminant meat and a purchase price of ETB 6,600/head.

6.5 Beneficiary Analysis

The following section presents the results of beneficiary analysis by JESH project stakeholder (see Table 6.4). Government revenue and project contributions are obtained from World Bank indicators for 2013. The conversion factors used in calculations are listed in Table 6.5.

Table 6.9: Beneficiary Analysis

Beneficiaries Analysis

BENEFICIARIES ANALYSIS (USD)

LABOR BENEFITS			
Total number of labors	133	#	
Present Value of Benefits		USD	518,521.72
Present Value of Benefit per Worker		USD	3,898.66

SMALLHOLDER BENEFITS	Number of animlas, household sold during	Annual production capacity (heads)	Number of benefiting households	Total PV of households Benefits (Million USD)	PV of Benefit per Household (USD)
Small Ruminants	3	600,000	200,000	15.67	78.36
Large Ruminants	1	60,000	60,000	12.23	203.88

LIVESTOCK TRADERS BENEFITS	Number of animlas, Traders sold during year	Quantity of livestock sold during the life of the project (heads)	Number of benefiting traders	PV of traders Benefits (Million USD)	PV of Benefit per trader (USD)
Small Ruminants	10,000	10,800,000	1,080	3.13	2,902.07
Large Ruminants	1,000	1,080,000	1,080	2.45	2,265.31

Recipients of Government Expenditures	Amount of government revenue	PV of Government Spending per capita for 20 years	Number of Beneficiaries of Government Support
	22,966,431.82	283	81,153

Faafan Village Community	Amount of the project contribution	Approxmiate Village Population (Households)	PV of benefits per Household
	310,195	2,867	108.20

Chapter 7

CONCLUSION AND RECOMMENDATIONS

Cost-benefit analysis of the JESH facility investment indicates that project FNPV and FIRR are positive from both the owner and the total investment perspectives. In addition, ENPV is positive, indicating that as well as benefiting pastoralists, the establishment of a commercial slaughterhouse is beneficial to the broader national economy.

USAID's Feed the Future (FtF) program supports projects that improve household incomes. The large NPV of the JESH project demonstrates that the facility will enhance household incomes, in line with FtF aims.

The high transportation costs and poor road conditions faced by pastoralists taking animals to market result in a high death rate among kids and lambs, in particular. Additional risks are entailed in taking animals to border markets to be sold. The JESH facility will create a new, accessible market for the meat of small animals, leads to an increase in household wellbeing.

The existence of a local slaughterhouse also helps pastoralists cope with the incidence of drought, facilitating the timely and efficient destocking of herds, in exchange for earnings sufficient to sustain remaining livestock.

In addition, the high project NPV will serve to attract other investors to the area, including in the construction of more slaughterhouses, further improving local livelihoods, while introducing the competition needed to ensure that the existing facility continues to operate efficiently. At the same time, the increased demand for livestock will boost prices paid to pastoralists, further increasing household incomes.

However, the JESH facility faces a number of challenges. First, the abattoir needs to further strengthen linkages with pastoralists with a view to gaining their trust and so securing a reliable supply of livestock, ensuring a steady rate of plant utilization.

Second, JESH must exercise caution in the managing livestock inventory, in order to protect against spikes in prices. Similarly, the facility must alert to the onset of drought, when feeding costs as well as the supply of livestock increase.

Key project risks can be summarized as follows:

1. Lack of trust: pastoralists in the region tend to keep small ruminants for several years until they have grown, in order to sell them at a higher price
2. First-mover risk: war and political instability have limited private investment in the Somali region, exposing JESH to challenges in isolation
3. Animal disease: a major outbreak could severely hamper exports
4. Drought: facility income may increase in periods of drought due to the lower cost of livestock but feeding and watering costs will increase significantly

REFERENCES

Abdirahman, A., Mohamed, A., Warsame, A., Sheriff Nur, T., Kasim, M., & Mohamud, M. (2012). Somali Region ,Deyr 2012 Multi Agency Need Assessment Report (pp. 2-3).

Aklilu, Y., & Catley, A. (2010). Mind the Gap Commercialization, Livelihoods and Wealth Disparity in Pastoralist Areas of Ethiopia (p. 11). *UKaid.*

Amaledegn, A. (2011). Marketing Your Sheep and Goats (pp. 3-4). *ESGPIP*.

Berhanu Gebremedhin, Hoekstra D and Samson Jemaneh. 2007. Heading Towards Commercialization? The Case of Live Animal Marketing in Ethiopia. Improving Productivity and Market Success (IPMS) of Ethiopian Farmers Project WorkingPaper 5. *ILRI* (International Livestock Research Institute), Nairobi, Kenya. (p. 77)

Business Portal,. (2011). Jigjiga Export Slaughter House PLC. Retrieved 3 September 2015, from http://www.businessportals.com/supplier/jeshplc.html

Deressa, T T, 2006 Measuring the Economic Impact of Climate Change on Ethiopian Agriculture: Ricardian Approach. CEEPA Discussion Paper No.25. *Centre for Environmental Economics and Policy in Africa:* University of Pretoria.

Devereux, S. (2006). Vulnerable Livelihoods in Somali Region, Ethiopia (p. 52). *IDS.*

Eid, A. (2014). Jostling for Trade: The Politics of Livestock Marketing on the Ethiopia - Somaliland Border (pp. 4-5). *Future Agriculture*.

Fadiga, M. Legese, G. 2014. Small Ruminant Value Chain Development in Ethiopia: Situation Analysis and Trends. ICARDA/ILRI Project Report. Nairobi, Kenya: *International Center for Agricultural Research in the Dry Areas/International Livestock Research Institute.*

FAO,. (2014). Somalia Registers Record Exports of 5 Million Livestock in 2014. Retrieved 17 November 2015, from http://www.fao.org/news/story/en/item/283777/icode/

fast-standard,. (2014). The FAST Standard Practical, Structured Design Rules for Financial Modelling. Retrieved 26 July 2015, from http://www.fast-standard.org/the-fast-standard/

Gathege, D., & Ruparelia, S. (2012). Assessment of Environmental, Institutional and Individual Leadership Capacity Needs for the Knowledge Society in Ethiopia (p. 19). *geSCI.*

Hare, H. (2007). Survey of ICT in Education in Ethiopia. Survey of ICT and Education in Africa (Volume 2): 53 Country Reports. Washington, DC: infoDev / *World Bank.*

ITAB-CONSULT PLC,. (2006). Addis Ababa Chamber of Commerce and Sectoral Association (pp. 37-38).

Jabbar, M., & Ayele, G. (2004). Livestock Marketing, Food Security and Related Issues in Ethiopia (pp. 9-10). *Ethiopian Agricultural Research Organisation*.

Jenkins, G., & Miklyaev, M. (2013). Economic Feasibility of a First-mover Abattoir Establishment in Somali Region, Ethiopia (pp. 3-6).

Jeshplc,. (2012). Retrieved 10 July 2015, from http://www.jeshplc.com/

Legese, G., Haile, A., Duncan, A.J., Dessie, T., Gizaw, S. and Rischkowsky, B. 2014. Sheep and Goat Value Chains in Ethiopia: A Synthesis of Opportunities and Constraints. ICARDA/ILRI Project Report. Nairobi, Kenya: *International Center for Agricultural Research in the Dry Areas/International Livestock Research Institute.*

Mercy Corps,. (2013). Pastoralists Areas Resilience Improvement and Market Expansion (PRIME) Project (p. 10). *USAID/Ethiopia.*

Mercy Corps,. (2015). Pastoralist Areas Resilience Improvement Through Market Expansion (PRIME) Project (p. 2). *USAID/Ethiopia.*

Negassa, A. and Jabbar, M. 2008. Livestock Ownership, Commercial Off-take Rates and Their Determinants in Ethiopia. ILRI Research Report 19. Nairobi, Kenya: *ILRI.*

Negassa, N., Shahidur, R. and Gebremedhin, B. 2011. Livestock Production and Marketing. ESSP Working Paper 26.*Washington, DC, USA: IFPRI.*

Pavanello, S. (2010). Livestock marketing in Kenya- Ethiopia Border Areas: A Baseline Study (p. 26). *Humanitarian Policy Group*.

Solomon, A., Workalemahu, A., Jabbar, M., Hurissa, A., and Hurissa, B. (2003). Livestock Marketing in Ethiopia: A Review of Structure, Performance and Development Initiatives (pp. 23-24).

World Bank,. (2012). International Development Association and International Finance Corporation and Multilateral Investment Guarantee Agency Country Partnership Strategy for the Federal Democratic Republic of Ethiopia (p. 14).

World Bank Group,. (2013). World Development Indicators: Size of the Economy (p.69).

World Bank,. (2014). Economic Overview. Retrieved 20 September 2015, from http://www.worldbank.org/en/country/ethiopia/overview

Yami, A. (2010). Sheep and goat transport (pp. 1-2). *ESGPIP*.

APPENDIX

Appendix A: Economic Resource Flow Statement

Resource Flow Statemant											
Model period beginning				01 May 2012	01 May 2013	01 May 2014	01 May 2015	01 May 2029	01 May 2030	01 May 2031
Model period ending				30 Apr 2013	30 Apr 2014	30 Apr 2015	30 Apr 2016	30 Apr 2030	30 Apr 2031	30 Apr 2032
Financial year				2012	2013	2014	2015	2029	2030	2031
Model column counter	CF	Unit	PV	1	2	3	4	18	19	20
ECONOMIC RESOURCE FLOW STATEMENT (Real, Million ETB)										
RESOURCES INFLOW										
Domestic Price Index	-	Index		1.00	1.20	1.44	1.73	22.19	26.62	31.95
Economic Discount rate	12.00%	%/Year								
Carcass of small ruminants (Export)	1.07	Factor	3,993.40	-	202.46	546.65	607.39	607.39	607.39	-
Red meat of large ruminants (Exports)	1.07	Factor	2,450.97	-	63.57	343.28	381.42	381.42	381.42	-
Carcass of small ruminants (Domestically sold)	1.07	Factor	443.71	-	22.50	60.74	67.49	67.49	67.49	-
Red meat of large ruminants (Domestically sold)	1.07	Factor	272.33	-	7.06	38.14	42.38	42.38	42.38	-
Skins	1.07	Factor	168.72	-	8.55	23.10	25.66	25.66	25.66	-
Hides	1.07	Factor	49.02	-	1.27	6.87	7.63	7.63	7.63	-
Edible offal of small ruminants	1.07	Factor	242.07	-	12.27	33.14	36.82	36.82	36.82	-
Edible offal of Large ruminants	1.07	Factor	77.55	-	2.01	10.86	12.07	12.07	12.07	-
Gross sales		**ETB'000000s**	7,697.79	**-**	**319.70**	**1,062.77**	**1,180.86**	**1,180.86**	**1,180.86**	**-**
Change is accounts receivable	1.07	ETB'000000s	(19.73)	-	(3.20)	(7.98)	(2.96)	(1.97)	(1.97)	9.85
LIQUIDATION VALUE										
Land	1.00	ETB'000000s	1.09	-	-	-	-	-	-	9.37
Buildings	1.00	ETB'000000s	1.57	-	-	-	-	-	-	13.55
Machinery and equipment	1.06	ETB'000000s	0.17	-	-	-	-	-	-	1.50
Motor Vehicles	1.06	ETB'000000s	0.71	-	-	-	-	-	-	6.11
USAID Contribution to cover the investment cost	-	ETB'000000s	-	-	-	-	-	-	-	-
Government Support	-	ETB'000000s	-	-	-	-	-	-	-	-
Total resources Inflow		ETB'000000s	7,681.60	-	316.50	1,054.79	1,177.90	1,178.88	1,178.88	40.38

RESOURCES OUTFLOW										
INVESTMENT COST										
Land	1.00	ETB'000000s	3.60	3.60	-	-	-	-	-	-
Electricity and road connection, transformers and etc.	1.00	ETB'000000s	5.77	5.77	-	-	-	-	-	-
Security Fence, boreholes and etc.	1.06	ETB'000000s	2.24	2.24	-	-	-	-	-	-
Buildings	1.00	ETB'000000s	21.86	21.86	-	-	-	-	-	-
CIF cost of Machinery and Equipment	1.06	ETB'000000s	30.02	30.02	-	-	-	-	-	-
Vehicles	1.06	ETB'000000s	17.32	14.18	-	-	-	-	-	-
Office furniture, fittings and equipment	1.06	ETB'000000s	0.59	0.59	-	-	-	-	-	-
Preliminary Administrative Expenses	1.00	ETB'000000s	3.28	3.28	-	-	-	-	-	-
Local transportation of the machinery to the project site	0.92	ETB'000000s	0.15	0.15	-	-	-	-	-	-
OPERATING COST										
LIVESTOCK COST										
Small ruminants	0.94	ETB'000000s	3,004.17	-	152.31	411.24	456.93	456.93	456.93	-
Large ruminants	0.94	ETB'000000s	2,345.01	-	60.82	328.44	364.93	364.93	364.93	-
FEEDING COST										
Small ruminants	1.07	ETB'000000s	527.39	-	26.74	72.19	80.21	80.21	80.21	-
Large ruminants	1.07	ETB'000000s	92.37	-	2.40	12.94	14.37	14.37	14.37	-
OTHER DIRECT COSTS										
Transportation cost of Chilled meat delivery to Addis-Ababa	0.92	ETB'000000s	69.37	-	3.52	9.50	10.55	10.55	10.55	-
Transportation charge for delivery of frozen beef to Djibouti	0.92	ETB'000000s	59.42	-	1.54	8.32	9.25	9.25	9.25	-
Packaging of small ruminants	1.07	ETB'000000s	37.74	-	1.91	5.17	5.74	5.74	5.74	-
Packaging of large ruminants	1.07	ETB'000000s	68.68	-	1.78	9.62	10.69	10.69	10.69	-
Fixed electricity consumption	0.90	ETB'000000s	0.69	-	0.09	0.09	0.09	0.09	0.09	-
Electricity consumption small ruminants	0.90	ETB'000000s	0.35	-	0.02	0.05	0.05	0.05	0.05	-
Electricity consumption large ruminants	0.90	ETB'000000s	1.65	-	0.04	0.23	0.26	0.26	0.26	-
Cost of running generator	0.79	ETB'000000s	0.31	-	0.04	0.04	0.04	0.04	0.04	-
INDIRECT COSTS										
Cost of uniforms	1.00	ETB'000000s	0.98	-	0.14	0.14	0.14	0.14	0.14	-
Telephone and Postage	1.00	ETB'000000s	3.91	-	0.54	0.54	0.54	0.54	0.54	-
Printing and Stationery	0.71	ETB'000000s	0.09	-	0.01	0.01	0.01	0.01	0.01	-
Cost of chemicals	0.97	ETB'000000s	2.50	-	0.35	0.35	0.35	0.35	0.35	-

OVERHEAD COSTS											
Certifications and Licenses	0.00	ETB'000000s	-		-	-	-	-	-	-	-
Health Insurance for Employees	1.00	ETB'000000s	0.72		-	0.10	0.10	0.10	0.10	0.10	-
Site insurance	1.00	ETB'000000s	0.80		-	0.11	0.11	0.11	0.11	0.11	-
Bank Charges (TT transactions)	0.00	ETB'000000s	-		-	-	-	-	-	-	-
Other office expenses	1.00	ETB'000000s	4.35		-	0.60	0.60	0.60	0.60	0.60	-
TOTAL LABOR COSTS (WAGES AND SOCIAL INSURANCE)											
Unskilled labor cost	0.83	ETB'000000s	13.06		-	0.36	1.79	1.83	2.41	2.46	-
Skilled labor cost	0.93	ETB'000000s	14.69		-	0.41	2.02	2.06	2.71	2.77	-
WORKING CAPITAL											
Change in accounts payable	1.07	ETB'000000s	(11.50)		-	(2.06)	(4.47)	(1.71)	(1.14)	(1.14)	5.72
Change in cash balance	1.00	ETB'000000s	184.33		-	29.89	74.52	27.62	18.41	18.41	(92.06)
Net VAT payment	-	ETB'000000s	-		-	-	-	-	-	-	-
Total resources outflow		ETB'000000s	6,505.92		81.69	281.66	933.52	984.76	977.36	977.46	(86.35)
Total resources Inflow	-	ETB'000000s	7,681.60	-	-	317	1,055	1,178	1,179	1,179	40
Total resources outflow	-	ETB'000000s	6,505.92	-	82	282	934	985	977	977	(86)
Net Resources Flow (Before TAX and Financing)		ETB'000000s	1,175.68		(81.69)	34.85	121.27	193.14	201.52	201.42	126.73
Corporate income tax	-	ETB'000000s	-		-	-	-	-	-	-	-
Net Resources Flow (Before TAX and Financing)	-	ETB'000000s	1,175.68	-	(81.69)	34.85	121.27	193.14	201.52	201.42	126.73
Corporate income tax	-	ETB'000000s	-	-	-	-	-	-	-	-	-
Net Resources Flow (After TAX, Before contribution to the community)		ETB'000000s	1,175.68		(81.69)	34.85	121.27	193.14	201.52	201.42	126.73
Contribution to the community	-	ETB'000000s	-		-	-	-	-	-	-	-
Net Resources Flow (After TAX, Before contribution to the co	-	ETB'000000s	1,175.68	-	(81.69)	34.85	121.27	193.14	201.52	201.42	126.73
Contribution to the community	-	ETB'000000s	-	-	-	-	-	-	-	-	-
Net Resources Flow (After TAX, After contribution to the community)		ETB'000000s	1,175.68		(81.69)	34.85	121.27	193.14	201.52	201.42	126.73
Real Exchange Rate	18	ETB/USD									
Net Resources Flow (After TAX, After contribution to the com	-	ETB'000000s	1,175.68	-	(82)	35	121	193	202	201	127
Net Resources Flow (After TAX, After contribution to the community)		USD'000000s	65.32		(4.54)	1.94	6.74	10.73	11.20	11.19	7.04
Financial Discount Rate	0.12	%/Year									
NPV		ETB'000000s			1,175.68						
NPV		USD'000000s			65.32						
IRR		%			112.93%						

Appendix B: Statement of Economic Externalities

Economic Externalities											
Model period beginning				01 May 2012	01 May 2013	01 May 2014	01 May 2015	01 May 2029	01 May 2030	01 May 2031
Model period ending				30 Apr 2013	30 Apr 2014	30 Apr 2015	30 Apr 2016	30 Apr 2030	30 Apr 2031	30 Apr 2032
Financial year				2012	2013	2014	2015	2029	2030	2031
Model column counter	CF	Unit	PV	1	2	3	4	18	19	20
STATEMENT OF ECONOMIC EXTERNALITIES (Real, Million ETB)										
RESOURCES INFLOW										
Gross sales		ETB'000000s	496.14	-	20.75	68.48	76.09	76.09	76.09	-
Change in accounts receivable		ETB'000000s	(1.30)	-	(0.21)	(0.52)	(0.19)	(0.13)	(0.13)	0.65
LIQUIDATION VALUE										
Land		ETB'000000s	-	-	-	-	-	-	-	-
Buildings		ETB'000000s	-	-	-	-	-	-	-	-
Machinery and equipment		ETB'000000s	0.01	-	-	-	-	-	-	0.09
Motor Vehicles		ETB'000000s	0.04	-	-	-	-	-	-	0.37
USAID Contribution to cover the investment cost		ETB'000000s	(24.86)	(24.86)	-	-	-	-	-	-
Government Support		ETB'000000s	(5.77)	(5.77)	-	-	-	-	-	-
Total Resources Inflow		ETB'000000s	464.26	(30.63)	20.54	67.95	75.89	75.96	75.96	1.11

RESOURCES OUTFLOW										
INVESTMENT COST										
Land		ETB'000000s	-	-	-	-	-	-	-	-
Electricity and road connection, transformers and etc.		ETB'000000s	-	-	-	-	-	-	-	-
Security Fence, boreholes and etc.		ETB'000000s	0.14	0.14	-	-	-	-	-	-
Buildings		ETB'000000s	-	-	-	-	-	-	-	-
CIF cost of Machinery and Equipment		ETB'000000s	1.81	1.81	-	-	-	-	-	-
Vehicles		ETB'000000s	1.05	0.86	-	-	-	-	-	-
Office furniture, fittings and equipment		ETB'000000s	0.04	0.04	-	-	-	-	-	-
Preliminary Administrative Expenses		ETB'000000s	-	-	-	-	-	-	-	-
Local transportation of the machinery to the project site		ETB'000000s	(0.01)	(0.01)	-	-	-	-	-	-
OPERATING COST										
LIVESTOCK COST										
Small ruminants		ETB'000000s	(197.55)	-	(10.02)	(27.04)	(30.05)	(30.05)	(30.05)	-
Large ruminants		ETB'000000s	(162.54)	-	(4.22)	(22.76)	(25.29)	(25.29)	(25.29)	-
FEEDING COST										
Small ruminants		ETB'000000s	34.29	-	1.74	4.69	5.21	5.21	5.21	-
Large ruminants		ETB'000000s	6.00	-	0.16	0.84	0.93	0.93	0.93	-
OTHER DIRECT COST										
Transportation cost of Chilled meat delivery to Addis-Ababa		ETB'000000s	(5.92)	-	(0.30)	(0.81)	(0.90)	(0.90)	(0.90)	-
Transportation charge for delivery of frozen beef to Djibouti		ETB'000000s	(5.07)	-	(0.13)	(0.71)	(0.79)	(0.79)	(0.79)	-
Packaging of small ruminants		ETB'000000s	2.30	-	0.12	0.32	0.35	0.35	0.35	-
Packaging of large ruminants		ETB'000000s	4.19	-	0.11	0.59	0.65	0.65	0.65	-
Fixed electricity consumption		ETB'000000s	(0.07)	-	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	-
Electricity consumption small ruminants		ETB'000000s	(0.04)	-	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	-
Electricity consumption large ruminants		ETB'000000s	(0.18)	-	(0.00)	(0.03)	(0.03)	(0.03)	(0.03)	-
Cost of running generator		ETB'000000s	(0.08)	-	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	-
INDIRECT COST										
Cost of uniforms		ETB'000000s	-	-	-	-	-	-	-	-
Telephone and Postage		ETB'000000s	-	-	-	-	-	-	-	-
Printing and Stationery		ETB'000000s	(0.04)	-	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	-
Cost of chemicals		ETB'000000s	(0.08)	-	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	-
OVERHEAD COST										
Certifications and Licenses		ETB'000000s	(0.13)	-	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	-
Health Insurance for Employees		ETB'000000s	-	-	-	-	-	-	-	-
Site insurance		ETB'000000s	-	-	-	-	-	-	-	-
Bank Charges (TT transactions)		ETB'000000s	(0.98)	-	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	-
Other office expenses		ETB'000000s	-	-	-	-	-	-	-	-

TOTAL LABOR COSTS (WAGES AND SOCIAL INSURANCE)											
Unskilled labor cost		ETB'000000s	(2.65)		-	(0.07)	(0.36)	(0.37)	(0.49)	(0.50)	-
Skilled labor cost		ETB'000000s	(18.69)		-	(0.77)	(2.53)	(2.58)	(3.41)	(3.48)	-
WORKING CAPITAL											
Changes in accounts payable		ETB'000000s	(0.78)		-	(0.14)	(0.30)	(0.12)	(0.08)	(0.08)	0.39
Changes in cash balance		ETB'000000s	-		-	-	-	-	-	-	-
Net VAT payment		ETB'000000s	(16.31)		-	(0.04)	(2.30)	(2.60)	(2.60)	(2.60)	-
Total resource outflow		ETB'000000s	(361.31)		2.83	(13.77)	(50.62)	(55.77)	(56.68)	(56.75)	0.39
Total Resources Inflow	-	ETB'000000s	464.26	-	(30.63)	20.54	67.95	75.89	75.96	75.96	1.11
Total resource outflow	-	ETB'000000s	(361.31)	-	2.83	(13.77)	(50.62)	(55.77)	(56.68)	(56.75)	0.39
Net resource flow (Before TAX and financing)		ETB'000000s	825.57		(33.46)	34.32	118.57	131.66	132.63	132.71	0.72
Net resource flow (Before TAX and financing)	-	ETB'000000s	825.57	-	(33.46)	34.32	118.57	131.66	132.63	132.71	0.72
Corporate income tax		ETB'000000s	(175.00)		-	-	-	-	(48)	(48)	-
Net resource flow (After tax and before contribution to the community)		ETB'000000s	1,000.57		(33.46)	34.32	118.57	131.66	180.46	180.49	0.72
Net resource flow (After tax and before contribution to the cor	-	ETB'000000s	1,000.57	-	(33.46)	34.32	118.57	131.66	180.46	180.49	0.72
Contribution to the community		ETB'000000s	(5.58)		-	(0.01)	(0.07)	(1.54)	(0.53)	(0.52)	(3.15)
Net resource flow (After tax and after contribution to the community)		ETB'000000s	1,006.16		(33.46)	34.33	118.64	133.20	180.99	181.01	3.87
Real Exchange Rate	18	ETB/USD									
Net resource flow (After tax and after contribution to the comr	-	ETB'000000s	1,006.16	-	(33.46)	34.33	118.64	133.20	180.99	181.01	3.87
Net resource flow (After tax and after contribution to the community)		USD'000000s	55.90		(1.86)	1.91	6.59	7.40	10.05	10.06	0.21