PROJECT TITLE

FEASIBILITY STUDY ON ANIMAL FATTENING AND ANIMAL FEED PRODUCTION

PROJECTOWNER:- ……

ADDRESS: -

Woreda:

Phone: - ……

PROJECT AREA:-

DATE:

1. EXCUTIVE SUMMARY

XXX Agro processing PLC is own by Ethiopian citizen investor, who engaged in different investment sector including hotel and tourism, Cereal, and fruit production, small scale fattening and other integrated agricultural system at [redacted]

The development of agriculture and agro processing industries in Ethiopia has given high priority. Realizing the opportunity [redacted] Agro Processing PLC plan to establish full-fledged integrated agro processing industry, in focus to Livestock development (fattening of cattle, sheep and goat) and Animal feed production/processing. The goal of intended project will be to establishment a modern integrated agricultural development project.

The proposed project establishes in Ethiopia, Amhara national regional state, in a locality called [redacted] which is more suitable for planned project productivity.

To this end, the company plan to request 10,000 m^2 land for animal feed processing in the town of [redacted] besides existing 6 ha of land already establish and start animal fattening [redacted] Selection of animal feed processing site was considering its suitability to feed processing and the availability of the necessary utilities as well as due to accessibility to road and other basic infrastructural facilities.

Regarding market access for the product of the company which is fatten livestock and animal feed were analyzed with the prevailing market situation and major players in the market. In this regard, it has planned to produce quality products with low cost to be able to penetrate the market and compete equally with competitors. The company will focus on setting up a whole seller based distribution system.

The total investment cost of proposed project including working **capital is estimated at Birr 60 million**. The project can create **328 job opportunity of that 220 male and 108 females** and the **estimated income is 5.4 million birr**. The financial result indicates that the project will generate profit beginning from **the first year of operation**. The result shows that the calculated **IRR of the project is 61.43% and NPV discounted at 10% of Birr 237,237,719.**

In addition to this, the proposed project possesses **wide range of economic and social benefits** such as increasing the level of **investment, tax revenue and employment creation**.

Hence, the project is **technically feasible, financially and commercially viable** as well as socially and economically acceptable and the project is worth implementing.

2. Introduction

2.1 Economic back ground and potential of the country in relation to investment

Ethiopia has achieved remarkable economic growth rate which is over 11% per annum in recent years. The current economic growth rate is well above of population growth (2.6%). Interestingly the current economic growth rate is well above the required MDG goal (recommended MDG economic growth rate is 7% per annum) of targeting to halving the poverty by 2015. Although initially led by agriculture, growth is now more broad-based dominated by services and construction sector in national GDP. According to Government projections, real GDP growth is projected to remain above 10% per annum over the impetus to growth.

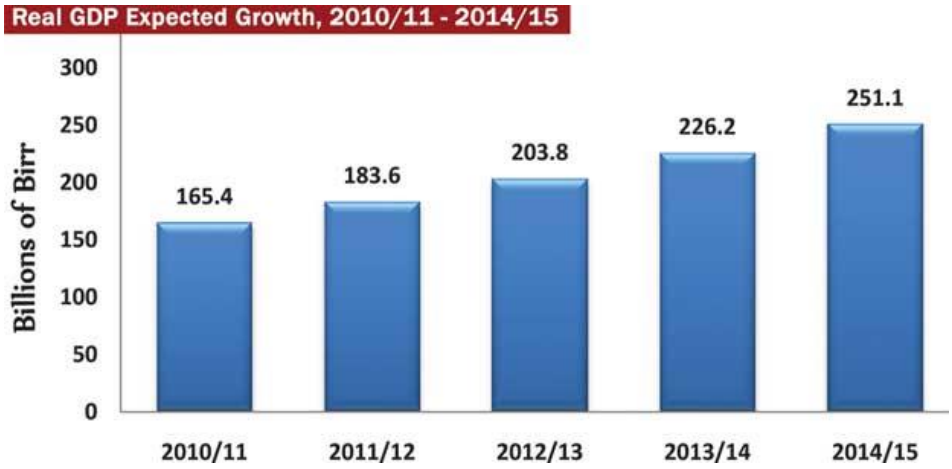
2.2 Growth & Drivers

Until recently, agriculture (mainly smallholder farming and livestock production) was the dominating sector in the Ethiopian economy. While the services sector has recently outstripped agriculture in terms of its share of GDP (currently estimated at 46%) agriculture remains critical for broad-based growth. The agriculture sector accounts for 42% of GDP, 80% of employment and 85% of Ethiopia‘s export earnings. The increase in agricultural production witnessed over the past five years (averaging 8%) is attributed mainly to favorable weather conditions, improved supply of inputs, improved supply of feed, improved induction of technology, and reduction in post-harvest losses and expansion in land under cultivation. Given the mainly smallholder dominated structure, pushing the production frontier without technological innovation and the development of rural infrastructure will not be feasible. GOE, therefore, sees the diffusion of modern agricultural technologies and best practices as central to economic transformation.

The economic growth plan, labeled the Five-year Growth and Transformation Plan (2011-2015), is based on the performance of the economy in the last five years and envisages the economy to grow, at worst, by 11per cent every year and, at best, to double by the year 2015.

The country, in the past five years, has been growing at an average rate of 11%, which is the basis for the projection for the next five years. The plan focuses on seven strategies, called

the pillars of the plan, which include the rapid growth of the agriculture sector, industry, and improvement of social services.



[redacted]

Even though agriculture production is expected to double, the plan forecasts the sector's contribution to GDP to decrease as the contribution from the industry sector increases in line with the government's economic strategy of Agricultural Development Led Industrialization (ADLI).

The plan forecasts agriculture to play a major role in earning the country huge amounts of revenue, contributing 12pc to the GDP, and envisages stepped up import substitutions to close the gap in the trade balance. The plan also forecasts rapid growth across sectors and envisages Ethiopia to be on the fast track to becoming a mid-level income country.

All the Millennium Development Goals (MDGs), which are coincidently set for the year 2015, the same year as the end of the five-year plan, will be fully met, predicting a drastic improvement across the board.

[redacted]

For Ethiopia in year 2010-11	Indicator Value
GDP Growth (Constant Prices, National Currency)	8.008 %
GDP (Current Prices, National Currency)	ETB 383.364 Billion.
GDP (Current Prices, US Dollars)	US$ 29.717 Billion
GDP Deflator	277.636 (Index, Base Year as per country's accounts = 100)
GDP Per Capita (Constant Prices, National Currency)	ETB 1,628.34 .
GDP Per Capita (Current Prices, National Currency)	ETB 4,520.86 .
GDP Per Capita (Current Prices, US Dollars)	US$ 350.441
GDP (PPP), US Dollars	US$ 86.123 Billion
GDP Per Capita (PPP), US Dollars	US$ 1,015.61
GDP Share of World Total (PPP)	0.116 %
Implied PPP Conversion Rate	4.451
Investment (% of GDP)	22.349 %
Gross National Savings (% of GDP)	20.768 %
Inflation, Average Consumer Prices (Indexed to Year (2010)	268.254 (Index, Base Year 2000 = 100)
Inflation (Average Consumer Price Change %)	2.786 %
Inflation, End of Year (Indexed to Year 2000)	273.556 (Index, Base Year 2000 = 100)
Inflation (End of Year Change %)	7.301 %
Import Volume of All Items Including Goods and Services (Percent Change)	7.435 %
Import Volumes of Goods Only (Percent Change)	7.435 %
Export Volume of All Items Including Goods and Services (Percent Change)	8.621 %
Export Volumes of Goods Only (Percent Change)	8.615 %
Value of Oil Imports	US$ 1.311 Billions
Value of Oil Exports	US$ 0 Billions
Population	84.799 Million
General government revenue (National Currency)	ETB 66.237 Billions.
General government revenue (% of GDP)	17.278 %
General government total expenditure (National Currency)	ETB 71.335 Billions.
General government total expenditure (% of GDP)	18.608 %
Total Government Net Lending/ Borrowing (% of GDP)	-1.33 %
Total Government Net Debt (National Currency)	ETB 124.765 Billion.
Total Government Net Debt (% of GDP)	32.545 %
Total Government Gross Debt (National Currency)	ETB 140.716 Billion.
Total Government Gross Debt (% of GDP)	36.705 %
Fiscal Year Gross Domestic Product, Current Prices	ETB 383.364 Billions.
Current Account Balance (US Dollars)	US$ -1.277 Billion
Current Account Balance (% GDP)	-4.298 %

Sources-: IMF, World Bank, UN, OECD, CIA World Fact book, Internet World Statistics, The Heritage Foundation and Transparency International, http/economywatch.com/economic statistics/Ethiopia/

Agriculture is the corner stone of the development policy of the Government of Ethiopia. According to the Rural Development Policy and Strategy document, the basic ingredient and resource the country has for the agricultural development is the abundant land and labor. Most of the western lowlands are endowed with water resources are virgin and fertile. Up to recently the areas were not developed due to lack of capital and technology. Therefore, there is strong commitment from the government to make these fertile lands available for investors that has the capital and technology to develop and distribute.

With regard to the agricultural investment potential of the country:

1. Out of the total land area of 111.5millon hectares of the country about 74.3 million hectares is suitable for annual and perennial crop production.
2. Of the total area of the country about 45 % (50.2 million hectares) is highland and the remaining is lowland.
3. Of the estimated arable land, around 18 million hectares is currently cultivated under rain fed crops.
4. The irrigation potential of the country is estimated to be around 4.3 million hectares.
5. Ethiopia produces mainly a variety of cereals, pulses, oilseeds, fruits, vegetable, fiber crops /cotton/, coffee, tea, spices, fodder and other industrial crops and also livestock production (fattening, dairy production)

3. Background of the project

3.1 Location

This project will be implemented on certified land of ha, 6 ha [redacted] for fattening and 1 ha [redacted] for animal feed processing at [redacted]
The woreda is located about 265 km along the main road to the northwest of Addis Ababa having 113,414 of total population. The area has an elevation of minimum 1,450 and maximum 2,580 m.a.s.l, which is suitable for cattle, goat and sheep fatting, dairy, vegetables,

cereal, and forage production [redacted]land usage and environmental protection office 2011).

3.2 Human Population and Density

The current population of [redacted] 2,299,871. In [redacted] it is estimated to be 113,414, of which 56,507 are male and 56,907 females (Woreda statistic's report, 2011). The project area exists at the boarder of Amhara region, which led a population to share culture, technology.

Spatially explicit population density of the study area was extrapolated from the 2007 population census collected at Kebele level (i.e. the smallest administrative unit in Ethiopia). According to the national statistical agency, 45% of the total area is characterized by 80 – 110 people per km^2 [redacted]Woreda land usage and environmental protection office 2011).

3.3 Religion

In the area Orthodox Christianity is the dominate religion having almost greater than 98 % followers while less than 2% is comprised of Muslim and others (2007, CSA report).

3.4 Livestock Population

The livestock population of the country was estimated to be 44 million heads of cattle, 24 million heads of sheep, 23 million heads of goats, 3 million heads of camels,43 million of poultry, 10 million bee colonies, 4.2 million heads of donkeys, 0.4 million heads of mules and 1.5 million heads of horses. On the other hand, according to the livestock master plan study report of 2006 (phase one), these were about 45 million heads of cattle, 21 million heads of sheep, 20 million heads of goats and 1.5 million heads camels (CSA, 2004). Nevertheless, both sources indicate large number of livestock population, production system where-by the product or by-product of one can be an input to the other.

The livestock heads in [redacted] are estimated to be 842,233. The livestock population at Woreda level sourced from animal production office is 89,643 Cattle, 63,405 goat and sheep ([redacted] land usage and environmental protection office 2011).

3.5 Infrastructure

The project area is the direct beneficiary of some infrastructure like road and some distance from other like electric power, telephone, and health center with some distance. As the project aim to improve these infrastructures in the near future, local community and other organization will benefit. [redacted]Woreda land usage and environmental protection office 2011).

Road coverage, gravel road 85.17 km from main road, Electric power coverage, full access for feeding production process (in [redacted]and 24 hour's generator for fattening (source of power on the cost of the project owners), full network access and one hospital and health center and enough first and one second cycle school [redacted]Woreda land usage and environmental protection office 2011).

3.6 Natural Resources

3.6.1 Climate

The climatic condition of the area based on eco-climatic classification termed as Dega (temperate) in [redacted]and kola in [redacted] The area demarcated under such region are characterized by three seasons and locally known as Bega (October to January), Belg (February to May) and Kermit (June to September). In general, the climate is favorable for a dairy, beef, vegetable and forage production [redacted]2008 and [redacted] Woreda land usage and environmental protection office 2011).

3.6.2Topography

The overall topography is plateau associated with high undulation and Valley bottoms having [redacted] drain throughout the year. The majority of the study area (> 50%) is characterized by a slope of more than 15%. Almost 1/3 of the study area has < 8% slope. Almost 30% of the study area has a slope above 30%. In general, above 67% of the study area is above 8% which requires physical soil and water conservation measures especially in the center and eastern part of the study area. The altitude of the study area ranges from 1451 m.a.s.l (at the outlet) and 2500 m.a.s.l at the extreme upper part of the study area. This implies that about 1149 m elevation difference exists in the area which in turn makes the landscape very complex from a topographic perspective. As a result, the biophysical (e.g. soil,

rainfall, geology, slope, etc.) are heterogeneous. However, huge altitudinal difference variation creates diverse biodiversity, land use and farming system over the study site.



Figure 2. Topographic picture of woreda

3.6.3 Soil

The soil type is dominated by clay loam soil (32%), silt loam soil (40%), loam soil (15) and clay soil (13%) rolling and undulating land features as well as hills and mountain side slopes, having some organic matter. These soils are known to be generally low in available nitrogen and phosphorous as evidenced by their responses to several fertilizer experiments.

3.6.4 Water resource

The area is rich with surface and ground water resource that can be used for irrigation and drinking surrounding the farm. There are also many seasonal rivers that flash flood during rainy seasons. The project area has access to both ground (almost 316 ground water this indicate ground water is the major source of water and easy access to store enough) and surface water (4 abay drainage rivers are crossing the area) average depth 7000 birr per meter and total depth 50 meter it cost 450,000birr including pipe distribution [redacted] Woreda land usage and environmental protection office 2011).

3.6.5 Temperature

The average annual max and min temperature of the area is range between 17 ^{0} to 22 ^{0} c. Night frost occurs frequently from October to January [redacted] Woreda land usage and environmental protection office 2011).

3.6.6 Rainfall

The rainfall pattern in this region has two distinct peaks during a year. Short rain occurs from February to May and long rain from June to September. The average annual rainfall is minimum 800 mm and maximum 1000mm, 50% falling in long rain periods [redacted] Woreda land usage and environmental protection office 2011).

3.6.7 Land use/ land cover

Even though, the area is suitable for integrated farming system of production, inappropriate land use practice implemented previously leading the resource to degradation and somehow rehabilitated now a day. The land use of [redacted]Woreda is 60% farm land, 10% for grazing, 10% settlement, 10% forest land, 5% regulation, 3% infrastructure and 2% for other use. The area also has a potential to grow short –cycle crops (Wheat, Teff, Magbean,) during 'Belg' rain, long- cycle of cereal crops (Sorghum, Millet, Corn), fruit and vegetable of different types, fodder tree and grass with artificial forest of lowland species[redacted] Woreda land usage and environmental protection office 2011).

3.7 Socio-economic Situation

The study catchment is administered in two regions: Amhara and Oromia National Regional States. Within the Amhara National Region, the study catchment is found in North Shewa Administrative Zone. The North Shewa Administrative Zone has 27 districts and 434 Kebeles with a total human population size of 2,012,323, and the livestock heads are estimated to be 842,233. The livelihoods of 83.52% population were based on agriculture, 10.43% based on trade and the remaining 6.05% categories under other (i.e. art, daily laborer) (2007, CSA report).

3.8 Suitability Assessment

Generally, the Woreda and particularly the Kebele have medium potential compared with the surrounding area. With some management action in the near future, the area has a potential of integrated production system of; animal (fatting, dairy, breeding), crop and tree species. The area also has good potential for agro-processing, lowland and highland fruits, vegetables, and cereal (Wheat, Maize, Sorghum, Corn etc..), oil crop (sesame, Mugabe etc…) indicating that different institution had interested to invest in the sectors mostly in Agro-processing, Agro-

forestry, which could create symbiotic relation among land- human-livestock-plant ecosystem [redacted]Woreda land usage and environmental protection office 2011).

3.9 Disease

3.9.1 Livestock diseases

Diseases and parasites are the major constraints to improved small ruminant production and productivity in most production systems/agro-ecological zones. Health problems cause high mortality and reduced reproductive and growth performances resulting in reduced output per animal and flock off-take rates. Flock monitoring studies showed that mortality rates attributable to diseases and parasites are 21.7% (goat) and 25.3% (sheep) in Alaba, 14.2% (goat) and 14.6% (sheep) in Gomma, and 10.9% (goat) in Dale. The effect of morbidity on productive and reproductive performances of the flocks is also apparently higher. (Source: Tsedeke (2007), Tesfaye (2009), Yenesew (2009)).

Sheep and goats are generally susceptible to the same diseases, Sheep and goats are infected by the same internal parasites (worms) which are transmitted via infected placenta to genetically-susceptible. Both sheep and goats can serve as abnormal host for meningeal worm, a parasite of white tail deer. Goats tend to be more susceptible to worms than sheep, due to their origins (in a dry climate) and natural browsing behavior. Goats also metabolize anthelmintics quicker and require higher doses of the drugs.

The local government animal health center 17 km far from the fattening areas then we recommend to establish private animal health center within the project property.

3.9.2 Crops diseases

During the 2014/15 main crop season fields and experimental plots were assessed for diseases; the major diseases encountered include rusts, septoria leaf blotches, foot and root diseases, Fusarium head blight and smuts. The overall mean prevalence of stem rust was 61%, yellow rust 22%, leaf rust 18.8% and Septoria leaf blotches 52.9%. An adapted variety with durable stem rust resistance in Ethiopia remains an urgent requirement. Assessed March 28, 2019 https://www.globalrust.org/about-bgri. The status of diseases in Ethiopia in the 2014/2015 main crop season.

3.10 SWOT Analysis

Crucial Factors & Steps in Decision Making for Investment Before making the decision, whether to invest in this project or not, one should carefully analyses the associated risk factors. A SWOT analysis can help in analyzing these factors which can play important role in making the decision.

Strengths

- Investment in livestock sector is increasing day by day and quality feed is a pre requisite in profitable livestock farming.
- Feed and Molasses formulation according to modern techniques with proper utilization of locally available cheaper feedstuffs leads to success in livestock farming hence for feed business too.

Weaknesses

- Limited availability of protein sources of standard quality due to low or static production, processing technology, variable composition and adulteration.
- Comparatively poor nutrient composition of indigenous feed ingredients due to differences in varieties and use of improper soil fertilizers.
- Improper use of pesticides, the residues of which result in poor feed utilization.
- Lack of proper storage facility. Due to this fact various agricultural products when produced under quite high moisture content, thus liable to be affected with insect damage, auto-oxidation and fungal contamination.
- Animal molasses cannot be produced economically on a small scale.

Opportunities

- Rapidly increasing demand for the various kinds of livestock products and feed.
- The agro industrial by products can be better utilized in formulated compound feed.

Threats

- Open and competitive commodity pricing
- There is no feed ingredient quality control program in the woreda and mixing of feed ingredients may also affect the quality of feed.
- The prices of different feedstuffs vary throughout the year.
- There is limited availability of protein sources of standard quality due to low or static production, processing technology, variable composition and adulteration.
- Lack of awareness among livestock farmers to use compound feed.

4. PRODUCT DESCRIPTION AND APPLICATION

4.1 Fattening

Fattening means controlling what cattle's eat by using high quality feed so that to generate faster weight gains. It is a strategic feeding option which produces a quick result (2-3 months and 3-4 term per a year), technically quite simple. Agro-industrial by products can be used as feed sources.

Once cattle have eaten to their appetite and remain full, the chances of negative upsets are reduced considerably. In this regard additional feeding would result in increased weight.

4.2 Livestock feed

Livestock feed is a mixture of feedstuffs produced by feed processing plant. It contains protein, minerals, and other nutrients which are useful for survival of the animals. The mixture would be produced from oil seed cake, molasses and Sadium hydrooxide (NaOH) .Such mix may be varied over a wide range of compositions, determined by nutritional values required, within the following average minimum and maximum values: The plant will be sized according to the possibility of treating the maximum amount of each material as per the required feed composition.

Table 2:- Feeding General Formula

Raw materials	Amount	Cattle feed/per day (Kg)	Per cycle	Sheep feed/per day (Gram)	kg/Per cycle	Goat feed/per day (Gram)	kg/Per cycle
Cereal bran (wheat)	15%	2.4	216	600	54	600	54
Oil seed (Noug cake)	5%	0.8	72	200	18	200	18
Lime	5%	0.8	72	200	18	200	18
Salt	5%	0.8	72	200	18	200	18
Molasses	20%	2.8	252	800	72	800	72
Total	50%	7	630	2000	180	2000	180

4.2.1 Molasses

Molasses is a thick, viscous material, which is a by-product of the sugar industry. Being a concentrated by-product, it provides a range of trace minerals and a complete mixture of vitamins. It is high in soluble carbohydrates. Although a cheaper source of energy, it is not commonly used by farmers due to difficulty in handling. Molasses can be included in ration by mixing it with other concentrates in the form of licks.

Byproducts of Sugar The sugar industry in Ethiopia have factories at four sites: [redacted]. The present area of cane is 20,000 ha the estimated yield of cane tops being six tons of dry matter per hectare, or 120,000 tons of dry matter per year. Production of molasses is estimated at 78,700 tons. Of this amount, about 30,000 tons of sugar is exported annually. In addition, there is a plan, which will be implemented within a short period of time, to develop about 90 ha of sugar plantation in the lower Awash Valley.[redacted]

4.2.2 Cereal brains

Cereal brans are high in phosphorus, trace minerals and also a range of vitamins. In addition they provide a slow release amino acid source from the relatively insoluble proteins to the microbes. Cereals and Pulses Cereal straw from, barley, teff and wheat is the largest component of livestock diet. Straw is stacked after threshing. Then, it is fed to animals during the dry season.

4.2.3 Oilcakes

Oilcakes are an excellent concentrate feed for ruminant livestock. Ethiopia grows most of the temperate and sub-tropical oilseed plants such as linseeds, Niger seeds, groundnuts (peanuts), rapeseeds, sesame, sunflower and cotton. The processing of oilseeds is widely practiced at the household level, or in small village mills.

4.2.3 Brewery By-products

Brewery Byproducts Brewer's grains are valued for animal's sources at Habesh and Dashen brewing factory in Debre Berehan, BGI brewing factory in Kombolcha and Heineken brewing factory in Addis Ababa.

4.3 Objectives of the project

The financial assistance is extended feed processing and animal fattening with the following objectives.

General objective

- To establish an integrated farming system whereby different sub-system components support each other and increase productivity and profitability via maintain environmental sustainability and assist surrounding community.
- To Fix cost of local animal feed product and ensure sustainability of feed and fattened animal supply.
- To establish training center for feed processing and animal fattening and hybrid.

Specific objectives

- ✓ To develop an integrated system, that is supplementary to each other.
- ✓ To produce and deliver high quality ready to use processed animal feed and fattened animal product
- ✓ To build an enterprise that balances quality, financial stability with Social and Community sustainability.
- ✓ To transfer technology of hybrid, integrated systems coincide with local potential.
- ✓ To create market access for local fattener and fodder product.
- ✓ To create job opportunity for local community there-by the region.
- ✓ To aware the level of the local community and diaspora on way of developing self-confidence to investing their resource on Ethiopian soil rather out-off mother land.

- ✓ To create market network with neighboring area and nation.
- ✓ To create access of innovation and demonstration to education and research institute surrounding the project area.

4.4 Beneficiaries of the project

The beneficiaries may be private institutions, governmental and non-governmental organizations. New entrepreneurs may start their business as an individual, proprietary concern, partnership firm or a joint stock company. Generally,

- **Owners**
- **The project will create a job opportunity for 328 employees**
- **The surrounding community**
- **District, regional and federal government**
- **Agricultural research institutes**
- **Agricultural technology and equipment suppliers**

5. Market Study, Farm Capacity and Production Program

5.1 Market Study

5.1.1 Past Supply and Current Demand

Fattening

Livestock productivity depends on access to concentrated feed and fodder. Animal Feed production and Animal Fattening have direct correlation. The range of possible uses of feed is limitless and new ways of using it are being devised daily.

Cattle supply

In Ethiopia there are 47,570,675 total cattle, Amhara region 11,757,295 and north shoa zone 1,138,365 supply 99.25 percent of the total cattle in the country are local breeds. The remaining are hybrid and exotic breeds (CSA 2007).

Sheep supply

In Ethiopia there are 26.12 million Sheep, Amhara region 9,469,746 and north shoa zone 1,,128,501 supply about 74 percent are females, and about 26 percent are males (CSA 2007).

Goat supply

In Ethiopia there are 21.71 million goats, Amhara region, 5,468,624 and north shoa zone 717,460 supplies. Out of these total goats, about 69 percent are females and 31 percent are males (CSA 2007).

Supply of feed

The supply of feed in Ethiopia is dominated by local products. Due to the limited production capacity and supply of the country's producer, plan to establish Animal feed processing project to minimize the gap in the project area.

Table below show relation of feed supply and number of fattening, which indicate low production of animal feed compare with fattening, hence the country imports high feed from oversee market.

Table 3:- Supply of fattening and feed estimation of north shoa zone based on (**CSA** 2007)

Years	Fattening in millions			Feed (ton in thousands)		
	Cattle	Sheep	Goat	Cattle	Sheep	Goat
2007	1.5	1.1	0.72	28,470	8,351	5,466
2008	1.84	1.6	1.4	34,923	12,147	10,628
2009	2.08	2.1	1.9	39,478	15,943	14,424
2010	2.4	2.6	2.4	45,552	19,739	18,220
2011	2.56	3.1	2.9	48,588	23,535	22,016
2012	2.88	3.6	3.4	54,662	27,331	25,812
2013	3.2	4.1	3.9	60,736	31,127	29,608
2014	3.36	4.6	4.4	63,772	34,923	33,404
2015	3.68	5.1	4.9	69,846	38,719	37,200
2016	4	5.6	5.4	75,920	42,515	40,996
2017	4.4	6.1	5.9	83,512	46,311	44,792

5.2 Projected Demand

Demand projection is made on the assumption that the demand for animal feed should grow with the growth in size of livestock population, income of farmers and the attitude of farmers towards the product. Hence, a modest growth rate of 10 percent is used to project the demand

for animal feed in the country. Feed consumption needs 14 kilograms per day for each one fat cattle, 2.4-4 kilograms per day for each sheep and goat per day (the calculation based on 4% of the total weight of the animal). (See Table4).

For every 100 kg live weight, cattle will eat an average of 2.7–3 kg of dry matter daily if the ration is palatable, but this will vary throughout the feeding period. For example, one 300 kg steer will eat 9–10 kg of feed a day, then the same 300 kg cattle could eat between 12 kg and 14 kg daily (12.3–13.9 kg) for the same dry matter intake. (NSA government, department of primary industries, 2018).

Table 4:- Demand of fattening and feed estimation of north shoa zone based on (**CSA** 2007)

Years	Fattening in millions			Feed (ton in thousands)		
	Cattle	Sheep	Goat	Cattle	Sheep	Goat
2007	1.65	1.21	0.79	31,317	9,186	6,012
2008	1.99	1.76	1.54	38,415	13,361	11,690
2009	2.28	2.31	2	43,425	17,539	15,866
2010	2.28	2.86	2.64	50,107	21,712	20,042
2011	2.82	3.41	3.12	53,446	25,888	24,217
2012	3	3.96	3.74	60,128	30,064	28,393
2013	3.3	4.5	4.3	66,809	34,239	32,568
2014	3.9	4.95	4.73	70,149	38,415	36,744
2015	4	5.5	5.13	76,830	42,590	40,920
2016	4.4	6.1	5.64	83,512	46,766	45,065
2017	4.84	6.71	6.5	91,863	50,942	49,264

Remark, annual consumption needs 8,400kg for cattle per head and 2,880 kg for sheep and goat per head.

Past Supply and Present Demand

Table depicts total exports of meat and meat products during the period of 1997-2006. Recent development reveals remarkable growth in the export of meat from the country. According to the Ethiopians Meat Producers and Exporters Association, on average 2979.21 tons of meat

and 6396.19 tone of livestock were exported annually o the middle east from 1997-2006. The Association expects continued increases in the meat and live animal in the coming years. (Gebrehiwot Kebede, (2007) Haramaya University, Sheep and Goat Fattening and Breeding Project)

Table 5. Export of meat and live animals

	Cattle, sheep and goat meat export (metric tons)	**Cattle, sheep and goat live animal export (metric tons)**
2010	1716.4	1304.7
	1529.4	1323.6
	2078.3	918.9
	1976.8	1766.3
	869.7	214.1
	662.5	165.7
	1722.2	607.1
	4007	3141.4
	7274.5	21226
	7955.3	33294.1
Total	29,792.1	63,961.9
Average	2979.21	6396.19

Source, National Bank of Ethiopia. Annual Report

5.3 Pricing and Distribution

The price of processed animal feed depends upon the availability and value of raw materials. In this profile, the ex-factory price of animal feed to be produced by the project under consideration is estimated to be average 5 Birr for each kind of feed per kilogram and selling price for animal will be cattle 13,126 birr, sheep 1,113 birr and goat 3,212 birr. At the first three years on every 3- 4 months there will be 480 cattle, 960 sheep and 960 goats providing capacity and after three years it will be extended up to 600 cattle, 1200 sheep and 1200 goats every 3- 4 months providing capacity. **Price will be rise considering inflation rate by 10%.**

Table 6: Price distribution on birr

Product	1	2	3	4	5	6	7	8	9	10
Cattle	13,126	13,782	14,471	15,194	15,954	16,752	17,590	18,469	19,393	20,362
Sheep	1,113	1,224	1,347	1,481	1,630	1,793	1,972	2,169	2,386	2,624
Goat	3,212	3,533	3,854	3,887	4,240	4,275	4,664	4,703	5,130	5,172
Feed kg	5birr	5.5	6	6.5	7	7.5	8	8.8	9	9.5

Remark, price will be change on 10% because of inflation (2019 base line inflation rate 10.7%).

5.4 Market location (for final products and raw materials)

[redacted]

[redacted]

3. Debre berehan market
4. Dessie market
5. Sheno market
6. Addis Ababa market
7. Fiche market

The selling process of the fattening products will be facilitate from [redacted] to every surrounding market by the project sales men's on carrying by Isuzu and double pickup.

5.5 Feature of the sector

Agriculture is the backbone of the economy and the most volatile sector mainly owing to its dependency on rainfall and the associated seasonal shocks that affect productivity. More than 85% of the Ethiopian population depends on agriculture for their livelihood. Within the context of the Ethiopian economy, the Agriculture sector traditionally includes economic activities such as crop and livestock production in which the crop sector has been the major driving element.

The Ethiopian economy is basically comprised of smallholder farming as well as medium and large scale commercial farming. Relatively speaking, commercial farms are not significant in terms of area cultivated and volume of production, even though the role has slightly increase in view of the recent phenomena associated with the establishment of flourishing cut flower farms in the country which is largely dominated by foreign investment.

Ethiopia is potentially a wealthy country, endowed with abundant resource conducive to the agricultural development such as fertile soil and good rainfall over large regions suitable for livestock fodder production and crop. Agriculture accounts for the lion share of the foreign exchange earnings. The sector contributes about 90% for the total export of commodities. The country's industrial development programs are closely tied to value-added processing of agricultural outputs with equal emphasis to both large & medium scale as well as small scale manufacturing industries.

5.6 Beneficiaries

The country will get the contribution in its national income through domestic consumption and export. This project will provide employment opportunity to the local population, this will raise the living standards of the people working in this project, and they also learn the latest technologies in animal feed production and fattening and also make use of them in their own farm. The regional government will also generate the revenue in the form of land rent will be an additional source of income on land resources.

The company, which is making investment on the land and doing lot of agricultural production (production of grass and alfalfa for feed processing) activities in developing the land will be benefitted in terms of return on their investment during the lease period.

5.7 Past and Present intervention

Fattening and animal feed production project has a technically strong, knowledgeable and experienced team to execute the project on time. With the vast knowledge base in agri-business activities, the company has tangible experience in making this project a success. Conflict in the area may retard plan of project.

5.8 Justification of the project

Ethiopia has huge investment potentials for agricultural development and its processing including livestock production and feed processing. Currently investment in agriculture

sector is found to be more attractive and profitable in diverse sub-sectors ranging from food products, industrial raw materials to bio-fuel. The agriculture sector accounts for 47% of the Gross Domestic Products of the country, provides 85% of employment and 90% of foreign currency earning.

Moreover, the country has huge market potential for crop and livestock produced with comparative advantage to the Middle East, Europe and Asia. For the past five consecutive years the agriculture sector was growing faster with more than 11% average annual growth. In addition of the contribution to the national growth, the growth has triggered to the increase in domestic market has for both livestock and food crops.

Looking at the agro climatic condition i.e. average temperature, rainfall, physic-chemical properties of the soil and the distribution of the rain fall give indication that the proposed land is suitable for cultivation of various crops but especially fodder and grass. The physic-chemical properties of the soil indicated in the information sheet provide further confidence for the success of the project. Moreover, the planning on the financial part of the project i.e. investment, cash flow, return on investment, profitability and cost benefit ratio will show a positive trend.

The expertise in marketing of farm produced in the local, national and international market will provide an additional benefit to improve the financial health of the organization. The statistic indicated in the financial report will provide us confidence in the project. It justifies the investment and returns on the investment.

5.9 Support for the project

The financial support i.e., the equity infusion in form of cash and kind for this project on investments shall be received from promoters. The company shall receive equity infusion in form of cash or kind from any of these mentioned companies hereby for its project. The company shall take the financial support in form of project loan from either development bank of Ethiopia or commercial bank of Ethiopia. The technical support will be sourced from our in-house experienced, knowledgeable and hardworking team who has more than 10 years or more experience in the field of agriculture. In addition to our in-house team we are also interacting with the Ethiopian Institute of Agriculture Research to get timely support and valuable advice in this project based on their experiences.

We are also expecting support from Agricultural office and responsible government officials for identification of suitable land and facilitation of the documentation and import of farm machinery and equipment, farm inputs for the success of this project. It appears to be a joint project of fattening and animal feed production farm project and Ministry of Agriculture, Government of Ethiopia, as we need lots of support from the Ministry of Agriculture at various level of implementation of activities in this project. Without their help and support, it will not be possible to make this project a success.

6. Plant Capacity and Production Program

6.1 Plant Capacity

6.1.1 Feed production

Feed production line capacity between 1-1.5 ton per hour, 3 ton per hour and 4-6 ton per hour. The project use 3 ton per hour capacity **because of input irregular access it means maximum 48 ton per day and 14,400 ton per annual.** The plant operates double shift/day for 300 days per annum. The planned feed at first phase will be 10,000 ton per year, at full capacity after 2 years which extend up-to 14,400 ton per year. (LUOYANG LUODATE MACHINERY EQUIPMENT CO.LTD CHINA, Contact, info@lyluodate. Com, phone 0086-13803884115).

Feed production line

Main feed machine raw material receiving section –Grinding and mixing section – Bucket elevator – stock bin – Pelletizing section - Bucket elevator –Colling and Screening section – packing section

6.1.2 Fattening production line

Purchase selected cattle, sheep and goats-feeding/keeping well-sell and provide for the market. The planned fattened at first phase will be 480 cattle per year, 960 sheep and 960 goats per year, at full capacity after 3 years which extend up-to 600 cattle per year, 1200 sheep and 1200 goats per year.

The Life Cycle (Stages) of Livestock Production

1. Beginning Stage (Calf,)

2A. Grass Finished (Middle Stage – Final Stage)

2B. Grain Finished: Back grounding (Middle Stage)

2C. Grain Finished: Finishing Lot (Final Stage)

3. Harvest and Processing (End Stage)

6.2 Production Program

The plant will work about 300 days per annum and double shifts of 16 hours per day. The fattening and feed plant will start its operation with **80%** and minimum feed production capacity in the first year and full capacity in the fourth year for fattening and second year for feed production and thereafter.

Table 7: Annual Production Program

Description	Annual production capacity in Operating Years			
	1(80%)	2(85%)	3(95%)	4-10
fattening Capacity (per head)	480 Cattle 960 sheep 960 goat	510 Cattle 1020 sheep 1020 goat	570 Cattle 1140 Sheep 1140 Goat	600 Cattle, 1200 Sheep 1200 Goat
feed production capacity (kg)	10,000,000	14,400,000	14,400,000	14,400,000
	2,160,000 own consumption	2,295,000 own consumption	2,565,000 own consumption	2,700,000 own consumption
	7,840,000 for sale	12,105,000 for sale	11,835,000 for sale	11,700,000 for sale

7. PLANT INPUTS AND UTILTIES

7.1 Plant Inputs

In Amhara region, where animal feed is often in large supply there are a number of sources of input. These include molasses, grass, and wheat bran and oil seed cake.

7.2 Materials and inputs

A. Materials

Raw material required for the production of fattening and livestock feed, at full operation capacity and the corresponding costs are shown in Table 8.

Table 8:- **Raw material**

Sr. No	Description	Quantity (ton)		Price(ton)	Cost in Birr	
		First year	Full capacity		First year	Full capacity
1	Oil Seed cake	750	1,000	1,885	1,413,750	1,885,000
2	Molasses	1,622	2,028	7000 (including transport cost)	11,354,000	14,196,000
3	Salt	250	360	5,296.80	1,324,200	1,906,848
4	Wheat Bran	750	1,000	1,885	1,413,750	1,885,000
5	Lime	350	504.00	1,200	420,000	604,800
6	Cattle	480	600	5600	2,688,000	3,360,000
7	Sheep	960	1200	445	427,200	534,000
8	Goat	960	1200	1284	1,232,640	1,540,800
	Total				**20,273,540**	**25,912,448**

B. UTILITIES

Utilities required by the plant are electricity, fuel (for cars and generator) and water for proceeding and sanitation. Annual utilities requirement of the plant and corresponding cost are indicated table 9. Major utilities cost for feed production)

Table 9: Annual Utilities Requirement and Cost

No	Description	Qty	Cost Birr
1	Electricity (Kwh) 1.30 birr per wh	1,000	1,300,000
2	Water (M3)	31,200	312,000
3	Fuel (litter)	20,000	360,000
4	Regular telephone		1,560
5	Internet	CDMA	1,000
	Total		**1,974,560**

The major utilities required are: water, electric power and Fuel for lighting and heating. The total yearly consumption of utilities at 100% capacity utilization rate and their estimated costs are given in Table 9. **The total annual cost of utilities is estimated at Birr 1,974,560.**

8. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

Raw materials, oil seed cake, molasses, lime, straw or stock and salt are supplied to the Processing plant. The stock or straw is unpacked and break into pieces before salt lye treatment took place.

Classification of feed ingredients: Feeds or feedstuffs are composed of several distinctly different groups of substances, known as nutrients e.g. proteins, carbohydrates, fats, minerals, vitamins and water. These have definite functions in body. For intelligent ration formulation, nutrients, nutrient composition and palatability of feedstuffs are important. Collect the final by product and process for biogas alternative power sources. These feedstuffs are grouped as follow,

Protein feedstuffs:

Common protein feedstuffs from plant origin are residues of oilseed after expeller or solvent extraction or products of wet milling of maize in starch making process. Nutritive value of protein feedstuffs depend upon their available amino acid composition, toxic materials and the changes brought during processing.

- Seed cake/meal
- Sunflower cake/meal

Feed ingredients (Trucks) - Feed Analysis in laboratory- Acceptance of feed ingredients- Separators and conveyors- Hoppers- Crushing by hammer mill- Dosage bin (separate for each feed) - Mixer Conditioning (Molasses, Minerals) - Packing- Storage or Exit

Carbohydrate/energy feedstuffs:

- Molasses

Mineral supplements:

- Salt
- Bone meal (for chicken)

Fats and oils: This source of energy can be obtained from meat processing industry, refining of vegetable oils or vegetable oils itself.

Main feed machine raw material receiving section – Grinding and mixing section – Bucket elevator – stock bin – Pelletizing section - Bucket elevator – Cooling and Screening section – packing section



Figure 3, **feed production machine**

Grinding system:

Crushing the raw materials into powder

Main equipment's:- permanent magnetic sleeve, hammer mill, and dust collector.

Batching and mixing system:

Batching the powder feed raw materials according to the formula.

Main equipment's: permanent magnetic sleeve, mixing machine, and dust collector.

Packing system:

Weighing and packing the final products according to requirements.

Main equipment's: packing scale, sewing machine, conveying machine, etc.



Figure 4, feed production process

Sales department for feed processing Machine:

Contact: Ms.Sunny

Cellphone & WhatsApp: 0086 13837907056

Skype：Luodate-International

Tel: 0086 379 63788388

Email:info@lyluodate.com

Web: http://www.lyluodate.com

Address: White Horse Temple Town, Luoyang City, Henan Province, China.

8. ENGINEERING.

8.1 Machinery and Equipment

The required plant machinery and equipment are listed in Table 10. Total cost is estimated at Birr **9.5 million**. The required machinery and equipment are supplied as a see

Table 10: Machinery and Equipment Requirement

No	Resource	Unit	Quantity	Unit price	Total price by birr
	Machineries				
1	Feed production Machine (Grinding Section, Mixing Section, Pelting Section, packaging section)	Number	**1**	**$35,000** including transport cost	**1,008,000 birr (28.8 exchange rate)**
2	Generator (32 kw)	Number	1	300,000	300,000
	ISUZU Vehicle	Number	3	750,000	2,250,000
3	Double cabin pick up	Number	3	1,500,500	4,500,000
	Office Furniture and different electronics				300,000.00
	Managerial Table	Number	1		25,000
	Managerial **c**hair	Number	1		10,000
	Experts Table	Number	10		120,000
	Experts **c**hair	Number	10		45,000
	File **c**abinet	Number	2		20,000
	Others				80,000
4	Water Tanks	Number	3		60,000.00
5	Molasses Tank	Number	2		100,000
	Others **(**including transport cost)				**500,000.00**
	Sub-total				**9,018,000**
	Spare Part (5% of sub-total)				**450,900**
	Grand Total				**9,468,900**

8.2 Land, Building and Civil Works

Total land requirement for the envisaged plant is 7ha, of which 6ha is earmarked for fattening at [redacted] and 1ha at [redacted] town for processing plant building and storage for raw material and finished product.

8.2.1 Land and Location

i) The total space required for buildings, product store, plant installation and raw material store and other accessary will be 1 ha and about 6 hectares of land for fattening. The exact design and details of the built up area has to be decided in consultation with the plant and machinery supplier or with a professional consultant.

ii) The location of site should have proximity to road facilities, services, such as water, electricity and social infrastructure, etc.

8.2.2 Site Development

i) Preferably the entire site should be fenced with grass/bush or compound wall is constructed with gates at suitable places

ii) Internal roads should be of cobble depending upon the soil conditions, rainfall and the number of animals moving every day.

iii) Proper drainage arrangements should be made to ensure cleanliness.

8.2.3 Land use

The land use plan of the proposed project is summarized as follows.

Table 11: Land use plan of the project

No	Items	Quantity (Quantity X Area)
Fattening centre		
1	Fatting centre (Shades)	6,300m2
2	Raw materials	2,000 m2
4	Guard's House	1000 m2
6	Outside toilet pit	1000 m2
7	Changing roam	1000 m2
8	Staff cafeteria	1000 m2
9	Office	1000 m2
10	Green area	20,000 m2
11	Grazing land	20,000 m2
12	Waste treatment plant	1000 m2
Feed processing centre		
1	Feed processing plant	4,000 m2
2	Workshop	1000 m2
3	Raw materials store	1000
4	Product store	1000
5	Cafeteria	500
6	Office	500
7	Green area	1000
8	Guard's House	200
9	Outside toilet pit	300
10	Changing roam	500

Remark, the shade and roof will be constructed on corrugated iron.

8.2.4 Layout and Civil Works

8.2.4.1 Layout

The total covered area depends on the processes involved, products manufactured, the quantity of manufactured feed production and processing handled and the equipment chosen product manufacturing.

8.2.4.2 Civil Works

The total area of land required for the project is about 7hectares. The total built-up area will be 60,000 square meters and the estimated cost will amount to Birr **21.4 million**. Including land meant for feed production and processing.

Table 12 Civil Works

Table 10. Estimated Cost of Structure for a 60,000m2 of feed production project				
No	Items	Quantity (Quantity X Area)	Unit Price (Cost/M2)	Total Cost (birr)
Fattening centre				
1	Fatting centre (Shades)	6,300m2	1000	6,300,000
2	Raw materials	2,000 m2	1000	2,000,000
4	Guard's House	1000 m2	1000	1,000,000
6	Outside toilet pit	1000 m2	1000	1,000,000
7	Changing roam	1000 m2	1000	1,000,000
8	Staff cafeteria	1000 m2	1000	1,000,000
9	Office	1000 m2	1000	1,000,000
10	Green area	20,000 m2	-	-
11	Grazing land	20,000 m2	-	-
12	Waste treatment plant	1000 m2	1000	1,000,000
Feed processing centre				
1	Feed processing plant	4,000 m2	1000	5,000,000
2	Workshop	1000 m2	1000	2,000,000
3	Raw materials store	1000	1000	1,000,000
4	Product store	1000	1000	1,000,000
5	Cafeteria	500	1000	500,000
6	Office	500	1000	500,000
7	Green area	1000	-	-
8	Guard's House	200	1000	200,000
9	Outside toilet pit	300	1000	300,000
10	Changing roam	500	1000	500,000
	Sub-total			20,300,000
	Contingency (5%)			1,015,000
	Total			21,315,000

9. MANPOWER AND TRAINING REQUIREMENT

9.1 Manpower Requirement

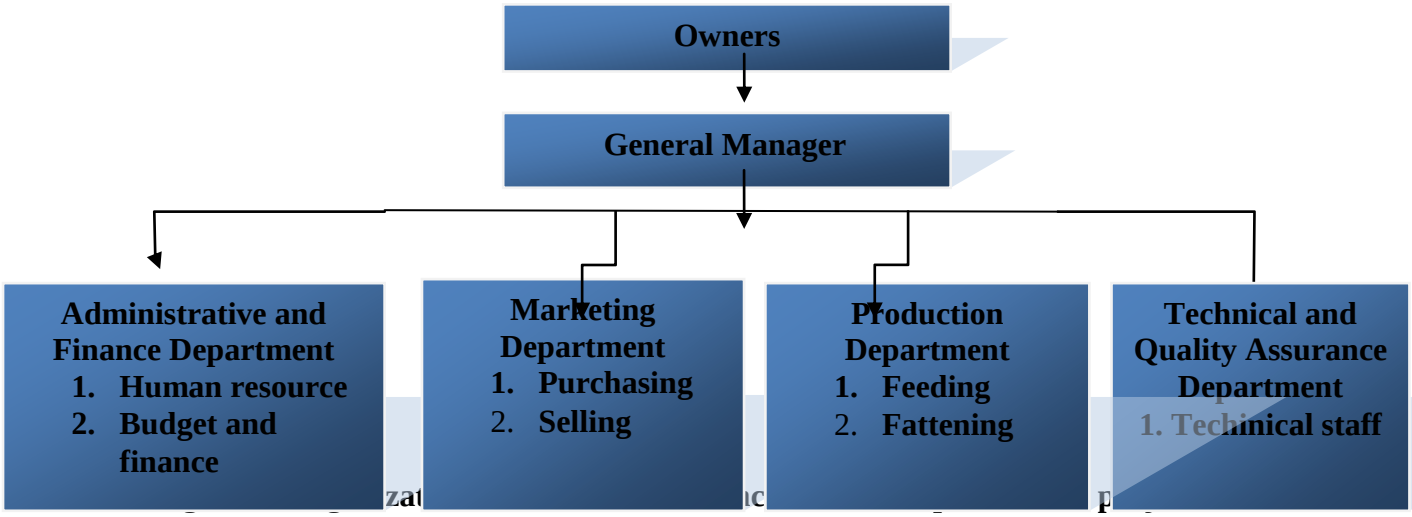
The total manpower required is 328 persons. Details of manpower and annual estimated labor cost including the fringe benefits are given in Table **13**. The total annual man power cost is estimated at Birr **5.4** million.

Table 13: Manpower Requirement and Estimated Labor Cost

	Job Title	No.	Education	experience	Salary/Wage (Birr)	
					Monthly	Annual
1	Project Manager	1	Agriculture(BSc)	4 years	7000	84,000
2	Record Keeper	2	Accounting(BA)	2 years	2000	72,000
3	Purchaser	3	Marketing(Dip)	3 years	4000	144,000
4	Chemical Engineer	1	chemist (BSc)	4 years	4000	48,000
5	Guard	3	grade 10	2 years	1600	57,600
6	Driver	3	grade 10	4 years	2000	72,000
7	Sales Person	4	Marketing(Dip)	4 years	2500	120,000
8	Promoter	2	Public relation(BA)	2 years	2000	48,000
9	Store Keepers	4	grade 10	2 years	2000	96,000
10	Animal health	2	Animal science(BSc)	4 years	3500	84,000
10	Machine Operators	3	Mechanics(Dip)	4 years	3000	108,000
11	Other Workers	300			1700	4,500,000
	Total	**328**				**5,433,600**

9.2 Organization structure of the Project

In the diagram, there is finance and administration manager next to the general manager (the owner) who is responsible to lead all the financial transaction and human resource of the farm. The promotion and sales of products will be facilitated by the marketing unit. The production unit leads the regular operation.



9.3 Training Requirement

Feed product processing utilizes modern technology that requires special training from woreda farmers training center (other option request trainers from Addis Ababa). The cost of such training is estimated at Birr 140,000.

9.4 Business Implementation Schedule

Generally, it takes about 14 month's period for obtaining loan, finalizing the suppliers and construction of various civil structures and installation of plant and machinery. Purchase of vehicles, utilities and office furniture and equipment's goes simultaneously while other investment activities including construction, machinery procurement & installation, etc. are carried out. Educated and skilled manpower will be recruited before machinery installation and commissioning to provide first hand training to newly employed workers by the engineers installing the machineries and make trial production together. Proper planning needs to be done so as to take up various activities without any break. The activity wise schedule of implementation is to be given in the project.

The project is expected to start commercial production in June 2021 while the remaining months in 2019 and part of the months in 2020 are assumed to be the project's implementation period. Detail planned schedule of the company is kept in the following here under.

Table 14: Implementation Plan

Item	2019									2020											
	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Project Execution																					
Loan processing	√	√																			
Building and construction			√	√	√	√	√	√													
Machinery purchasing			√	√	√	√	√	√	√												
Machinery Transportation										√	√	√									
Vehicle purchase			√	√	√	√															
Purchase of Utilities						√	√	√	√												
Purchasing of office furniture & equipment's						√	√	√	√												
Plant installation & Commissioning													√	√							
Recruitment and training												√	√	√							
Commercial production & marketing															√	√	√	√	√	√	√

10. Financial Feasibility

10.1. Basic Assumptions for Financial Analysis

10.1.1 Project Life

According to the implementation plan of the project, the implementation period allocated for the entire project from the start to the final commissioning is one year. With regard to operational life of the project, 10 Years is considered.

10.1.2 Repair and Maintenance Cost

The annual repair and maintenance cost of the plant is estimated based on the following rates.

Table 15: Repair and Maintenance Cost

Item	**1-3 years**		**4-10 years**		**Rate**
Machinery and equipment	1%	214,150	3%	642,450	of the total cost or Book value
Building and civil works	1%	9,468,900	3%	284,067	of the total cost or Book value
Utilities	1%	1,974,000	3%	59,220	of the total cost or Book value
		328,579		985,737	

10.1.2 Depreciation and Amortization

The following depreciation rates are applied to depreciate the assets of the project:

- Buildings and associated Civil works 10%, linear to scrap Value
- Machinery and Equipment's 10%, linear to scrap Value
- Pre-production expenditure 10%, linear to scrap value

10.1.3 Working Capital

The working capital requirement of the project during operation is calculated on the basis of the minimum days of coverage needed for the different elements of the working capital.

Hence, the minimum days are specified as follows and the detail is attached in the annex part.

Table 16: Initial Working capital amount

Items	Per Years
Raw Material Consumption	**20,273,540**
Utilities	**1,974,000**
Wage and Salary	**5,433,600**
Repair & Maintenance	**328,579**
Total Working Capital	**28,009,719**

10.1.4 Financing Considerations

The project planned to produce detergent materials by mobilizing fund from equity and bank loan. The bank loan is proposed to cover 70% of the total project establishment cost while the rest 30% will be covered from equity.

The following factors are taken into considerations with regard loan to be borrowed from domestic banks

- Interest rate on loan borrowed is assumed to 13% which is line with the lending interest rate of the investment bank in the country for prioritized projects.
- Grace period is assumed to be at least for one-year period which is assumed during the implementation period until the company enters the market
- The total loan is expected to be repaid in period of seven

10.1.5 Credit Information

Based on the several assessments of the project, the project requires a loan of Birr 47 Million from external sources. As the detail assessment results shows the loan will be settled without any problem. The loan will be obtained from development bank of Ethiopia. It will be paid in seven equal instalments starting from the fourth year of the project. The principal repayment shall be made based on the amortization loan repayment system. An interest rate of 13 % will be paid for the loan per annum on the outstanding balance payable on yearly basis together

with the principal repayment amount. The loan repayment schedule is summarized by the table attached in the Annex.

10.1.6 Revenue

After assessing the current market situation and period required to fully adopting the technology, the project is proposed to start at 80% of its capacity in the initial year, 85% 2nd year, 95% third year and 100% capacity is expected to be attained in the fourth. The necessary detail on the assumption employed is presented in Annex .

10.2 Result of Financial Analysis

10.2.1 Total Investment Cost and Share of Each Investment Components

The total investment cost of the project is estimated at Birr **58.9** million. From the total investment cost the highest share 47% is allocated to working capital followed by 36% building, 16% machines and equipment's. The rest budget costs are allocated for pre-production. The details are presented on annex part and the summery on table below.

Table 17: Total Investment Cost

Description	Total Cost in Birr	Percentage shares (%)
Buildings and ground water/borehole/and other structures	**21,415,000**	**36%**
Machines and equipment's	**9,468,900**	**16.08%**
Pre-production Expense	**100,000**	**0.17%**
Working capital	**28,009,719**	**47.40%**
Total initial investment capital	**58,993,619**	**100.00%**

10.2.2 Proposed Financing Scheme

The bank borrowing is proposed to cover 70% of the total investment cost whereas the rest will be covered by company equity 30%. See Table below.

Table 18: Proposed Financing Arrangement

Description	Total Cost in Birr	US Dollar	Bank Loan (70)	US Dollar	Owners' Equity(30)	US Dollar
Buildings and other structures	**21,415,000**	**738,448**	**14,990,500**	**516,914**	**6,424,500**	**221,534**
Machines and equipment's	**9,468,900**	**326,514**	**6,628,230**	**228,560**	**2,840,670**	**97,954**
Depreciation	**1,193,250**	**41,147**	**835,275**	**28,803**	**357,975**	**12,344**
Pre-production Expense	**100,000**	**3,448**	**70,000**	**2,414**	**30,000**	**1,034**
Working capital	**28,009,719**	**962,691**	**19,542,628**	**673,884**	**8,375,412**	**288,807**
Total initial investment capital	**60,095,190**	**2,072,248**	**42,066,633**	**1,450,574**	**18,028,557**	**621,674**
Percentage shares (%)	**100%**		**70%**		**30%**	

10.2.3 Total Revenue

Based on the projected profit and loss statement, the project will generate a profit throughout its operation life. Annual net profit after tax increases from Birr **49,612,480** at the beginning of the project to Birr **132,724,465** during the last year of operation year. The detail is presented in Annex.

10.2.4 Profit margin

Cattles, sheep's and goats cost before fattening 5600 cattle, 445 sheep and 1284 birr, respectively.

1. 3 months cost of cattle fattening (5600birr + 7kg food per day + 5birr kg cost) will be cost 8750 birr selling price will be 13,126 then 33.8% profit margin but the project provide feeding then benefit margin will be 66.2% (5600/13216);

2. 3 months cost of sheep fattening (445 birr + 2kg food per day + 5birr kg cost) will be cost 1345 birr selling price will be 1113 then -17% lost profit margin but the project provide feeding then benefit margin will be 60% (445/1113);

3. 3 months cost of goat fattening (1284 birr + 2kg food per day + 5birr kg cost) will be cost 2,184 birr selling price will be 3212 then 32% profit margin but the project provide feeding then benefit margin will be 60% (1284/3212);

10.2.5 Discounted Payback Period

The payback period, also called pay–off period is defined as the period required recovering the original investment outlay through the accumulated net cash flows earned by the project. Accordingly, based on the projected cash flow it is estimated that the project's initial investment will be fully recovered within 1year 9 months.

10.2.6 Cash flow

The projected cash flow of the envisaged project shows that the project would generate positive net cash flows throughout the operation years. Cumulative cash flow generated by the project towards the end of the first operation year will amount to Birr **19,507.370.** At the end of the project life, this amount will rise to Birr **80,766,803.** The detail is presented in Annex.

10.2.7 Benefit cost ratio

The BCR is defined as the ratio of the sum of the project's discounted benefits to the sum of its **discounted investment and operating costs**.

When BCR > 1, accept the project

When BCR < 1, reject the project

When BCR = 1, be indifferent

$$BCR = \frac{\sum_{t=0}^{n} \frac{B_t}{(1+r)^t}}{\sum_{t=0}^{n} \frac{C_t}{(1+r)^t}}$$

BCR is 2 and positive this indicates this project would return 2 birr in benefits for each birr spent.

10.2.8 Internal Rate of Return

The internal rate of return (IRR) is an indicator of the efficiency or quality of an investment. A project is a good investment proposition if its IRR is greater than the rate of return that could be earned by alternate investments or putting the money in a bank account. Accordingly, the IRR of the project after tax is computed to be **61.43%** indicating the viability of the project.

10.2.9 Net present value

Net present value (NPV) is defined as the total present (discounted) value of a time series of cash flows. NPV aggregates cash flows that occur during different periods of time during the life of a project into a common measuring unit i.e. present value. It is a standard method for using the time value of money to asses' long-term projects. NPV is an indicator of how much value an investment or project adds to the capital invested. In principle a project is accepted if the NPV is non-negative. Accordingly, the net present value of the project at 10% discount rate is found to be Birr **237,237,719** which is acceptable.

10.2.10 Risk analysis

In order to minimize future loses of the business the following various risks associated with the project are identified as well as mitigation mechanisms clearly suggested. Increase in Operating Cost by 10% the project NPV will be positive and acceptable with less risk, when Increase in Investment Cost by 10 Million the project NPV will be negative and high risky business and when Decrease in Price by 10% the project NPV will be negative and high risky business.

Table :- 19 risk analysis and rank for management attention

Factor (a)	% Change in Factor (b)	% decrease in NPV (c)	Sensitivity /c/b/	Rank for Management Attention
Increase in Operating Cost by10%	237 million	-0.72%	**0.00000021**	3
Increase in Investment Cost by 10 Million	negative 391 million	-132.00%	**0.00000033**	2
Decrease in Price by 10%	negative111 million	-109.00%	**9.8E-09**	1

10.2.11 Contingency plan

Based on the risk analysis result feeding and fattening business will be risky then the management attention about price (using occasional and holiday market such like New year, Christmas, epiphany, Easter etc, those periods driving the demand and price), investment cost (avoid delay on construction phase) and operating cost (Using cost efficiency techniques), respectively.

10.2.12 Socio Economic Benefits

The economic impact of the project can be viewed in a number of ways. It can be viewed through its specific impact such as employment generation and increasing government revenue.

The project creates employment opportunities for 328 persons. Moreover, during the life of the project it will generate Birr **89,303,459** in terms of corporate tax and also contributes to

the regional income in the form of payroll tax. Beyond this specific impact, the project could have such social impacts as it will also create forward linkage with the food industry.

10.2.13 Pro Environment Project

The project will undertake environmental protection and management activities. In doing so, the proposed production is environmental friendly.

10.2.14 Public Health and Nutrition

Delivering quality fattened livestock having fresh and clean meat, which improves public health and nutrition.

10.2.15 Modernization of Agriculture

The proposed project compliments to the concerted efforts to modernize and commercialize Ethiopian agriculture.

10.2.16 Cross cutting issues analysis

Cross cutting issues are issues which will be implemented in every plan, programs and projects by all organizations. These issues include HIV/AIDS and Gender. Recently these issues have got due attention and are a preconditions for project appraisal

10.2.17 HIV/AIDS

The HIV/AIDS pandemic and all socio economic problems that it poses are more serious in the district and its surrounding areas. To mitigate HIV/AIDS prevalence many governmental and nongovernmental organizations devote their time and budget. This project also has responsible to take part in the same commitment through allocating funds as per the project's capacity to finance charities and anti HIV/AIDS clubs. In order to increase workers awareness, the project also arranges different regular discussion programs among workers.

10.2.18 Gender

Gender refers to the different roles that men and women play in a society, and the relative power they wield. Gender roles vary from one country to another, but almost everywhere, women face disadvantages relative to men in social, economic and political spheres of life.

Where men are viewed as the principal decision makers, women often hold a subordinate position in negotiations about limiting family size, contraceptive use, managing family resources, protecting family health, or seeking jobs. Taking consideration to this, the project creates employment opportunities to both sexes. The project also will take positive affirmative action for female participants.

11CONCLUTIONS AND RECOMMENDATIONS

Conclusion

The objective of this proposed feasibility study is primarily to facilitate the entrepreneur with the investment information and provide an overview about project. The proposed feasibility may form the basis of an important investment decision and in order to serve this objective, the document covers various aspects of Concept Development, Start-up, Production, Marketing, Finance and Business Management.

The feasibility is based on the information obtained from various agricultural sources as well as discussions with businessmen. For financial model, since the forecast/projections relate to the future periods, actual results are likely to differ because of the events and circumstances that don't occur frequently as expected.

Whilst due care and attention has been taken in performing the exercise, no liability can be inferred for any in-accuracy or omissions reported from the results thereof. It is essential that our report be read in its entirety with financial model in order to fully comprehend the impact of key assumptions on the range of values determined.

The project is accessible and has the necessary infrastructure such as road, telephone, water and electric power. The proposed project clearly identifies all the necessary equipment, inputs, management of the company and the required man power. The highest authority in the project will be vested in the hand of the owner. He will control the overall activities of the proposed project. Demand projection divulges that there is high demand for feed production in the country. Accordingly, the planned project is set to provide quality products in the area.

The proposed project possesses wide range of economic and social benefits such as increasing the level of investment, tax revenue and employment creation for both women and youths. It will have also environmental concerns to protect it by planting trees around its working area and by utilizing environmental friendly raw materials. Generally, the project is technically feasible, financially and commercially viable as well as socially and economically acceptable. Hence the project is worth implementing.

Recommendations

Financial sensitivity analysis shows that the project is highly sensitive to decrease in sales revenue but relatively less sensitive to increase in raw material and investment costs. Therefore, it is recommended that the company should give a great attention for the possible reasons for sales reduction. In this case, different mechanisms should be selected and implemented to increase sales. In addition to this, the company should decrease its cost that lowers profitability. The project must utilize modern promotional styles to capture the planned market share. To do so, it has to design effective strategy to achieve this plan.

Although, due care and diligence has been taken to compile this document, the contained information may vary due to any change in any of the concerned factors, and the actual results may differ substantially from the presented information. In this case, any delaying to implement the project creates some problem on its profitability as there is always change like change in price of services and goods, cost of raw materials, customers preference and purchasing power etc.….So, it is recommended that investors should implement the project as soon as possible before any change occurred.

ANNEXES

Annex 1. Production Plan

Table 1a. Estimated Yearly Production/per ton

Description	Yearly Estimated Production Levels(ton)									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Feed production	10,000.00	14,400.00	14,400.00	14,400.00	14,400.00	14,400.00	14,400.00	14,400.00	14,400.00	14,400.00

Table 1b. Estimated Yearly fattening/per

Description	Yearly Estimated Production Levels									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cattle	480	510	570	600	600	600	600	600	600	600
Goat	960	1020	1140	1200	1200	1200	1200	1200	1200	1200
Sheep	960	1020	1140	1200	1200	1200	1200	1200	1200	1200
Total	2,400	2,550	2,850	3,000	3,000	3,000	3,000	3,000	3,000	3,000

Table 2. Forecasted Annual Sales Revenue										
Description	**Project year**									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
feed prodution in ton	**7,840**	**12,105**	**11,835**	**11,700**	**11,700**	**11,700**	**11,700**	**11,700**	**11,700**	**11,700**
price per ton	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500	9,000	9,500
total sale	**39,200,000**	**66,577,500**	**71,010,000**	**76,050,000**	**81,900,000**	**87,750,000**	**93,600,000**	**99,450,000**	**105,300,000**	**111,150,000**
no of cattle	**480**	**510**	**570**	**600**	**600**	**600**	**600**	**600**	**600**	**600**
price per head	13,126	13,782	14,471	15,195	15,955	16,752	17,590	18,470	19,393	20,363
total sale	**6,300,480**	**7,028,973**	**8,248,707**	**9,116,991**	**9,572,841**	**10,051,483**	**10,554,057**	**11,081,760**	**11,635,848**	**12,217,640**
no of goat	**960**	**1,020**	**1,140**	**1,200**	**1,200**	**1,200**	**1,200**	**1,200**	**1,200**	**1,200**
price per head	3,212	3,533	3,854	3,887	4,240	4,275	4,664	4,703	5,130	5,173
total sale	**3,083,520**	**3,603,864**	**4,394,016**	**4,663,824**	**5,087,808**	**5,130,206**	**5,596,589**	**5,643,227**	**6,156,248**	**6,207,550**
no of sheep	**960**	**1,020**	**1,140**	**1,200**	**1,200**	**1,200**	**1,200**	**1,200**	**1,200**	**1,200**
price head	1,113	1,224	1,347	1,481	1,630	1,792	1,972	2,169	2,386	2,624
total sale	**1,068,480**	**1,248,786**	**1,535,272**	**1,777,684**	**1,955,452**	**2,150,997**	**2,366,097**	**2,602,707**	**2,862,977**	**3,149,275**
Total Sale	**49,652,480**	**78,459,123**	**85,187,995**	**91,608,499**	**98,516,101**	**105,082,687**	**112,116,743**	**118,777,694**	**125,955,073**	**132,724,465**

Description	Annex 2.Oparation cost									
	Operating years of the project									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
A. Direct cost										
Raw Material Cost	20,273,540	20,273,540	20,273,540	25,912,448	25,912,448	25,912,448	25,912,448	25,912,448	25,912,448	25,912,448
Sub-total	20,273,540	20,273,540	20,273,540	25,912,448	25,912,448	25,912,448	25,912,448	25,912,448	25,912,448	25,912,448
Total Direct cost	20,273,540	20,273,540	20,273,540	25,912,448	25,912,448	25,912,448	25,912,448	25,912,448	25,912,448	25,912,448
B. Indirect										
Wage and Salary	5,433,600	5,433,600	5,433,600	5,976,960	5,976,960	5,976,960	5,976,960	6,274,320	6,274,320	6,274,320
Repair and Maintenance	328,579	328,579	328,579	985,737	985,737	985,737	985,737	985,737	985,737	985,737
Insurance	47,391	47,391	47,391	47,391	47,391	47,391	47,391	47,391	47,391	47,391
Utility	1,972,000	1,972,000	1,972,000	1,972,000	1,972,000	1,972,000	1,972,000	1,972,000	1,972,000	1,972,000
Land lease	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000
Advertising	30,000	28,000	26,000	24,000	22,000	20,000	20,000	20,000	20,000	20,000
Miscellaneous	60,000	55,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Sub-total indirect cost	9,871,570	9,864,570	9,857,570	11,056,088	11,054,088	11,052,088	11,052,088	11,349,448	11,299,448	11,349,448
Total Operating cost	**30,145,110**	**30,138,110**	**30,131,110**	**36,968,536**	**36,966,536**	**36,964,536**	**36,964,536**	**37,261,896**	**37,211,896**	**37,261,896**

	Annex 3. Income statement									
	Operating years of the project									
Description	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Sales Revenue	**49,652,480**	**78,459,123**	**85,187,995**	**91,608,499**	**98,516,100**	**105,082,686**	**112,116,742**	**118,777,693**	**125,955,072**	**132,724,465**
Less: Operating cost	**30,145,110**	**30,138,110**	**30,131,110**	**36,968,536**	**36,966,536**	**36,964,536**	**36,964,536**	**37,261,896**	**37,211,896**	**37,261,896**
Income	**19,507,370**	**48,321,013**	**55,056,885**	**54,639,963**	**61,549,564**	**68,118,150**	**75,152,206**	**81,515,797**	**88,743,176**	**95,462,569**
Less: interest	**678,097.25**	**678,097.25**	**678,097.25**	**678,097.25**	**678,097.25**	**678,097.25**	**678,097.25**	**678,097.25**	**678,097.25**	**678,097.25**
Income before Depreciation	**18,829,273**	**47,642,916**	**54,378,788**	**53,961,866**	**60,871,467**	**67,440,053**	**74,474,109**	**80,837,700**	**88,065,079**	**94,784,472**
Less: Depreciation	**1,193,250**	**1,193,250**	**1,193,250**	**1,193,250**	**1,193,250**	**1,193,250**	**1,193,250**	**1,193,250**	**1,193,250**	**1,193,250**
Profit /Loss Before Tax	**17,636,023**	**46,449,666**	**53,185,538**	**52,768,616**	**59,678,217**	**66,246,803**	**73,280,859**	**79,644,450**	**86,871,829**	**93,591,222**
Less: Tax (30%)		**13,934,900**	**15,955,661**	**15,830,585**	**17,903,465**	**19,874,041**	**21,984,258**	**23,893,335**	**26,061,549**	**28,077,367**
Net Profit or Loss After Tax		**32,514,766**	**37,229,876**	**36,938,031**	**41,774,752**	**46,372,762**	**51,296,601**	**55,751,115**	**60,810,280**	**65,513,855**

Annex 4 undiscounted cash flow

Description	Project Years										
	Investment Year	Operating years									
	0	1	2	3	4	5	6	7	8	9	10
INFLFOWS											
Inflow Funds											
Own Equity	18,028,557										
Long-term Loan	42,066,633	0	0								
Inflow Operations		49,652,480	78,459,123	85,187,995	91,608,499	98,516,100	105,082,686	112,116,742	118,777,693	125,955,072	132,724,46
Sales revenue	0	49,652,480	78,459,123	85,187,995	91,608,499	98,516,100	105,082,686	112,116,742	118,777,693	125,955,072	132,724,46
TOTAL INFLOWS	60,095,190	49,652,480	78,459,123	85,187,995	91,608,499	98,516,100	105,082,686	112,116,742	118,777,693	125,955,072	132,724,46
OUTFLOWS											
Investment cost	60,095,190	0	0	0	0	0	0	0	0	0	0
Operating cost	0	30,145,110	30,138,110	30,131,110	36,968,536	36,966,536	36,964,536	36,964,536	37,261,896	37,211,896	37,261,89
Financing Cost											
· Principal	**0**	**0**	**0**	**0**	**6,009,523**	**6,009,523**	**6,009,523**	**6,009,523**	**6,009,523**	**6,009,523**	**6,009,523**
·Interest	**0**	**546,866**	**546,866**	**546,866**	**546,866**	**546,866**	**546,866**	**546,866**	**546,866**	**546,866**	**546,866**
Income Tax	0	0	6,685,510	7,876,021	6,225,046	7,692,688	9,058,026	10,563,005	12,222,211	13,785,186	15,195,766
TOTAL OUTFLOWS	60,095,190	30,691,976	37,370,486	38,553,997	49,749,971	51,215,613	52,578,951	54,083,930	56,040,496	57,553,471	59,014,051
NET CASH FLOW	0	18,960,504	41,088,637	46,633,998	41,858,528	47,300,487	52,503,735	58,032,812	62,737,197	68,401,601	73,710,414
BEGINNING CASH BALANCE	0	0	18,960,504	60,049,141	106,683,139	148,541,667	195,842,154	248,345,889	306,378,701	369,115,898	437,517,49
ENDING CASH BALANCE	0	18,960,504	60,049,141	106,683,139	148,541,667	195,842,154	248,345,889	306,378,701	369,115,898	437,517,499	511,227,91

Annex 5. discounted cash flow

Description	Investment Year	Project Life years									
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
INFLOW											
Net sales revenue	0	49,652,480	78,459,123	85,187,995	91,608,499	98,516,100	105,082,686	112,116,742	118,777,693	125,955,072	132,724,465
TOTAL INFLOWS	0	49,652,480	78,459,123	85,187,995	91,608,499	98,516,100	105,082,686	112,116,742	118,777,693	125,955,072	132,724,465
OUTFLOWS											
Investment cost	60,095,190	-	-	-	-	-	-	-	-	-	-
Operating cost	0	30,145,110	30,138,110	30,131,110	36,968,536	36,966,536	36,964,536	36,964,536	37,261,896	37,211,896	37,261,896
Income tax	0	-	6,685,510	7,876,021	6,225,046	7,692,688	9,058,026	10,563,005	12,222,211	13,785,186	15,195,766
NET CASH FLOW	60,095,190	19,507,370.00	41,635,503.00	47,180,863.75	48,414,917.00	53,856,876.00	59,060,124.00	64,589,201.00	69,293,586.00	74,957,990.00	80,266,803.00
			NET PRESENT VALUE (NPV)						**255,549,067.00**		
			INTERNAL RATE OF RETURN (IRR)						**61.43%**		
			DISCOUNTED PAYBACK PERIOD (DPBP)						**1 years 9 month**		

		Annex 6. loan distribution									
	Installment Periods (in years)										
Item	0	1	2	3	4	5	6	7	8	9	10
Principal					6,009,523.00	6,009,523.00	6,009,523.00	6,009,523.00	6,009,523.0	6,009,523.00	6,009,523.00
Interest (13%)		546,866.20	546,866.20	546,866.20	546,866.20	546,866.20	546,866.20	546,866.20	546,866.20	546,866.20	546,866.20
Total	0	546,866.20	546,866.20	546,866.20	6,556,389.20	6,556,389.20	6,556,389.20	6,556,389.20	6,556,389.2	6,556,389.20	6,556,389.20

				case one if operating cost increase by 10%							
Description	Investment Year	Project Life years									
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
INFLOW											
Net sales revenue	0	49,652,480	78,459,123	85,187,995	91,608,499	98,516,100	105,082,686	112,116,742	118,777,693	125,955,072	132,724,465
TOTAL INFLOWS	0	49,652,480	78,459,123	85,187,995	91,608,499	98,516,100	105,082,686	112,116,742	118,777,693	125,955,072	132,724,465
OUTFLOWS											
Investment cost	60,095,190	-	-	-	-	-	-	-	-	-	-
		33,159,621	33,151,921	33,144,221	40,665,390	40,663,190	40,660,990	40,660,990	40,988,086	40,933,086	40,988,086
Operating cost	0	30,145,110	30,138,110	30,131,110	36,968,536	36,966,536	36,964,536	36,964,536	37,261,896	37,211,896	37,261,896
Income tax	0	-	6,685,510	7,876,021	6,225,046	7,692,688	9,058,026	10,563,005	12,222,211	13,785,186	15,195,766
TOTAL OUTFLOWS	60,095,190	30,145,110	39,837,431	41,020,242	46,890,436	48,355,878	49,719,016	51,223,995	53,210,297	54,718,272	56,183,852
NET CASH FLOW	10,850,695.00	19,507,370.00	38,621,692.00	44,167,752.75	44,718,063.40	50,160,222.40	55,363,670.40	60,892,747.40	65,567,396.40	71,236,800.40	76,540,613.40
			NET PRESENT VALUE (NPV)								**237,237,719.00**
	Factor (a)	**% Change in Factor (b)**	**% decrease in NPV (c)**	**Sensitivity (c/b)**							
	increase in cost	237 million	-0.72%	**0.00000021**							
					case two If cost of initial investment increases by 10 million						

Description	Investment Year	Project Life years									
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
INFLOW											
Net sales revenue	0	49,652,480	78,459,123	85,187,995	91,608,499	98,516,100	105,082,686	112,116,742	118,777,693	125,955,072	132,724,465
TOTAL INFLOWS	0	49,652,480	78,459,123	85,187,995	91,608,499	98,516,100	105,082,686	112,116,742	118,777,693	125,955,072	132,724,465
OUTFLOWS											
Investment cost	*70,095,190*	-	-	-	-	-	-	-	-	-	-
		33,159,621	33,151,921	33,144,221	40,665,390	40,663,190	40,660,990	40,660,990	40,988,086	40,933,086	40,988,086
Operating cost	0	30,145,110	30,138,110	30,131,110	36,968,536	36,966,536	36,964,536	36,964,536	37,261,896	37,211,896	37,261,896
Income tax	0	-	6,685,510	7,876,021	6,225,046	7,692,688	9,058,026	10,563,005	12,222,211	13,785,186	15,195,766
TOTAL OUTFLOWS	70,095,190	30,145,110	39,837,431	41,020,242	46,890,436	48,355,878	49,719,016	51,223,995	53,210,297	54,718,272	56,183,852
NET CASH FLOW	10,850,695.00	19,507,370.00	38,621,692.00	44,167,752.75	44,718,063.40	50,160,222.40	55,363,670.40	60,892,747.40	65,567,396.40	71,236,800.40	76,540,613.40
							NPV	-448,728,883			
Factor (a)	**% Change in Factor (b)**	**% decrease in NPV (c)**	**Sensitivity (c/b)**								
increase in cost	negative 391 million	-132.00%	**3.3E-07**								
			case three if price decrease by 10%								

Description	Investment Year	Project Life years									
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
INFLOW		35,534,160.00	59,252,960.70	62,818,195.28	66,652,649.15	71,654,490.88	76,349,417.97	81,465,068.61	86,244,924.32	91,489,565.69	96,367,018.66
Net sales revenue	0	39,482,400	65,836,623	69,797,995	74,058,499	79,616,101	84,832,687	90,516,743	95,827,694	101,655,073	107,074,465
TOTAL INFLOWS	0	39,482,400	65,836,623	69,797,995	74,058,499	79,616,101	84,832,687	90,516,743	95,827,694	101,655,073	107,074,465
OUTFLOWS											
Investment cost	*71,293,590*	-	-	-	-	-	-	-	-	-	-
		50,583,254	50,575,554	50,567,854	62,367,131	62,364,931	62,362,731	62,362,731	62,689,827	62,634,827	62,689,827
Operating cost	0	45,984,776	45,977,776	45,970,776	56,697,392	56,695,392	56,693,392	56,693,392	56,990,752	56,940,752	56,990,752
Income tax	0	-	6,685,510	7,876,021	6,225,046	7,692,688	9,058,026	10,563,005	12,222,211	13,785,186	15,195,766
TOTAL OUTFLOWS	71,293,590	45,984,776	57,261,064	58,443,875	68,592,177	70,057,619	71,420,757	72,925,736	74,912,038	76,420,013	77,885,593
NET CASH FLOW	10,850,695.00	- 6,502,376.00	8,575,559.40	11,354,120.15	5,466,321.85	9,558,481.78	13,411,929.43	17,591,006.70	20,915,655.49	25,235,059.79	29,188,871.98
		NET PRESENT VALUE (NPV)						**-**		**111,719,030.00**	
	Factor (a)	**% Change in Factor (b)**	**% decrease in NPV (c)**	**Sensitivity (c/b)**							
	increase in cost	negative111 million	-109.00%	**9.8E-09**							

	Factor (a)	% Change in Factor (b)	% decrease in NPV (c)	Sensitivity /c/b/	Rank for Management Attention						
	Increase in Operating Cost by10%	237 million	-0.72%	**0.00000021**	3						
	Increase in **Investment Cost** by 10 Million	negative 391 million	-132.00%	**0.00000033**	2						
	Decrease in **Price** by 10%	negative111 million	-109.00%	**9.8E-09**	1						