



PROJECT PROFILE ON GRAIN MILL PRODUCTS

MILLING



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ADDIS ABEBA CITY ADMINISTRATION INVESTMENT COMMISSION

PROJECT PROFILE ON GRAIN MILL PRODUCTS

TABLE OF CONTENT

LIST OF TABLES.....	3
I. EXECUTIVE SUMMARY	5
1. BACKGROUND INFORMATION.....	7
1.1. INTRODUCTION	7
1.2. PRODUCT DESCRIPTION.....	8
1.3. PROJECT LOCATION AND JUSTIFICATION	9
1.3.1. <i>Location of Addis Ababa</i>	9
1.3.2. <i>Demography of Addis Ababa</i>	9
1.3.3. <i>Economic activity of Addis Ababa</i>	9
1.4. WHY IS IT BENEFICIAL TO INVEST IN ADDIS ABABA?	11
1.4.1. The city benefit from the investment	12
1.5. DOMESTIC WHEAT FLOUR CONSUMPTION IN ETHIOPIA.....	13
1.6. STATUS OF GRAIN MILLING INDUSTRY IN ETHIOPIA.....	13
1.7. AVAILABILITY OF RAW MATERIALS.....	14
1.7.1. <i>Wheat production and productivity in Ethiopia</i>	14
2. MARKETING STUDY	15
2.1. MARKET ANALYSIS SUMMARY.....	15
2.2. THE SUPPLY OF WHEAT FLOUR.....	15
2.2.1. <i>Local wheat Flour Supply</i>	15
2.2.2. <i>Import</i>	16
2.3. WHEAT FLOUR DEMAND PROJECTION.....	17
2.4. DEMAND-SUPPLY GAP ANALYSIS.....	19
3. TECHNOLOGY AND ENGINEERING	20
3.1. TECHNOLOGY	20
3.1.1. WHEAT FLOUR PRODUCTION PROCESS DESCRIPTION	20
3.1.2. <i>Environmental and social impact assessment of the project</i>	22
3.1.3. <i>Production Capacity and Production Program</i>	22
3.2. ENGINEERING	25
3.2.1. <i>Land, buildings and civil works</i>	25
3.2.2. <i>Machinery and equipment</i>	28
3.2.3. LISTS OF MACHINERY SUPPLIERS.....	29
4. WHEAT FLOUR FACTORY ORGANIZATIONAL STRUCTURE	30
4.1. MANPOWER REQUIREMENT AND ESTIMATED ANNUAL MANPOWER COSTS	30
5. FINANCIAL ANALYSIS.....	31
5.1. GENERAL	31
5.2. INITIAL FIXED INVESTMENT COSTS.....	32

PROJECT PROFILE ON GRAIN MILL PRODUCTS

5.3.	WORKING CAPITAL.....	33
5.4.	PROJECT FINANCING.....	33
5.5.	PRODUCTION COSTS	34
5.5.1.	Material inputs.....	34
5.5.2.	Utilities	35
5.5.3.	Over heads.....	36
5.5.4.	Financial costs.....	37
5.5.5.	Depreciation	37
5.6.	BREAK EVEN POINT AND ROI.....	38
5.6.1.	Break Even point (BEP)	38
5.6.2.	Return on investment	39
5.7.	PROJECT BENEFITS	39

LIST OF TABLES

Table 1	Trends of wheat in area coverage, production and yield by region in 2017/18 and 2019/20	14
Table 2	Calculation for wheat flour supply	15
Table 3	Volume of imported Wheat flour from 2012 to 2021 in kg.....	16
Table 4	Future forecast of import of Wheat flour by trend adjusted exponential smoothing method	17
Table 5	Projected Demand for Wheat flour in Ethiopia	18
Table 6	Demand supply gap Analysis.....	19
Table 7	Production program and Raw materials requirement in quantity for the next five years	23
Table 8	Production mix in quintals	25
Table 9	Building costs	26
Table 10	Land lease period in Addis Abeba.....	27
Table 11	Land lease floor price in Addis Abeba	27
Table 12	Lists of machineries required for wheat flour production	28
Table 13	Annual manpower costs	30
Table 14	Initial Fixed investment costs.....	32
Table 15	Raw materials input plan in Birr'000'	34
Table 16	Utilities of the factory'000" Birr	35
Table 17	Overhead costs	36
Table 18	Depreciation in Birr"000"	37
Table 19	Source of revenue in Birr"000"	40
Table 20	Annual total production costs"000"	43
Table 21	Calculation of working capital	44
Table 22	Projected Sales Revenue in Birr"000"	45
Table 23	Projected Net income statement "000"	46
Table 24	Debt services schedule and computation"000"	47
Table 25	Projected Cash flow statement	48

PROJECT PROFILE ON GRAIN MILL PRODUCTS

Table 26 Total investment costs''000''	49
Table 27 Total Assets	49
Table 28 Sources of finance.....	50
Table 29 Summary of financial efficiency tests	50
Table 30 Calculation of payback period''000''	51
Table 31 Calculation of NPV at 17% D.F.....	52

Lists of figures

Figure 1 Process flow diagram for wheat flour production	21
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PROJECT PROFILE ON GRAIN MILL PRODUCTS

I. Executive summary

This project profile is prepared to assess the viability of running Wheat flour factory, in Addis Abeba city administration. Hence Market, Technical, Organizational and Financial study was made to investigate the viability of the envisaged project.

This project profile on Wheat flour factory has been developed to support the decision –making process based on a cost benefit analysis of the actual project viability. This profile includes marketing study, production and financial analysis, which are utilized to assist the decision-makers when determining if the business concept is viable. Ethiopia has a private sector driven Wheat flour industry. According to the latest data sourced from the ministry of Trade and industry there are more than 682 registered wheat flour and related products producing factories in Ethiopia.

The location of the plant will be decided on the basis of access to raw materials, infrastructure namely power, water, transport and telecom to easy access to international market. The most locally available raw materials for the factory are wheat.

The factory at full capacity operation can process 312,000 quintals to produce 233,753 quintals of wheat flour, per year based on 260 working days and their shifts of 24 hours per day.

The total investment capital including establishing the factory is Birr 307.50 million. Out of the total investment capital, the owners will cover Birr 92.25 million (30 %) while the remaining balances amounting to Birr 215.25 million (70 %) will be secured from bank in the form of term loan.

As indicated in the financial study, the cash flow projection of the project shows surplus from the first year on. The net cash flows of the project range from Birr 152 Million in the first year to Birr

PROJECT PROFILE ON GRAIN MILL PRODUCTS

208 million at the end of the 10th year of operation. At the end of the 10th year of operation period the cumulative cash balance reaches Birr 1.97 billion. The Benefit-cost ratio and Net present value (NPV) have been calculated at 17% discount factor (D.F) for 10 years of the project activity. Accordingly, the project has NPV of 222.84 million Birr at 17%D.F. and the benefit-cost ratio of 1.05 at 17% D.F.

Therefore, from the aforementioned overall market technical and financial analysis we can conclude that the wheat flour factory business is a viable and worthwhile.

PROJECT PROFILE ON GRAIN MILL PRODUCTS

1. Background information

1.1. Introduction

Wheat is grown in most parts of the world, from near arctic to near equatorial latitudes. It is the most important crop among the cereals. Furthermore, the protein and caloric content of wheat is greater than that of any other food crop. Most wheat is consumed in the form of baked goods, mainly bread; therefore, wheat grains must be milled to produce flour prior to consumption. Wheat is also used as an ingredient in compound feedstuffs, pasta and macaroni production, Biscuits production, starch production and as a feed stock in ethanol production. There are various other uses such as in bread and other bakery products as well as in many other recipes in which wheat flour is used as main ingredient. An excellent source of complex carbohydrates is wheat flour. Wheat flour contains B vitamins, calcium, iron, magnesium, phosphorus, potassium, zinc, minimal amounts of sodium and other trace elements.

The milling industry is always looking for new value-added applications for wheat-milling products, like pasta, macaroni, biscuits and other baby foods, each offers an excellent example of the way that can add value to raw agricultural commodities. By doing so, it is possible to expand market for farmers, increase employment through processing, and provide a wide array of useful products to industry and consumers. It is obvious from the above that world-wide Wheat plays a highly significant role in terms of human food- both directly and indirectly. It also plays an important role in the Ethiopian context. According to the Central Statistics Authority, the estimated Wheat production in 2019/2020 (2012E.C.) was about 53,341,395 quintals. This growth in production is arise both from the expansion of hectare and from improved crop productivity.

PROJECT PROFILE ON GRAIN MILL PRODUCTS

1.2. Product description

Wheat flour is a powder made from the grinding of wheat used for human consumption. More wheat flour is produced than any other flour. Wheat flour is particularly valuable as an ingredient of pancake mixes, baby foods, cookies, biscuits, pasta, macaroni and etc. Wheat flour can be categorized in four types: -

- **All-purpose** or **plain flour** is a blended wheat with a protein content lower than bread flour, ranging between 9% and 12%. Depending on brand or the region where it is purchased, it may be composed of all hard or soft wheats, but is usually a blend of the two, and can range from low protein content to moderately high. It is marketed as an inexpensive alternative to bakers' flour which is acceptable for most household baking needs.
- **Bread flour** or **strong flour** is always made from hard wheat, usually hard spring wheat. It has a very high protein content, between 10% and 13%, making it excellent for yeast bread baking. It can be white or whole wheat or in between.
- **Cake flour** is a finely milled white flour made from soft wheat. It has very low protein content, between 8% and 10%, making it suitable for soft-textured cakes and cookies. The higher protein content of other flours would make the cakes tough.
- **Durum flour** is made from Durum wheat and is suited for pasta making, traditional pizza and flatbread for.

PROJECT PROFILE ON GRAIN MILL PRODUCTS

1.3. Project Location and Justification

1.3.1. Location of Addis Ababa

Addis Ababa is the seat of the Ethiopian federal government. It is located on the central highlands of Ethiopia in the middle of Oromia Region. The absolute location is around the intersection point of 9°01'48"N latitude and 38°44'24"E longitudes. This is very near to the geographical center of the country. It is, therefore, equidistant to the peripheral areas or is equally accessible to almost all parts of Ethiopia. Addis Ababa is located on a well-watered plateau surrounded by hills and mountains. The city is in the highlands on the edge of the Ethiopian rift valley or the eastern slopes of the Entoto Mountain ranges bordering the Great Rift Valley. The total area of Addis Ababa is about 540 km² of which 18.2 km² are rural. Addis Ababa's built-up urban area spans 474 km². It is also the largest city in the world located in a landlocked country.

1.3.2. Demography of Addis Ababa

According to the CSA (2013) population projection, Ethiopia's total population reaches about 105 million people in 2022. Of the total population 22.9% (24 million people) live in urban areas. Ethiopia's urban population is expected to triple by 2037 (World Bank, 2015). Addis Ababa hosts an estimated 3,859,638 people. Currently, Addis Ababa is experiencing an annual growth rate of 3.8% and is estimated to reach 4,696,629 inhabitants by 2032 (CSA, 2015).

1.3.3. Economic activity of Addis Ababa

The transformation of Addis Ababa has especially been rapid since 1991. According to the data from the city's Bureau of Finance and Economic Development (2006), per capital income of Addis Ababa has grown from USD 788.48 in 2010 to USD 1,359 in 2015. The city also achieved a decline in the

PROJECT PROFILE ON GRAIN MILL PRODUCTS

poverty index from a high of 29.6 in 2012 to 22.0 in 2014. Moreover, the current poverty headcount index for Addis Ababa is estimated at 18.9 while the poverty severity account for 5 and 1.8 index points respectively. Even though, the poverty status of Addis Ababa has an improvement over previous years, there is still much work to be done to curb both the incidence and severity of poverty.

The major contributor to the economic growth of the city is the implementation of publicly financed mega urban projects like condominium housing, the Light Rail Transit, the international airport and industrial zone development (The state of Addis Ababa, 2017). The existence of international large and medium-size enterprises in and around Addis Ababa have also significant role in creating huge opportunity for employment and technology transfer. Furthermore, there are strong demand for goods and services following the existence of many embassies and inter-governmental organizations like the African Union, the United Nations Economic Commission for Africa.

The manufacturing sector's contribution to Addis Ababa's GDP is high. Despite the fact that 86% of the industries in the city are micro and small scale (cottage and handicrafts, and small-scale), the majority of the country's large and medium scale industries are found in the city. Noticeable increases are also registered currently in other aspects of industrial growth.

The service sector is both the largest contributor to the city's economy and the largest employer. It contributes to 76.4% of the city's GDP while industry's share makes up (almost all) the rest. This sector is dominated by three major sub-sectors: Transport and communication; Real estate, Renting and Business services; and Trade, Hotel and Restaurants. According to the state of Ethiopian Cities 2015 report, the service sector has also been responsible for more than 50% of the growth in the estimated annual growth of the city's GDP. Although 75% of employment in the city is also generated in the service sector, a large proportion of the employed work in low skill and low paying

PROJECT PROFILE ON GRAIN MILL PRODUCTS

jobs as shop salespersons, petty and 'gullit' traders, sales workers in small shops, domestic helpers or doorkeepers and restaurant service workers.

Analysis of the economic structure of Addis Ababa reveals that the services sectors (63%) dominates with industry (36%) in second place indicating that these sectors account for almost all of the Addis Ababa's GDP (The State of Addis Ababa, 2017).

Addis Ababa has a great share in the economy of the country due to its attractiveness to businesses, companies, individuals and foreign direct investment. Overall primacy index of the city is 24.8 based on urban employment and unemployment survey (CSA 2015). According to the State of Addis Ababa 2017 report, the simultaneous high rates of economic growth and urbanization in Addis Ababa indicates a likely further rising dominance of the city in Ethiopia's economy as well as growing agglomeration of economic activities in and around the city.

1.4. Why is it beneficial to invest in Addis Ababa?

Addis Ababa is the largest and most economically significant city in the country. Ethiopia's urban population share is only 17 percent (as of 2012, World Bank 2015). The city is the only urban area in Ethiopia capable of delivering scale economies in terms of concentrated demand, specialization, diversity and depth of skills, innovation, and technology transfers. Thus, investors will be benefited in getting capable human power from the market.

The capital is the country's main industrial hub. The city dominates industrial capacity in almost all the braches of light manufacturing that Ethiopia prioritizes. As a result Addis Ababa completely dominates production in various subsectors. This can be taken as the political and social stability of the city.

PROJECT PROFILE ON GRAIN MILL PRODUCTS

Overall, the city has a beautiful environment, favorable location, and strong industrial base. Its advantage as an economic powerhouse of the country and human resource center are the most attractive features for local and overseas investors.

Moreover, investors will be getting a comprehensive set of incentives for priority sectors. These include:

- Customs duty free privilege on capital goods and construction materials, and on spare parts whose value is not greater than 15% of the imported capital goods' total value.
- Investors have the right to redeem a refund of customs duty paid on inputs (raw materials and components) when buying capital goods or construction materials from local manufacturing industries.
- Income tax exemption of up to 6 years for manufacturing and agro-processing, and up to 9 years for agricultural investment.
- Additional 2-4 years income tax exemption for exporting investors located within industrial parks and 10-15 years exemption for industrial park developers.
- Loss Carry forward for half of the tax holiday period. Several export incentives, including Duty Draw-Back, Voucher, Bonded Factory, and Manufacturing Warehouse, and Export Credit Guarantee schemes.

1.4.1. The city benefit from the investment

The city will be benefited from investment. These are discussed below.

- Employment opportunity

Investment is expected to provide direct and indirect employment. These range from unskilled casual workers, semi-skilled and skilled employees.

PROJECT PROFILE ON GRAIN MILL PRODUCTS

- Improving growth of the economy

Through the use of locally available materials and exporting products, the investment contributes towards growth of the economy by contributing to the growth of domestic product. These eventually attract taxes including VAT which will be payable to the government hence increasing government revenue while the cost of local materials will be payable directly to the producers. In addition, domestic products save foreign exchange and exports also bring money to the country.

1.5. Domestic wheat flour Consumption in Ethiopia

The domestic wheat flour demand is believed to increase with increasing population, urbanization, and income in general. The per capital consumption of wheat flour in developed countries is much higher than in developing countries. According to the FAO, 2019, In terms of human consumption, the mean annual per capita consumption of Wheat and wheat products in rural and urban household consumption is 31 kg per year and 20kg per year respectively in Ethiopia. To meet its food and feed needs, sub-Saharan African's Wheat demand is expected to grow by at least more than 5% per year.

1.6. Status of grain milling industry in Ethiopia

There are more 682 flour mills in Ethiopia, with a total production capacity of 2,996,808 tons of flour a year. About one third of the mills are located in Addis Ababa and nearby areas, including most of the large ones 16. Millers can purchase either domestically produced wheat from the local market or imported wheat from the government grain trade agency (EGTE). The EGTE offers millers to buy imported wheat at a subsidized price, but caps the price of the resultant wheat flour. Millers that want to buy wheat grain from the EGTE should register with the ministry of trade, which decides

PROJECT PROFILE ON GRAIN MILL PRODUCTS

the amount of wheat they can purchase based on their production capacity. Most of wheat flour factories are operating 20 -30% of their design capacity due to shortage of raw materials.

1.7. Availability of raw materials

1.7.1. Wheat production and productivity in Ethiopia

Agriculture is the pillar for the growth of the Ethiopian economy. The agricultural sector has shown Improvement from time to time and takes the highest contribution to the development of the country's economy. Sustained growth in agricultural productivity and modernization supported by continued investment in a large public extension structure that extends from the federal to regions were the main drivers for the large contribution of the agricultural sector to the country's economy. The report of CSA indicates that three years' average wheat yield of Ethiopia is 28.29 quintals per hectare. As it has been shown in table 1 wheat productivity have shown increasing range from 27.36 to 29.70 quintals per hectare patterns over the last three years (2017/2018–2019/2020). Such increasing rate of wheat production is due to implementation of several government programs and initiatives which drive agricultural growth and food security in the country.

Table 1 Trends of wheat in area coverage, production and yield by region in 2017/18 and 2019/20

Year	Area in hectares	Production in quintals	Productivity	Production Growth rate
2017/18	1,696,907	46,429,657	27.36	
2018/19	1,747,939	48,380,740	27.80	4.2%
2019/20	1,789,372	53,152,703	29.70	9.86%

Source: - CSA

PROJECT PROFILE ON GRAIN MILL PRODUCTS

2. Marketing study

2.1. Market analysis summary

The current drive and emphasis by the government on the diversification of the industrial base away from the other sector presents an opportunity for production industry to a valuable contribution towards achieving goal. Having undertaken a thorough and comprehensive research of the market we realized that there was a vast opportunity for domestic products. Aware of the fact operating in such a market is largely dependent on good networking, the promoter intends to establish networks and strategic relationships with various wholesalers and retailers to ensure a steady stream of orders. In so doing the owner intend to ensure that the products they produce are of extremely high quality and fully serve the customers purpose.

2.2. The Supply of wheat flour

2.2.1. Local wheat Flour Supply

In Ethiopia there are large scales, medium and household level Wheat processing mills. According to Ethiopian milling association, there are about 682 grain milling factories in Ethiopia. The design capacity of those large, medium scale and small scale milling factories is estimated to be about 2,996,808 tons of Wheat/year. However, due to various problems, the large and medium mills not operate at full capacity, so average capacity utilization of mills is 33.2% which 994,940.25 tons per year.

Table 2 Calculation for wheat flour supply

Estimated annual design capacity of milling factories according to EMA	2,996,808 Tons
Estimated annual Capacity utilization at mills@20% to 30%(EMA)	899,042 Tons
Estimated annual Capacity utilization at mills @36.4% (CSA)	1,090,838 Tons
Average capacity utilization at mills@33.2%	994,940.25 Tons

Sources: - Compiled by consultant

PROJECT PROFILE ON GRAIN MILL PRODUCTS

2.2.2. Import

The supply of Wheat flour has been met both through import and domestic production. Although there is no apparent trend in the growth of import Wheat flour has continuously been appearing in the import statistics.

Table 3 Volume of imported Wheat flour from 2012 to 2021 in kg

HS CODE 11010000, Wheat or meslin Flour from 2012 to 2021

year	Gross Wt. (Kg)	Net Wt. (Kg)	CIF Value (ETB)	CIF Value (USD)	Total tax (ETB)	Total tax (USD)	Per capital consumption of imported wheat flour
2012	23807698.97	23,802,883.42	187060720.4	10470441.54	1560689	87,357	0.25
2013	17563839.85	17,555,566.2	159232166.2	8469751.025	3,034,711	161,419	0.18
2014	34353629.92	34,351,201.62	313287427.6	15552702.97	65,323	3,242	0.35
2015	45788033.8	45778250	433259935.7	20847846.01	1,740,588	83,754	0.45
2016	17419221.62	17090332	176643027.4	8178485.89	2,150,610	99,572	0.16
2017	35760532.84	35744425.63	392025229.8	16188084.76	2,841,896	117,352	0.34
2018	56,986,692	56,945,827	814,421,028	29,433,358	1,919,560	69,373	0.52
2019	69,914,421	68,870,391	1,214,424,345	41,575,637	116,545,790	3,989,928	0.62
2020	65,546,600	65,520,233	924,182,921	26,443,002	109,354,368	3,128,880	0.57
2021	364,384,877	363,388,235	5,436,152,017	122,656,860	730,485,195	16,482,067	3.10

Source: Ethiopia customs Authority

As it has been shown in table 3 import of Wheat flour which was 23,802,883 kg at the beginning of the period (2012) has increased to 363,388,235kg by the end of, 2021. A closer observation at the data set reveals that imported Wheat flour over the study period has shown varying patterns. Based on the data obtained from Ethiopia customs Authority, the annual average volume of imported Wheat flour is 72,904,735 kg from 2012 through 2021.

PROJECT PROFILE ON GRAIN MILL PRODUCTS

2.2.2.1. Forecasted future import of Wheat flour

Table 4 Future forecast of import of Wheat flour by trend adjusted exponential smoothing method

Year	Imported wheat flour from 2012 to 2021 in kg	Trend adjusted exponential smoothing in kg
2012	23,802,883	
2013	17,555,566	
2014	34,351,202	
2015	45,778,250	
2016	17,090,332	
2017	35,744,426	
2018	56,945,827	
2019	68,870,391	
2020	65,520,233	
2021	363,388,235	
2022		363,388,235
2023		397,346,770
2024		431,305,305
2025		465,263,841
2026		499,222,376
2027		533,180,911
2028		567,139,446
2029		601,097,981
2030		635,056,517
2031		669,015,052
2032		702,973,587

Compiled: - by consultant

2.3. Wheat flour Demand Projection

The demand for Wheat flour can be influenced by a number of factors. The size of population and its growth rate, disposable income and prices are few among many variables. However, data on some of these parameters are not readily available in Ethiopia. Consequently, it is difficult if not impossible to objectively quantify the actual demand. Nevertheless, for the purpose of this study,

PROJECT PROFILE ON GRAIN MILL PRODUCTS

attempts have been made to forecast the likely future demand for Wheat flour on the basis of the following assumptions:

- i. Local supply of Wheat flour assumed to be increased by 2.5% every year based on 994,940,250kg local production per year.
 - ii. Ethiopia population is estimated to be 120,202,679 in 2022
 - iii. Annual growth of population is taken to be 2.5%
- i. $\text{Per capital consumption} = \frac{\text{Effective demand}}{\text{Total population}}$
 - ii. Effective demand = per capital consumption of domestic wheat flour + Average per capital consumption of imported wheat flour = 8.3kg+ 0.65kg = 8.95kg/person/year

Table 5 Projected Demand for Wheat flour in Ethiopia

Year	Population	Per capital consumption of wheat flour is 8.95 kg per year	Total demand for wheat flour,
2022	120,202,679	8.95	1,075,813,977
2023	123,207,746	8.95	1,102,709,327
2024	126,287,940	8.95	1,130,277,063
2025	129,445,138	8.95	1,158,533,985
2026	132,681,267	8.95	1,187,497,340
2027	135,998,298	8.95	1,217,184,767
2028	139,398,256	8.95	1,247,614,391
2029	142,883,212	8.95	1,278,804,747
2030	146,455,292	8.95	1,310,774,863
2031	150,116,675	8.95	1,343,544,241
2032	153,869,592	8.95	1,377,132,848

As it is indicated above the effective demand for Wheat flour in 2022 is 718,461,429kg. This volume will increase to 919,691,371kg tons in the year.

PROJECT PROFILE ON GRAIN MILL PRODUCTS

2.4. Demand-Supply Gap Analysis

When we see the historical supply volume of Wheat flour in Ethiopia there is no apparent trend in the growth. Because both the import and production data are found to be erratic. Hence, it is found difficult to objectively forecast the future supply volume. Single exponential forecasted method was used, for forecasting purposes. A 2.5% supply growth rate, is also assumed for local production increase, for new as well as the capacity utilization increase for the existing unit.

Table 6 Demand supply gap Analysis

Year	Domestic production in (kg)	Forecasted Import in (kg)	Total supply in (kg)	Demand (kg)	Excess demand If import totally substitute by local production (in kg)
2022	994,940,250	363,388,235	1,358,328,485	1,075,813,977	80,873,727
2023	1,019,813,756	397,346,770	1,417,160,526	1,102,709,327	82,895,571
2024	1,045,309,100	431,305,305	1,476,614,405	1,130,277,063	84,967,963
2025	1,071,441,828	465,263,841	1,536,705,669	1,158,533,985	87,092,157
2026	1,098,227,873	499,222,376	1,597,450,249	1,187,497,340	89,269,467
2027	1,125,683,570	533,180,911	1,658,864,481	1,217,184,767	91,501,197
2028	1,153,825,659	567,139,446	1,720,965,105	1,247,614,391	93,788,732
2029	1,182,671,301	601,097,981	1,783,769,282	1,278,804,747	96,133,446
2030	1,212,238,083	635,056,517	1,847,294,600	1,310,774,863	98,536,780
2031	1,242,544,036	669,015,052	1,911,559,088	1,343,544,241	101,000,205
2032	1,273,607,636	702,973,587	1,976,581,223	1,377,132,848	103,525,212

Compiled by:- Consultant

As shown in the above table, the product will have unsatisfied demand for the coming ten years' period. The projected unsatisfied demand will continue to be positive until 2032, if wheat flour import is blocked by the government, have to be substituted that also helps in saving the foreign currency outflow from the country.

PROJECT PROFILE ON GRAIN MILL PRODUCTS

3. Technology and engineering

3.1. Technology

3.1.1. Wheat flour production process Description

3.1.1.1. Cleaning

Cleaning: - The grain contains various impurities like cobs, stones, metal parts, dust, other foreign matter etc. These unwanted materials are removed in cleaning section. The grain is passed over perforated metals sheets, air blowers, electromagnets to remove the impurities.

Wheat conditioning: -The major objectives of Wheat conditioning are to induce physical changes in the kernel that will result in leaching of soluble components, in effective separation of hulls. During conditioning, the kernels absorb water, increasing their moisture levels from 4 percent to 6 percent increase in weight.

Grinding and plansifter: -The grinding process is completed in 2 stages. The grinders are made of stainless steel with adjustable RPM with or without pneumatic settings. There are a number of manufacturers of grinding machines in different countries like in China, Indian, Germany and turkey. In first stage, the steeped Wheat grains are ground (Break) coarsely to loosen the husk. The second stage grinding, known as fine grinding, help in detaching the husk from the grain. After grinding, the material is lifted vertically by pneumatic conveying system and feed into the Plan Sifter through Pneumatic cyclone and air Lock. In the Plan Sifter (sieve) we can sieve the material into many segments. The final product goes to Worm conveyor and then packed, and the remaining material goes to Roller Mill for further grinding and sieving.

PROJECT PROFILE ON GRAIN MILL PRODUCTS

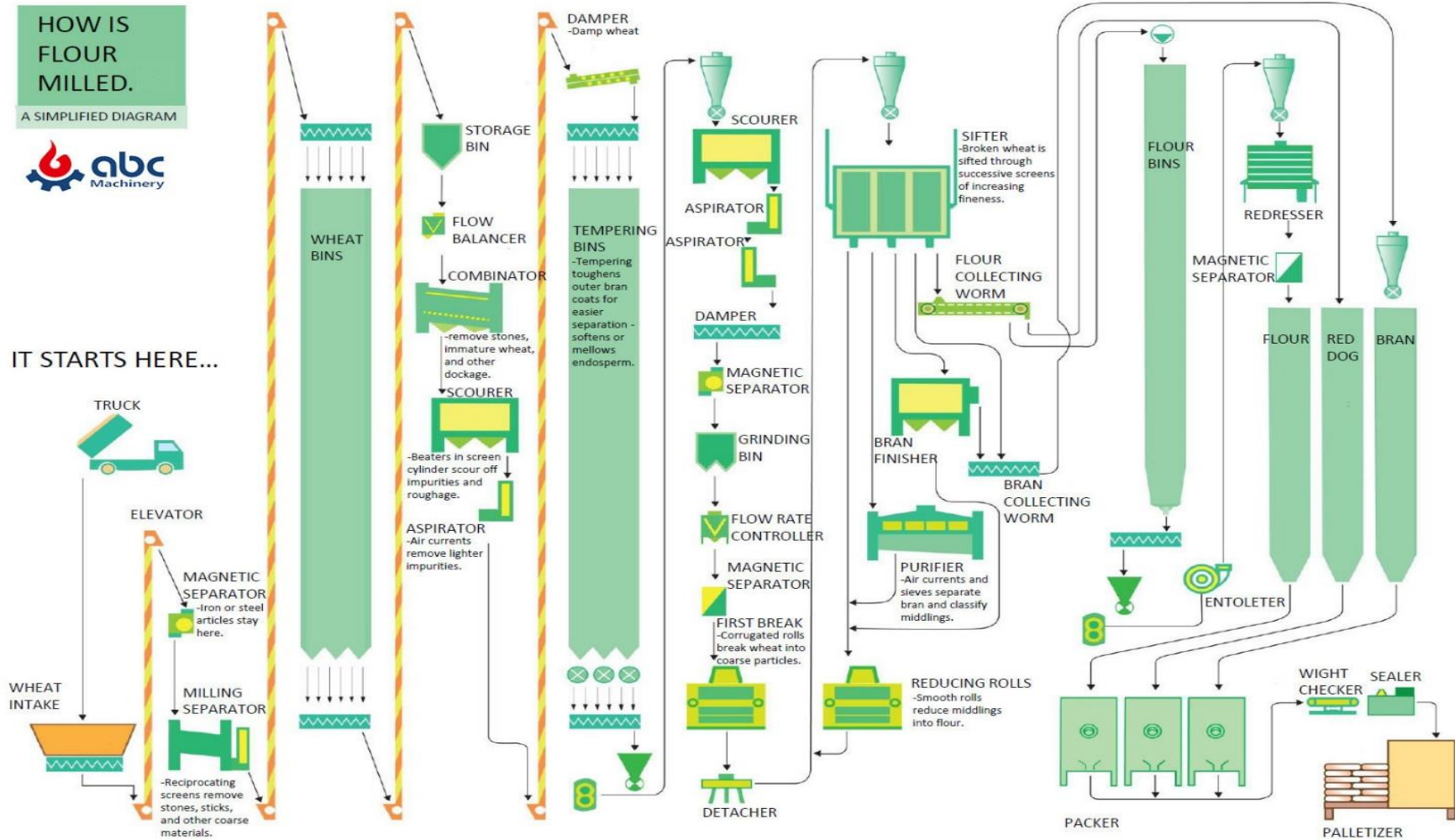


Figure 1 Process flow diagram for wheat flour production

3.1.2. Environmental and social impact assessment of the project

Typically, any developmental projects also trigger a set of environmental and social impacts. These environmental and social due to development projects occur in different forms. An Environmental and Social Impact Assessment (ESIA) has to be carried out to study the potential environmental and social impacts due to the production wheat flour. Potential environmental and social impacts due to the production of wheat flour based products on attributes like air quality, noise, water quality, soil, flora, socio-economic, etc. have to be assessed as part of the ESIA study. Appropriate mitigation measures to help minimize/avoid impacts from the development have to be recommended in the study. The measures include avoidance measures, mitigation measures and environmental enhancement measures. For the purpose of including environmental costs, the costs of wastewater treatment plant and solid waste incineration systems are included in the cost of machinery and equipment.

3.1.3. Production Capacity and Production Program

3.1.3.1. Plant capacity

The annual production capacity of the plant in full capacity is 312,000 quintals. The production capacity is based on projected demand and realistic market share that could be captured. The production commences three shift and 260 working days a year. The production program does not include Sundays and national and public holidays. It was also considered that the plant would conduct annual maintenance for 12 days when the supply of Wheat is low.

PROJECT PROFILE ON GRAIN MILL PRODUCTS

3.1.3.2. Production program

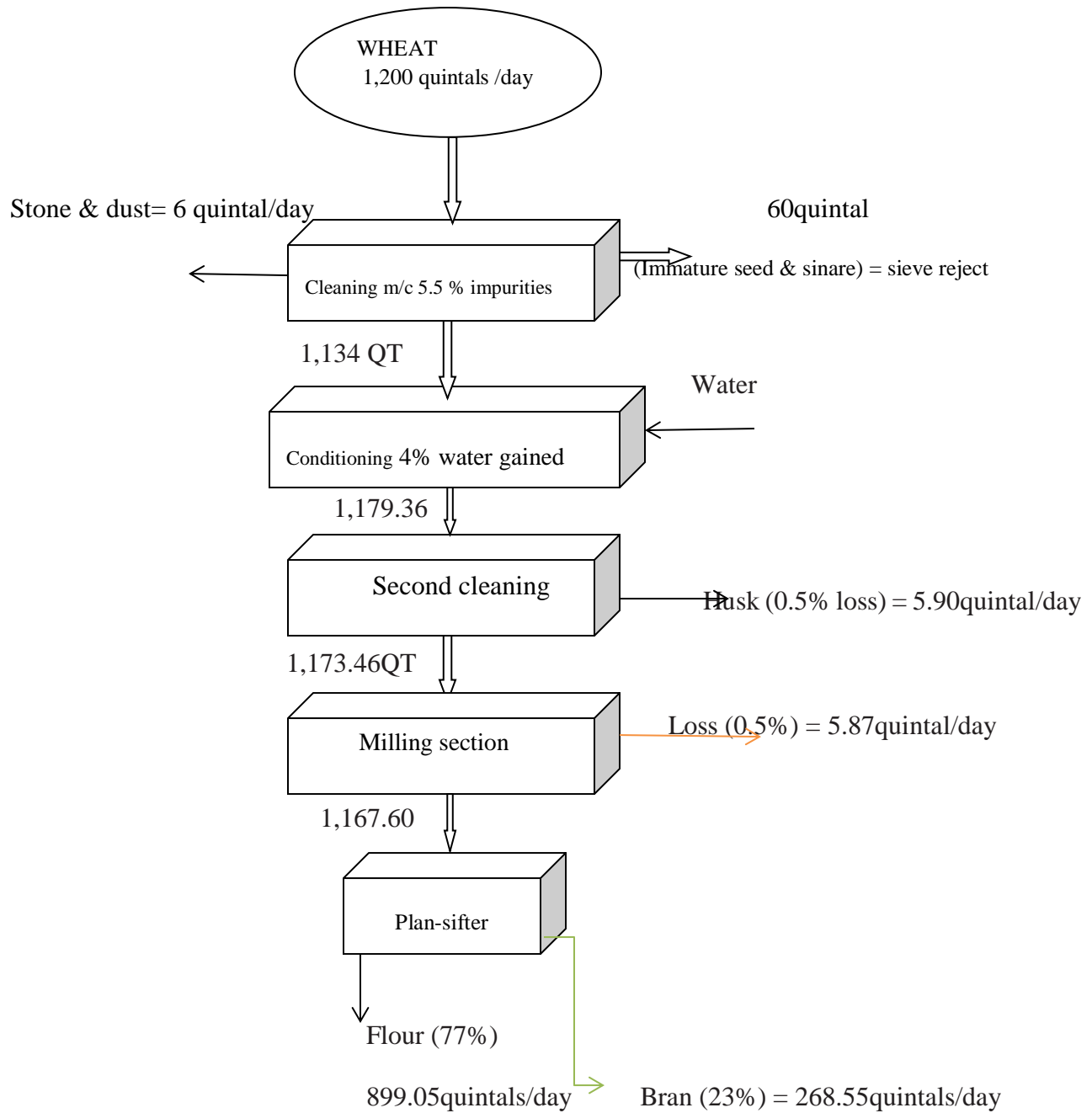
. The plant initially produces 70 % of its annual rated capacity bound to initial operating problems such as machine set up and marketing. The production capacity will increase by 10 % and attain its full capacity by the third year of its commencement.

Table 7 Production program and Raw materials requirement in quantity for the next five years

	Period			Start-up			Full Capacity	
	Capacity utilization			70%	80%	90%	100%	100%
	Project year			1	2	3	4	5
	Product type	Unit of measurement	At full capacity					
1	Raw Wheat	Quintals	312,000	218,400	249,600	280,800	312,000	312,000
	Sub Total			218,400	249,600	280,800	312,000	312,000

PROJECT PROFILE ON GRAIN MILL PRODUCTS

Material balance of wheat flour factory



PROJECT PROFILE ON GRAIN MILL PRODUCTS

Table 8 Production mix in quintals

	Period			Start-up			Full Capacity	
	Capacity utilization			70%	80%	90%	100%	100%
	Project year			1	2	3	4	5
	Product type		At full capacity Per day					
1	Wheat flour	Quintals	899.05	163,627	187,002	210,378	233,753	233,753
2	Bran	Quintals	268.55	48,876	55,858	62,841	69,823	69,823
3	Sieve reject	Quintals	60	10,920	12,480	14,040	15,600	15,600
4	Husk	Quintals	5.90	1,074	1,227	1,381	1,534	1,534

3.2. Engineering

3.2.1. Land, buildings and civil works

The required area (m²) and construction cost for the production facilities essential for the successful operation of the processing plant is shown in Table 9. A total area ready for the processing plant is 10,000 m² out of which 5,100 m² is to be covered by building while uncovered area of 4,900m² is left storage of waste materials and future expansions. . In order to estimate the land lease cost of the project profiles it is assumed that all the project will be located in different land level from level 1/1 to level 4/3, their current market lease price is from 39,073.31 birr per M² to 2,800.71 birr per M² respectively. Therefore, for the profile a land lease rate of birr 3,885 per M² have been taken, which is between the ranges.

The cost of construction of building should be appropriate to the size and expected profitability of business, costs of building generally differs by the type of construction materials used, the type of

PROJECT PROFILE ON GRAIN MILL PRODUCTS

foundation, wall height and location. The current building cost for simple storage and processing room is from 10,000.00 Birr per m² to 25,000.00 Birr per m². The total construction cost of buildings and civil works, at a rate of Birr 20,000 per m² is estimated at Birr 82.61 million. Therefore, the total cost of land lease and construction of buildings and civil works is estimated at Birr 121.46 million.

The proposed plant layout comprises the following buildings and structures.

Table 9 Building costs

S/No	Descriptions	Total area	Estimated cost per square meter (in Birr)	Total estimated cost (in Birr)	Remarks
1	Raw materials store	1,500M ²	20,000.00	30,000,000.00	
2	Damping pit	9M ²	20,000.00	180,000.00	
3	Cleaning section	200M ²	20,000.00	4,000,000.00	
4	maize flour production line	1,000M ²	20,000.00	20,000,000.00	
6	Main product store	500 M ²	20,000.00	10,000,000.00	
7	packing materials store	300 M ²	20,000.00	6,000,000.00	
8	Office and toilet	200M ²	20,000.00	4,000,000.00	
9	Canteen	160M ²	20,000.00	3,200,000.00	
10	Guard house	6M ²	20,000.00	120,000.00	
11	parking	600M ²	5,000	3,000,000.00	
12	Green area	625M ²	500	312,500.00	
13	Fence	1,200M	600*2*1,500	1,800,000.00	
	TOTAL	5,100 M²		82,612,500.00	

PROJECT PROFILE ON GRAIN MILL PRODUCTS

Table 10 Land lease period in Addis Abeba

Sector of development activity	Period of lease	Down payment
Education, health, culture and sports	90	10%
Industry (manufacturing)	70	10%
commerce	60	10%
For urban agriculture	15	10%
For others	60	10%

Sources: - city government of Addis Abeba land development and management bureau

Table 11 Land lease floor price in Addis Abeba

S/No	Land level	Current land lease floor price per M ²	Current lease price per M ² (Market price)
1	1/1	2,213.25	39,073.31
2	1/2	2,165.47	36,825.73
3	1/3	1,900.19	34,578.15
4	¼	1,552.93	31,119.21
5	1/5	1,531.91	29,096.45
6	2/1	1327.39	27,073.71
7	2/2	1,221.18	25,050.96
8	2/3	1,191.17	23,028.21
9	2/4	1,074.39	21,005.46
10	2/5	1,027.84	18,982.71
11	3/1	994.71	16,959.96
12	3/2	960.21	14,937.21
13	3/3	927.84	12,914.46
14	¾	904.77	10,891.71
15	3/5	873.74	8,868.96
16	4/1	814.06	6,846.21
17	4/2	786.45	4,823.46
18	4/3	748.80	2,800.71

Sources: - city government of Addis Abeba land development and management bureau

PROJECT PROFILE ON GRAIN MILL PRODUCTS

3.2.2. Machinery and equipment

The main plant and machinery consists cleaning equipment, roller mills, Plan-sifter, Packing machine and etc. Major part of the machinery will be imported.

Table 12 Lists of machineries required for wheat flour production

120Tons/Day of wheat processing machinery						
I. Summary list of main Equipment						
S/No	Equipment Name	Type	PCS	Power (kw)		Remarks
				Unit	Total	
1	Bucket elevator	TDTG20/10	5	1.10	5.50	
2	Low pressure Fan	4-72-4A	2	5.50	11.00	
3	Magnetic separator		2	0.00	0.00	
4	Vibrating sieve	TQLZ80	1	0.50	0.50	
5	Gravity grading Destoner	TQSF80	1	0.50	0.50	
6	Gravity Destoner	TQSD80	1	0.75	0.75	
7	Vertical Aspirating Channel	TQLM85	1	0.00	0.00	
8	Low pressure de-dusting network		2	0.00	0.00	
9	Aspirating separator	D=50	2	0.00	0.00	
10	Germ purifier	150#	1	7.50	7.50	
11	Double bin plan sifter	FSFS83	5	1.50	7.50	
12	Gravity separator	TSQ*100	3	0.75	2.25	
13	Bran conveyor	TLSS16	1	1.10	1.10	
14	Flour conveyor	TLSS16	1	1.10	1.10	
15	Low pressure fan	4-72-4A	3	4.00	12.00	
16	2-united de-duster		2	0.00	0.00	
17	Cyclone de-duster		3	0.00	0.00	
18	Low pressure De-dusting network		3	0.00	0.00	
19	Roller mill	FMFJ40	5	14.80	74.00	
20	Air seal	D = 250	14	1.50	3.00	
20	High pressure fan	6-30-6.5A	1	15.00	15.00	
21	Pulse bag filter	TBLM52	1	1.85	1.85	
	Sub total				160.05	

PROJECT PROFILE ON GRAIN MILL PRODUCTS

3.2.3. LISTS OF MACHINERY SUPPLIERS

Hebei Pingle Flour Machinery Group Co., Ltd.

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PROJECT PROFILE ON GRAIN MILL PRODUCTS

4. Wheat flour factory organizational structure

The selection of structure of the envisaged project is made based on the existing structure of manufacturing plants operating in the country, the capacity, complexity and technology mix of the plant. Organizational structure principles such as specialization, coordination, and departmentalization are also considered for design of structure that best suits the envisaged project

4.1. Manpower Requirement and Estimated Annual manpower costs

Table 13 Annual manpower costs

S/No	Description	Number of persons	Salary in birr	
			monthly	annually
1	General manager	1	35,000.00	420,000.00
2	executive secretary	1	10,000.00	120,000.00
5	Manager- admin. and finance	1	25,000.00	300,000.00
7	accountant	1	20,000.00	240,000.00
10	cashier	1	7,500.00	90,000.00
13	guards	5	3,500.00	210,000.00
14	messenger and cleaner	1	3,500.00	42,000.00
15	driver ii	4	7,500.00	360,000.00
16	production and technical head	1	30,000.00	360,000.00
18	chief quality controller	3	15,000.00	540,000.00
19	chief miller	1	20,000.00	240,000.00
20	pre-cleaning machine operator	3	5,000.00	180,000.00
21	roller mill operator	3	7,500.00	270,000.00
22	assistant machine operator	6	5,000.00	360,000.00
23	senior mechanics	3	12,000.00	432,000.00
25	senior electrician	3	12,000.00	432,000.00
26	shift electrician	3	10,000.00	360,000.00
27	shift mechanic	3	10,000.00	360,000.00
28	store keeper	1	10,000.00	120,000.00
29	manager- commercial	1	20,000.00	240,000.00
30	purchaser	1	10,000.00	120,000.00
31	sales- manager	1	15,000.00	180,000.00
32	sales clerk	1	7,500.00	90,000.00
	Total	49	301,000.00	6,066,000.00

PROJECT PROFILE ON GRAIN MILL PRODUCTS

5. Financial Analysis

5.1. General

The financial analysis evaluation of wheat flour project, are mainly consisted of capital investment as well as operating and maintenance costs. The capital investment costs include fixed investment costs (initial fixed investment and replacement costs) and working capital, while operating and maintenance costs comprise current expenses related to material inputs, manpower cost, utility, repair and maintenance costs, spare parts, Overheads, Sales and distribution, interest and depreciation expenses.

The financial analysis and evaluation has been conducted taking assumptions:

1. It is assumed that about 70% of the total capital investment costs including the working capital requirement could be covered through development bank loans of short and long-term credits. The remaining balance 30% will be covered by equity capital contribution of the project owner.
2. Even though the project might secure loans under different term and conditions as well as from different financial sources, for the purpose of calculation of debt service scheduling, the current development bank of Ethiopia credit terms and conditions have been used. Consequently. It is assumed that the project will secure loan facility on the basis of 11.5 % annual interest rate.
3. Even though the estimated project production life is more 10 years, the financial analysis has been undertaken for a period interval covering the first 10 years only, during which time

PROJECT PROFILE ON GRAIN MILL PRODUCTS

most of the capital assets are assumed to be depreciated, debts recovered and pay-back period accomplished.

4. It is assumed that the project will be start up production activity at 70 % capacity. During years 2 & year 3 the projects is anticipated to gradually increase capacity utilization to reach 100% in year 4. Therefore, starting from year 4 the project will be operational at full capacity.
5. Loading and unloading costs will be paid on piece rate (10 Birr per quintals)
6. For the project under reference promotional, sales and distribution expenses have been estimated at 3% of the sales revenue.
7. Maintenance and spare parts costs are 1.5% of the fixed investment costs.
8. Furniture and fixture costs assumed to be 500,000.00

5.2. Initial Fixed investment costs

Table 14 Initial Fixed investment costs

S/No	Fixed investment type	Unit of measurement	Quantity	Unit price	Total Amount	Remarks
1	Land	Square meter	10,000	3,885 birr/M ²	38,850,000.00	The period of land lease will be 70 years and 10% of the total lease amount will be paid in the first year
2	Buildings and civil works	Square meter	5,100	lump sum	82,612,500.00	
	Sub total				121,462,500.00	
3	Machineries	set	2	Lump sum	60,000,000.00	
4	Transformer	set	1	Lump sum	2,000,000.00	
5	Weighbridge	Set	1	Lump sum	4,000,000.00	
6	Truck and vehicles	Pcs	2	Lump sum	6,000,000.00	
7	Furniture and fixture	Pcs			500,000.00	
	SUB TOTAL				72,500,000.00	
	Fixed capital investment costs				193,962,500.00	
8	pre-operational expenses				2,000,000.00	
	Working capital				111,495,000.00	
	TOTAL INVESTMENT COSTS				307,457,500.00	

PROJECT PROFILE ON GRAIN MILL PRODUCTS

5.3. Working capital

Working capital is the financial means required for smooth operation and maintenance of a project mathematically, it is a difference between current assets and current liabilities. In the particular case of the project under consideration, the current assets comprise receivables, inventories (local and imported material inputs, spare parts, work in progress, and products ready for delivery) and cash in hand, while current liabilities comprise accounts payable to creditors.

5.4. Project Financing

Fixed capital investment costs and working capital requirements are assumed to be financed by equity capital of the owner and through loans of short and long-term credits.

The company obtains loans under different terms and condition as well as from different sources, for the purpose of calculation of debt service scheduling the current development bank of Ethiopia credit terms and conditions have been used. Accordingly, it is assumed that the company will be able to obtain loan 70% of the total investment costs for construction of different buildings for purchase of machineries. The remaining balance that of the total investment costs will be expected to be covered by equity contribution of the project promoter.

PROJECT PROFILE ON GRAIN MILL PRODUCTS

5.5. Production costs

As it is depicted in Annex Table 20 major categories of the total production costs are assembled into the following cost elements.

5.5.1. Material inputs

In the project under study the basic material inputs are wheat and packing materials etc. Therefore, the current prevailing local and international market prices have been used for estimation of material inputs costs. At full capacity operation the material inputs costs are estimated at Birr 675.974 million per annum.

Table 15 Raw materials input plan in Birr'000'

	Period				Start-up			Full Capacity
	Capacity utilization				70%	80%	90%	100%
	Project year				1	2	3	4
	Materials input for wheat flour	Description	Quantity at full Capacity	Unit price				
1	Raw wheat		312,000	3,300	720,720	823,680	926,640	1,029,600
2	P.P. Bag for flour	will be Packed in 50kg	499,150PCS	22	7,687	8,785	9,883	10,981
3	P.P. Bag for Bran	will be Packed in 50kg	141,835PCS	22	2,200	2,514	2,828	3,142
4	P.P.Bag for sieve reject	will be Packed in 50kg	43,680PCS	22	673	769	865	961
5	P.P.Bag for husk	will be Packed in 50kg	3,001 pcs	22	46	53	59	66
	Total				731,326	835,801	940,275	1,044,750

PROJECT PROFILE ON GRAIN MILL PRODUCTS

5.5.2. Utilities

In estimating costs of utility expenses for operation and maintenance of the project, Costs of fuel, oil and lubricant, electricity and water consumptions have been taken in to consideration, the rates of which have been estimated on the basis of the proposed capacity utilization program of the project and at the current official charging rates. At full capacity operation the project will have the following utility expense per annum which amounts to Birr 6.055million.

Table 16 Utilities of the factory'000''Birr

Utility'000''Birr		Start-up			Full Capacity
		70 %	80 %	90 %	100 %
Capacity utilization		1	2	3	4
Project year					
Item description	Unit of measurement				
Fuel					
Gasoline for service vehicle	50km*260days*37Birr/LIT*8km/Li	42.09	48.10	54.11	60.13
Gasoline for transport truck	(200km*300days*37Birr/LIT*5km/Li)*3	932	1,066	1,199	1,332
Sub-Total		974.09	1,114.10	1,253.11	1,392.13
Change of oil and lubricant	10% of the fuel consumption	97.41	111.41	125.31	139.21
Sub-Total		1,071.50	1,225.51	1,378.42	1,531.34
Electricity	260days*24 hrs*650kwh* 0.4736Birr/kwh	2,839	3,245	3,650	4,056
Sub- Total		2,839	3,245	3,650	4,056
Water	365days*100m ³ /day*15 Birr/m ³	255.50	292.00	328.50	365.00
Sub -Total		255.50	292.00	328.50	365.00
Telecommunication					
Telephone	5 lines* 1,500Birr/month/line+18Birr/line/month	31.08	31.08	31.08	31.08
Mobile	5 lines*1,500 Birr/month/line	30.00	30.00	30.00	30.00
Fax	2line*1,000Birr/month + 17 Birr/line/month	12.40	12.40	12.40	12.40
Internet	2,500 Birr/month	30.00	30.00	30.00	30.00
Sub-Total		103.48	103.48	103.48	103.48
TOTAL		4,269.48	4,865.99	5,460.40	6,055.82

PROJECT PROFILE ON GRAIN MILL PRODUCTS

5.5.3. Over heads

In the expenses under this title have been included land and building taxes, buildings, vehicles as well as machinery and equipment insurance, vehicles annual inspection; postage, telephone and e. mail, stationery and office supplies; printing and copying; audit fee; cash indemnity etc. The overhead costs and divided in to direct overheads and administration overheads.

Table 17 Overhead costs

Direct Overhead"000" Birr		Year 1	Year 2	Year 3	Year 4
Annual land lease Payment		5,550	5,550	5,550	
Insurance					
Building and Civil works	0.10%	82.61	82.61	82.61	82.61
Machinery and Equipment	0.20%	120	120	120	120
Motor vehicle and Truck	1%	60.00	60.00	60.00	60.00
Vehicles annual inspection and registration	25,000 Birr per annum per vehicle	50.00	50.00	50.00	50.00
Work cloth	Two times per annum per workers at 800 Birr	78.40	78.40	78.40	78.40
Cleaning and sanitation	An estimate of 300 Birr/day	78.00	78.00	78.00	78.00
Sub Total		6,019	6,019	6,019	6,019
Administration Overhead "000' Birr					
Audit fee	40,000 Birr per annum	40.00	40.00	40.00	40.00
Office cleaning and sanitation	2,000 Birr per month	24.00	24.00	24.00	24.00
Stationery and office supplies	2,000 Birr per month	20.00	20.00	20.00	20.00
Printing and Copy	2,000 Birr per month	24.00	24.00	24.00	24.00
Sub Total		108.00	108.00	108.00	108.00
GRAND TOTAL		6,127	6,127	6,127	6,127

PROJECT PROFILE ON GRAIN MILL PRODUCTS

5.5.4. Financial costs

As it has been outlined earlier under” project Financing” the current Development Bank of Ethiopia credit terms and conditions for newly establishing projects have been used to compute the financial costs, estimated to be incurred in connection with that of the total investment costs assumed to be covered through loan financing. The amount of the loan capital to be obtained and the financial costs to be incurred thereof have been determined depending on the amount of fixed investment cost and pre-production expenses.

5.5.5. Depreciation

Table 18 Depreciation in Birr"000"

Period			Start-up			
			70 %	80 %	90 %	100 %
Capacity utilization			1	2	3	4
Project year						
Item description	Original Value					
Structure and civil works	82,612,500.00	5% of original value	4,131.00	4,131.00	4,131.00	4,131.00
Machinery and equipment	60,000,000.00	15 % of original value	9,000.00	9,000.00	9,000.00	9,000.00
Transformer	2,000,000.00	15 % of original value	300.00	300.00	300.00	300.00
Motor vehicles and trucks	6,000,000.00	15 % of original value	900.00	900.00	900.00	900.00
Weighbridge	4,000,000.00	15 % of original value	600.00	600.00	600.00	600.00
Office equipment and furniture	500,000.00	20% of original value	100.00	100.00	100.00	100.00
Pre-operation expense	2,000,000.00	25% of original value	500.00	500.00	500.00	500.00
Total			15,531.00	15,531.00	15,531.00	15,531.00

PROJECT PROFILE ON GRAIN MILL PRODUCTS

5.6. Break Even point and ROI

5.6.1. Break Even point (BEP)

Three kinds of break-even point

- A. BEP Sales Revenue(BR)
- B. BEP production (Volume)
- C. BEP Percentage (%)

A. Break-even point(BEP) Sales

To determine BEP Annual Sales, multiply annual sales found in income statement by the annual fixed cost, and divided by Annual sales less Annual variable cost.

$$\text{BEP (sales)} = = \frac{\text{Annual sales} \times \text{Annual fixed costs}}{\text{Annual sales} - \text{Annual variables costs}}$$

Annual sales = 1,225,803,000 Birr

Unit selling price = 45 Birr/kg

$$\text{BEP (sales)} = = \frac{\text{Annual sales} \times \text{Annual fixed costs}}{\text{Annual sales} - \text{Annual variables costs}} = = \frac{1,225,803 \times 56,425}{1,225,803 - 759,394}$$

BEP (Sales) = 148,945,000 Birr

B. BEP production

To determine BEP production volume, divided BEP sales by the unit selling price (USP)

BEP production = 148,945,000/4,500 = 33,099

$$\begin{aligned} \text{c. BEP percentage} &= \frac{\text{Annual fixed costs} \times 100\%}{\text{Annual sales} - \text{Annual variables costs}} \\ &= \frac{56,425 \times 100\%}{1,225,803 - 759,394} \\ &= 12\% \end{aligned}$$

PROJECT PROFILE ON GRAIN MILL PRODUCTS

5.6.2. Return on investment

Return on investment = Net profit /Total capital requirement

$$= 27,458,000/307,457,500$$

$$= 8.9\%$$

The return on owners' investment (ROOI)

= Annual net profit /owners' investment

$$= 27,458,000/92,237,250$$

$$= 30\%$$

5.7. Project benefits

For financial analysis and evaluation of the given project, the current corn price, and packing materials buying price and final packed corn flour price at the project gate has been taken as a basis. Consequently, based on the recent market survey, wheat buying price per quintal at the nearby market pints is estimated at Birr 3,500 and delivery price of processed wheat price has been indicated in table 22.

As it has been stated earlier the project is envisaged to reach full capacity operation four years after commencement of production activities which are assumed to begin with 70% of the estimated total capacity.

At full capacity operation the project is envisaged to have the following revenue components.

PROJECT PROFILE ON GRAIN MILL PRODUCTS

Table 19 Source of revenue in Birr"000"

	Period			Start-up			Full Capacity	
	Capacity utilization			70%	80%	90%	100%	100%
	Project year			1	2	3	4	5
	Product type		Unit price					
1	Wheat flour	Quintals	4,500	736,321,500	841,509,000	946,701,000	1,051,888,500	1,051,888,500
2	Bran	Quintals	2,000	97,752,000	111,716,000	125,682,000	139,646,000	139,646,000
3	Sieve reject	Quintals	2,000	21,840,000	24,960,000	28,080,000	31,200,000	31,200,000
4	Husk	Quintals	2,000	2,148,000	2,454,000	2,762,000	3,068,000	3,068,000
	Total			858,061,500	980,639,000	1,103,225,000	1,225,802,500	1,225,802,500

Thus, according to the computation in Annex Table 23 and Annex Table 25, the net income and cash flow statements analysis revealed that at full capacity operation the project will generate a total income (gross revenue) amounting to 1.225billion Birr per annum. The corresponding Annex Table 23 of “Net Income Statement” shows a steady growth of gross profit starting from 42 million Birr in year 1 reaching the peak of 116 million Birr in year 10. In its 10 years of manufacturing activities, the project is expected to generate a total net profit of 581 million Birr and contribute 313 million Birr to the government treasury in form of 35% income tax.

According to the current investment Law, machinery and equipment are anticipated to be imported duty- free. The liquidity position of the project is very strong. The corresponding Annex Table 25 of “Cash Flow Statement” shows the positive cumulative cash balance of Birr 1.972 billion and the project will not face any cash shortage throughout its production life.

PROJECT PROFILE ON GRAIN MILL PRODUCTS

The computation of the pay-back period as depicted in Annex table 30 indicates that the project will be able to reimburse itself from its net cash-income within six years after commencement of production activities, the period which is considered to be very good for the project of this nature.

In Annex Table 31 of the Benefit-cost ratio and Net present value (NPV) have been calculated at 17% discount factor (D.F) for 10 years of the project activity. Accordingly, the project has NPV of 222 million Birr at 17%D.F. and the benefit-cost ratio of 1.04 at 17% D.F. These results are most appreciable, especially, when related to the external capital borrowing interest rate which ranges from 8.50% to 18.5 % for newly establishing projects.

break-even point (BEP) have been undertaken the project under study when implemented will have BEP at about 12% operation of the estimated full capacity

In addition to this, finally, summary of financial efficiency tests have been conducted in Annex table 29, Accordingly, all efficiency ratios indicated positive trends and consequently, it can be inferred that the project can operate in the frame work of free market mechanism on commercially and financially viable basis and is remunerative.

ANNEXES

PROJECT PROFILE ON GRAIN MILL PRODUCTS

ANNEX II

CALCULATION OF ANNUAL PRODUCTION COSTS

Table 20 Annual total production costs''000''

Period	Start-up			Full capacity						
	70 %	80 %	90 %	100 %	100 %					
Project Year	1	2	3	4	5	6	7	8	9	10
Cost category										
I. Material inputs	731,326	835,801	940,275	1,044,750	1,044,750	1,044,750	1,044,750	1,044,750	1,044,750	1,044,750
II. Labor	6,066	6,066	6,066	6,066	6,066	6,066	6,066	6,066	6,066	6,066
III. Utility	3,951	4,501	5,051	5,601	5,601	5,601	5,601	5,601	5,601	5,601
IV. Repair and Maintenance and spare parts (0.5 % of fixed costs)	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327
VI Direct overheads	6,019	6,019	6,019	6,019	6,019	6,019	6,019	6,019	6,019	6,019
A. Direct Production costs	749,689	854,714	959,738	1,064,763	1,064,763	1,064,763	1,064,763	1,064,763	1,064,763	1,064,763
VII. Administration over head	108	108	108	108	108	108	108	108	108	108
VIII. Marketing and Promotional expense 3 % of sales revenue	25,741	29,419	33,097	36,774	36,774	36,774	36,774	36,774	36,774	36,774
B. Operating costs	775,538	884,241	992,943	1,101,645	1,101,645	1,101,645	1,101,645	1,101,645	1,101,645	1,101,645
Interest	24,750	23,305	21,694	19,898	17,895	15,662	13,172	10,396	7,300	3,849
Depreciation	15,531	15,531	15,531	15,531	15,031	11,335	4,131	4,131	4,131	4,131
C. Total production costs	815,819	923,077	1,030,168	1,137,074	1,134,571	1,128,642	1,118,948	1,116,172	1,113,076	1,109,625

PROJECT PROFILE ON GRAIN MILL PRODUCTS

ANNEX IV CALCULATION OF WORKING CAPITAL REQUIREMENTS

- I. Minimum requirement of current assets and liabilities
- A. Accounts receivable: 26 days at total production costs minus depreciation and interest
- B. Inventory
1. Material inputs: 26 days
 2. Spare parts : 90 days
 3. Work under process: two days at direct costs
 4. Product ready for delivery: 8 days at direct costs plus administration overheads
- C. Cash on hand : 360 days
- D. Accounts payable 26 days for material inputs and utilities

ii. Working capital requirement

Table 21 Calculation of working capital

Cost category	Minimum Days of coverage	Coeff-icent of turnover	Project year									
			Start up			Full capacity						
			1	2	3	4	5	6	7	8	9	10
I. Current asset												
A. A/R	26	10	77,554	88,424	99,294	110,165	110,165	110,165	110,165	110,165	110,165	110,165
B. Inventory												
1. Material inputs	26	10	73,133	83,580	94,028	104,475	104,475	104,475	104,475	104,475	104,475	104,475
2. Spare parts	90	4	776	776	77	776	776	776	776	776	776	776
3. Work under process	2	130	5,767	6,575	7,383	8,190	8,190	8,190	8,190	8,190	8,190	8,190
4. Product ready for delivery	8	32.5	23,175	26,407	29,638	32,870	32,870	32,870	32,870	32,870	32,870	32,870
C. Cash on hand			4,618	4,755	4,893	5,030	5,030	5,030	5,030	5,030	5,030	5,030
D. Current assets			185,023	210,517	235,313	261,506	261,506	261,506	261,506	261,506	261,506	261,506
II. Current liabilities												
A. A/p	26	10	73,528	84,030	94,533	105,035	105,035	105,035	105,035	105,035	105,035	105,035
III. Working capital												
A. Net working capital			111,495	126,487	140,780	156,471	156,471	156,471	156,471	156,471	156,471	156,471
B. Increasing in working capital			111,495	14,992	14,293	15,691	0.0	0.0	0.0	0.0	0.0	0.0

PROJECT PROFILE ON GRAIN MILL PRODUCTS

ANNEX V

PROJECTED SALES REVENUE

Table 22 Projected Sales Revenue in Birr"000"

	Period			Start-up								Full Capacity	
	Capacity utilization			70%	80%	90%	100%					100%	
	Project year			1	2	3	4	5	6	7	8	9	10
	Product type		Unit price										
1	Wheat flour	Quintals	4,500	736,322	841,509	946,701	1,051,888	1,051,888	1,051,888	1,051,888	1,051,888	1,051,888	1,051,888
2	Bran	Quintals	2,000	97,752	111,716	125,682	139,646	139,646	139,646	139,646	139,646	139,646	139,646
3	Sieve reject	Quintals	2,000	21,840	24,960	28,080	31,200	31,200	31,200	31,200	31,200	31,200	31,200
4	Husk	Quintals	2,000	2,148	2,454	2,762	3,068	3,068	3,068	3,068	3,068	3,068	3,068
	Total			858,062	980,639	1,103,225	1,225,803	1,225,803	1,225,803	1,225,803	1,225,803	1,225,803	1,225,803

PROJECT PROFILE ON GRAIN MILL PRODUCTS

ANNEX VI

PROJECTED NET INCOME STATEMENT

Table 23 Projected Net income statement "000"

Period	Start up			Full capacity						
	70 %	80 %	90 %	100 %						
Project year	1	2	3	4	5	6	7	8	9	10
Item description										
Product sales revenue	858,062	980,639	1,103,225	1,225,803	1,225,803	1,225,803	1,225,803	1,225,803	1,225,803	1,225,803
Less total production costs	815,819	923,077	1,030,168	1,137,074	1,134,571	1,128,642	1,118,948	1,116,172	1,113,076	1,109,625
Gross profit	42,243	57,562	73,057	88,729	91,232	97,161	106,855	109,631	112,727	116,178
Tax	14,785	20,147	25,570	31,055	31,931	34,006	37,399	38,371	39,454	40,662
Net profit	27,458	37,415	47,487	57,674	59,301	63,155	69,456	71,260	73,273	75,516
Accumulated undistributed profit	27,458	64,873	112,360.30	170,034	229,335	292,490	361,945	433,206	506,478	581,994

PROJECT PROFILE ON GRAIN MILL PRODUCTS

ANNEX VII DEBT SERVICE SCHEDULE AND COMPUTATION PAYMENT OF EQUAL ANNUAL INSTALLMENTS

Table 24 Debt services schedule and computation”000”

Item description	Project year									
	1	2	3	4	5	6	7	8	9	10
A. Investment and working capital										
1. Investment										
2. Increment working capital										
Total										
B. Loan receipts and balances										
1. Loan receipts	215,220	202,656	188,648	173,028	155,612	136,193	114,540	90,398	63,480	33,466
2. Outstanding balance at end of year	215,220	202,656	188,648	173,028	155,612	136,193	114,540	90,398	63,480	33,466
a. First year loan										
Total										
A. Debt service										
1. First year Loan										
a. Interest	24,750	23,305	21,694	19,898	17,895	15,662	13,172	10,396	7,300	3,849
b. Repayment of principal	12,564	14,009	15,620	17,416	19,419	21,652	24,142	26,919	30,014	29,617

PROJECT PROFILE ON GRAIN MILL PRODUCTS

ANNEX VIII CASH-FLOW STATEMENT FOR FINANCIAL PLANING

Table 25 Projected Cash flow statement

Period	Start up				Full capacity							
	70%	80%	90%	100%	5	6	7	8	9	10	11	12
Capacity utilization												
Project year	1	2	3	4	5	6	7	8	9	10	11	12
Item description												
A. Cash - inflow	922,660	842,855	946,102	1,049,350	1,032,460	1,032,460	1,032,460	1,032,460	1,032,460	1,032,460		
1. Financial resource (total)	199,944	16,887	16,888	16,890								
2. Sales revenue	722,716	825,968	929,214	1,032,460	1,032,460	1,032,460	1,032,460	1,032,460	1,032,460	1,032,460		
B. Cash – outflow	770,121	673,871	756,863	839,875	823,154	823,341	823,550	823,782	824,042	824,331		
1. Total assets schedule including replacement	199,944	16,887	16,888	16,890								
2. Operating costs	510,542	582,417	654,292	726,173	726,173	726,173	726,173	726,173	726,173	726,173		
3. Debt service (total)												
a. Interest	8,414	7,922	7,375	6,764	6,084	5,324	4,478	3,534	2,482	1,308		
b. Repayment	0.00	4,271	4,762	5,310	5,921	6,602	7,361	8,207	9,151	10,203		
4. Tax	51,221	62,374	73,546	84,738	84,976	85,242	85,538	85,868	86,236	86,647		
C. Surplus (Deficit)	152,539	168,984	189,239	209,475	209,306	209,119	208,910	208,678	208,418	208,129		
D. Cumulative cash balance	152,539	321,523	510,762	720,237	929,543	1,138,662	1,347,572	1,556,250	1,764,668	1,972,797		

PROJECT PROFILE ON GRAIN MILL PRODUCTS

ANNEX XII TOTAL INVESTMENT COSTS

Table 26 Total investment costs''000''

Period	Start up			Full capacity							
Project year	1	2	3	4	5	6	7	8	9	10	11
Investment Category											
1. Fixed investment costs											
a. Initial fixed investment costs	193,962										
b. Replacement											
2. Pre-operational capital expenditure	2,000										
3. Working capital increase	111,495	14,992	14,293	15,691							
Total investment costs	307,457	14,992	14,293	15,691							

ANNEX XIII TOTAL ASSETS

Table 27 Total Assets

Period	Start up			Full capacity								
Project year	1	2	3	4	5	6	7	8	9	10	11	12
Investment Category												
1. Fixed investment costs												
c. Initial fixed investment costs	192,962											
❖ Cost of land												
d. Replacement												
2. Pre-operational capital expenditure	2,000											
3. Current assets increase	185,023	25,494	24,796	26,193								
Total assets	379,985	25,494	24,796	26,193								

PROJECT PROFILE ON GRAIN MILL PRODUCTS

ANNEX XIV SOURCES OF FINANCE

Table 28 Sources of finance

Period	Start up			Full capacity							
	1	2	3	4	5	6	7	8	9	10	Total
Sources of finance											
1. Equity capital	92,237	14,992	14,293	15,691							
2. Loan capital	215,220										
3. Current liabilities	73,528	10,502	10,503	10,502							
Total finance	380,985	25,494	24,796	26,193							

ANNEX XI SUMMARY OF FINANCIAL EFFECIENCY TESTS

Table 29 Summary of financial efficiency tests

Project year	Project year									
	1	2	3	4	5	6	7	8	9	10
Capacity utilization	70%	80%	90%	100%						
Financial ratio in %										
1. Gross profit : Revenue	5%	6%	7%	7%	7%	8%	9%	9%	9%	9%
2. Net profit : Revenue	3%	4%	4%	5%	5%	5%	6%	6%	6%	6%
3. Net profit : initial investment	9%	12%	14%	16%	17%	18%	20%	20%	21%	21%
4. Net profit : Equity	30%	35%	39%	42%	43%	46%	51%	52%	53%	55%
5. Gross profit : Initial investment	14%	18%	22%	25%	26%	28%	30%	31%	32%	33%
6. Operating costs : Revenue	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%

PROJECT PROFILE ON GRAIN MILL PRODUCTS

ANNEX XV CALCULATIONS OF PAYBACK PERIOD

Table 30 Calculation of payback period”000”

Year	Amount Paid Back			Total investment	End of year
	Net Profit	Depreciation	Total		
1	27,458	15,531	42,989	307,457	-264,468
2	37,415	15,531	52,946	14,992	-226,514
3	47,487	15,531	63,018	14,293	-177,789
4	57,674	15,531	73,205	15,691	-120,275
5	59,301	15,031	74,332	0.0	-45,943
6	63,155	11,335	74,490		+28,547

PROJECT PROFILE ON GRAIN MILL PRODUCTS

ANNEX XVI CALCULATIONS OF NET PRESENT VALUE AT 17% D.F.

Table 31 Calculation of NPV at 17% D.F.

Project year	Gross Revenue	1/(1+i) ⁿ At 17%	Present value at 17%	Project costs			
				Total investment	Operating costs	Total	Present value at 17%
1	858,062	0.854701	733,386	307,457	775,538	1,082,995	925,637
2	980,639	0.730514	716,371	14,992	884,241	899,233	656,902
3	1,103,225	0.624371	688,822	14,293	992,943	1,007,236	628,889
4	1,225,803	0.53365	654,150	15,691	1,101,645	1,117,336	596,266
5	1,225,803	0.456111	559,102		1,101,645	1,101,645	502,472
6	1,225,803	0.389839	477,866		1,101,645	1,101,645	429,464
7	1,225,803	0.333195	408,431		1,101,645	1,101,645	367,063
8	1,225,803	0.284782	349,087		1,101,645	1,101,645	313,729
9	1,225,803	0.243404	298,365		1,101,645	1,101,645	268,145
10	1,225,803	0.208037	255,012		1,101,645	1,101,645	229,183
Total			5,140,592				4,917,750

A. Benefit- cost ratio At 17% D.F. = 1.045

B. NPV At 17% D.F. = 222,842,000 Birr