

**PROFILE ON THE PRODUCTION OF ROASTED
GROUNDED AND PACKED COFFEE**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of roasted, grounded and packed coffee with a capacity of 300 tons per annum. Several varieties of processed green coffee usually are blended and roasted together to produce the tastes, aromas and flavors popular with consumers. Grounded coffee is consumed by hotels, bars, cafeterias and households.

The country's requirement of roasted, grounded and packed coffee is met through local production and import. The present (2012) demand for roasted, grounded and packed coffee is estimated at 2,197 tons. The demand for the products is projected to reach 2,712 tons and 3,491 tons by the years 2017 and 2022, respectively.

The principal raw material required is green coffee which is available locally.

The total investment cost of the project is estimated at Birr 10.13 million. From the total investment cost the highest share (Birr 5.24 million or 51.77%) is accounted by fixed investment cost followed by initial working capital (Birr 3.87 million or 38.23%) and pre operation cost (Birr 1.01 million or 10.01%). From the total investment cost Birr 818.40 thousand or 8.07% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 20.98% and a net present value (NPV) of Birr 6.29 million, discounted at 10%.

The project can create employment for 22 persons. The establishment of such factory will have a foreign exchange saving and earning effect to the country by substituting the current imports and exporting its products to the international market. The project will also create backward linkage with the agricultural sector and forward linkage with the hotel and tourism sector and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTION AND APPLICATION

Coffee is a common name for any of a genus of trees of the madder family, and also for their seeds (beans) and for the beverage brewed from them. The Arabicas and Rubastas are the two

major types of commercial coffee. Chemicals extracted from expertly processed and roasted coffee by hot water classified as non volatile are caffeine, trigonelline, chlorogenic acid, phenolic acids, amino acids, aldehydes, ketones, esters, amines, and mercaptanes. Undoubtedly the popularity of this beverage is, at least to some extent, related to its stimulant effects. Average caffeine contents per cup of brewed coffee is 110 mg. Caffeine is a mild psycho - stimulant that has been called the most widely used psychoactive substance on earth.

Several varieties of processed green coffee usually are blended and roasted together to produce the tastes, aromas and flavors popular with consumers. Grounded coffee is consumed by hotels, bars, cafeterias and households.

Roasted and packed coffee is a resource based project that will substitute import and have an export potential.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

A coffee bean (green coffee) has very high domestic and export demand. Coffee consumption in Ethiopian society is not only used for personal satisfaction but also includes some traditional ceremonies and group enjoyments with family members and neighbors.

Supply of roasted coffee has been both from local and imports of different origins. There is also some amount of export. For domestic production see Tables 3.1, while for import & export see Table 3.2.

Table 3.1

DOMESTIC PRODUCTION OF ROASTED COFFEE (TONS)

Year	Production
2001/02	300
2002/03	115
2003/04	259
2004/05	563
2005/06	16,317
2006/07	1,544
2007//08	2,767
2008//09	1,984
2009/10	1,708

Source: - CSA, Large and Medium Scale Manufacturing and Electricity Industries Survey, Various Issues.

As can be seen from Table 3.1, domestic production of roasted coffee which was 300 tons at the beginning of the period (2001/02) has grown to 1,708 tons at the close of the period (2009/10). It can also be observed that exports amounted in the hundredth's (309 tons on average) in 2001/02- 2004/05 interval while starting 2005/06 it amounted in thousands (2000 tons on average after excluding the outlier value of 2005/06). There were also fluctuations within these intervals. So, it will be more appropriate to take the average of last three years in estimating the year 2012 production level. Accordingly, the year 2012 domestic production of roasted coffee is estimated at 2,153 tons.

Table 3.2
IMPORT AND EXPORT OF ROASTED COFFEE (TONS)

Year	Import	Export
2001	3	0.5
2002	5	19.0
2003	4.3	-
2004	1	1.5
2005	16	1.5
2006	13	1.0
2007	96	48.0
2008	61	2.0
2009	44	3.0
2010	66	6.0
2011	23	7.0

Source: - Ethiopian Revenue and Customs Authority.

It can be seen from Table 3.2 that import and export have been small in amount as compared to domestic production. The pattern with imports and exports has shown more or less similar situations to that of domestic production. In estimating the 2012 import and export levels the average of last three years has been taken. Accordingly, import and export of roasted coffee for 2012 has been estimated at 44 tons and 5 tons, respectively.

Thus, adding domestic production and that of import, the present effective demand of roasted coffee for 2012 is estimated at 2,197 tons.

2. Demand Projection

Demand for roasted coffee has two sources; domestic component and export. The domestic demand (D) is obtained by the formula: $D = P_D + I - E$ where P_D is domestic production, I is import and E export thus for year 2012 it is 2,192 tons. The domestic demand for roasted coffee depends on level of income and population growth rates. Moreover, the product's superior convenience will have a positive effect on the level of demand. Since the product is high valued type, major consumers are expected to be urban dwellers and those prosperous among the rural

society. However, it has been assumed for this purpose that the urban residents will be major target consumers of the product. According to CSA (2011) the urban population is growing at more than 4% per annum. The country's economy is growing at 11%, the population and income effects are also similar. With such understanding 4% is used to project demand growth. Domestic production is expected to remain at year 2012 level (2,153 tons). Export is forecasted to grow by its average growth rate of the last four years i.e., 55%. The demand projection for roasted coffee is depicted in Table 3.3.

Table 3.3
DEMAND PROJECTION FOR ROASTED COFFEE (TONS)

Year	Domestic Demand	Export Demand	Total Demand	Domestic Production	Total Unsatisfied Demand
2013	2,280	8	2,288	2,153	135
2014	2,371	12	2,383	2,153	230
2015	2,466	19	2,485	2,153	332
2016	2,564	29	2,593	2,153	441
2017	2,667	45	2,712	2,153	559
2018	2,774	70	2,844	2,153	691
2019	2,885	108	2,993	2,153	840
2020	3,000	167	3,167	2,153	1,014
2021	3,120	159	3,279	2,153	1,126
2022	3,245	246	3,491	2,153	1,338

3. Pricing and Distribution

The market price for export quality roasted coffee on average is Birr 190 /kg. Hence, allowing a 20% margin for distributors and retailers, selling price for the project is proposed to be Birr 158 /kg.

As to its distribution, it can be realized through whole sale networks and retail outlets such as supermarkets and shops.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

Based on the outcome of the market study and considering the minimum economic scale of production, the envisaged plant will have a capacity of 100 tons of roasted, ground and packed coffee per annum. This capacity will be attained by working a single shift of 8 hours per day and 300 working days per year.

2. Production Program

With an assumption that enough time during the initial stage will be required for market penetration and technical skill development, the envisaged plant will start production at 80% of its rated capacity which will grow to 90% in the second year. Full capacity will be reached in the third year and onwards. Details of the annual production program are shown in Table 3.3.

Table 3.4
ANNUAL PRODUCTION PROGRAM

Sr. No.	Description	Unit of Measure	Production Year		
			1st	2nd	3rd & Onwards
1	Roasted, ground and packed coffee	ton	80	90	100
2	Capacity utilization rate	%	80	90	100

V. MATERIALS AND INPUTS

A. RAW MATERIALS

The principal raw material required for the envisaged plant is clean green coffee. The green coffee beans, upon roasting process, lose weight due to evaporation of water. The extreme limits of the weight loss termed as “a loss in the fire” are between 14 and 23% of the initial weight of coffee beans. Elimination of the silver skin of coffee beans which amounts from 0.2% to 0.4% and the release of certain volatile elements also occurs during roasting.

Taking the above mentioned weight loss into account, the annual requirement for green coffee at 100 per cent capacity utilization rate is estimated to be $100 \text{ tons} + (0.22 \times 100 \text{ tons}) = 122 \text{ tons}$. To attain the optimum price and taste for the ground coffee, different types of coffee from different areas will be mixed.

The major auxiliary materials required for the production of roasted, ground and packed coffee comprise packing materials of various types. The packing materials to be used by the envisaged plant are paper bag, corrugated paper box with carton panel, and gumming paper. All these auxiliary materials can be locally available.

The proposed package sizes of printed paper bag for packing of roasted and ground coffee are 500 gm, 1,000 gm and 1,500 gm which are planned to constitute 30%, 60% and 10% of the total roasted and ground coffee, respectively.

The annual requirement of the envisaged plant for raw and auxiliary materials at full capacity operation and the corresponding cost estimates are given in Table 4.1.

Table 4.1

ANNUAL RAW AND AUXILIARY MATERIALS REQUIREMENT AND COST

Sr. No.	Description	Unit of Measure	Required Qty	Unit Price, Birr/Unit	Total
1	Clean green coffee	ton	122	115,000.00	14,030.00
2	Paper bag, for 500 gm package	pc	61,800	1.75	108.15
3	Paper bag, for 1,000 gm package	pc	61,800	2.20	135.96
4	Paper bag, for 1,500 gm package	pc	6,867	2.62	17.99
5	Corrugated paper box, for 500 gm package	pc	3,090	4.35	13.44
6	Corrugated paper box, for 1,000 gm package	pc	4,120	6.67	27.48
7	Corrugated paper box, for 1,500 gm package	pc	687	6.70	4.60
8	Gumming paper	roll	lump sum		9.62
Total					14,347.25

B. UTILITIES

Electric power and water are the only power and utilities required for the envisaged plant. The annual requirement for power and utilities at full capacity production of the plant and the total estimated costs are shown in Table 4.2.

Table 4.2

ANNUAL UTILITIES REQUIREMENT AND ESTIMATED COST

Sr. No.	Description	Unit of Measure	Required Qty	Unit Price, Birr/Unit	Cost, ('000 Birr)		
					F.C.	L.C.	Total
1	Electric power	kWh	12,000	0.5778		69.34	69.34
2	Water	m ³	150	10.00		1.50	1.50
Total						70.84	70.84

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The main processing steps in the manufacture of roasted ground coffee are blending, roasting, grinding and packing. Green coffee is cleaned of string, lint, dust, hulls and other foreign matter. The post – cleaning operations of the production process are stated briefly hereunder.

Roasting: Coffee from different varieties or sources is usually blended before or after roasting in order to achieve good taste coffee as well as low cost production.

Roasting by hot combustion gases in roasting cylinders requires 8-15 minutes. The bean charge absorbs heat at a fairly uniform rate and most moisture is removed during the first two-thirds of this period. As the temperature of the coffee increases rapidly during the last few minutes, the beans swell and unfold with a noticeable cracking sound, like that of popping corn, indicating a reaction change from endothermic to exothermic. This stage is known as development of the roast. The final bean temperature, 200-220°C, is determined by the blend, variety, and flavor development desire. A water or air quench terminates the roasting reaction. Most, but not all, of any added water is then evaporated.

The bean temperature, correlated to the color of ground coffee measured by a photometric reflectance instrument, determines the quench end point of a roast. At the final bean temperature, the firing shuts down automatically, followed by water spraying for a timed period and finally, discharge of the coffee.

Air must be circulated through the beans to remove excess heat before the finished and quenched roasted coffee is conveyed to storage bins. Residual foreign matter such as stones and tramp iron, which may have passed through the initial green coffee cleaning operation, must be removed before grinding. This is accomplished by an air lift adjusted to such a high velocity that the roasted coffee beans are carried over into bins above the grinders, and heavier impurities left behind. The coffee beans flow by gravity to mills where they are ground to the desired particle size.

Grinding: Roasted coffee beans are ground to improve the extraction efficiency in the preparation of the beverage. Particle size distributions ranging from about 1100 μ m average (very coarse) to about 500 μ m average (very fine) are tailored by the manufacturer to the various kinds of coffee makers used in house holds, hotels, restaurants and institutions. Coffee is ground in mills that use multiple steel cutting rolls to produce the most desirable uniform particle size distribution. After passing through cracking rolls, the broken beans are fed between two or more rolls, one of which is cut or scored longitudinally, the other, circumferentially. The paired rolls operate at differential speeds to cut, rather than crush, the coffee particles. A second pair of more finely scored rolls, installed below the main grinding rolls and running at higher speeds, is used for finer grinds.

Packaging: - After roasting and grinding, the coffee is conveyed, usually by gravity, to weighing and filling machines that achieve the proper fill by tapping or vibrating. The ground coffee is vacuum packed in flexible paper bag and placed in a paperboard carton that helps shape the bag into a hard brick form during the vacuum process. The carton also protects the package from physical damage during handling and transportation. This type of package provides a barrier to moisture and oxygen.

2. Environmental Impact

The process has no any adverse impact on the environment. Thus, the project is environment friendly.

B. ENGINEERING

1. Machinery and Equipment

The plant machinery and equipment required for the envisaged plant comprises coffee roaster, mixer, grinder, automatic packing machine, screw and goose type conveyor. List of machinery and equipment to be acquired for the project and the estimated costs are given in Table 5.1.

Table 5.1

LIST OF MACHINERY AND EQUIPMENT AND ESTIMATED COST(SETS)

Sr. No.	Description	Required Qty.	Cost, ('000 Birr)		
			F.C.	L.C.	Total
1	Coffee roaster	1	73.66	18.41	92.07
2	Coffee mixer	1	57.29	14.32	71.61
3	Coffee grinder	6	343.73	85.93	429.66
4	Automatic packing machine	2	229.15	57.29	286.44
5	Screw conveyer	1	57.29	14.32	71.61
6	Goose type conveyer	1	57.29	14.32	71.61
			818.40	204.60	1,023.00

2. Land, Buildings and Civil Works

The total area of land required for the envisaged project is 900 m², out of which 500 m² is built-up area. The construction cost of buildings and civil works at a rate of Birr 4,500 per square meter is estimated at Birr 2.25 million.

According to the Federal Legislation on the Lease Holding of Urban Land (Proclamation No 721/2004) in principle, urban land permit by lease is on auction or negotiation basis, however, the time and condition of applying the proclamation shall be determined by the concerned regional or city government depending on the level of development.

The legislation has also set the maximum on lease period and the payment of lease prices. The lease period ranges from 99 years for education, cultural research health, sport, NGO , religious and residential area to 80 years for industry and 70 years for trade while the lease payment period ranges from 10 years to 60 years based on the towns grade and type of investment.

Moreover, advance payment of lease based on the type of investment ranges from 5% to 10%.The lease price is payable after the grace period annually. For those that pay the entire

amount of the lease will receive 0.5% discount from the total lease value and those that pay in installments will be charged interest based on the prevailing interest rate of banks. Moreover, based on the type of investment, two to seven years grace period shall also be provided.

However, the Federal Legislation on the Lease Holding of Urban Land apart from setting the maximum has conferred on regional and city governments the power to issue regulations on the exact terms based on the development level of each region.

In Addis Ababa, the City's Land Administration and Development Authority is directly responsible in dealing with matters concerning land. However, regarding the manufacturing sector, industrial zone preparation is one of the strategic intervention measures adopted by the City Administration for the promotion of the sector and all manufacturing projects are assumed to be located in the developed industrial zones.

Regarding land allocation of industrial zones if the land requirement of the project is below 5000 m², the land lease request is evaluated and decided upon by the Industrial Zone Development and Coordination Committee of the City's Investment Authority. However, if the land request is above 5,000 m² the request is evaluated by the City's Investment Authority and passed with recommendation to the Land Development and Administration Authority for decision, while the lease price is the same for both cases.

Moreover, the Addis Ababa City Administration has recently adopted a new land lease floor price for plots in the city. The new prices will be used as a benchmark for plots that are going to be auctioned by the city government or transferred under the new "Urban Lands Lease Holding Proclamation."

The new regulation classified the city into three zones. The first Zone is Central Market District Zone, which is classified in five levels and the floor land lease price ranges from Birr 1,686 to Birr 894 per m². The rate for Central Market District Zone will be applicable in most areas of the city that are considered to be main business areas that entertain high level of business activities.

The second zone, Transitional Zone, will also have five levels and the floor land lease price ranges from Birr 1,035 to Birr 555 per m². This zone includes places that are surrounding the city and are occupied by mainly residential units and industries.

The last and the third zone, Expansion Zone, is classified into four levels and covers areas that are considered to be in the outskirts of the city, where the city is expected to expand in the future. The floor land lease price in the Expansion Zone ranges from Birr 355 to Birr 191 per m² (see Table 5.2).

Table 5.2
NEW LAND LEASE FLOOR PRICE FOR PLOTS IN ADDIS ABABA

Zone	Level	Floor Price/m ²
Central Market District	1 st	1686
	2 nd	1535
	3 rd	1323
	4 th	1085
	5 th	894
Transitional zone	1 st	1035
	2 nd	935
	3 rd	809
	4 th	685
	5 th	555
Expansion zone	1 st	355
	2 nd	299
	3 rd	217
	4 th	191

Accordingly, in order to estimate the land lease cost of the project profiles it is assumed that all new manufacturing projects will be located in industrial zones located in expansion zones. Therefore, for the profile a land lease rate of Birr 266 per m² which is equivalent to the average floor price of plots located in expansion zone is adopted.

On the other hand, some of the investment incentives arranged by the Addis Ababa City Administration on lease payment for industrial projects are granting longer grace period and extending the lease payment period. The criteria are creation of job opportunity, foreign

exchange saving, investment capital and land utilization tendency, etc. Accordingly, Table 5.3 shows incentives for lease payment.

Table 5.3
INCENTIVES FOR LEASE PAYMENT OF INDUSTRIAL PROJECTS

Scored Point	Grace period	Payment Completion Period	Down Payment
Above 75%	5 Years	30 Years	10%
From 50 - 75%	5 Years	28 Years	10%
From 25 - 49%	4 Years	25 Years	10%

For the purpose of this project profile the average i.e. five years grace period, 28 years payment completion period and 10% down payment is used. The land lease period for industry is 60 years.

Accordingly, the total land lease cost at a rate of Birr 266 per m² is estimated at Birr 239,400 of which 10% or Birr 23,940 will be paid in advance. The remaining Birr 215,460 will be paid in equal installments with in 28 years i.e. Birr 7,695 annually.

NB: The land issue in the above statement narrates or shows only Addis Ababa's city administration land lease price, policy and regulations.

Accordingly the project profile prepared based on the land lease price of Addis Ababa region. To know land lease price, police and regulation of other regional state of the country updated information is available at Ethiopian Investment Agency's website www.eia.gov.et on the factor cost.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENT

A. HUMAN RESOURCE REQUIREMENT

The coffee roasting, grinding and packing plant will create job opportunities for 15 persons. The human resource requirement and the estimated annual labour cost, including fringe benefits, are given in Table 6.1.

Table 6.1
HUMAN RESOURCE REQUIREMENT AND LABOR COST

Sr. No.	Job Title	Required No. of Persons	Salary, Birr	
			Monthly	Annual
1	Plant manager	1	4,000	48,000
2	Secretary	1	800	9,600
3	Personnel	1	850	10,200
4	Accountant	1	800	9,600
5	Cashier	1	800	9,600
6	Salesman	2	1,700	20,400
7	Store keeper	1	800	9,600
8	Purchaser	1	800	9,600
9	Production supervisor	1	1,800	21,600
10	Quality controller	1	1,500	18,000
11	Machine operator	3	2,100	25,200
12	Production worker	4	2,400	28,800
13	Driver	1	750	9,000
14	Guard	3	1,200	14,400
Sub - total		22	20,300	243,600
Employees benefit, 20% of basic salary			4,060	48,720
Grand - total			24,360	292,320

B. TRAINING REQUIREMENT

The quality controller, production supervisor, and 3 operators should be given on-the-job training for duration of two weeks by the advanced expert of the machinery supplier. The total training cost is estimated at Birr 140,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the roasted, grounded and packed coffee project is based on the data presented in the previous chapters and the following assumptions:-

Construction period	1 year
Source of finance	30 % equity 70 % loan
Tax holidays	3 years
Bank interest	10%
Discount cash flow	10%
Accounts receivable	30 days
Raw material local	30 days
Raw material imported	120 days
Work in progress	1 day
Finished products	30 days
Cash in hand	5 days
Accounts payable	30 days
Repair and maintenance	5% of machinery cost

A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at Birr 10.13 million (See Table 7.1). From the total investment cost the highest share (Birr 5.24 million or 51.77%) is accounted by fixed investment cost followed by initial working capital (Birr 3.87 million or 38.23%) and pre operation cost (Birr 1.01 million or 10.01%). From the total investment cost Birr 818.40 thousand or 8.07% is required in foreign currency.

Table 7.1**INITIAL INVESTMENT COST ('000 Birr)**

Sr. No.	Cost Items	Local Cost	Foreign Cost	Total Cost	% Share
1	Fixed investment				
1.1	Land Lease	23.94		23.94	0.24
1.2	Building and civil work	2,250.00		2,250.00	22.20
1.3	Machinery and equipment	204.60	818.4	1,023.00	10.09
1.4	Vehicles	1,500.00		1,500.00	14.80
1.5	Office furniture and equipment	450.00		450.00	4.44
	Sub total	4,428.54	818.40	5,246.94	51.77
2	Pre operating cost *				
2.1	Pre operating cost	351.15		790.00	7.79
2.2	Interest during construction	663.07		663.07	6.54
	Sub total	1,014.22		1,014.22	10.01
3	Working capital **	3,874.39		3,874.39	38.23
	Grand Total	9,317.15	818.40	10,135.55	100.00

* *N.B Pre operating cost include project implementation cost such as installation, startup, commissioning, project engineering, project management etc and capitalized interest during construction.*

** *The total working capital required at full capacity operation is Birr 4.83 million. However, only the initial working capital of Birr 3.87 million during the first year of production is assumed to be funded through external sources. During the remaining years the working capital requirement will be financed by funds to be generated internally (for detail working capital requirement see Appendix 7.A.1).*

B. PRODUCTION COST

The annual production cost at full operation capacity is estimated at Birr 16.55 million (see Table 7.2). The cost of raw material account for 86.64% of the production cost. The other major components of the production cost are depreciation, financial cost and marketing and

distribution, which account for 4.29%, 3.85% and 1.81% respectively. The remaining 3.41 % is the share of labor, utility, repair and maintenance, labor overhead and administration cost. For detail production cost see Appendix 7.A.2.

Table 7.2

ANNUAL PRODUCTION COST AT FULL CAPACITY (year three)

Items	Cost (in 000 Birr)	%
Raw Material and Inputs	14,347.25	86.64
Utilities	70.84	0.43
Maintenance and repair	51.15	0.31
Labour direct	243.60	1.47
Labour overheads	48.72	0.29
Administration Costs	150.00	0.91
Land lease cost	-	-
Cost of marketing and distribution	300.00	1.81
Total Operating Costs	15,211.56	91.86
Depreciation	709.83	4.29
Cost of Finance	638.21	3.85
Total Production Cost	16,559.60	100

C. FINANCIAL EVALUATION

1. Profitability

Based on the projected profit and loss statement, the project will generate a profit through out its operation life. Annual net profit after tax ranges from Birr 1.07 million to Birr 1.87 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 17.60 million. For profit and loss statement and cash flow projection see Appendix 7.A.3 and 7.A.4, respectively.

2. Ratios

In financial analysis financial ratios and efficiency ratios are used as an index or yardstick for evaluating the financial position of a firm. It is also an indicator for the strength and weakness of the firm or a project. Using the year-end balance sheet figures and other relevant data, the most important ratios such as return on sales which is computed by dividing net income by revenue, return on assets (operating income divided by assets), return on equity (net profit divided by equity) and return on total investment (net profit plus interest divided by total investment) has been carried out over the period of the project life and all the results are found to be satisfactory.

3. Break-even Analysis

The break-even analysis establishes a relationship between operation costs and revenues. It indicates the level at which costs and revenue are in equilibrium. To this end, the break-even point for capacity utilization and sales value estimated by using income statement projection are computed as followed.

$$\text{Break Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 5,885,476$$

$$\text{Break Even Capacity utilization} = \frac{\text{Break even Sales Value}}{\text{Sales revenue}} \times 100 = 32\%$$

4. Pay-back Period

The pay-back period, also called pay – off period is defined as the period required for 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 5 years.

5. Internal Rate of Return

The internal rate of return (IRR) is the annualized effective compounded return rate that can be earned on the invested capital, i.e., the yield on the investment. Put another way, the internal rate of return for an investment is the discount rate that makes the net present value of the investment's income stream total to zero. It 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 this project is computed to be 20.98% indicating the viability of the project.

6. 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 in to a common measuring unit i.e. present value. It is a standard method for using the time value of money to appraise 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 6.29 million which is acceptable. For detail discounted cash flow see Appendix 7.A.5.

D. ECONOMIC AND SOCIAL BENEFITS

The project can create employment for 22 persons. The project will generate Birr 4.63 million in terms of tax revenue. The establishment of such factory will have a foreign exchange saving and earning effect to the country by substituting the current imports and exporting its products to the international market. The project will also create backward linkage with the agricultural sector and forward linkage with the hotel and tourism sector and also generates income for the Government in terms of payroll tax.

Appendix 7.A
FINANCIAL ANALYSES SUPPORTING TABLES

Appendix 7.A.1
NET WORKING CAPITAL (in 000 Birr)

Items	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Total inventory	2,869.45	3,228.13	3,586.81	3,586.81	3,586.81	3,586.81	3,586.81	3,586.81	3,586.81	3,586.81
Accounts receivable	1,019.10	1,143.37	1,267.63	1,267.63	1,268.27	1,268.27	1,268.27	1,268.27	1,268.27	1,268.27
Cash-in-hand	5.48	6.17	6.85	6.85	6.96	6.96	6.96	6.96	6.96	6.96
CURRENT ASSETS	3,894.04	4,377.67	4,861.30	4,861.30	4,862.04	4,862.04	4,862.04	4,862.04	4,862.04	4,862.04
Accounts payable	19.65	22.11	24.56	24.56	24.56	24.56	24.56	24.56	24.56	24.56
CURRENT LIABILITIES	19.65	22.11	24.56	24.56	24.56	24.56	24.56	24.56	24.56	24.56
TOTAL WORKING CAPITAL	3,874.39	4,355.56	4,836.73	4,836.73	4,837.48	4,837.48	4,837.48	4,837.48	4,837.48	4,837.48

Appendix 7.A.2
PRODUCTION COST (in 000 Birr)

Item	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Raw Material and Inputs	11,478	12,913	14,347	14,347	14,347	14,347	14,347	14,347	14,347	14,347
Utilities	57	64	71	71	71	71	71	71	71	71
Maintenance and repair	41	46	51	51	51	51	51	51	51	51
Labour direct	195	219	244	244	244	244	244	244	244	244
Labour overheads	39	44	49	49	49	49	49	49	49	49
Administration Costs	120	135	150	150	150	150	150	150	150	150
Land lease cost	0	0	0	0	8	8	8	8	8	8
Cost of marketing and distribution	300	300	300	300	300	300	300	300	300	300
Total Operating Costs	12,229	13,720	15,212	15,212	15,219	15,219	15,219	15,219	15,219	15,219
Depreciation	710	710	710	710	710	135	135	135	135	135
Cost of Finance	0	729	638	547	456	365	274	182	91	0
Total Production Cost	12,939	15,160	16,560	16,468	16,385	15,719	15,628	15,537	15,445	15,354

Appendix 7.A.3
INCOME STATEMENT (in 000 Birr)

Item	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Sales revenue	14,400	16,200	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000
Less variable costs	11,929	13,420	14,912	14,912	14,912	14,912	14,912	14,912	14,912	14,912
VARIABLE MARGIN	2,471	2,780	3,088	3,088	3,088	3,088	3,088	3,088	3,088	3,088
in % of sales revenue	17.16	17.16	17.16	17.16	17.16	17.16	17.16	17.16	17.16	17.16
Less fixed costs	1,010	1,010	1,010	1,010	1,018	443	443	443	443	443
OPERATIONAL MARGIN	1,461	1,770	2,079	2,079	2,071	2,646	2,646	2,646	2,646	2,646
in % of sales revenue	10.15	10.92	11.55	11.55	11.51	14.70	14.70	14.70	14.70	14.70
Financial costs		729	638	547	456	365	274	182	91	0
GROSS PROFIT	1,461	1,040	1,440	1,532	1,615	2,281	2,372	2,463	2,555	2,646
in % of sales revenue	10.15	6.42	8.00	8.51	8.97	12.67	13.18	13.69	14.19	14.70
Income (corporate) tax	0	0	0	459	485	684	712	739	766	794
NET PROFIT	1,461	1,040	1,440	1,072	1,131	1,597	1,661	1,724	1,788	1,852
in % of sales revenue	10.15	6.42	8.00	5.96	6.28	8.87	9.23	9.58	9.93	10.29

Appendix 7.A.4
CASH FLOW FOR FINANCIAL MANAGEMENT (in 000 Birr)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Scrap
TOTAL CASH INFLOW	5,598	18,957	16,202	18,002	18,000	18,000	18,000	18,000	18,000	18,000	18,000	6,874
Inflow funds	5,598	4,557	2	2	0	0	0	0	0	0	0	0
Inflow operation	0	14,400	16,200	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	0
Other income	0	0	0	0	0	0	0	0	0	0	0	6,874
TOTAL CASH OUTFLOW	5,598	16,786	15,845	17,245	17,130	17,072	17,180	17,116	17,052	16,989	16,013	0
Increase in fixed assets	5,598	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	3,894	484	484	0	1	0	0	0	0	0	0
Operating costs	0	11,929	13,420	14,912	14,912	14,919	14,919	14,919	14,919	14,919	14,919	0
Marketing and Distribution cost	0	300	300	300	300	300	300	300	300	300	300	0
Income tax	0	0	0	0	459	485	684	712	739	766	794	0
Financial costs	0	663	729	638	547	456	365	274	182	91	0	0
Loan repayment	0	0	912	912	912	912	912	912	912	912	0	0
SURPLUS (DEFICIT)	0	2,171	357	757	870	928	820	884	948	1,011	1,987	6,874
CUMULATIVE CASH BALANCE	0	2,171	2,528	3,285	4,156	5,083	5,904	6,787	7,735	8,746	10,733	17,608

Appendix 7.A.5
DISCOUNTED CASH FLOW (in 000 Birr)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Scrap
TOTAL CASH INFLOW	0	14,400	16,200	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	6,874
Inflow operation	0	14,400	16,200	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	0
Other income	0	0	0	0	0	0	0	0	0	0	0	6,874
TOTAL CASH OUTFLOW	9,472	12,710	14,202	15,212	15,672	15,704	15,904	15,931	15,958	15,986	16,013	0
Increase in fixed assets	5,598	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	3,874	481	481	0	1	0	0	0	0	0	0	0
Operating costs	0	11,929	13,420	14,912	14,912	14,919	14,919	14,919	14,919	14,919	14,919	0
Marketing and Distribution cost	0	300	300	300	300	300	300	300	300	300	300	0
Income (corporate) tax		0	0	0	459	485	684	712	739	766	794	0
NET CASH FLOW	-9,472	1,690	1,998	2,788	2,328	2,296	2,096	2,069	2,042	2,014	1,987	6,874
CUMULATIVE NET CASH FLOW	-9,472	-7,783	-5,784	-2,996	-668	1,628	3,725	5,794	7,836	9,850	11,837	18,712
Net present value	-9,472	1,536	1,652	2,095	1,590	1,426	1,183	1,062	952	854	766	2,650
Cumulative net present value	-9,472	-7,936	-6,285	-4,190	-2,600	-1,174	9	1,071	2,024	2,878	3,644	6,294

NET PRESENT VALUE 6,294
INTERNAL RATE OF RETURN 20.98%
NORMAL PAYBACK 5 years

