

**59. PROFILE ON THE PRODUCTION OF  
PHARMACEUTICALS**

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## I. SUMMARY

This profile envisages the establishment of a plant for the production of pharmaceuticals with a capacity of 300 million pieces of capsules, 600 million pieces of tablets, 1 million pieces of vial, 500,000 litres of syrup and 40 tons of ointment per annum. Pharmaceuticals are "a chemical substance used in the treatment, cure, prevention, or diagnosis of disease or used to otherwise enhance physical or mental well-being."

The country's requirement of pharmaceuticals is met through import and local production. The present (2012) demand for capsules, tablets, antibiotics, syrup, ointment and injection is estimated at 2.103 billion pieces, 1.071 billion pieces, 15.15 million pieces, 3.06 million liters, 78 tons and 20.07 million pieces, respectively. The demand for capsules, tablets, antibiotics, syrup, ointment and injection is projected to reach 4.504 billion pieces, 2.312 billion pieces, 32.70 million pieces, 6.61 million liters, 169 tons and 43.33 million pieces, by the year 2022.

The principal raw materials required are bulk drugs, which have to be imported.

The total investment cost of the project including working capital is estimated at Birr 227.18 million. From the total investment cost, the highest share (Birr 123.79 million or 54.49%) is accounted by initial working capital followed by fixed investment cost (Birr 87.62 million or 38.57%) and pre operation cost (Birr 15.77 million or 6.94%). From the total investment cost Birr 8.10 million or 3.57% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 31.86% and a net present value (NPV) of Birr 285.90 million, discounted at 10%.

The project can create employment for 713 persons. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports. The project will also create forward linkage with the health sector also generates income for the Government in terms of tax revenue and payroll tax.

## **II. PRODUCTION DESCRIPTION AND APPLICATION**

Pharmaceutical drugs are "a chemical substance used in the treatment, cure, prevention, or diagnosis of disease or used to otherwise enhance physical or mental well-being." Drugs may be prescribed for a limited duration, or on a regular basis for chronic disorders.

The products to be manufactured are identified on the basis of the product mixes of EPHARM, which represents the essential drug lists for the local population. The categories of drugs to be formulated include tablets, capsules, syrups, vials, ampoules and ointment.

Tablets are solid forms of drug which include antibiotics, painkillers and vitamins. Their weight ranges from 25 to 500 mg. Capsules are solid formulations with the powder drug enclosed in a gelatin shell. The shell, which disintegrates after swallowing, serves to mask the taste of the active drug. Capsules are mostly antibiotics.

Syrups are liquid formulations to be administered orally. In addition to the active drug, flavoring agents impart good taste. They are sold in 30-640 ml bottles. Vials are sterile antibiotic powders to be administered intravenously. They are administered after adding them to liquid medium (to form solutions or suspensions). These drugs are sold in 1-500 mg doses filled vials.

Ampoules are sterile liquid antibiotics to be administered intravenously. They are used for injection and are mostly sold in 2 ml glass bottles. Ointments are sterile semi-solid preparations for application to the eye and skin. They are sold in collapsible tubes.

## **III. MARKET STUDY AND PLANT CAPACITY**

### **A. MARKET STUDY**

#### **1. Past Supply and Present Demand**

The demand for pharmaceutical drugs is met through domestic production and imports. However, data on imports of the products are not readily available, as the Annual External Trade Statistics does not indicate most of the products in a separate and manageable pattern for this

document preparation. Thus, the domestic production of the basic and commonly used drugs can be used as best representative in determining present demand for pharmaceuticals. The volume of domestic production of these basic drugs is presented in Table 3.1 below:

**Table 3.1**  
**DOMESTIC PRODUCTION OF BASIC DRUGS**

<b>Year</b>	<b>Capsul (,000 pcs)</b>	<b>Tablets (,000 pcs)</b>	<b>Atnibiotics (,000 pcs)</b>	<b>Syrup (,000 ltr)</b>	<b>Ointment (tons)</b>	<b>Injection of 100A (,000 pcs)</b>
2001	214799	450962	32159	258	59	-
2002	267948	310386	5734	419	30	-
2003	235031	434632	7190	668	37	-
2004	173864	201260	-	24684	-	214
2005	323,113	552,323	15	922	54	-
2006	370,445	602,887	5	191	55	4481
2007	389,997	573,412	25	1638	45	4277
2008	275,781	501,758	25	1653	52	2731
2009	206,085	462,519	66	2534	83	25578
2010	991,731	505,022	7144	1444	37	9464

**Source:-** CSA, *Report on Large and Medium Scale and Electricity Industries Survey, 2011.*

The supply of drugs, which constitutes domestic production, exhibited significant fluctuation over a period of ten years (2001--2010). The statistical record shows that between 2001 and 2004, it showed very oscillating pattern, and in the subsequent three years, it showed an increasing trend, however, it could not continue with the increasing trend but it turned down to reach below a level where it was three years ago. The decline in the domestic production of pharmaceuticals continued until 2008. However, during 2009 and 2010, an abrupt increase in the production of all types of pharmaceuticals was exhibited.

The consumption of drugs is influenced by population growth, income, and the expansion of health facilities. Accordingly, taking into account the 2.9% rate of population growth, the

remarkable rate of economic growth registered in recent years both in urban and rural areas, and the strenuous effort being exerted on the part of the government to expand health facilities and thereby substantially raise the health coverage in the country, the demand for the product is assumed to grow at the rate of 8%.

Thus by taking the 2010 level of local production as a base and applying a growth rate of 8% the current (2012) local production for capsules, tablets, antibiotics, syrup, ointment and injection is estimated at 1.156 billion pieces, 589.05 million pieces, 8.33 million pieces, 1.68 million liters, 43 tons and 11.03 million pieces, respectively.

A survey conducted on some retail drug shops reveals that the market share of domestic production of the pharmaceutical products is roughly in the order of 55%. Therefore the total present (2012) demand for capsules, tablets, antibiotics, syrup, ointment and injection is estimated at 2.103 billion pieces, 1.071 billion pieces, 15.15 million pieces, 3.06 million liters, 78 tons and 20.07 million pieces, respectively.

## **2. Demand Projection**

The above stated 8% growth rate is applied in projecting the demand for pharmaceutical drugs. Assuming existing domestic producers will maintain their market share (55%) by strengthening their own internal capacity, the projected demand and the unsatisfied demand for the products is depicted in Table 3.2.

**Table 3.2****PROJECTED DEMAND FOR PHARMACEUTICAL PRODUCTS**

Year	Project Demand						Unmet Project Demand					
	Capsule (,000 pcs)	Tablets (,000 pcs)	Antibiotics (,000 pcs)	Syrup (,000 ltr)	Ointment (tons)	Injection (,000 pcs)	Capsule (,000 pcs)	Tablets (,000 pcs)	Antibiotics (,000 pcs)	Syrup (,000 ltr)	Ointment (tons)	Injection (,000 pcs)
2013	2,271,446	1,156,695	16,363	3,307	85	21,676	1,022,151	520,513	7,363	1,488	38	9,754
2014	2,453,162	1,249,231	17,672	3,572	92	23,410	1,103,923	562,154	7,952	1,607	41	10,535
2015	2,649,415	1,349,169	19,085	3,858	99	25,283	1,192,237	607,126	8,588	1,736	44	11,377
2016	2,861,368	1,457,103	20,612	4,166	107	27,306	1,287,616	655,696	9,275	1,875	48	12,288
2017	3,090,278	1,573,671	22,261	4,500	115	29,490	1,390,625	708,152	10,017	2,025	52	13,271
2018	3,337,500	1,699,565	24,042	4,860	125	31,849	1,501,875	764,804	10,819	2,187	56	14,332
2019	3,604,500	1,835,530	25,965	5,248	134	34,397	1,622,025	825,988	11,684	2,362	61	15,479
2020	3,892,860	1,982,372	28,042	5,668	145	37,149	1,751,787	892,067	12,619	2,551	65	16,717
2021	4,204,288	2,140,962	30,286	6,122	157	40,121	1,891,930	963,433	13,629	2,755	71	18,055
2022	4,540,632	2,312,239	32,709	6,611	169	43,331	2,043,284	1,040,507	14,719	2,975	76	19,499

### 3. Pricing and Distribution

Providing the price list for all drugs is quite impractical. Accordingly, based on CSA report of the average products price for the year 2009/10 and estimating the current period price, the following prices are proposed for the envisaged plant.

➤ Capsules	Birr 1.29	per piece
➤ Tablets	Birr 0.40	per piece
➤ Antibiotics	Birr 3.25	per piece
➤ Syrup	Birr 5.94	per 200ml
➤ Ointment	Birr 33.25	per 20g
➤ Injection	Birr 1.74	per piece

The envisaged plant can distribute its product through the existing wholesale and retail network.

## B. PLANT CAPACITY AND PRODUCTION PROGRAM

### 1. Plant Capacity

The capacity of the formulation plant, in terms of the maximum rated output of the individual products, is as follows:

- 600 million pcs of Tablet;
- 300 million pcs Capsule;
- 500 thousand liters of Syrup,
- 1 million pcs of Vials;and
- 40,000 kg of Ointment at full capacity utilization of the plant.

### 2. Production Program

The envisaged plant of pharmaceutical formulation will commence production of all its products simultaneously. The proposed production plan will be it starts at 75% & 85% of its full production capacity during the first year and second years of operation and attained its full



capacity in the third year and thereafter. The plant will operate 250 days annually in a single shift.

#### **IV. MATERIALS AND INPUTS**

##### **A. MATERIALS**

The raw materials for the formulation plant are bulk drugs, which have to be imported. The plant annual required raw material quantity and its cost is shown in Table 4.1 given bellow.

**Table 4.1**  
**RAW MATERIAL REQUIREMENTS**

<b>Description</b>	<b>Annual Quantity (tons)</b>	<b>Annual Cost ('000 Birr)</b>		
		<b>F.C</b>	<b>L.C</b>	<b>Total</b>
Bulk Drug	881.28	424,487	181,923	475,891.20

The auxiliary materials constitute a various packing materials such as glass and plastic bottles, rubber stoppers, plastic caps, cartons for outer packaging etc. Total annual cost of packing materials is estimated at Birr 50 million out of which the foreign currency required is 85%.

##### **B. UTILITIES**

The utilities required for the envisaged plant of pharmaceutical formulations are water, electricity and fuel. The estimated annual utilities required and their costs are shown on the Table 4.2.

**Table 4.2****REQUIRED ANNUAL UTILITIES AND THEIR ESTIMATED COST**

<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Rate</b>	<b>Total Cost</b>
Water	m3	25,000.00	10.00	250,000.00
Electricity	MWH	2,246.00	650.00	1,459,900.00
Fuel	lit	405,000.00	12.00	4,860,000.00
<b>Grand Total</b>				<b>6,569,900.00</b>

**V. TECHNOLOGY AND ENGINEERING****A. TECHNOLOGY****1. Production Process**

Basically, the formulation process involves the blending of the different bulk drug constituents in pre-determined proportions. The formulation tablet involves mixing/milling, drying and tableting. The formulation of capsules involves powder mixture preparation, filling into gelatin capsule, and sealing. Liquid syrup formulation involves basically mixing and filling. The manufacture of sterile drugs like vials and ampoules includes, in addition to basic formulation operations, sterilization process.

**2. Environmental Impact**

The production process involves blending of the different bulk drug in pre-determined proportions. Hence, the project does not pose any adverse impact to the environment.

**B. ENGINEERING****1. Machinery Equipment**

The total F.O.B cost of machinery and equipment is estimated at Birr 8.11 million. Assuming insurance and freight represent 15% and inland transport and port handling 10% of the F.O.B

cost, the landed cost will be Birr 10.14 million. The list of production machinery and equipment are presented in Table 5.1.

**Table 5.1**  
**MACHINERY AND EQUIPMENT**

Sr. No.	Type of M/C and Equipment	Qty.
1	<b>Tablet Production Line</b> <ul style="list-style-type: none"> <li>- Mixer (250 kg)</li> <li>- Multi-mill (250 kg)</li> <li>- Tray Dryers (96 Trays)</li> <li>- Fluid bed dryers (120 kg)</li> <li>- Conical Mixer (600 kg)</li> <li>- Tableting M/C</li> <li>- Tablet Inspection Belt</li> <li>- Coating pan</li> <li>- Sifter (20")</li> <li>- Tablet Deduster</li> <li>- Balance &amp; Lab Equipment</li> </ul>	 2 2 2 2 1 5 3 1 1 5 set
2.	<b>Capsule Production Line</b> <ul style="list-style-type: none"> <li>- Paddle mixer</li> <li>- Fritz mill</li> <li>- Tray dryer</li> <li>- Sifter</li> <li>- Filling of sealing m/c</li> <li>- Sorting/ polishing belt</li> <li>- Balances</li> </ul>	 2 2 1 1 3 2 set

Sr. No.	Type of M/C and Equipment	Qty.
3.	<b>Syrup Formulation Line</b> <ul style="list-style-type: none"> <li>- Hoist</li> <li>- Sugar loader</li> <li>- Syrup mixing vessel</li> <li>- Manufacturing Vessel</li> <li>- Staging vessel</li> <li>- Filter press</li> <li>- Colloid mill</li> <li>- Bottle washing, drying, filling, labeling ling</li> </ul>	1 1 2 2 2 2 1 1
4.	<b>Ampoules And Vials Production Line</b> <ul style="list-style-type: none"> <li>- Counter and filler</li> <li>- Packing conveyer</li> <li>- Turn table</li> <li>- Strip packing machine</li> <li>- Defoiler</li> <li>- Dcarton loading</li> </ul>	2 4 1 4 2 2
5.	<b>Packing (For Tablet And Capsule)</b> <ul style="list-style-type: none"> <li>- Counter and filler</li> <li>- Packing conveyer</li> <li>- Turn Table</li> <li>- Strip packing</li> <li>- Defoiler</li> <li>- Carton Coding</li> </ul>	2 4 1 4 2 2
6.	<b>Ointment Formulation Line</b> <ul style="list-style-type: none"> <li>- Wax melting vessel</li> <li>- Ointment mixing vessel</li> <li>- Triple roll mill</li> <li>- Ointment filling /crimpling</li> </ul>	2 2 2 1

Sr. No.	Type of M/C and Equipment	Qty.
	<ul style="list-style-type: none"> <li>- Laminar flow</li> <li>- Steam sterilizer</li> <li>- Dry heat sterilizer</li> <li>- Stat conveyor</li> </ul>	<p style="text-align: center;">1</p> <p style="text-align: center;">1</p> <p style="text-align: center;">1</p> <p style="text-align: center;">1</p>
7.	Boiler for steam generation	1

## 2. Land, Building and Civil Works

The total land plot area required for the project including provision for open space is estimated to be 20,000 m<sup>2</sup>, out of which the building area is 15,000 m<sup>2</sup> that includes building for different formulation lines, stores, offices, and boiler room etc. Based on a unit rate of Birr 5,000 per m<sup>2</sup>, the total cost of building and civil work is estimated at Birr 75 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 5,000 m<sup>2</sup>, 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 m<sup>2</sup>, 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 m<sup>2</sup>. 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 m<sup>2</sup>. 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 m<sup>2</sup> (see Table 5.2).

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

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

<b>Scored Point</b>	<b>Grace Period</b>	<b>Payment Completion Period</b>	<b>Down Payment</b>
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 m<sup>2</sup> is estimated at Birr 5,320,000 of which 10% or Birr 532,000 will be paid in advance. The remaining Birr 4,788,000 will be paid in equal installments with in 28 years i.e. Birr 171,000 annually.

## **VI. HUMAN RESOURCE AND TRAINING REQUIREMENTS**

### **A. HUMAN RESOURCE REQUIREMENT**

The envisaged plant will create jobs for 713 persons. The estimated cost of labor required is Birr 28.71 million (see Table 6.1 for details).



**Table 6.1**  
**HUMAN RESOURCE REQUIREMENT & LABOR COST (BIRR)**

Sr. No.	Category	Quantity	Monthly	Total Monthly	Annual Salary
1	Manager	1	8,000.00	8,000.00	96,000.00
2	Skilled worker				-
3	Supervisor	6	5,000.00	30,000.00	360,000.00
4	Pharmacist	12	5,000.00	60,000.00	720,000.00
5	Chemist	6	5,000.00	30,000.00	360,000.00
6	Technician	5	4,000.00	20,000.00	240,000.00
7	Operators	400	3,000.00	1,200,000.00	14,400,000.00
8	Unskilled Workers	283	2,000.00	566,000.00	6,792,000.00
	<b>Sub-total</b>				22,968,000.00
	Employee benefits (25%)				5,742,000.00
	<b>Total</b>	<b>713</b>		<b>1,914,000.00</b>	<b>28,710,000.00</b>

## **B. TRAINING REQUIREMENT**

Training of one month is proposed on production and quality control to be given for two technical persons. The training will be conducted by foreign experts from machine suppliers and the estimated training cost is Birr 200 thousands.

## **VII. FINANCIAL ANALYSIS**

The financial analysis of the pharmaceutical 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	5 years
Bank interest	10%
Discount cash flow	10%
Accounts receivable	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 227.18 million (see Table 7.1). From the total investment cost, the highest share (Birr 123.79 million or 54.49%) is accounted by initial working capital followed by fixed investment cost (Birr 87.62 million or 38.57%) and pre operation cost (Birr 15.77 million or 6.94%). From the total investment cost Birr 8.10 million or 3.57% is required in foreign currency.

**Table 7.1**

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

Sr. No	Cost Items	Local Cost	Foreign Cost	Total Cost	% Share
<b>1</b>	<b>Fixed investment</b>				
1.1	Land Lease	532.00		532.00	0.23
1.2	Building and civil work	75,000.00		75,000.00	33.01
1.3	Machinery and equipment	2,027.00	8,109.00	10,136.00	4.46
1.4	Vehicles	1,500.00		1,500.00	0.66
1.5	Office furniture and equipment	450.00		450.00	0.20
	<b>Sub total</b>	<b>79,509.00</b>	<b>8,109.00</b>	<b>87,618.00</b>	<b>38.57</b>
<b>2</b>	<b>Pre operating cost *</b>				
2.1	Pre operating cost	906.80		906.80	0.40
2.2	Interest during construction	14,862.25		14,862.25	6.54
	<b>Sub total</b>	<b>15,769.05</b>		<b>15,769.05</b>	<b>6.94</b>
<b>3</b>	<b>Working capital **</b>	<b>123,793.11</b>		<b>123,793.11</b>	<b>54.49</b>
	<b>Grand Total</b>	<b>219,071.16</b>	<b>8,109.00</b>	<b>227,180.16</b>	<b>100</b>

\* *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 177.56 million. However, only the initial working capital of Birr 123.79 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 580.54 million (see Table 7.2). The cost of raw material account for 90.59% of the production cost. The other major components of the production cost are labor, financial cost and utility, which account for 3.96%, 2.11% and 1.13%, respectively. The remaining 2.21% is the share of depreciation, labor overhead, repair and maintenance, and administration cost. For details of production cost see Appendix 7.A.2.

**Table 7.2**

### **ANNUAL PRODUCTION COST AT FULL CAPACITY (year three)**

<b>Items</b>	<b>Cost (in 000 Birr)</b>	<b>%</b>
Raw Material and Inputs	525,891	90.59
Utilities	6,570	1.13
Maintenance and repair	507	0.09
Labor direct	22,968	3.96
Labor overheads	5,742	0.99
Administration Costs	300	0.05
Land lease cost	0	0.00
Cost of marketing and distribution	750	0.13
<b>Total Operating Costs</b>	<b>562,728</b>	<b>96.93</b>
Depreciation	5,554	0.96
Cost of Finance	12,261	2.11
<b>Total Production Cost</b>	<b>580,543</b>	<b>100.00</b>

## C. FINANCIAL EVALUATION

### 1. Profitability

Based on the projected profit and loss statement, the project will generate a profit throughout its operation life. Annual net profit after tax ranges from Birr 41.24 million to Birr 46.97 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 638.49 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.

$$\text{Break- Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 265,876,800$$

$$\text{Break -Even Capacity utilization} = \frac{\text{Break -even Sales Value}}{\text{Sales revenue}} \times 100 = 40\%$$

## 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 3 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 31.86% 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 285.90 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 713 persons. The project will generate Birr 94.51 million in terms of tax revenue. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports. The project will also create forward linkage with the health sector and also generates income for the Government in terms of payroll tax.

**Appendix 7.A**

**FINANCIAL ANALYSES SUPPORTING TABLES**



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

<b>Item</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>	<b>Year 8</b>	<b>Year 9</b>	<b>Year 10</b>	<b>Year 11</b>
Raw Material and Inputs	368,124	420,713	473,302	525,891	525,891	525,891	525,891	525,891	525,891	525,891
Utilities	4,599	5,256	5,913	6,570	6,570	6,570	6,570	6,570	6,570	6,570
Maintenance and repair	355	405	456	507	507	507	507	507	507	507
Labour direct	16,078	18,374	20,671	22,968	22,968	22,968	22,968	22,968	22,968	22,968
Labour overheads	4,019	4,594	5,168	5,742	5,742	5,742	5,742	5,742	5,742	5,742
Administration Costs	210	240	270	300	300	300	300	300	300	300
Land lease cost	0	0	0	0	171	171	171	171	171	171
Cost of marketing and distribution	750	750	750	750	750	750	750	750	750	750
<b>Total Operating Costs</b>	<b>394,135</b>	<b>450,332</b>	<b>506,530</b>	<b>562,728</b>	<b>562,899</b>	<b>562,899</b>	<b>562,899</b>	<b>562,899</b>	<b>562,899</b>	<b>562,899</b>
Depreciation	5,554	5,554	5,554	5,554	5,554	3,045	3,045	3,045	3,045	3,045
Cost of Finance	0	16,348	14,305	12,261	10,218	8,174	6,131	4,087	2,044	0
<b>Total Production Cost</b>	<b>399,688</b>	<b>472,234</b>	<b>526,389</b>	<b>580,543</b>	<b>578,670</b>	<b>574,118</b>	<b>572,075</b>	<b>570,031</b>	<b>567,987</b>	<b>565,944</b>



**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	443,12 8	569,73 6	633,04 0	633,04 0	633,04 0	633,04 0	633,04 0	633,04 0	633,04 0	633,04 0
Less variable costs	393,38 5	449,58 2	505,78 0	561,97 8	561,97 8	561,97 8	561,97 8	561,97 8	561,97 8	561,97 8
<b>VARIABLE MARGIN</b>	<b>49,743</b>	<b>120,15 4</b>	<b>127,26 0</b>	<b>71,062</b>	<b>71,062</b>	<b>71,062</b>	<b>71,062</b>	<b>71,062</b>	<b>71,062</b>	<b>71,062</b>
in % of sales revenue	11.23	21.09	20.10	11.23	11.23	11.23	11.23	11.23	11.23	11.23
Less fixed costs	6,304	6,304	6,304	6,304	6,475	3,966	3,966	3,966	3,966	3,966
<b>OPERATIONAL MARGIN</b>	<b>43,440</b>	<b>113,85 0</b>	<b>120,95 6</b>	<b>64,759</b>	<b>64,588</b>	<b>67,096</b>	<b>67,096</b>	<b>67,096</b>	<b>67,096</b>	<b>67,096</b>
in % of sales revenue	9.80	19.98	19.11	10.23	10.20	10.60	10.60	10.60	10.60	10.60
Financial costs		16,348	14,305	12,261	10,218	8,174	6,131	4,087	2,044	0
<b>GROSS PROFIT</b>	<b>43,440</b>	<b>97,502</b>	<b>106,65 1</b>	<b>52,497</b>	<b>54,370</b>	<b>58,922</b>	<b>60,965</b>	<b>63,009</b>	<b>65,053</b>	<b>67,096</b>
in % of sales revenue	9.80	17.11	16.85	8.29	8.59	9.31	9.63	9.95	10.28	10.60
Income (corporate) tax	0	0	0	0	0	17,677	18,290	18,903	19,516	20,129
<b>NET PROFIT</b>	<b>43,440</b>	<b>97,502</b>	<b>106,65 1</b>	<b>52,497</b>	<b>54,370</b>	<b>41,245</b>	<b>42,676</b>	<b>44,106</b>	<b>45,537</b>	<b>46,967</b>
in % of sales revenue	9.80	17.11	16.85	8.29	8.59	6.52	6.74	6.97	7.19	7.42

**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
<b>TOTAL CASH INFLOW</b>	<b>88,525</b>	<b>583,153</b>	<b>569,932</b>	<b>633,236</b>	<b>633,040</b>	<b>633,040</b>	<b>633,040</b>	<b>633,040</b>	<b>633,040</b>	<b>633,040</b>	<b>633,040</b>	<b>237,231</b>
Inflow funds	88,525	140,025	196	196	0	0	0	0	0	0	0	0
Inflow operation	0	443,128	569,736	633,040	633,040	633,040	633,040	633,040	633,040	633,040	633,040	0
Other income	0	0	0	0	0	0	0	0	0	0	0	237,231
<b>TOTAL CASH OUTFLOW</b>	<b>88,525</b>	<b>534,159</b>	<b>504,988</b>	<b>559,142</b>	<b>613,296</b>	<b>593,569</b>	<b>609,185</b>	<b>607,755</b>	<b>606,324</b>	<b>604,894</b>	<b>583,028</b>	<b>0</b>
Increase in fixed assets	88,525	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	125,162	17,871	17,871	17,871	17	0	0	0	0	0	0
Operating costs	0	393,385	449,582	505,780	561,978	562,149	562,149	562,149	562,149	562,149	562,149	0
Marketing and Distribution cost	0	750	750	750	750	750	750	750	750	750	750	0
Income tax	0	0	0	0	0	0	17,677	18,290	18,903	19,516	20,129	0
Financial costs	0	14,862	16,348	14,305	12,261	10,218	8,174	6,131	4,087	2,044	0	0
Loan repayment	0	0	20,436	20,436	20,436	20,436	20,436	20,436	20,436	20,436	0	0
<b>SURPLUS (DEFICIT)</b>	<b>0</b>	<b>48,993</b>	<b>64,944</b>	<b>74,094</b>	<b>19,744</b>	<b>39,471</b>	<b>23,855</b>	<b>25,285</b>	<b>26,716</b>	<b>28,146</b>	<b>50,012</b>	<b>237,231</b>
<b>CUMULATIVE CASH BALANCE</b>	<b>0</b>	<b>48,993</b>	<b>113,937</b>	<b>188,031</b>	<b>207,775</b>	<b>247,246</b>	<b>271,100</b>	<b>296,386</b>	<b>323,101</b>	<b>351,247</b>	<b>401,260</b>	<b>638,491</b>

**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
<b>TOTAL CASH INFLOW</b>	<b>0</b>	<b>443,128</b>	<b>569,736</b>	<b>633,040</b>	<b>633,040</b>	<b>633,040</b>	<b>633,040</b>	<b>633,040</b>	<b>633,040</b>	<b>633,040</b>	<b>633,040</b>	<b>237,231</b>
Inflow operation	0	443,128	569,736	633,040	633,040	633,040	633,040	633,040	633,040	633,040	633,040	0
Other income	0	0	0	0	0	0	0	0	0	0	0	237,231
<b>TOTAL CASH OUTFLOW</b>	<b>212,318</b>	<b>411,810</b>	<b>468,008</b>	<b>524,206</b>	<b>562,745</b>	<b>562,899</b>	<b>580,575</b>	<b>581,189</b>	<b>581,802</b>	<b>582,415</b>	<b>583,028</b>	<b>0</b>
Increase in fixed assets	88,525	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	123,793	17,676	17,676	17,676	17	0	0	0	0	0	0	0
Operating costs	0	393,385	449,582	505,780	561,978	562,149	562,149	562,149	562,149	562,149	562,149	0
Marketing and Distribution cost	0	750	750	750	750	750	750	750	750	750	750	0
Income (corporate) tax		0	0	0	0	0	17,677	18,290	18,903	19,516	20,129	0
<b>NET CASH FLOW</b>	<b>-212,318</b>	<b>31,318</b>	<b>101,728</b>	<b>108,834</b>	<b>70,295</b>	<b>70,141</b>	<b>52,465</b>	<b>51,851</b>	<b>51,238</b>	<b>50,625</b>	<b>50,012</b>	<b>237,231</b>
<b>CUMULATIVE NET CASH FLOW</b>	<b>-212,318</b>	<b>181,000</b>	<b>-79,272</b>	<b>29,562</b>	<b>99,857</b>	<b>169,998</b>	<b>222,463</b>	<b>274,314</b>	<b>325,553</b>	<b>376,178</b>	<b>426,190</b>	<b>663,422</b>
Net present value	-212,318	28,471	84,073	81,769	48,013	43,552	29,615	26,608	23,903	21,470	19,282	91,463
Cumulative net present value	-212,318	183,847	-99,775	-18,006	30,007	73,559	103,174	129,782	153,685	175,155	194,437	285,900

NET PRESENT VALUE                   285,900  
INTERNAL RATE OF RETURN       31.86%  
NORMAL PAYBACK                     3 years