

**31. PROFILE ON THE PRODUCTION OF CANDLE  
WAX (ARTIFICIAL WAX)**

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## **I. SUMMARY**

This profile envisages the establishment of a plant for the production of candle wax (artificial wax) with a capacity of 200 tons per annum. Waxes are used in the manufacturing of candles for religious or decorative purposes, and in polishes, matches, waxed paper, and cosmetics. Waxes are also used in the manufacture of rust preventives, rubber antioxidants, electrical insulators, paper coatings, printing inks, textile finishes, leather dressings, and waxed containers for food.

Since there are no local producers of candle wax the demand for the product is entirely met through import. The present (2012) demand for the product is estimated at 145 tons per annum. The demand is projected to reach 185 tons and 236 tons by the year 2017 and year 2022, respectively.

Major raw materials required are seed of soy bean, bleaching earth and Ni catalyst. Soya bean is available locally while the other raw materials have to be imported.

The total investment cost of the project including working capital is estimated at Birr 8.78 million. From the total investment cost ,the highest share (Birr 6.44 million or 73.41%) is accounted by fixed investment cost followed by initial working capital (1.42 million or 16.15%) and pre operation cost (Birr 916.35 thousand or 10.44%). From the total investment cost Birr 2.36 million or 26.97% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 23.31%and a net present value (NPV) of Birr 8.29 million, discounted at 10%.

The project can create employment for 38 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 and back ward linkage with the manufacturing sector and agricultural sector, respectively and also generates income for the Government in terms of tax revenue and payroll tax.

## II. PRODUCT DESCRIPTION AND APPLICATION

Wax, name applied originally to natural occurring esters of fatty acids and monohydric alcohols, but now to both natural and manufactured (artificial) products resembling these esters. All such materials have a dull luster and somewhat soapy or greasy texture. They soften gradually on heating, going through a soft malleable state before ultimately forming a liquid. Fats and oils resemble waxy esters but differ in that they are formed from glycerol; a trihydric alcohol.

Waxes are of different types which include animal wax, insect wax, vegetable wax and artificial wax. Most commercial waxes now come from petroleum, such as paraffin wax. Paraffin wax is a mixture of saturated hydrocarbons of high molecular mass, produced during refining of petroleum.

Waxes are used in the manufacture of candles for religious or decorative purposes, and in polishes, matches, waxed paper, and cosmetics. Waxes are also used in the manufacture of rust preventives, rubber antioxidants, electrical insulators, paper coatings, printing inks, textile finishes, leather dressings, and waxed containers for food. This range of products requires waxes of different melting points, as well as of different gloss, hardness, tensile, strength, water resistance, and ductility.

This profile envisaged Soy wax which is vegetable source. Soy wax is actually a pure vegetable wax that has been demanding the candle making spotlight recently. Soy wax is 100% and completely natural and biodegradable, a very clean burn and produces no petro-carbon soot, non-toxic and environmentally friendly. It is made from renewable resources and safe around children and pets. It provides a longer burn time because it burns slower and cooler than paraffin waxes. It has a descent cold scent throw in candles.

### III. MARKET STUDY AND PLANT CAPACITY

#### A. MARKET STUDY

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

Ethiopia imports a variety of waxes (vegetable wax, bees and other insect waxes, animal waxes, paraffin wax, and artificial waxes) from different parts of the world. Most of the country's requirement of wax is met by the import of paraffin wax. A considerable amount of artificial wax is also imported to fulfill specific requirements. According to the Ethiopian Revenues and Customs Authority, external trade statistics, Ethiopia imports two types of artificial waxes, namely artificial waxes of modified lignite and artificial waxes of poly (oxyethylene or polyethylene glycol). Import of artificial waxes (excluding paraffin, animal, bee & other insect and vegetable) for the past twelve years is shown in Table 3.1.

**Table 3.1**  
**IMPORT OF ARTIFICIAL WAX**

<b>Year</b>	<b>Quantity (Tons)</b>	<b>Value (`000 Birr)</b>
2000	26.6	2,020
2001	15.2	328
2002	7.7	122
2003	9.5	255
2004	30.4	568
2005	45.2	912
2006	14.0	273
2007	131.7	1,671
2008	197.7	1,584
2009	276.6	3,563
2010	58.4	1,995
2011	65.5	3,200

*Source: - Ethiopian Revenue and Customs Authority.*

As could be seen from Table 3.1, import of artificial wax during the period 2000--2006 was relatively small compared to the period between 2007--2009 as well as to the period 2010/2011. The yearly average level of import during the period 2000--2006 was 21.2 tons. A very high jump of import was registered during the three consecutive years of 2007--2009. During this period the yearly average level of import has reached at 202 tons. When compared to the previous seven years yearly average it is almost ten times higher. However, the situation does not stay long and the imported quantity again fell to an annual average of 62 tons during the years 2010 and 2011.

Although it is difficult to arrive at accurate figures of forecast due to the highly erratic nature of the data it can be safely concluded that the average of the past five years would represent the current effective demand for the product. Accordingly, the current effective demand for artificial wax is estimated at 145 tons.

## **2. Demand Projection**

The demand for artificial wax is directly related with the expansion of the user industries indicated in the product description section. The development of the user industries is in turn influenced by the demand of the products they produce. Generally, due to population growth, income rise and urbanization; the demand for the various products which are to be based on waxes will definitely increase. However, the types of waxes required differ according to the intended uses. Hence, to be conservative demand for artificial wax is assumed to grow by only 5% for the coming ten years. The forecasted demand up to the year 2022 is given in Table 3.2.

**Table 3.2****PROJECTED DEMAND FOR ARTIFICIAL WAX (TONS)**

<b>Year</b>	<b>Projected Demand</b>
2013	152
2014	160
2015	168
2016	176
2017	185
2018	194
2019	204
2020	214
2021	225
2022	236

The demand for artificial wax will grow from 152 tons in the year 2013 to 185 tons and 236 tons by the year 2017 and 2022, respectively.

### **3. Pricing and Distribution**

The data collected from ERCA indicates that the average CIF price per ton of artificial waxes in the year 2011 was Birr 48,855. Allowing 20% for customs duty and other import related expenses a factory gate price of Birr 58,626 per ton is recommended for the project. For the byproduct i.e. oil cake a factory gate price of Birr 100 per quintal is considered.

Currently, the product is mainly imported by the end user industries. The major end users of the product are enterprises engaged in the manufacture of chemical products. Hence, since the end users are limited and found mainly in the major cities of the country the distribution channel proposed is direct sale to the end users without involving other intermediaries.

## B. PLANT CAPACITY AND PRODUCTION PROGRAM

### 1. Plant Capacity

Considering the period of implementation of the project, market penetration and skill development, and other technical and financial factors, the envisaged soy wax processing plant is recommended to have a capacity of 200 tons per year of 300 working days.

### 2. Production Program

The envisaged soy wax processing plant will start its operation at 70% of its full capacity and progressively grow and reach full capacity operation at the fourth year and then after. The low capacity operation at the early stage of the project life is due to time required for market penetration and skill development. The production program of the envisaged project is given in Table 3.3.

**Table 3.3**  
**PRODUCTION PROGRAM**

<b>Year of Production</b>	<b>1<sup>st</sup> Year</b>	<b>2<sup>nd</sup> Year</b>	<b>3<sup>rd</sup> Year</b>	<b>4<sup>th</sup> -10<sup>th</sup></b>
Production in %	70%	80%	90%	100
Soy wax	140	160	180	200
Oil cake for animal feed (tons)	700	800	900	1,000

## IV. MATERIALS AND INPUTS

### A. RAW MATERIALS

The raw material required by the envisaged soy wax production plant comprises seed of soy bean for oil extraction, bleaching earth for bleaching of the oil before hydrogenation, Ni catalyst for

hydrogenation stage. Packaging materials are required for delivering this product. The annual materials requirement and cost of the plant is given in Table 4.1. The total annual cost of raw material is estimated at Birr 7,619,278.

**Table 4.1**  
**ANNUAL CONSUMPTION OF RAW MATERIALS AND COST**

Description	Unit of measure	Qty.	Cost in '000 Birr		
			F.C	L.C	T.C
Soy bean	tons	1,200	-	6,960.00	6,960.00
Bleaching earth	tons	3	-	19.28	19.28
Ni catalyst	tons	10	240	-	240.00
Plastic drum of 200kg	pcs	2,000	400	-	400.00
<b>Total</b>			<b>640</b>	<b>6,979.28</b>	<b>7,619.28</b>

## B. UTILITIES

Utilities required for production of soy wax include electric power, potable and cooling water, and steam (see Table 4.2). The total annual cost of utilities is estimated at Birr 531,184.

**Table 4.2**  
**ANNUAL CONSUMPTION OF UTILITIES AND COST**

Description	Unit of Measure	Qty.	Cost in '000 Birr
Electricity	kWh	64,800	37.584
Furnace oil	lt	32,500	483.600
Water	m <sup>3</sup>	1,000	10.000
<b>Total</b>			<b>531.184</b>

## **V. TECHNOLOGY AND ENGINEERING**

### **A. TECHNOLOGY**

#### **1. Production Process**

Soy wax is produced from soybean oil but may contain other non-soy ingredients. Soybean oil is separated from the solid components by solvent extraction or by mechanical pressing. This raw oil will be further refined and bleached. About 60 kg of soybeans are required to produce 10 kg of soybean oil. The soy solids, which remain after oil extraction, can be used as cattle feed. To make the soybean oil more solid (to make wax of it) it is hydrogenated.

Hydrogenation is the process whereby the poly- and monounsaturated oils are solidified in order to increase the viscosity. This is done by reaction of hydrogen with the oil at elevated temperature (140-225°C) in the presence of a nickel catalyst. It is important to stir the mixture to help dissolve and achieve a uniform distribution of the catalyst with the oil.

#### **2. Environmental Impact**

The envisaged plant shall adopt the latest technology to minimize the waste to be generated at the source but the waste water to be generated during production process shall be treated in a waste water treatment plant before disposing it to the environment to avert the possible adverse impact on environment. The investment cost of the waste water treatment unit is included in the cost of machinery and equipment.

### **B. ENGINEERING**

#### **1. Machinery and Equipment**

The list of production machinery and equipment required for the plant is provided in Table 5.1. The total cost of plant machinery and equipment is estimated at Birr 2,841.2 thousand, out of which Birr 2,367.7 thousand will be required in foreign currency.

**Table 5.1****LIST OF PRODUCTION MACHINERY AND EQUIPMENT**

<b>Sr.No.</b>	<b>Description</b>	<b>Quantity</b>
1	Bucket elevator	1
2	Screw conveyor	1
3	Automatic weigher	1
4	Magnetic drum	1
5	Seed cleaner	1
7	Oil press	1
8	Oil pump	2
9	Filter press	2
10	Overflow tank	1
11	Filtering oil tank	2
12	Balance tank	1
13	Filtered oil storage tank	1
14	Bleaching feed pump	1
15	Oil heater	1
16	Bleaching earth feeding system	1
17	Oil bleaching earth mixer	1
18	Bleacher	1
19	Hydrogenation tank	1set
20	Boiler unit	1set
21	Waste water treatment unit	1set

## **2. Land, Building and Civil Works**

The total area required by the envisaged project will be 2,000 m<sup>2</sup>. The built-up area of the plant will be 600 m<sup>2</sup>. The plant will have production buildings, stores, office buildings and other civil structures. The total cost of buildings and civil works shall be Birr 3,000,000.

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**

<b>Zone</b>	<b>Level</b>	<b>Floor Price/m<sup>2</sup></b>
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 532,000 of which 10% or Birr 53,200 will be paid in advance. The remaining Birr 478,800 will be paid in equal installments with in 28 years i.e. Birr 17,100 annually.

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

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

The total human resource requirement of the plant will be 38. The total annual cost of human resource is estimated at Birr 694,500. The monthly and annual salaries and wages are summarized in Table 6.1.

**Table 6.1****HUMAN RESOURCE REQUIREMENT AND COST (BIRR)**

<b>Sr. No.</b>	<b>Description</b>	<b>No. of Persons</b>	<b>Monthly Salary</b>	<b>Annual Salary</b>
	Manager	1	6,000	72,000
	Secretary	1	1,200	14,400
	Personnel	1	2,000	24,000
	Sales man	1	2,000	24,000
	Purchaser	1	2,000	24,000
	Store keeper	1	800	9,600
	Accountant	1	2,000	24,000
	Production Supervisors	3	4,500	54,000
	Operators	9	10,800	129,600
	Assistant Operators	9	8,100	97,200
	Mechanic	2	2,400	28,800
	Electrician	2	2,400	28,800
	Guard	3	1,200	14,400
	Cleaner and Messenger	3	900	10,800
	<b>Sub-total</b>	<b>38</b>	<b>46,300</b>	<b>555,600</b>
	Employees benefit (25% of basic salary)		11,575	138,900
	<b>Total</b>		<b>57,875</b>	<b>694,500</b>

**B. TRAINING REQUIREMENT**

Supervisors, operators, mechanics and electricians shall take on-the-job training on the operation and maintenance of machineries and equipment by the experts of machinery supplier during plant erection and commissioning period. Therefore, the cost of training is estimated at Birr 50,000.

## VII. FINANCIAL ANALYSIS

The financial analysis of the candle wax 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 8.78 million (see Table 7.1). From the total investment cost, the highest share (Birr 6.44 million or 73.41%) is accounted by fixed investment cost followed by initial working capital (1.42 million or 16.15%) and pre operation cost (Birr 916.35 thousand or 10.44%). From the total investment cost Birr 2.36 million or 26.97% 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	53.20		53.20	0.61
1.2	Building and civil work	3,000.00		3,000.00	34.17
1.3	Machinery and equipment	473.50	2,367.70	2,841.20	32.37
1.4	Vehicles	450.00		450.00	5.13
1.5	Office furniture and equipment	100.00		100.00	1.14
	<b>Sub total</b>	<b>4,076.70</b>	<b>2,367.70</b>	<b>6,444.40</b>	<b>73.41</b>
<b>2</b>	<b>Pre operating cost *</b>				
2.1	Pre operating cost	342.06		342.06	3.90
2.2	Interest during construction	574.29		574.29	6.54
	<b>Sub total</b>	<b>916.35</b>		<b>916.35</b>	<b>10.44</b>
<b>3</b>	<b>Working capital **</b>	<b>1,417.69</b>		<b>1,417.69</b>	<b>16.15</b>
	<b>Grand Total</b>	<b>6,410.74</b>	<b>2,367.70</b>	<b>8,778.44</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 2.11 million. However, only the initial working capital of Birr 1.41 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 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 10.76 million (see Table 7.2). The cost of raw material account for 68.57% of the production cost. The other major components of the production cost are depreciation, financial cost and utility, which account for 8.57%, 5.53% and 4.78%, respectively. The remaining 12.55% is the share of 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 FOUR)**

<b>Items</b>	<b>Cost</b>	<b>%</b>
Raw Material and Inputs	7,619.28	68.57
Utilities	531.18	4.78
Maintenance and repair	140.00	1.26
Labour direct	555.60	5.56
Labour overheads	138.90	1.39
Administration Costs	150.00	1.35
Land lease cost	-	-
Cost of marketing and distribution	300.00	3.00
<b>Total Operating Costs</b>	<b>9,434.96</b>	<b>85.91</b>
Depreciation	856.65	8.57
Cost of Finance	473.79	5.53
<b>Total Production Cost</b>	<b>10,765.40</b>	<b>100</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 will grow from Birr 1.37 million to Birr 2.20 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 19.48 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.

$$\text{Break -Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 4,809,970$$

$$\text{Break -Even Capacity utilization} = \frac{\text{Break-even Sales Value}}{\text{Sales revenue}} \times 100 = 36.59\%$$

## 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 4 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 23.31% 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 8.29 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 38 persons. The project will generate Birr 5.67 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 and back ward linkage with the manufacturing sector and agricultural sector respectively and also generates income for the Government in terms of tax revenue and 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	5,333	6,095	6,857	7,619	7,619	7,619	7,619	7,619	7,619	7,619
Utilities	372	425	478	531	531	531	531	531	531	531
Maintenance and repair	98	112	126	140	140	140	140	140	140	140
Labour direct	439	478	556	556	556	556	556	556	556	556
Labour overheads	110	119	139	139	139	139	139	139	139	139
Administration Costs	105	120	135	150	150	150	150	150	150	150
Land lease cost	0	0	0	0	17	17	17	17	17	17
Cost of marketing and distribution	300	300	300	300	300	300	300	300	300	300
<b>Total Operating Costs</b>	<b>6,757</b>	<b>7,650</b>	<b>8,591</b>	<b>9,435</b>	<b>9,452</b>	<b>9,452</b>	<b>9,452</b>	<b>9,452</b>	<b>9,452</b>	<b>9,452</b>
Depreciation	857	857	857	857	857	130	130	130	130	130
Cost of Finance	0	632	553	474	395	316	237	158	79	0
<b>Total Production Cost</b>	<b>7,614</b>	<b>9,138</b>	<b>10,000</b>	<b>10,765</b>	<b>10,704</b>	<b>9,898</b>	<b>9,819</b>	<b>9,740</b>	<b>9,661</b>	<b>9,582</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	8,907	10,180	11,452	12,725	12,725	12,725	12,725	12,725	12,725	12,725
Less variable costs	6,457	7,350	8,291	9,135	9,135	9,135	9,135	9,135	9,135	9,135
<b>VARIABLE MARGIN</b>	<b>2,450</b>	<b>2,830</b>	<b>3,161</b>	<b>3,590</b>	<b>3,590</b>	<b>3,590</b>	<b>3,590</b>	<b>3,590</b>	<b>3,590</b>	<b>3,590</b>
in % of sales revenue	27.51	27.80	27.60	28.21	28.21	28.21	28.21	28.21	28.21	28.21
Less fixed costs	1,157	1,157	1,157	1,157	1,174	447	447	447	447	447
<b>OPERATIONAL MARGIN</b>	<b>1,294</b>	<b>1,674</b>	<b>2,005</b>	<b>2,433</b>	<b>2,416</b>	<b>3,143</b>	<b>3,143</b>	<b>3,143</b>	<b>3,143</b>	<b>3,143</b>
in % of sales revenue	14.52	16.44	17.51	19.12	18.99	24.70	24.70	24.70	24.70	24.70
Financial costs		632	553	474	395	316	237	158	79	0
<b>GROSS PROFIT</b>	<b>1,294</b>	<b>1,042</b>	<b>1,452</b>	<b>1,959</b>	<b>2,021</b>	<b>2,827</b>	<b>2,906</b>	<b>2,985</b>	<b>3,064</b>	<b>3,143</b>
in % of sales revenue	14.52	10.23	12.68	15.40	15.88	22.22	22.84	23.46	24.08	24.70
Income (corporate) tax	0	0	0	588	606	848	872	895	919	943
<b>NET PROFIT</b>	<b>1,294</b>	<b>1,042</b>	<b>1,452</b>	<b>1,372</b>	<b>1,415</b>	<b>1,979</b>	<b>2,034</b>	<b>2,089</b>	<b>2,145</b>	<b>2,200</b>
in % of sales revenue	14.52	10.23	12.68	10.78	11.12	15.55	15.99	16.42	16.85	17.29

**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
<b>TOTAL CASH INFLOW</b>	<b>6,786</b>	<b>10,944</b>	<b>10,184</b>	<b>11,457</b>	<b>12,725</b>	<b>12,725</b>	<b>12,725</b>	<b>12,725</b>	<b>12,725</b>	<b>12,725</b>	<b>12,725</b>	<b>4,539</b>
Inflow funds	6,786	2,037	4	4	0	0	0	0	0	0	0	0
Inflow operation	0	8,907	10,180	11,452	12,725	12,725	12,725	12,725	12,725	12,725	12,725	0
Other income	0	0	0	0	0	0	0	0	0	0	0	4,539
<b>TOTAL CASH OUTFLOW</b>	<b>6,786</b>	<b>8,794</b>	<b>9,273</b>	<b>10,136</b>	<b>11,489</b>	<b>11,343</b>	<b>11,406</b>	<b>11,350</b>	<b>11,295</b>	<b>11,240</b>	<b>10,395</b>	<b>0</b>
Increase in fixed assets	6,786	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	1,462	202	202	202	100	0	0	0	0	0	0
Operating costs	0	6,457	7,350	8,291	9,135	9,152	9,152	9,152	9,152	9,152	9,152	0
Marketing and Distribution cost	0	300	300	300	300	300	300	300	300	300	300	0
Income tax	0	0	0	0	588	606	848	872	895	919	943	0
Financial costs	0	574	632	553	474	395	316	237	158	79	0	0
Loan repayment	0	0	790	790	790	790	790	790	790	790	0	0
<b>SURPLUS (DEFICIT)</b>	<b>0</b>	<b>2,150</b>	<b>911</b>	<b>1,321</b>	<b>1,236</b>	<b>1,382</b>	<b>1,319</b>	<b>1,374</b>	<b>1,430</b>	<b>1,485</b>	<b>2,330</b>	<b>4,539</b>
<b>CUMULATIVE CASH BALANCE</b>	<b>0</b>	<b>2,150</b>	<b>3,061</b>	<b>4,382</b>	<b>5,618</b>	<b>7,000</b>	<b>8,320</b>	<b>9,694</b>	<b>11,124</b>	<b>12,609</b>	<b>14,939</b>	<b>19,478</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>8,907</b>	<b>10,180</b>	<b>11,452</b>	<b>12,725</b>	<b>12,725</b>	<b>12,725</b>	<b>12,725</b>	<b>12,725</b>	<b>12,725</b>	<b>12,725</b>	<b>4,539</b>
Inflow operation	0	8,907	10,180	11,452	12,725	12,725	12,725	12,725	12,725	12,725	12,725	0
Other income	0	0	0	0	0	0	0	0	0	0	0	4,539
<b>TOTAL CASH OUTFLOW</b>	<b>8,204</b>	<b>6,955</b>	<b>7,848</b>	<b>8,789</b>	<b>10,123</b>	<b>10,058</b>	<b>10,300</b>	<b>10,324</b>	<b>10,348</b>	<b>10,371</b>	<b>10,395</b>	<b>0</b>
Increase in fixed assets	6,786	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	1,418	198	198	198	100	0	0	0	0	0	0	0
Operating costs	0	6,457	7,350	8,291	9,135	9,152	9,152	9,152	9,152	9,152	9,152	0
Marketing and Distribution cost	0	300	300	300	300	300	300	300	300	300	300	0
Income (corporate) tax		0	0	0	588	606	848	872	895	919	943	0
<b>NET CASH FLOW</b>	<b>-8,204</b>	<b>1,952</b>	<b>2,332</b>	<b>2,663</b>	<b>2,602</b>	<b>2,666</b>	<b>2,425</b>	<b>2,401</b>	<b>2,377</b>	<b>2,354</b>	<b>2,330</b>	<b>4,539</b>
<b>CUMULATIVE NET CASH FLOW</b>	<b>-8,204</b>	<b>-6,252</b>	<b>-3,920</b>	<b>-1,256</b>	<b>1,346</b>	<b>4,012</b>	<b>6,437</b>	<b>8,838</b>	<b>11,215</b>	<b>13,569</b>	<b>15,899</b>	<b>20,438</b>
Net present value	-8,204	1,775	1,927	2,001	1,777	1,656	1,369	1,232	1,109	998	898	1,750
Cumulative net present value	-8,204	-6,429	-4,502	-2,501	-723	932	2,301	3,533	4,642	5,640	6,538	8,288

NET PRESENT VALUE                    8,288  
INTERNAL RATE OF RETURN            23.31%  
NORMAL PAYBACK                        4 years