

## **129. PROFILE ON THE PRODUCTION OF CARPET**

**TABLE OF CONTENTS**

		<b><u>PAGE</u></b>
I.	SUMMARY	129-2
II.	PRODUCT DESCRIPTION & APPLICATION	129-3
III.	MARKET STUDY AND PLANT CAPACITY	129-3
	A. MARKET STUDY	129-3
	B. PLANT CAPACITY & PRODUCTION PROGRAMME	129-6
IV.	MATERIALS AND INPUTS	129-6
	A. RAW & AUXILIARY MATERIALS	129-6
	B. UTILITIES	129-7
V.	TECHNOLOGY & ENGINEERING	129-7
	A. TECHNOLOGY	129-7
	B. ENGINEERING	129-8
VI.	HUMAN RESOURCE & TRAINING REQUIREMENT	129-12
	A. HUMAN RESOURCE REQUIREMENT	129-12
	B. TRAINING REQUIREMENT	129-13
VII.	FINANCIAL ANALYSIS	129-14
	A. TOTAL INITIAL INVESTMENT COST	129-14
	B. PRODUCTION COST	129-15
	C. FINANCIAL EVALUATION	129-16
	D. ECONOMIC AND SOCIAL BENEFITS	129-18

## I. SUMMARY

This profile envisages the establishment of a plant for the production of carpet with a capacity of 20,000 m<sup>2</sup> per annum. Carpet is a textile floor covering consisting of an upper layer of "pile" attached to a backing.

The demand for carpets is met through imports and domestic production. The present (2012) demand for carpet is estimated at 473.7 tons or 363,304 sq.ms. The demand for carpet is projected to reach 762.92 tons or 585,105 sq.ms and 1,228.69 tons or 942,317 sq.ms by the year 2017 and 2022, respectively.

The principal raw materials required are cotton and acrylic yarns which are locally available.

The total investment cost of the project including working capital is estimated at Birr 18.73 million. From the total investment cost the highest share (Birr 15.63 million or 83.44%) is accounted by fixed investment cost followed by pre operation cost (1.95 million or 10.41%) and initial working capital (Birr 1.15 million or 6.16%). From the total investment cost Birr 10.44 million or 55.73% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 21.22% and a net present value (NPV) of Birr 9.72 million discounted at 10%.

The project can create employment for 24 persons. The establishment of such factory will have a foreign exchange earning effect through export and a foreign exchange saving effect to the country by substituting the current imports. The project will also create backward linkage with textile manufacturing subsector and also generates income for the Government in terms of tax revenue and payroll tax.

## **II. PRODUCT DESCRIPTION AND APPLICATION**

A carpet is a textile floor covering consisting of an upper layer of "pile" attached to a backing. The pile is generally either made from wool or a manmade fibre such as polypropylene, nylon or polyester and usually consists of twisted tufts which are often heat-treated to maintain their structure.

The carpet is produced on a loom quite similar to woven cloth. The pile can be plush or berber. Plush carpet is a cut pile and berber carpet is a loop pile. There are new styles of carpet combining the two styles called cut and loop carpeting. Normally many colored yarns are used and this process is capable of producing intricate patterns from pre-determined designs. These carpets are usually the most expensive due to the relatively slow speed of the manufacturing process.

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

### **A. MARKET STUDY**

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

The demand for carpets is met through imports and domestic production. The total domestic supply (domestic consumption) of carpets (i.e. imported and domestically produced net of exports), during 2000 - 2011 is depicted in Table 3.1. Carpets are mainly supplied from domestic production. Imports of the product, on the average, covered about 20% of the total supply during the period under consideration. Exports of carpets are negligible in the sense that they accounted for mere 0.1% of domestic production.

As shown in Table 3.1, total domestic supply of carpets varied from 4,880 square meters in 2009 to 4,004,755 sq. meters in 2004. Imports, domestic production, exports and total domestic supply of the product averaged at 1,520,936 sq. meters, 1,312,498 sq. meters, 1471 sq. meters, and 1,644,123 sq. meters, respectively, during the period under reference.

**Table 3.1**  
**TOTAL DOMESTIC SUPPLY OF CARPETS**

Year	Import		Domestic production		Export		Total Domestic Supply	
	tons	Sq.mt	tons	Sq.mt	tons	Sq.mt	tons	Sq.mt
2000	131	50,472	0	0			131.00	50,472
2001	158	92,858	4,779	2,590,218	0.06	1	4,937.06	2,683,077
2002	118	88,188	1,855	1,005,410	9.86	3,708	1,982.86	1,097,306
2003	225	126,113	2,000	1,084,000	11.34	6,019	2,236.34	1,216,132
2004	386	167,205	7,070	3,831,940	5.62	5,610	7,461.62	4,004,755
2005	184.4	302,344	4,809	2,606,478	0.30	5	4,993.70	2,908,827
2006	490.4	298,189	4,416	2,393,472	0.14	57	4,906.54	2,691,718
2007	824	318,482	2,921	1,583,182	0.76	357	3,745.76	1,902,021
2008	396	417,985	1,209	655,278	0.04	103	1,605.04	1,073,366
2009	513	4,568		0	0.83	312	513.83	4,880
2010	807	1,520,936		0	0.06	3	807.06	1,520,939
2011	935	575,976		0	0.81	3	935.81	575,979
<b>Average</b>	430.65	330,276	3,229	1,312,498	2.71	1471	2,854.72	1,644,123

*Source: - Ethiopian Revenues & Customs Authority, for Imports and Export.*

*- CSA, for Domestic Production.*

As could be seen from Table 3.1, there is a substantial growth in the imports of carpets. Total imports of the product (in tons) on the average grew at the rate of 35.5% annually during the reference period. To determine the present unsatisfied demand for the product average import of the period under consideration is first assumed to reflect the demand for the year 2011. Then, a modest estimate of average annual growth rate of 10% is applied to arrive at the current (year 2012) unsatisfied demand for the product. Thus, the current unsatisfied demand for the product is estimated at 473.7 tons (363,304 square metres).

## 2. Projected Demand

Demand for carpets is mainly influenced by population growth, urbanization, economic growth (rise in income of the population). Given the rapid population and economic growth, and the rate of urbanization in the country as well as the substantially high average rate of growth of imports of the product (35.5%) observed during 2000-2011, a modest estimate of 10% average annual growth rate is considered in projecting the unsatisfied demand for carpets. The projected future unsatisfied demand for the product is shown in Table 3.2.

**Table 3.2**

**PROJECTED UNSATISFIED DEMAND FOR CARPETS (TONS/SQ.M)**

Year	Projected Demand	
	Ton	Sq.mt
2013	521.09	399,634
2014	573.20	439,598
2015	630.51	483,558
2016	693.57	531,913
2017	762.92	585,105
2018	839.22	643,615
2019	923.14	707,977
2020	1,015.45	778,774
2021	1,117.00	856,652
2022	1,228.69	942,317

## 3. Pricing and Distribution

According to CSA Report on Large and Medium Scale Manufacturing and Electricity Industries Survey, the average producer's price of carpet in 2010 was Birr 463.04 per sq.mt. Allowing a modest estimate of an annual 10% rise in prices, the factory gate price for the envisaged plant is estimated at Birr 560.28 per sq.mt.

The envisaged plant can use the existing wholesale and retail channel to distribute its product.

## B. PLANT CAPACITY AND PRODUCTION PROGRAMME

### 1. Plant Capacity

Based on the market study and minimum economies of scale, the production capacity of the plant is proposed to be 20,000 m<sup>2</sup>.

### 2. Production Programme

The plant will produce at 75% of its capacity during the first year, 90% in the second year and full capacity in the third year and then after. The plant will operate 300 days in a year and one shift of 8 hours per day. The low capacity utilization of the plant at the start up period is due to marketing and other technical factors like skill and experience. The production programme is indicated in Table 3.3.

**Table 3.3**  
**ANNUAL PRODUCTION PROGRAMME**

No.	Description	Production year		
		1	2	3
1	Capacity utilization rate ( %)	75	90	100
2	Carpet (met. Sq)	15,000.00	18,000.00	20,000.00

## IV. MATERIALS AND INPUTS

### A. RAW MATERIALS

The major raw material required for carpet is cotton and acrylic yarns. Other raw materials required in small amount are adhesives, and jute. Among the raw materials, cotton yarn and jute are locally available from jute and textile producing factories operating in the country. The total annual cost of raw material for the project at full capacity operation is estimated at Birr 4,646,000.00. The raw material requirements and costs are shown in Table 4.1.

**Table 4.1****RAW MATERIALS REQUIREMENT AND COST**

No.	Raw Material	Description	Annual Input(KG)	Cost ( '000 Birr )		
				FC	LC	Total Cost
1	Backing					
1.1	Cotton yarn	count 16/3	12,400	-	3,720	3,720
1.2	Jute	Long Fiber	20,000	-	33	33
2	Facing					
2.1	Acrylic yarn	count 21/7	25,000	468.75	156	625
3	Adhesive	Latex Type	As req.	186.00	82	268
<b>Grand Total</b>			<b>-</b>	<b>654.75</b>	<b>3,991</b>	<b>4,646</b>

**B. UTILITIES**

Utilities required by the plant include electricity and water. Quantities required and associated costs are given in Table 4.2.

**Table 4.2****UTILITIES REQUIREMENT (AT FULL CAPACITY)**

Sr. No.	Items	Qty.	Cost Birr
1	Electricity (KWH)	125,000	71,975
2	Water (m <sup>3</sup> )	10,000	100,000
	<b>Total</b>		<b>171,975</b>

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

The type of carpet that is envisaged to be produced in the factory has got two main parts; the backing and the face. Each part can be made from different kinds of materials depending on the chosen design and quality. The backing can be jute or cotton. The face is mostly from acrylic.



The yarn is put on a creel (a bar with skewers) behind the tufting machine, and then fed into a nylon tube that leads to the tufting needle. The needle pierces the primary backing and pushes the yarn down into a loop. Photoelectric sensors control how deeply the needles plunge into the backing, so the height of the loops can be controlled. A looper, or flat hook, seizes and releases the loop of yarn while the needle pulls back up; the backing is shifted forward and the needle once more pierces the backing further on. To make cut pile, a looper facing the opposite direction is fitted with a knife that acts like a pair of scissors, snipping the loop. This process is carried out by several hundred needles (up to 1,200 across the 12 foot (3.7 m) width), and several hundred rows of stitches are carried out per minute. One tufting machine can thus produce several hundred square yards of carpet a day.

## **2. Environmental Impact Assessment**

The process does not produce wastes that can be harmful to the environment. Hence, there is no additional investment required for environmental protection.

## **B. ENGINEERING**

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

The production of the carpet can be done using several kinds of processing machinery depending on factors like productivity, cost and working area requirement. The choice of machinery for this project was done by taking most of the above set of factors. The total cost of machinery and equipment is estimated at Birr 12.46 million out of which Birr 10.44 million is required in foreign currency. The list of selected machinery for the envisaged project is presented in Table 5.1.

**Table 5.1****MACHINERY AND EQUIPMENT REQUIREMENT AND COST**

<b>S/N</b>	<b>Description</b>	<b>Qty</b>
1	Tufting Machine for cut & loop piles, high speed, attachment for patterns, complete with accessories( 4 mm width type)	1
2	Cone winding machine	1
3	Latex Sprayer	1

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

The total land area required is 800 m<sup>2</sup> of which the total built-up area of the plant is estimated to be 400 m<sup>2</sup>. The cost of building and civil work at the rate of Birr 5,000 per m<sup>2</sup> is estimated at Birr 2 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 212,800 of which 10% or Birr 21,280 will be paid in advance. The remaining Birr 191,520 will be paid in equal installments with in 28 years i.e. Birr 6,840 annually.

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

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

The envisaged plant requires 24 workers for one shift. Of these nine are technical workers. The total yearly salary and benefit amounts to Birr 676,800. The details are shown in Table 6.1.

**Table 6.1****HUMAN RESOURCE REQUIREMENTS & ANNUAL LABOUR COST**

No	Job Title	No. of Persons	Salary (Birr)	
			Monthly	Annual (`000 Birr)
1	Manager	1	4,000	48.00
2	Textile Technologist	1	1000	12.00
3	Technicians	3	2,500	90.00
4	Helper Technicians	3	2,500	90.00
5	Operators	2	2,500	60.00
6	Administrator	1	2000	24.00
7	Accountant	1	2000	24.00
8	Cashier	1	1000	12.00
9	Purchaser	1	1500	18.00
10	Store keeper	1	1000	12.00
11	Salesman	1	1500	18.00
12	Driver	1	1500	18.00
13	Guard	5	1500	90.00
14	Cleaners	2	2000	48.00
	<b>Sub – Total</b>	<b>24</b>		<b>564.00</b>
	Employee's Benefit 20% basic salary			112.80
	<b>Grand Total</b>			<b>676.80</b>

**B. TRAINING REQUIREMENT**

On the job demonstration of the operation of the machine would be enough for workers with background knowledge on textile machines. No special training is required.

## VII. FINANCIAL ANALYSIS

The financial analysis of the carpet 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
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 18.73 million (See Table 7.1). From the total investment cost the highest share (Birr 15.63 million or 83.44%) is accounted by fixed investment cost followed by pre operation cost (1.95 million or 10.41%) and initial working capital (Birr 1.15 million or 6.16%). From the total investment cost Birr 10.44 million or 55.73% 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	21.28		21.28	0.11
1.2	Building and civil work	2,000.00		2,000.00	10.68
1.3	Machinery and equipment	2,020.00	10,440.00	12,460.00	66.51
1.4	Vehicles	900.00		900.00	4.80
1.5	Office furniture and equipment	250.00		250.00	1.33
	<b>Sub total</b>	<b>5,191.28</b>	<b>10,440.00</b>	<b>15,631.28</b>	<b>83.44</b>
<b>2</b>	<b>Pre operating cost *</b>				
2.1	Pre operating cost	723.80		723.80	3.86
2.2	Interest during construction	1,225.61		1,225.61	6.54
	<b>Sub total</b>	<b>1,949.41</b>		<b>1,949.41</b>	<b>10.41</b>
<b>3</b>	<b>Working capital **</b>	<b>1,153.69</b>		<b>1,153.69</b>	<b>6.16</b>
	<b>Grand Total</b>	<b>8,294.38</b>	<b>10,440.00</b>	<b>18,734.38</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 1.67 million. However, only the initial working capital of Birr 1.15 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 10.35 million (see Table 7.2). The cost of raw material account for 44.88% of the production cost. The other major components of the production cost are depreciation, financial cost, labour, and repair and maintenance which account for 28.22%, 9.77%, 5.45% and 3.61% respectively. The remaining 8.07% is the share of utility, marketing and distribution, labour overhead and administration cost. For detail production cost see Appendix 7.A.2.



**Table 7.2****ANNUAL PRODUCTION COST AT FULL CAPACITY (year three)**

<b>Items</b>	<b>Cost (000 Birr)</b>	<b>%</b>
Raw Material and Inputs	4,646	44.88
Utilities	172	1.66
Maintenance and repair	374	3.61
Labour direct	564	5.45
Labour overheads	113	1.09
Administration Costs	200	1.93
Land lease cost	0	0.00
Cost of marketing and distribution	350	3.38
<b>Total Operating Costs</b>	<b>6,419</b>	<b>62.01</b>
Depreciation	2,922	28.22
Cost of Finance	1,011	9.77
<b>Total Production Cost</b>	<b>10,352</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 will grow from Birr 738 thousand to Birr 3.41 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 25.46 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.

$$\text{Break Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 4,790,520$$

$$\text{Break Even Capacity utilization} = \frac{\text{Break even Sales Value}}{\text{Sales revenue}} \times 100 = 55.04 \%$$

## 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 21.22% 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 9.72 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 24 persons. The project will generate Birr 7.50 million in terms of tax revenue. The establishment of such factory will have a foreign exchange earning effect through export and a foreign exchange saving effect to the country by substituting the current imports. The project will also create backward linkage with textile manufacturing subsector also generates other income for the Government.

**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	3,252	3,717	4,181	4,646	4,646	4,646	4,646	4,646	4,646	4,646
Utilities	120	138	155	172	172	172	172	172	172	172
Maintenance and repair	262	299	337	374	374	374	374	374	374	374
Labour direct	395	451	508	564	564	564	564	564	564	564
Labour overheads	79	90	102	113	113	113	113	113	113	113
Administration Costs	140	160	180	200	200	200	200	200	200	200
Land lease cost	0	0	0	0	7	7	7	7	7	7
Cost of marketing and distribution	350	350	350	350	350	350	350	350	350	350
<b>Total Operating Costs</b>	<b>4,598</b>	<b>5,205</b>	<b>5,812</b>	<b>6,419</b>	<b>6,426</b>	<b>6,426</b>	<b>6,426</b>	<b>6,426</b>	<b>6,426</b>	<b>6,426</b>
Depreciation	2,922	2,922	2,922	2,922	2,922	105	105	105	105	105
Cost of Finance	0	1,348	1,180	1,011	843	674	506	337	169	0
<b>Total Production Cost</b>	<b>7,520</b>	<b>9,475</b>	<b>9,914</b>	<b>10,352</b>	<b>10,190</b>	<b>7,205</b>	<b>7,036</b>	<b>6,868</b>	<b>6,699</b>	<b>6,531</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	7,984	10,265	11,406	11,406	11,406	11,406	11,406	11,406	11,406	11,406
Less variable costs	4,248	4,855	5,462	6,069	6,069	6,069	6,069	6,069	6,069	6,069
<b>VARIABLE MARGIN</b>	<b>3,736</b>	<b>5,410</b>	<b>5,944</b>	<b>5,337</b>	<b>5,337</b>	<b>5,337</b>	<b>5,337</b>	<b>5,337</b>	<b>5,337</b>	<b>5,337</b>
in % of sales revenue	46.79	52.70	52.11	46.79	46.79	46.79	46.79	46.79	46.79	46.79
Less fixed costs	3,272	3,272	3,272	3,272	3,279	462	462	462	462	462
<b>OPERATIONAL MARGIN</b>	<b>464</b>	<b>2,138</b>	<b>2,672</b>	<b>2,065</b>	<b>2,058</b>	<b>4,875</b>	<b>4,875</b>	<b>4,875</b>	<b>4,875</b>	<b>4,875</b>
in % of sales revenue	5.81	20.83	23.43	18.11	18.05	42.74	42.74	42.74	42.74	42.74
Financial costs		1,348	1,180	1,011	843	674	506	337	169	0
<b>GROSS PROFIT</b>	<b>464</b>	<b>790</b>	<b>1,492</b>	<b>1,054</b>	<b>1,216</b>	<b>4,201</b>	<b>4,370</b>	<b>4,538</b>	<b>4,707</b>	<b>4,875</b>
in % of sales revenue	5.81	7.69	13.09	9.24	10.66	36.83	38.31	39.79	41.26	42.74
Income (corporate) tax	0	0	0	316	365	1,260	1,311	1,361	1,412	1,463
<b>NET PROFIT</b>	<b>464</b>	<b>790</b>	<b>1,492</b>	<b>738</b>	<b>851</b>	<b>2,941</b>	<b>3,059</b>	<b>3,177</b>	<b>3,295</b>	<b>3,413</b>
in % of sales revenue	5.81	7.69	13.09	6.47	7.46	25.78	26.82	27.85	28.89	29.92

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

<b>Item</b>	<b>Year 1</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>	<b>Scrap</b>
<b>TOTAL CASH INFLOW</b>	<b>16,355</b>	<b>10,418</b>	<b>10,273</b>	<b>11,414</b>	<b>11,406</b>	<b>11,406</b>	<b>11,406</b>	<b>11,406</b>	<b>11,406</b>	<b>11,406</b>	<b>11,406</b>	<b>4,083</b>
Inflow funds	16,355	2,434	8	8	0	0	0	0	0	0	0	0
Inflow operation	0	7,984	10,265	11,406	11,406	11,406	11,406	11,406	11,406	11,406	11,406	0
Other income	0	0	0	0	0	0	0	0	0	0	0	4,083
<b>TOTAL CASH OUTFLOW</b>	<b>16,355</b>	<b>7,032</b>	<b>8,407</b>	<b>8,845</b>	<b>9,600</b>	<b>9,319</b>	<b>10,045</b>	<b>9,928</b>	<b>9,810</b>	<b>9,692</b>	<b>7,888</b>	<b>0</b>
Increase in fixed assets	16,355	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	1,208	168	168	168	1	0	0	0	0	0	0
Operating costs	0	4,248	4,855	5,462	6,069	6,076	6,076	6,076	6,076	6,076	6,076	0
Marketing and Distribution cost	0	350	350	350	350	350	350	350	350	350	350	0
Income tax	0	0	0	0	316	365	1,260	1,311	1,361	1,412	1,463	0
Financial costs	0	1,226	1,348	1,180	1,011	843	674	506	337	169	0	0
Loan repayment	0	0	1,685	1,685	1,685	1,685	1,685	1,685	1,685	1,685	0	0
<b>SURPLUS (DEFICIT)</b>	<b>0</b>	<b>3,386</b>	<b>1,866</b>	<b>2,568</b>	<b>1,806</b>	<b>2,087</b>	<b>1,361</b>	<b>1,478</b>	<b>1,596</b>	<b>1,714</b>	<b>3,518</b>	<b>4,083</b>
<b>CUMULATIVE CASH BALANCE</b>	<b>0</b>	<b>3,386</b>	<b>5,251</b>	<b>7,820</b>	<b>9,626</b>	<b>11,713</b>	<b>13,073</b>	<b>14,552</b>	<b>16,148</b>	<b>17,863</b>	<b>21,380</b>	<b>25,463</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>7,984</b>	<b>10,265</b>	<b>11,406</b>	<b>11,406</b>	<b>11,406</b>	<b>11,406</b>	<b>11,406</b>	<b>11,406</b>	<b>11,406</b>	<b>11,406</b>	<b>4,083</b>
Inflow operation	0	7,984	10,265	11,406	11,406	11,406	11,406	11,406	11,406	11,406	11,406	0
Other income	0	0	0	0	0	0	0	0	0	0	0	4,083
<b>TOTAL CASH OUTFLOW</b>	<b>17,509</b>	<b>4,759</b>	<b>5,366</b>	<b>5,973</b>	<b>6,736</b>	<b>6,791</b>	<b>7,686</b>	<b>7,737</b>	<b>7,787</b>	<b>7,838</b>	<b>7,888</b>	<b>0</b>
Increase in fixed assets	16,355	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	1,154	161	161	161	1	0	0	0	0	0	0	0
Operating costs	0	4,248	4,855	5,462	6,069	6,076	6,076	6,076	6,076	6,076	6,076	0
Marketing and Distribution cost	0	350	350	350	350	350	350	350	350	350	350	0
Income (corporate) tax		0	0	0	316	365	1,260	1,311	1,361	1,412	1,463	0
<b>NET CASH FLOW</b>	<b>-17,509</b>	<b>3,225</b>	<b>4,899</b>	<b>5,433</b>	<b>4,670</b>	<b>4,615</b>	<b>3,720</b>	<b>3,669</b>	<b>3,619</b>	<b>3,568</b>	<b>3,518</b>	<b>4,083</b>
<b>CUMULATIVE NET CASH FLOW</b>	<b>-17,509</b>	<b>14,284</b>	<b>-9,385</b>	<b>-3,951</b>	<b>719</b>	<b>5,334</b>	<b>9,054</b>	<b>12,723</b>	<b>16,342</b>	<b>19,910</b>	<b>23,428</b>	<b>27,511</b>
Net present value	-17,509	2,932	4,049	4,082	3,190	2,866	2,100	1,883	1,688	1,513	1,356	1,574
Cumulative net present value	-17,509	14,577	-10,528	-6,446	-3,256	-390	1,709	3,592	5,280	6,794	8,150	9,724

NET PRESENT VALUE                    9,724  
INTERNAL RATE OF RETURN            21.22%  
NORMAL PAYBACK                        5 years