90. PROFILE ON THE PRODUCTION RUBBER THREADS AND CHORDS

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I. SUMMARY

This profile envisages the establishment of a plant for the production of rubber threads and chords with a capacity of 150 tons per annum. Rubber threads and chords are primarily used to manufacture various types of elastic tapes mainly for foundation garments like briefs, trunks and panties.

The demand for Rubber threads and chords is entirely met through import. The present (2012) demand for Rubber threads and chords is estimated at 169,877 kg. The demand for Rubber threads and chords is projected to reach 273,588 kg and 440,617 kg by the year 2017 and 2022, respectively.

The principal raw materials required are natural rubber latex, potassium oleate, soap solution, sulphur dispersion, zinc oxide dispersion, potassium hydroxide solution, vulcator ZDC dispersion, Nonax dispersion SP, and coloring matter and coagulate (acetic acid which have) to be imported.

The total investment cost of the project including working capital is estimated at Birr 48.16 million. From the total investment cost, the highest share (Birr 40.63 million or 84.37%) is accounted by fixed investment cost followed by pre operation cost (Birr 4.45 million or 9.26%) and initial working capital (Birr 3.07 million or 6.38%). From the total investment cost Birr 27.75 million or 57.62% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 27.45% and a net present value (NPV) of Birr 40.59 million discounted at 10%.

The project can create employment for 40 persons. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports. The project will create forward linkage with the textile sub sector and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTION AND APPLICATION

Rubber threads and chords are primarily used to manufacture various types of elastic tapes mainly for foundation garments like briefs, trunks and panties. They are also used in elastic types for shorts, skirts, sportswear, sock tops, shoe uppers, head bands and wrist bands for sportsmen and travel goods.

Rubber threads and cords products come in different types, sizes and colors with high quality assurance so as to satisfy the various demands of customers. Rubber threads are suitable product line ranges from rubber threads for the production of socks, stockings, trouser bands, lingerie to all kinds of the rubber bands, used for the textile industry and all related industries and are ideal for textile industry that requires softness and swiftness

III. MARKET STUDY AND PLANT CAPCITY

A. MARKET STUDY

1. Past Supply and Present Demand

The local demand for rubber threads and chords is met through import. The amount of the product imported during the period 2002 – 2011 is shown in Table 3.1.

Table 3.1
IMPORTED RUBBER THREAD AND CORDS (KG)

Year	Import
2002	28,289
2003	53,441
2004	60,791
2005	41,392
2006	53,131
2007	87,328
2008	77,929
2009	61,549
2010	168,315
2011	129,677

Source:- *Ethiopian Revenues & Customs Authority****.***

As can be seen from Table 3.1, the total import or apparent consumption of rubber threads and cords during the period 2002--2011 has ranged from 28,289 kg to 168,315 kg. On average during the period under consideration 76,184 tons of rubber threads and cords were annually imported. During the period of 2002--2011the total import of rubber threads and cords has registered an average annual growth rate of 31%.

For estimating the present effective demand for the products under consideration, it is assumed that the average annual growth rate registered in the apparent consumption of the product during 2002--2011 will continue in the near future. Accordingly, taking the 2011 level of apparent consumption as a base and applying a growth rate of 31%, the present (2012) demand for rubber threads and cords is estimated at 169,877 kg.

2. Demand Projection

According to the GTP, during the period 2010/11--2014/15 the real GDP of the country (at a base case scenario) is expected to grow at an average annual growth rate of 11.2%. Moreover, during the same period the annual average planned targets of growth for the industrial sector is 20%. Accordingly, by considering the above factors the demand for rubber threads and cords is conservatively assumed to grow at a rate of 10%. Projected demand is presented in Table 3.2.

Table 3.2

PROJECTED DEMAND FOR RUBBER THREAD AND CHORDS (KG)

Year	Projected Demand
2013	186,865
2014	205,551
2015	226,106
2016	248,717
2017	273,588
2018	300,947
2019	331,042
2020	364,146
2021	400,561
2022	440,617
2023	484,679
2024	533,146
2025	586,461

3. Pricing and Distribution

The retail price of common rubber thread used for notes is Birr 18 per 50 gm. The recommended price for the new project under study is Birr 12 per 50 gm.

Distribution of rubber threads and cords would be handled through the existing wholesale channel as well as own retail shops. After commencing of full operation the distribution channel will expand by dealing with new sales agents.

B. PLANT CAPACITY AND PRODUCION PROGRAM

1. Plant Capacity

Considering the economic and manageable scale of manufacturing process the production capacity of the rubber thread and cord plant is set to be 150 tons per annum .The envisaged plant will operate in two shifts sixteen hours per day for three hundred days within a year considering 13 holidays and 52 Sundays per year and assuming that maintenance activities will be performed during off hours and Sundays.

2. Production Program

The plant will operate at 65 % of its installed capacity in the first year of operation. During the second, third and fourth year and then after it will operate at 75%, 85% and 100%, respectively. The low capacity utilization during the early years of operation is due the time required for skill development and market penetration. For details see Table 3.3.

Table 3.3

ANNUAL PRODUCTION PROGRAM

Description	Production Year			
	1	2	3	4
Capacity utilization rate (%)	65	75	85	100
Rubber thread and cord (ton)	97.5	112.5	127.5	150

IV. MATERIALS AND INPUTS

A. MATERIALS

The raw and auxiliary materials of the project are natural rubber latex, potassium oleate, soap solution, sulphur dispersion, zinc oxide dispersion, potassium hydroxide solution, vulcator ZDC dispersion, Nonax dispersion SP, and coloring matter and coagulate (acetic acid). All the raw materials have to be imported. The annual requirement and related cost of the raw materials at full capacity operation is shown in Table 4.

Table 4.1

ANNUAL RAW MATERIAL REQUIREMENT&COST

Sr. No.	Description	Annual Consumption	UOM	Unit Cost (Birr	Cost ("000) Birr		
					LC	FC	Total (Birr)
1	Natural rubber latex	110	ton	45,000		4,961.25	4,961.25
2	Potassium oleate	8	ton	27,000		202.50	202.50
3	Sulphur dispersion	60	ton	54,000		3,240.00	3,240.00
4	Soap solution	8	ton	25,000		200.00	200.00
5	potassium hydroxide	15	ton	27,000		405.00	405.00
6	Zinc oxide	60	ton	28,800		1,728.00	1,728.00
7	coloring pigments	8	ton	22,500		168.75	168.75
8	Coagulate (acetic	8	ton	14,400		108.00	108.00
9	Volcafor zdc	8	ton	45,000		337.50	337.50
Total FOB						**11,351.00**	**11,351.00**
10	CIF (15%)				1,702.65		1,702.65
Total Annual Cost					**1,702.65**	**11,351.00**	**13,053.65**

B. UTILITES

The main utility of the envisaged plant are electricity and water. Annual cost of utilities is Birr 2.664 million. Annual consumption of utilities and related cost at full capacity operation is shown in Table 4.2.

Table 4.2

ANNUAL UTILITIES REQUIREMENT & COST

Sr. No.	Description	Annual Consumption	UOM	Unit Cost (Birr)	Total Cost (`000 Birr)
1	Electricity	3,960,000	kWh	0.58	2,296.80
2	water	45,000	m^3	10	450.00
Total Cost					**2,746.80**

V. TECHNOLOGY AND ENGINNERING

A. TECHNOLOGY

1. Production Process

The natural rubber latex is deammonized with moist and warm air just below the surface of latex while it is agitated with paddle type agitator machine. This mixture is used in the manufacture of compounding latex. Then its maturation is done at a temperature between 30 to 40oC, by slow agitation (10-20 r.p.m).

After the process of maturation has been completed, the mixture is cooled to below 20oC and strained through a nylon gauge or fine silk. The air bubbles are removed from the mixture by applying vacuum to storage tank. The phenomenon is an important step in the process, because only air free mixture can successfully be used for the manufacture of threads. After removal of air from the mix, it passes through filter into a small feed tank, charged into a manifold reading to capillaries for extrusion into the acid bath.

In the extrusion, the maintenance of constant pressure is necessary. Variation in pressure inevitably results in a thread of a non-uniform dimension. In this process, the rate of extrusion must be fast. Great care must be exercised to control not only pressure, mixture, viscosity, concentration of coagulant, immersion on depth, the angle capillaries and tension under which the threads are transformed for washing and cleaning. If these factors are not controlled, then

the quality of the threads may be changed. Finally, the threads are sent for acid bath and then vulcanized by using hot air after washing with warm water.

2. Environmental Impact

The envisaged plant is a manufacturing plant with no chemical or any hazardous waste to the surrounding environment and process scrapes and wastes will be recycled or sold to the surrounding market for different application to be further processed. So, there will not be additional investment for environmental protection.

B. ENGINNERING

1. Machinery and Equipment

Total cost of machinery and equipment is Birr 31,920.15. The list of machinery and equipments required for the envisaged plant together with their associated cost is shown in Table 5.1.

Table 5.1

LIST OF MACHINERY & EQUIPMENT AND COST

Sr. No.	Description	Qty.	UOM	Unit Cost (Birr)	Cost (`000 Birr)		
					LC	FC	Total (Birr)
1	Rubber mixing machine	1.00	pcs	5,400,000		5,400.00	5,400.00
2	Rubber latex extrusion machine	2.00	pcs	2,700,000		5,400.00	5,400.00
3	Rubber cord extrusion machine	1.00	pcs	1,800,000		1,800.00	1,800.00
4	Vulcanizing chamber	2.00	pcs	540,000		1,080.00	1,080.00
5	Deamonization equipment	2.00	pcs	180,000		360.00	360.00
6	Rubber thread machine	1.00	pcs	3,600,000		3,600.00	3,600.00
7	Rubber thread wrapping machine	1.00	pcs	2,880,000		2,880.00	2,880.00
8	Tools and equipment	1.00	set	720,000		720.00	720.00
9	Moulds and dies	1.00	set	2,700,000		2,700.00	2,700.00

Sr. No.	Description	Qty.	UOM	Unit Cost (Birr)	Cost (`000 Birr)		
					LC	FC	Total (Birr)
10	Lathe	1.00	pcs	1,080,000		1,080.00	1,080.00
11	Milling machine	1.00	pcs	720,000		720.00	720.00
12	drilling machine	1.00	pcs	450,000		450.00	450.00
13	Hydraulic press machine	1.00	pcs	360,000		360.00	360.00
14	Welding	1.00	pcs	27,000		27.00	27.00
15	Bench grinder	1.00	pcs	5,400		5.40	5.40
16	Compressor	1.00	pcs	630,000		630.00	630.00
17	Spare parts (2%)					544.25	544.25
Total Fob Price						**27,756.65**	**27,756.65**
18	CIF(15%)				4,163.50		4,163.50
Grand Total					**4,163.50**	**27,756.65**	**31,920.15**

2. Land, Building and Civil Works

The total estimated area of land requirement for the plant is 2,500 m², out of which the factory build -up area is 1500 m². At a rate of Birr 5,000 per m^2 the total cost of building and civil work is estimated at Birr 7.5 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^2, 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^2, 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^2. 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^2 .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^2 (see Table 5.2).

Table 5.2

NEW LAND LEASE FLOOR PRICE FOR PLOTS IN ADDIS ABABA

Zone	Level	Floor Price/m^2
Central Market District	1st	1686
	2nd	1535
	3rd	1323
	4th	1085
	5th	894
Transitional zone	1st	1035
	2nd	935
	3rd	809
	4th	685
	5th	555
Expansion zone	1st	355
	2nd	299
	3rd	217
	4th	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^2 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 criterions are creation of job opportunity, foreign exchange saving, investment capital and land utilization tendency etc. Accordingly, Table 5.3 shows incentives for lease payment.

Table 5.3

INCENTIVES FOR LEASE PAYMENT OF INDUSTRIAL PROJECTS

Scored Point	Grace	Payment	Down
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^2 is estimated at Birr 665,000 of which 10% or Birr 66,500 will be paid in advance. The remaining Birr 598,500 will be paid in equal installments with in 28 years i.e. Birr 21,375 annually.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENTS

A. HUMANRESOURCE REQUREMENT

The total direct and indirect labor requirement of the project is 40 persons. Annual cost of labor is estimated at Birr 1.205,300. For details of the human resource requirement by type of job and monthly and annual cost see Table 6.1.

Table 6.1

HUMANRESOURCE REQUIREMENT & LABOR COST

Sr.No.	Description	No. of Persons	Monthly Salary (Birr)	Annual salary ("000) Birr
1	Plant manager	1	10,000.00	120.0
2	Secretary	1	2,500.00	30.0
3	operators	15	1,400.00	252.0
4	Administration and finance	1	4,500.00	54.0
5	production manager	1	6,000.00	72.0
6	production engineer	2	3,500.00	84.0
7	quality super visor	2	3,000.00	72.0
9	Accountant	1	3,000.00	36.0
10	sales man	2	3,500.00	84.0
11	Clerk	1	800.00	9.6
12	Cashier	1	1,800.00	21.6
13	Mechanic	2	2,200.00	52.8
14	Electricians	2	2,200.00	52.8
15	Assistant operators	5	700.00	42.0
16	Guards	3	600.00	21.6
Total		**40**	**45,700.00**	**1,004.4**
17	Employment benefits and allowances 20%		9,140.00	200.9
Total Annual Labor Cost (Direct +Indirect)				**1,205.3**

B. TRAINING REQUIREMENT

For cost effectiveness and good transfer of knowledge on- job training can be arranged by hiring maintenance workers and operators before machinery commissioning and involve them both at installation and commissioning stage of the plant machineries and equipments with an estimated training cost of Birr 120,000

VII. FINANCIAL ANALYSIS

The financial analysis of the Rubber threads and chords 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 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 48.16 million (see Table 7.1). From the total investment cost, the highest share (Birr 40.63 million or 84.37%) is accounted by fixed investment cost followed by pre operation cost (Birr 4.45 million or 9.26%) and initial working capital (Birr 3.07 million or 6.38%). From the total investment cost Birr 27.75 million or 57.62% is required in foreign currency.

Table 7.1

INITIAL INVESTMENT COST ('000 Birr)

Sr. No.	Cost Items	Local Cost	Foreign Cost	Total Cost	% Share
1	**Fixed investment**				
1.1	Land Lease	66.50		66.50	0.14
1.2	Building and civil work	7,500.00		7,500.00	15.57
1.3	Machinery and equipment	4,163.50	27,756.65	31,920.15	66.27
1.4	Vehicles	900.00		900.00	1.87
1.5	Office furniture and equipment	250.00		250.00	0.52
	Sub -total	**12,880.00**	**27,756.65**	**40,636.65**	**84.37**
2	**Pre operating cost ***				
2.1	Pre operating cost	1,307.60		1,307.60	2.71
2.2	Interest during construction	3,151.05		3,151.05	6.54
	Sub -total	**4,458.65**		**4,458.65**	**9.26**
3	**Working capital**	**3,070.71**		**3,070.71**	**6.38**
	Grand Total	**20,409.36**	**27,756.65**	**48,166.01**	**100**

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

** *The total working capital required at full capacity operation is Birr 4.70 million. However, only the initial working capital of Birr 3.07 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 29.10 million (see Table 7.2). The cost of raw material account for 44.85% of the production cost. The other major components of the production cost are depreciation, utility and financial cost, which account for 24.57%, 9.44% and 8.93%, respectively. The remaining 12.20% is the share of utility, labor, marketing and distribution, 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)

Items	Cost (in 000 Birr)	%
Raw Material and Inputs	13,053.65	44.85
Utilities	2,746.80	9.44
Maintenance and repair	1,596.01	5.48
Labor direct	1,004.40	3.45
Labor overheads	200.90	0.69
Administration Costs	250.00	0.86
Land lease cost	-	-
Cost of marketing and distribution	500.00	1.72
Total Operating Costs	**19,351.76**	**66.50**
Depreciation	7,150.55	24.57
Cost of Finance	2,599.61	8.93
Total Production Cost	**29,101.92**	**100**

C. FINANCIAL EVALUATION

1. Profitability

Based on the projected profit and loss statement, the project will generate a profit through out its operation life. Annual net profit after tax will grow from Birr 3.54 million to Birr 11.41 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 91.97 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.

$$\text{Break -Even Sales Value} = \frac{\text{Fixed Cost + Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 16{,}061{,}112$$

$$\text{Break -Even Capacity utilization} = \frac{\text{Break -even Sales Value}}{\text{Sales revenue}} \times 100 = 45\%$$

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 27.45%% 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 40.59 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 40 persons. The project will generate Birr 27.41 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 textile sub sector and also generates income for the Government in terms of payroll tax.

Appendix 7.A

FINANCIAL ANALYSES SUPPORTING TABLES

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

Items	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Total inventory	2,121.22	2,447.56	2,773.90	3,263.41	3,263.41	3,263.41	3,263.41	3,263.41	3,263.41	3,263.41
Accounts receivable	1,062.80	1,219.90	1,377.00	1,612.65	1,614.43	1,614.43	1,614.43	1,614.43	1,614.43	1,614.43
Cash-in-hand	27.55	31.78	36.02	42.38	42.68	42.68	42.68	42.68	42.68	42.68
CURRENT ASSETS	**3,211.57**	**3,699.25**	**4,186.92**	**4,918.44**	**4,920.52**	**4,920.52**	**4,920.52**	**4,920.52**	**4,920.52**	**4,920.52**
Accounts payable	140.86	162.53	184.20	216.70	216.70	216.70	216.70	216.70	216.70	216.70
CURRENT LIABILITIES	**140.86**	**162.53**	**184.20**	**216.70**	**216.70**	**216.70**	**216.70**	**216.70**	**216.70**	**216.70**
TOTAL WORKING CAPITAL	**3,070.71**	**3,536.72**	**4,002.73**	**4,701.74**	**4,703.82**	**4,703.82**	**4,703.82**	**4,703.82**	**4,703.82**	**4,703.82**

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

Item	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Raw Material and Inputs	8,485	9,790	11,096	13,054	13,054	13,054	13,054	13,054	13,054	13,054
Utilities	1,785	2,060	2,335	2,747	2,747	2,747	2,747	2,747	2,747	2,747
Maintenance and repair	1,037	1,197	1,357	1,596	1,596	1,596	1,596	1,596	1,596	1,596
Labour direct	653	753	854	1,004	1,004	1,004	1,004	1,004	1,004	1,004
Labour overheads	131	151	171	201	201	201	201	201	201	201
Administration Costs	163	188	213	250	250	250	250	250	250	250
Land lease cost	0	0	0	0	21	21	21	21	21	21
Cost of marketing and distribution	500	500	500	500	500	500	500	500	500	500
Total Operating Costs	**12,754**	**14,639**	**16,524**	**19,352**	**19,373**	**19,373**	**19,373**	**19,373**	**19,373**	**19,373**
Depreciation	7,151	7,151	7,151	7,151	7,151	325	325	325	325	325
Cost of Finance	0	3,466	3,033	2,600	2,166	1,733	1,300	867	433	0
Total Production Cost	**19,904**	**25,256**	**26,707**	**29,102**	**28,690**	**21,431**	**20,998**	**20,565**	**20,131**	**19,698**

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	25,200	28,800	32,400	36,000	36,000	36,000	36,000	36,000	36,000	36,000
Less variable costs	12,254	14,139	16,024	18,852	18,852	18,852	18,852	18,852	18,852	18,852
VARIABLE MARGIN	**12,946**	**14,661**	**16,376**	**17,148**	**17,148**	**17,148**	**17,148**	**17,148**	**17,148**	**17,148**
in % of sales revenue	51.37	50.91	50.54	47.63	47.63	47.63	47.63	47.63	47.63	47.63
Less fixed costs	7,651	7,651	7,651	7,651	7,672	846	846	846	846	846
OPERATIONAL MARGIN	**5,296**	**7,011**	**8,725**	**9,498**	**9,476**	**16,302**	**16,302**	**16,302**	**16,302**	**16,302**
in % of sales revenue	21.02	24.34	26.93	26.38	26.32	45.28	45.28	45.28	45.28	45.28
Financial costs		3,466	3,033	2,600	2,166	1,733	1,300	867	433	0
GROSS PROFIT	**5,296**	**3,544**	**5,693**	**6,898**	**7,310**	**14,569**	**15,002**	**15,435**	**15,869**	**16,302**
in % of sales revenue	21.02	12.31	17.57	19.16	20.31	40.47	41.67	42.88	44.08	45.28
Income (corporate) tax	0	0	0	2,069	2,193	4,371	4,501	4,631	4,761	4,891
NET PROFIT	**5,296**	**3,544**	**5,693**	**4,829**	**5,117**	**10,198**	**10,501**	**10,805**	**11,108**	**11,411**
in % of sales revenue	21.02	12.31	17.57	13.41	14.21	28.33	29.17	30.01	30.86	31.70

Appendix 7.A.4

CASH FLOW FOR FINANCIAL MANAGEMENT (in 000 Birr)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Scrap
TOTAL CASH INFLOW	**41,944**	**31,563**	**28,822**	**32,422**	**36,000**	**36,000**	**36,000**	**36,000**	**36,000**	**36,000**	**36,000**	**12,421**
Inflow funds	41,944	6,363	22	22	0	0	0	0	0	0	0	0
Inflow operation	0	25,200	28,800	32,400	36,000	36,000	36,000	36,000	36,000	36,000	36,000	0
Other income	0	0	0	0	0	0	0	0	0	0	0	12,421
TOTAL CASH OUTFLOW	**41,944**	**19,116**	**22,925**	**24,377**	**29,085**	**28,067**	**29,810**	**29,506**	**29,203**	**28,900**	**24,264**	**0**
Increase in fixed assets	41,944	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	3,212	488	488	732	2	0	0	0	0	0	0
Operating costs	0	12,254	14,139	16,024	18,852	18,873	18,873	18,873	18,873	18,873	18,873	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	2,069	2,193	4,371	4,501	4,631	4,761	4,891	0
Financial costs	0	3,151	3,466	3,033	2,600	2,166	1,733	1,300	867	433	0	0
Loan repayment	0	0	4,333	4,333	4,333	4,333	4,333	4,333	4,333	4,333	0	0
SURPLUS (DEFICIT)	**0**	**12,446**	**5,896**	**8,044**	**6,915**	**7,933**	**6,190**	**6,494**	**6,797**	**7,100**	**11,736**	**12,421**
CUMULATIVE CASH BALANCE	**0**	**12,446**	**18,343**	**26,387**	**33,302**	**41,235**	**47,425**	**53,919**	**60,716**	**67,816**	**79,553**	**91,974**

Appendix 7.A.5

DISCOUNTED CASH FLOW (in 000 Birr)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Scrap
TOTAL CASH INFLOW	**0**	**25,200**	**28,800**	**32,400**	**36,000**	**36,000**	**36,000**	**36,000**	**36,000**	**36,000**	**36,000**	**12,421**
Inflow operation	0	25,200	28,800	32,400	36,000	36,000	36,000	36,000	36,000	36,000	36,000	0
Other income	0	0	0	0	0	0	0	0	0	0	0	12,421
TOTAL CASH OUTFLOW	**45,015**	**13,220**	**15,105**	**17,223**	**21,423**	**21,566**	**23,744**	**23,874**	**24,004**	**24,134**	**24,264**	**0**
Increase in fixed assets	41,944	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	3,071	466	466	699	2	0	0	0	0	0	0	0
Operating costs	0	12,254	14,139	16,024	18,852	18,873	18,873	18,873	18,873	18,873	18,873	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	2,069	2,193	4,371	4,501	4,631	4,761	4,891	0
NET CASH FLOW	**-45,015**	**11,980**	**13,695**	**15,177**	**14,577**	**14,434**	**12,256**	**12,126**	**11,996**	**11,866**	**11,736**	**12,421**
CUMULATIVE NET CASH FLOW	**-45,015**	**-33,035**	**-19,339**	**-4,162**	**10,414**	**24,848**	**37,104**	**49,231**	**61,227**	**73,093**	**84,830**	**97,251**
Net present value	-45,015	10,891	11,318	11,403	9,956	8,962	6,918	6,223	5,596	5,032	4,525	4,789
Cumulative net present value	-45,015	-34,124	-22,805	-11,403	-1,447	7,516	14,434	20,657	26,253	31,285	35,810	40,599

NET PRESENT VALUE	40,599
INTERNAL RATE OF RETURN	27.45%
NORMAL PAYBACK	4 years