

**87. PROFILE ON THE PRODUCTION OF RUBBER
GASKET AND SEALS**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of gasket and seals with a capacity of 400 tons per annum. Gasket and seals are mechanical devices that fill the space between two objects, generally to prevent leakage between the two objects while under compression.

The demand for gasket and seals is through domestic production and import. The present (2012) demand for gasket and seals is estimated at 1,168 tons. The demand for gasket and seals is projected to reach 1,881 tons and 3,030 tons by the year 2017 and 2022, respectively.

The principal raw material required is nitrite rubber, which has to be imported.

The total investment cost of the project including working capital is estimated at Birr 34.92 million. From the total investment cost, the highest share (Birr 28.87 million or 82.67%) is accounted by fixed investment cost followed by pre operation cost (3.24 million or 9.27%) and working capital (Birr 2.81 million or 8.05%). From the total investment cost, Birr 17.51 million or 50.15% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 18.95% and a net present value (NPV) of Birr 15.45 million, discounted at 10%.

The project can create employment for 47 persons. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTION AND APPLICATION

Gasket and seals are mechanical devices that fill the space between two objects, generally to prevent leakage between the two objects while under compression. They save money by allowing less precise mating surfaces on machine parts which can use them to fill irregularities.

One of the more desirable properties of an effective gasket in industrial applications for compressed fiber gasket material is the ability to withstand high compressive loads. Most

industrial gasket applications involve bolts exerting compression well into the 14 MPa (2000 psi) range or higher.

A washer is a thin plate (typically disk-shaped) with a hole (typically in the middle) that is normally used to distribute the load of a threaded fastener. Other uses are as a spacer, spring (Belleville, wave washers), wear pad, preload indicating device, and locking device.

Gaskets used in taps to stop the flow of water are sometimes referred to colloquially as washers; while they may look similar, however, washers and gaskets are usually made differently and designed for different functions.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The current demand for rubber gaskets, washers and seals is met mainly through import. Although it is believed that there is some amount of local production the data could not be found in the medium and large scale manufacturing industries survey conducted by CSA. As a result the import data has been analyzed to estimate the unsatisfied demand for the products. Import of rubber gaskets, washers and seals is given in Table 3.1.

Table 3.1**IMPORT OF RUBBER GASKETS, WASHERS AND SEALS (TONS)**

Year	Import
2002	116
2003	136
2004	148
2005	345
2006	542
2007	907
2008	758
2009	869
2010	1,324
2011	1,062

Source: - Ethiopian Custom and Revenues Authority.

As could be seen from Table 3.1, import of rubber gaskets, washers and seals during the years (2002-2011) was generally on an increasing trend although some ups and downs on the data pattern was observed. The average annual import during the years 2002-2011 was about 620 tons and the annual average during the period 2010-2011 was about 1,193 tons where the quantity of import has passed the one thousand margins during these two years (2010-2011). The average growth rate of the quantity of imported rubber gaskets, washers and seals during the years 2002-2011 was about 22% by omitting the growth rate during the year 2005 which was about 133% as an outlier. The average growth rate during the last 2 years (2010-2011) was about 16%.

To determine the current (2012) demand a 10% growth rate which is less than the average growth rate during the years under consideration (2002-2011) is applied. Accordingly, the current demand for the products is set at 1,168 tons.

2. Demand Projection

The demand for rubber gaskets, washers and seals is influenced by many factors due to their wide application. Gaskets and seals are used in pressure vessel; between cylinder head and

cylinder block of automobile engine, in starting piston, breaks etc. Washers are used in joints (bolts and nuts) or assemblies to insure tightness. Therefore, the demand for the product generally will grow parallel with the growth of the national economy. Considering the average GDP growth rate achieved in the past few years (11.3%), an annual growth rate of 10% is considered in forecasting the future demand for the products (see Table 3.2.).

Table 3.2

PROJECTED DEMAND FOR GASKETS, WASHERS AND SEALS (TONS)

Year	Quantity
2013	1,285
2014	1,414
2015	1,555
2016	1,710
2017	1,881
2018	2,070
2019	2,276
2020	2,504
2021	2,755
2022	3,030

Demand for the products is estimated to grow from 1,285 tons in the year 2013 to 1,710 tons and 2,276 tons by the year 2016 and 2019 respectively and reach 3,030 in the year 2022.

3. Pricing and Distribution

Based on the year 2011, CIF value and subsequent local cost estimates, a factory gate price of Birr 69,700 per ton is recommended. Whole sales to distributors and direct sales to end-users will be used to market the products.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

Considering the economic and manageable scale of manufacturing process the production capacity of the plant is set to be 400 ton of rubber gasket, washer and seals 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 Sunday per year and assuming that maintenance activities will be performed during off hours and Sunday

2. Production Program

The plant will operate at different capacity after the implementation until all production factors start to function properly and also till the operators develop skills and experience for operation and troubleshooting as shown in Table 3.2

Table 3.2

PRODUCTION PROGRAM

Description	Production Year			
	1	2	3	4
Capacity utilization rate (%)	65	75	85	100
Gasket, seals and washers (ton)	260	300	340	400

IV. MATERIALS AND INPUTS

A. MATERIALS

The major raw material required for production of rubber gaskets, seals and washers is nitrite rubber, auxiliary raw materials and additives such as GPF black, stearic acid, Zinc oxide and others. All the raw materials have to be imported. The annual requirement and related cost of the raw materials is shown in Table 4.1.

Table 4.1**ANNUAL RAW MATERIAL REQUIREMENT**

Sr. No.	Description	Annual Consumption	UOM	Unit Cost (Birr) /Ton	Cost (''000) Birr		
					LC	FC	Total (Birr)
1	Nitrile rubber	240	ton	32,727.27		7,848.00	7,848.00
2	Sulpher	1	ton	9,818.18		14.13	14.13
3	Stearic acid	2	ton	8,836.36		21.19	21.19
4	Tripoly phosphate	24	ton	6,545.45		156.96	156.96
5	Zinc oxide	12	ton	10,472.73		125.57	125.57
7	GPF black	90	ton	6,545.45		588.60	588.60
8	Mexaplas PPA	36	ton	6,545.45		235.44	235.44
Total FOB						8,989.88	8,989.88
3	CIF (15%)				1,348.48		1,348.48
Total Annual Cost					1,348.48	8,989.88	10,338.37

B. UTILITES

The main utilities required by the envisaged plant are electricity and water annual cost of utilities at full capacity operation is Birr 5.28 million. For details see Table 4.2.

Table 4.2**ANNUAL UTILITIES REQUIREMENT & COST**

Sr. No.	Description	Annual Consumption	UOM	Unit Cost	Total Cost
				(Birr)	(''000 Birr)
1	Electricity	7,560,000	kWh	0.58	4,384.80
2	Water	90,000	m ³	10.00	900.00
Total Annual Cost					5,284.80

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The manufacturing process of oil seals, rubber and gasket involves mixing of raw materials, forming and packing. The raw materials are mixed so as to attain uniform blend of the mix, adequate dispersion of pigments, uniform degree of dispersion and viscosity.

The mixing mill is used for complete and homogenous mixing of the ingredients. The two rollers of the mixing machine are filled with water and steam to keep the rollers cool in compounding process and slabs of rubber material will be extruded and cut to pieces to be fed to moulds of hydraulic press. Rubber sheets of specific thickness are cut to desired size and punched to the required shapes by power press and rubberized to required shapes.

In general to manufacture those rubber products, rubber compounds are cut into moulds and pressed with the help of hand press, which are heated with steam, cut to required sizes and finally packed for the market.

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 surrounding market for different application. Therefore, there will not be additional investment for environmental protection.

B. ENGINEERING

1. Machinery and Equipment

Total cost of machinery & equipment is Birr 20.13 million, out of which Birr 17.51 million is required in foreign currency. The machinery and equipments required for the envisaged plant together with their associated cost is shown in Table 5.1.

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

Sr. No.	Description	Qty.	UOM	Unit Cost (Birr)	Cost (`000 Birr)		
					LC	FC	Total
1	Rubber mixing mill	1	pcs	5,400,000		5,400.0	5,400.0
2	Hydraulic press	3	pcs	540,000		1,620.0	1,620.0
3	Steam heated press	2	pcs	2,160,000		4,320.0	4,320.0
4	Boiler	1	pcs	900,000		900.0	900.0
5	Power press	4	pcs	252,000		1,008.0	1,008.0
6	Shearing machine	1	pcs	540,000		540.0	540.0
7	Extruder /calander machine	1	pcs	1,260,000		1,260.0	1,260.0
8	Lathe	1	pcs	720,000		720.0	720.0
9	Milling machine	1	pcs	720,000		720.0	720.0
10	Hydraulic press machine	1	pcs	360,000		360.0	360.0
11	Welding	1	pcs	27,000		27.0	27.0
12	Bench grinder	1	pcs	5,400		5.4	5.4
13	Compressor	1	pcs	630,000		630.0	630.0
Total Fob Price						17,510.4	17,510.4
14	CIF (15%)				2,626.6		2,626.6
Grand Total Cost					2,626.6	17,510.4	20,137.0

2. Land, Building and Civil Works

The envisaged plant requires total land area of 3,000 meter square, out of which built -up are is 1,500 meter square. At the rate of Birr 5,000 per m², 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 m², the land lease request is evaluated and decided upon by the Industrial Zone Development and Coordination Committee of the City's Investment Authority. However, if the land request is above 5,000 m², the request is evaluated by the City's Investment Authority and passed with recommendation to the Land Development and Administration Authority for decision, while the lease price is the same for both cases.

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

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

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

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

Table 5.2

NEW LAND LEASE FLOOR PRICE FOR PLOTS IN ADDIS ABABA

Zone	Level	Floor Price/M²
Central Market District	1 st	1686
	2 nd	1535
	3 rd	1323
	4 th	1085
	5 th	894
Transitional zone	1 st	1035
	2 nd	935
	3 rd	809
	4 th	685
	5 th	555
Expansion zone	1 st	355
	2 nd	299
	3 rd	217
	4 th	191

Accordingly, in order to estimate the land lease cost of the project profiles it is assumed that all new manufacturing projects will be located in industrial zones located in expansion zones.

Therefore, for the profile a land lease rate of Birr 266 per m² which is equivalent to the average floor price of plots located in expansion zone is adopted.

On the other hand, some of the investment incentives arranged by the Addis Ababa City Administration on lease payment for industrial projects are granting longer grace period and extending the lease payment period. The criteria are creation of job opportunity, foreign exchange saving, investment capital and land utilization tendency etc. Accordingly, Table 5.3 shows incentives for lease payment.

Table 5.3
INCENTIVES FOR LEASE PAYMENT OF INDUSTRIAL PROJECTS

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

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

Accordingly, the total land lease cost at a rate of Birr 266 per m² is estimated at Birr 798,000 of which 10% or Birr 79,800 will be paid in advance. The remaining Birr 718,200 will be paid in equal installments within 28 years i.e. Birr 25,650 annually

VI. HUMANRESOURCE AND TRAINING REQUIREMENTS

A. HUMANRESOURCE REQUIREMENT

The total direct and indirect labor requirement of the plant for two shifts operation is 47 workers. Annual cost of labor is Birr 1,196,640. Human resource requirement by type of job and labor cost is given in Table 6.1.

Table 6.1

HUMANRESOURCE REQUIREMENT &LABOR COST

Sr. No.	Description	Reqd.No.	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	25	1,400.00	420.0
4	Administration and finance	1	4,500.00	54.0
5	Accountant	1	3,000.00	36.0
6	Sales man	2	3,500.00	84.0
7	Clerk	1	800.00	9.6
8	Cashier	1	1,800.00	21.6
9	Mechanic	4	2,200.00	105.6
10	Electrician	2	2,200.00	52.8
11	Assistant operators	5	700.00	42.0
12	Guards	3	600.00	21.6
Sub-total		47	33,200.00	997.2
13	Employment benefits and allowances 20%		6,640.00	199.4
Total Annual Labor Cost (Direct +Indirect)				1,196.64

B. TRAINING REQUIREMENT

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 sheet glass 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 34.92 million (see Table 7.1). From the total investment cost, the highest share (Birr 28.87 million or 82.67%) is accounted by fixed investment cost followed by pre operation cost (3.24 million or 9.27%) and working capital (Birr 2.81 million or 8.05%). From the total investment cost, Birr 17.51 million or 50.15% 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	79.80		79.80	0.23
1.2	Building and civil work	7,500.00		7,500.00	21.48
1.3	Machinery and equipment	2,626.60	17,510.40	20,137.00	57.67
1.4	Vehicles	900.00		900.00	2.58
1.5	Office furniture and equipment	250.00		250.00	0.72
	Sub total	11,356.40	17,510.40	28,866.80	82.67
2	Pre operating cost *				
2.1	Pre operating cost	954.11		954.11	2.73
2.2	Interest during construction	2,284.32		2,284.32	6.54
	Sub total	3,238.43		3,238.43	9.27
3	Working capital **	2,812.30		2,812.30	8.05
	Grand Total	17,407.14	17,510.40	34,917.54	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 4.14 million. However, only the initial working capital of Birr 2.81 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 25.45 million (see Table 7.2). The cost of raw material account for 40.61% of the production cost. The other major components of the production cost are utility, depreciation and financial cost, which account for 20.76%, 18.55% and 8.47%, respectively. The remaining 11.60 % is the share of labor, marketing and distribution, labor overhead and administration cost. For detail production cost see Appendix 7.A.2.

Table 7.2
ANNUAL PRODUCTION COST AT FULL CAPACITY (YEAR FIVE)

Items	Cost	%
Raw Material and Inputs	10,338.37	40.55
Utilities	5,284.80	20.73
Maintenance and repair	1,006.85	3.95
Labour direct	997.20	3.91
Labour overheads	199.40	0.78
Administration Costs	250.00	0.98
Land lease cost	-	-
Cost of marketing and distribution	500.00	1.96
Total Operating Costs	18,576.62	72.85
Depreciation	4,723.22	18.52
Cost of Finance	2,198.66	8.62
Total Production Cost	25,498.50	100

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 1.90 million to Birr 6.27 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 45.63 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.

$$\text{Break -Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 11,709,600$$

$$\text{Break- Even Capacity utilization} = \frac{\text{Break -even Sales Value}}{\text{Sales revenue}} \times 100 = 53 \%$$

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 6 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 18.95% 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 15.45 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 47 persons. The project will generate Birr 14.19 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 generate other income for the Government.

Appendix 7.A

FINANCIAL ANALYSES SUPPORTING TABLES

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	7,237	8,271	10,338	10,338	10,338	10,338	10,338	10,338	10,338	10,338
Utilities	3,699	4,228	5,285	5,285	5,285	5,285	5,285	5,285	5,285	5,285
Maintenance and repair	705	805	1,007	1,007	1,007	1,007	1,007	1,007	1,007	1,007
Labour direct	698	798	997	997	997	997	997	997	997	997
Labour overheads	140	160	199	199	199	199	199	199	199	199
Administration Costs	175	200	250	250	250	250	250	250	250	250
Land lease cost	0	0	0	0	26	26	26	26	26	26
Cost of marketing and distribution	500	500	500	500	500	500	500	500	500	500
Total Operating Costs	13,154	14,961	18,577	18,577	18,602	18,602	18,602	18,602	18,602	18,602
Depreciation	4,723	4,723	4,723	4,723	4,723	325	325	325	325	325
Cost of Finance	0	2,513	2,199	1,885	1,570	1,256	942	628	314	0
Total Production Cost	17,877	22,197	25,499	25,184	24,896	20,184	19,870	19,555	19,241	18,927

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	19,516	23,698	25,092	27,880	27,880	27,880	27,880	27,880	27,880	27,880
Less variable costs	12,654	14,461	18,077	18,077	18,077	18,077	18,077	18,077	18,077	18,077
VARIABLE MARGIN	6,862	9,237	7,015	9,803	9,803	9,803	9,803	9,803	9,803	9,803
in % of sales revenue	35.16	38.98	27.96	35.16	35.16	35.16	35.16	35.16	35.16	35.16
Less fixed costs	5,223	5,223	5,223	5,223	5,249	851	851	851	851	851
OPERATIONAL MARGIN	1,639	4,013	1,792	4,580	4,555	8,953	8,953	8,953	8,953	8,953
in % of sales revenue	8.40	16.94	7.14	16.43	16.34	32.11	32.11	32.11	32.11	32.11
Financial costs		2,513	2,199	1,885	1,570	1,256	942	628	314	0
GROSS PROFIT	1,639	1,501	-407	2,696	2,984	7,696	8,010	8,325	8,639	8,953
in % of sales revenue	8.40	6.33	-1.62	9.67	10.70	27.61	28.73	29.86	30.99	32.11
Income (corporate) tax	0	0	0	809	895	2,309	2,403	2,497	2,592	2,686
NET PROFIT	1,639	1,501	-407	1,887	2,089	5,387	5,607	5,827	6,047	6,267
in % of sales revenue	8.40	6.33	-1.62	6.77	7.49	19.32	20.11	20.90	21.69	22.48

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	29,821	24,730	23,715	25,125	27,880	27,880	27,880	27,880	27,880	27,880	27,880	10,866
Inflow funds	29,821	5,214	17	33	0	0	0	0	0	0	0	0
Inflow operation	0	19,516	23,698	25,092	27,880	27,880	27,880	27,880	27,880	27,880	27,880	0
Other income	0	0	0	0	0	0	0	0	0	0	0	10,866
TOTAL CASH OUTFLOW	29,821	18,367	21,028	24,741	24,411	24,211	25,309	25,089	24,869	24,649	21,288	0
Increase in fixed assets	29,821	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	2,929	413	825	0	2	0	0	0	0	0	0
Operating costs	0	12,654	14,461	18,077	18,077	18,102	18,102	18,102	18,102	18,102	18,102	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	809	895	2,309	2,403	2,497	2,592	2,686	0
Financial costs	0	2,284	2,513	2,199	1,885	1,570	1,256	942	628	314	0	0
Loan repayment	0	0	3,141	3,141	3,141	3,141	3,141	3,141	3,141	3,141	0	0
SURPLUS (DEFICIT)	0	6,362	2,687	384	3,469	3,669	2,571	2,791	3,011	3,231	6,592	10,866
CUMULATIVE CASH BALANCE	0	6,362	9,050	9,434	12,903	16,572	19,143	21,934	24,946	28,177	34,769	45,635

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	19,516	23,698	25,092	27,880	27,880	27,880	27,880	27,880	27,880	27,880	10,866
Inflow operation	0	19,516	23,698	25,092	27,880	27,880	27,880	27,880	27,880	27,880	27,880	0
Other income	0	0	0	0	0	0	0	0	0	0	0	10,866
TOTAL CASH OUTFLOW	32,633	13,549	15,753	18,577	19,388	19,497	20,911	21,005	21,100	21,194	21,288	0
Increase in fixed assets	29,821	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	2,812	396	792	0	2	0	0	0	0	0	0	0
Operating costs	0	12,654	14,461	18,077	18,077	18,102	18,102	18,102	18,102	18,102	18,102	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	809	895	2,309	2,403	2,497	2,592	2,686	0
NET CASH FLOW	-32,633	5,967	7,945	6,515	8,492	8,383	6,969	6,875	6,780	6,686	6,592	10,866
CUMULATIVE NET CASH FLOW	-32,633	26,667	-18,722	12,206	-3,714	4,669	11,637	18,512	25,292	31,978	38,570	49,437
Net present value	-32,633	5,424	6,566	4,895	5,800	5,205	3,934	3,528	3,163	2,836	2,541	4,189
Cumulative net present value	-32,633	27,209	-20,643	15,748	-9,947	-4,743	-809	2,719	5,882	8,718	11,259	15,448

NET PRESENT VALUE	15,448
INTERNAL RATE OF RETURN	18.95%
NORMAL PAYBACK	6 years