PROFILE ON THE PRODUCTION OF WIRE MESH AND BARBED WIRES

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I. SUMMARY

This profile envisages the establishment of a plant for the production of 300 tons of barbed wire and 2000 tons of wire meshes per annum. Wire mesh and barbed wires is a product made from interwoven galvanized wires that are used for making fences.

The demand for wire mesh and barbed wires is met through import and domestic production. The present (2012) unsatisfied demand for the products is estimated at 412 tons and 1,670 tons for barbed wires and wire mesh, respectively. The demand for barbed wires and wire mesh and net is projected to reach 663 tons and 3,082 tons by the year 2017 and 1,068 tons 4,963 tons by the year 2022, respectively.

The principal raw material required is galvanized steel wire which has to be imported.

The total investment cost of the project including working capital is estimated at Birr 22.99 million. From the total investment cost the highest share (Birr 15.99 million or 69.57%) is accounted by initial working capital followed by fixed investment cost (Birr 5.07 million or 22.05%) and pre operation cost (Birr 1.92 million or 8.38%). From the total investment cost Birr 2.00 million or 8.10% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 22.90% and a net present value (NPV) of Birr 19.39 million discounted at 10%.

The project can create employment for 22 persons. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports. The project will also create forward linkage with the construction sub sector and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTIONS AND APPLICATIONS

Wire mesh is a product made from interwoven galvanized wires that are used for making fences. Barbed wire is a product made from wires twisted together along with sharp wires twisted on the long wires. The wire is thorny and gives a good protection for the fenced area.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Present Supply and Present Demand

The demand for wire mesh and barbed wire in Ethiopia is met from two sources: imports and domestic production by importing the billet and processing it in local factories. The historical data on the unsatisfied demand for the product which is met through import for the period 2002 - 2011 is provided in Table 3.1.

Table 3.1

IMPORT OF WIRE MESH AND BARBED WIRE(TONS)

Year	Barbed Wire	Wire Mesh And Net
2002	22	606
2003	108	985
2004	491	2,319
2005	267	1,706
2006	171	1,254
2007	168	2,171
2008	929	1,660
2009	320	2,992
2010	275	1,767
2011	122	1,236

Source: *Ethiopian Revenues & Customs Authority Issues.*

Scrutiny of Table 3.1 reveals that imports of wire mesh and net during the period under consideration (2002-2011) ranged from 606 tones (2002) to 2,992 tones (2009) with a mean

import of 1,670 tones. Similarly, during the same period import of barbed wire ranges from 22 tons in 2002 to 929 tons in 2008 averaging at 287 tons.

Accordingly, considering the trend in import of the products the recent four years (2008-2011) average import i.e., 1,670 tones for wire mesh and net and 412 tons for barbed wire is considered to approximate current (2012) unsatisfied demand for the products.

2. Projected Demand

The demand for wire mesh and barbed wire depends mainly on the performance of its end-user (i.e. the construction sector). Therefore, the demand for the products under consideration is a derived demand, which depends directly on the performance of its major end – user.

The construction sector of the country has undergone tremendous changes and development in recent years. The contribution of the construction sector to the GDP during the period 2001 – 2010 have been growing at annual average growth rate of 13 percent which is above the average annual growth rate of real GDP during the period under consideration (11.4 %), indicating a rise in the share of the construction sector within the overall economy. Moreover, during the GTP period (2010 – 2015), the construction sector is expected to grow at annual average growth rate of 20%.

On the other hand among the factors that influence the demand for wire mesh and barbed wire one of the critical factor is identified to be economic growth leading to growth of the construction sector. According to the government's "Growth and Transformation Plan" during the period 2010 – 2015 the GDP of the country is expected to grow at a minimum average annual growth rate of 11.2%.

Accordingly, based on the above discussion a growth rate of 10% which is slightly lower than the expected growth rate of the country's GDP during the GTP period (2011 – 2015) is used.

Based on the above assumption and using the estimated present unsatisfied demand as a base the projected unsatisfied demand for wire mesh and barbed wire is shown in Table 3.2.

Table 3.2

PROJECTED UNSATISFIED DEMAND FOR WIRE MESH AND BARBED WIRE (TONS)

Year	Barbed wire	Wire mesh and net
2013	453	2105
2014	498	2,315
2015	548	2,547
2016	603	2,802
2017	663	3,082
2018	729	3,390
2019	802	3,729
2020	882	4,102
2021	971	4,512
2022	1,068	4,963
2023	1,175	5,460
2024	1,292	6,006
2025	1,421	6,606

3. Pricing and Distribution

The current retail price of wire mesh and barbed wire is Birr 42/Kg and Birr 38/Kg respectively. Allowing a margin of 25%, the recommended factory gate price for the envisaged factory is Birr 34/kg and Birr 28/kg for wire mesh and barbed wire respectively. The products can be distributed by appointing agents in major urban centers of the country.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant capacity

The selected manufacturing capacity of the plant is 300 tons of barbed wire and 2000 tons of wire meshes per annum, in a single shift per day.

2. Production Program

Considering the production process involved and time required for technical knowhow the plant will start to operate at 75% of its installed capacity. In the second year it will increase to 85%. In the third year and then after full capacity will be attained. The production program is shown in Table 3.3.

Table 3.3

ANNUAL PRODUCTION PROGRAM

Type of product	**Year 1**	**Year 2**	**Year 3**
Barbed Wire (Tons)	235	255	300
Wire Mesh (Tons)	1500	1700	2000
Capacity %	75	85	100

IV. RAW MATERIAL AND INPUTS

A. RAW AND AUXILIARY MATERIALS

The major raw material required is galvanized steel wire which has to be imported. Annual cost of raw material is Birr 68.244 million. The required quantity of raw material and cost at full capacity production is given in Table 4.1

B. UTILITIES

Electricity and water are the utilities required by the plant. Annual cost of utilities at full capacity operation is Birr 60,151 (see Table 4.2.).

Table 4.1

RAW MATERIAL REQUIREMENT AND COST

Sr. No.	Raw Materials	Description	Annual Requirement (ton)	Cost (000 Birr)		
				F.C	L.C	Total
1	Cold drawn steel wire (for barbed wire)	2 mm Galvanized	330	6,270	1,254	7,524
2	Cold Drawn Steel Wire for (wire mesh)	2mm Galvanized	2,200	50,600	10,120	60,720
	Total			**56,870**	**11,374**	**68,244**

Table 4.2

ANNUAL UTILITY REQUIREMENTS AND COST

No	Utility	Unit	Quantity	Cost(Birr)
1	Electricity	KWh	83,000	48,151
2	Water	Meter cube	1,200	12,000
	Total			**60,151**

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Process Description

- **Barbed wires**

The wire is fed to the barbed wire making plant which eventually releases the complete barbed wire.

- **Wire mesh**

The wire is fed from the spool to the wire mesh making machine which eventually release a completed wire mesh.

2. Environmental Impact

The Production activity of the plant does not have any negative impact on the environment as the process involves only cutting and bending of wires.

B. ENGINEERING

1. Machinery and Equipment

Total cost of machinery and equipment is estimated at Birr 2.4 million of which Birr 2 million is required in foreign currency. The necessary machinery and equipment that are required for the production of the envisaged barbed wire mesh products are listed on Table 5.1.

Table 5.1

LIST OF MACHINERY AND EQUIPMENT

Sr. No	Machinery	Description	Unit	Quantity
1	Automatic barbed wire making machine	Complete with winding drum	Nos.	1
2	Automatic wire mesh making machine.	Complete with winding drum.	Nos.	1
3	Wire winding station	To fit barbed and wire mesh machine	Nos.	1

2. Land, Building and Civil Works

The total land required by the project is about 800 m^2, of which 300 m^2 is built-up area. The cost of building and civil works is estimated at Birr 1,500,000.

According to the Federal Legislation on the Lease Holding of Urban Land (Proclamation No 721/2004) in principle, urban land permit by lease is on auction or negotiation basis, however, the time and condition of applying the proclamation shall be determined by the concerned regional or city government depending on the level of development.

The legislation has also set the maximum on lease period and the payment of lease prices. The lease period ranges from 99 years for education, cultural research health, sport, NGO , religious and residential area to 80 years for industry and 70 years for trade while the lease payment period ranges from 10 years to 60 years based on the towns grade and type of investment.

Moreover, advance payment of lease based on the type of investment ranges from 5% to 10%.The lease price is payable after the grace period annually. For those that pay the entire amount of the lease will receive 0.5% discount from the total lease value and those that pay in installments will be charged interest based on the prevailing interest rate of banks. Moreover, based on the type of investment, two to seven years grace period shall also be provided.

However, the Federal Legislation on the Lease Holding of Urban Land apart from setting the maximum has conferred on regional and city governments the power to issue regulations on the exact terms based on the development level of each region.

In Addis Ababa, the City's Land Administration and Development Authority is directly responsible in dealing with matters concerning land. However, regarding the manufacturing sector, industrial zone preparation is one of the strategic intervention measures adopted by the City Administration for the promotion of the sector and all manufacturing projects are assumed to be located in the developed industrial zones.

Regarding land allocation of industrial zones if the land requirement of the project is below 5,000 m^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 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 m^2 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 within 28 years i.e. Birr 6,840 annually.

NB: The land issue in the above statement narrates or shows only Addis Ababa's city administration land lease price, policy and regulations.

Accordingly the project profile prepared based on the land lease price of Addis Ababa region.

To know land lease price, police and regulation of other regional state of the country updated information is available at Ethiopian Investment Agency's website www.eia.gov.et on the factor cost.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENT

A. HUMAN RESOURCE REQUIREMENT

A total of 22 people are required for the plant, out of which 13 are technical workers. Total annual cost of labor is Birr 565,800**.** The human resource required by type of job and the cost is shown in 6.1.

Table 6.1

HUMAN RESOURCE REQUIREMENT AND COST

Sr. No.	Description	No.	Salary (Birr)	
			Monthly	Annual
1	Plant Manager	1	5,000	60,000
2	Secretary	1	2,500	30,000
3	Accountant	1	2,500	30,000
4	Salesman/purchaser	1	2,500	30,000
5	Clerk	1	1,500	18,000
6	Cashier	1	2,000	24,000
7	General Service	3	800	28,800
8	Foreman/	1	2,500	30,000
9	Machinery Operators	6	2,000	144,000
10	Assistant Operators	1	1,500	6,000
11	Quality controller &lab. technicians	3	1,500	54,000
12	Laborers	2	800	19,200
Total		**21**		**474,000**
Employee's Benefit (25% of Basic Salary)		-	-	91,800
Total		**22**	**-**	**565,800**

B. TRAINING REQUIREMENT

On the job training of the operators would be enough for workers with technical back ground, as the production is automated. One time training for all workers can be conducted. This involves a cost of Birr 20,000.

VII. FINANCIAL ANALYSIS

The financial analysis of wire mesh and barbed wires project is based on the data presented in the previous chapters and the following assumptions:-

Construction period	1 year
Source of finance	30 % equity and 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 22.99 million (See Table 7.1). From the total investment cost the highest share (Birr 15.99 million or 69.57%) is accounted by initial working capital followed by fixed investment cost (Birr 5.07 million or 22.05%) and pre operation cost (Birr 1.92 million or 8.38%). From the total investment cost Birr 2.00 million or 8.10% 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	21.28		21.28	0.09
1.2	Building and civil work	1,500.00		1,500.00	6.52
1.3	Machinery and equipment	400.00	2,000.00	2,400.00	10.44
1.4	Vehicles	900.00		900.00	3.91
1.5	Office furniture and equipment	250.00		250.00	1.09
	Sub total	**3,071.28**	**2,000.00**	**5,071.28**	**22.05**
2	**Pre operating cost ***				
2.1	Pre operating cost	422.00		422.00	1.84
2.2	Interest during construction	1,504.38		1,504.38	6.54
	Sub total	**1,926.38**		**1,926.38**	**8.38**
3	**Working capital**	**15,997.81**		**15,997.81**	**69.57**
	Grand Total	**20,995.47**	**2,000.00**	**22,995.47**	**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 22.86 million. However, only the initial working capital of Birr 15.99 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 71.81 million (see Table 7.2). The cost of raw material account for 95.03% of the production cost. The other major components of the production cost are financial cost, depreciation, and direct labor which account for 1.73%, 1.15% and 0.66% respectively. The remaining 1.42% is the share of utility, cost of 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 three)

Items	Cost (000 Birr)	%
Raw Material and Inputs	68,244.00	95.03
Utilities	60.15	0.08
Maintenance and repair	120.00	0.17
Labor direct	474.00	0.66
Labor overheads	91.80	0.13
Administration Costs	250.00	0.35
Land lease cost	-	-
Cost of marketing and distribution	500.00	0.70
Total Operating Costs	**69,739.95**	**97.12**
Depreciation	829.40	1.15
Cost of Finance	1,241.11	1.73
Total Production Cost	**71,810.46**	**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 2.77 million to Birr 4.59 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 52.28 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.

$$\text{Break Even Sales Value} = \frac{\text{Fixed Cost + Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 14{,}185{,}119$$

$$\text{Break Even Capacity utilization} = \frac{\text{Break even Sales Value}}{\text{Sales revenue}} \times 100 = 19\%$$

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 22.90% 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 19.39 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 22 persons. The project will generate Birr 12.04 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 construction sub sector and also generates other income for the government.

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	11,942.70	13,648.80	15,354.90	17,061.00	17,061.00	17,061.00	17,061.00	17,061.00	17,061.00	17,061.00
Accounts receivable	4,080.66	4,657.66	5,234.66	5,811.66	5,812.23	5,812.23	5,812.23	5,812.23	5,812.23	5,812.23
Cash-in-hand	9.10	10.40	11.70	13.00	13.09	13.09	13.09	13.09	13.09	13.09
CURRENT ASSETS	**16,032.46**	**18,316.86**	**20,601.26**	**22,885.66**	**22,886.32**	**22,886.32**	**22,886.32**	**22,886.32**	**22,886.32**	**22,886.32**
Accounts payable	34.65	39.60	44.55	49.50	49.50	49.50	49.50	49.50	49.50	49.50
CURRENT LIABILITIES	**34.65**	**39.60**	**44.55**	**49.50**	**49.50**	**49.50**	**49.50**	**49.50**	**49.50**	**49.50**
TOTAL WORKING CAPITAL	**15,997.81**	**18,277.26**	**20,556.71**	**22,836.16**	**22,836.82**	**22,836.82**	**22,836.82**	**22,836.82**	**22,836.82**	**22,836.82**

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	47,771	54,595	61,420	68,244	68,244	68,244	68,244	68,244	68,244	68,244
Utilities	42	48	54	60	60	60	60	60	60	60
Maintenance and repair	84	96	108	120	120	120	120	120	120	120
Labour direct	332	379	427	474	474	474	474	474	474	474
Labour overheads	64	73	83	92	92	92	92	92	92	92
Administration Costs	175	200	225	250	250	250	250	250	250	250
Land lease cost	0	0	0	0	7	7	7	7	7	7
Cost of marketing and distribution	500	500	500	500	500	500	500	500	500	500
Total Operating Costs	**48,968**	**55,892**	**62,816**	**69,740**	**69,747**	**69,747**	**69,747**	**69,747**	**69,747**	**69,747**
Depreciation	829	829	829	829	829	85	85	85	85	85
Cost of Finance	0	1,655	1,448	1,241	1,034	827	621	414	207	0
Total Production Cost	**49,797**	**58,376**	**65,093**	**71,810**	**71,610**	**70,659**	**70,452**	**70,245**	**70,039**	**69,832**

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	53,480	61,120	76,400	76,400	76,400	76,400	76,400	76,400	76,400	76,400
Less variable costs	48,468	55,392	62,316	69,240	69,240	69,240	69,240	69,240	69,240	69,240
VARIABLE MARGIN	**5,012**	**5,728**	**14,084**	**7,160**	**7,160**	**7,160**	**7,160**	**7,160**	**7,160**	**7,160**
in % of sales revenue	9.37	9.37	18.43	9.37	9.37	9.37	9.37	9.37	9.37	9.37
Less fixed costs	1,329	1,329	1,329	1,329	1,336	592	592	592	592	592
OPERATIONAL MARGIN	**3,683**	**4,399**	**12,755**	**5,831**	**5,824**	**6,568**	**6,568**	**6,568**	**6,568**	**6,568**
in % of sales revenue	6.89	7.20	16.69	7.63	7.62	8.60	8.60	8.60	8.60	8.60
Financial costs		1,655	1,448	1,241	1,034	827	621	414	207	0
GROSS PROFIT	**3,683**	**2,744**	**11,307**	**4,590**	**4,790**	**5,741**	**5,948**	**6,155**	**6,361**	**6,568**
in % of sales revenue	6.89	4.49	14.80	6.01	6.27	7.51	7.78	8.06	8.33	8.60
Income (corporate) tax	0	0	0	1,377	1,437	1,722	1,784	1,846	1,908	1,970
NET PROFIT	**3,683**	**2,744**	**11,307**	**3,213**	**3,353**	**4,019**	**4,163**	**4,308**	**4,453**	**4,598**
in % of sales revenue	6.89	4.49	14.80	4.21	4.39	5.26	5.45	5.64	5.83	6.02

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	**5,493**	**71,017**	**61,125**	**76,405**	**76,400**	**76,400**	**76,400**	**76,400**	**76,400**	**76,400**	**76,400**	**25,262**
Inflow funds	5,493	17,537	5	5	0	0	0	0	0	0	0	0
Inflow operation	0	53,480	61,120	76,400	76,400	76,400	76,400	76,400	76,400	76,400	76,400	0
Other income	0	0	0	0	0	0	0	0	0	0	0	25,262
TOTAL CASH OUTFLOW	**5,493**	**66,505**	**61,900**	**68,617**	**76,711**	**74,287**	**74,365**	**74,220**	**74,075**	**73,931**	**71,717**	**0**
Increase in fixed assets	5,493	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	16,032	2,284	2,284	2,284	1	0	0	0	0	0	0
Operating costs	0	48,468	55,392	62,316	69,240	69,247	69,247	69,247	69,247	69,247	69,247	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	1,377	1,437	1,722	1,784	1,846	1,908	1,970	0
Financial costs	0	1,504	1,655	1,448	1,241	1,034	827	621	414	207	0	0
Loan repayment	0	0	2,069	2,069	2,069	2,069	2,069	2,069	2,069	2,069	0	0
SURPLUS (DEFICIT)	**0**	**4,512**	**-775**	**7,788**	**-311**	**2,113**	**2,035**	**2,180**	**2,325**	**2,469**	**4,683**	**25,262**
CUMULATIVE CASH BALANCE	**0**	**4,512**	**3,737**	**11,525**	**11,215**	**13,327**	**15,363**	**17,542**	**19,867**	**22,336**	**27,019**	**52,282**

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**	**53,480**	**61,120**	**76,400**	**76,400**	**76,400**	**76,400**	**76,400**	**76,400**	**76,400**	**76,400**	**25,262**
Inflow operation	0	53,480	61,120	76,400	76,400	76,400	76,400	76,400	76,400	76,400	76,400	0
Other income	0	0	0	0	0	0	0	0	0	0	0	25,262
TOTAL CASH OUTFLOW	**21,491**	**51,247**	**58,171**	**65,095**	**71,117**	**71,184**	**71,469**	**71,531**	**71,593**	**71,655**	**71,717**	**0**
Increase in fixed assets	5,493	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	15,998	2,279	2,279	2,279	1	0	0	0	0	0	0	0
Operating costs	0	48,468	55,392	62,316	69,240	69,247	69,247	69,247	69,247	69,247	69,247	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	1,377	1,437	1,722	1,784	1,846	1,908	1,970	0
NET CASH FLOW	**-21,491**	**2,233**	**2,949**	**11,305**	**5,283**	**5,216**	**4,931**	**4,869**	**4,807**	**4,745**	**4,683**	**25,262**
CUMULATIVE NET CASH FLOW	**-21,491**	**-19,259**	**-16,310**	**-5,005**	**277**	**5,494**	**10,425**	**15,293**	**20,100**	**24,845**	**29,528**	**54,790**
Net present value	-21,491	2,030	2,437	8,493	3,608	3,239	2,783	2,499	2,242	2,012	1,805	9,740
Cumulative net present value	-21,491	-19,461	-17,025	-8,531	-4,923	-1,684	1,099	3,598	5,840	7,852	9,658	19,397

NET PRESENT VALUE	19,397
INTERNAL RATE OF RETURN	22.90%
NORMAL PAYBACK	5 years