

**162. PROFILE ON THE PRODUCTION OF
CORRUGATED IRON SHEET**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of corrugated iron sheet with a capacity of 15,000 tons per annum. Corrugated iron sheet is used for roofing of houses and other construction.

The demand for corrugated iron sheet is met through both local production and import. The present (2012) demand for corrugated iron sheet is estimated at 705,195 tons. The demand for corrugated iron sheet is projected to reach 1,418,399 tons and 2,852,906 tons by the year 2017 and 2022, respectively.

The principal raw materials required is plain iron sheet which has to be imported.

The total investment cost of the project including working capital is estimated at Birr 48.87 million. From the total investment cost the highest share (Birr 30.60 million or 62.62%) is accounted by initial working capital followed by fixed investment cost (Birr 14.31 million or 29.29%) and pre operation cost (Birr 3.95 million or 8.09%). From the total investment cost Birr 7.74 million or 15.83% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 34.48% and a net present value (NPV) of Birr 67.82 million discounted at 10%.

The project can create employment for 28 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 DESCRIPTION AND APPLICATION

Corrugated iron sheet is used for roofing of houses and other construction. Corrugated iron sheets are classified according to their thickness and surface area. Standard gauge sizes are 28, 30 and 32. It is usually manufactured 2 meters in length and 1.2 meters in width. Corrugated

iron sheets are mostly used for roofing and fencing. Corrugation is a process of deforming plain sheets in the uniform way or zigzag shapes pattern by rolling mills across their entire width.

III. MARKET AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The country's requirement of corrugated iron sheet is met through both local production and imports. According to CSA as of 2010 there are 23 local producers of corrugated iron sheet while the products are imported from various countries. Table 3.1 summarizes local production, import and total supply or apparent consumption of corrugated iron sheet.

Table 3.1

**LOCAL PRODUCTION, IMPORT AND TOTAL SUPPLY OR APPARENT
CONSUMPTION OF CORRUGATED IRON SHEET (TONS)**

Year	Local * production	Import**	Total
2002	35,341	6,023	41,364
2003	30,688	6,173	36,861
2004	70,760	3,048	73,808
2005	35,628	2,997	38,625
2006	114,223	592	114,815
2007	604,973	157	605,130
2008	643,903	763	644,666
2009	785,925	16,547	802,472
2010	464,308	17,064	481,372
2011	631,379 ¹	8,036	639,415

Source: * CSA's "Survey on Large and medium scale manufacturing"

** Ethiopian Revenues & Customs Authority

¹ Local production data for 2011 is not available. Hence the average production during the previous three years (2008-2010) is considered as the production level in 2011

As can be seen from Table 3.1, the total supply or apparent consumption of corrugated iron sheet during the period 2002 – 2011 reveals a growth trend specially beginning from year 2007. The annual average total supply or apparent consumption which was 61,095 tons during the period 2002-2006 has increased to an annual average of 634,611 tons during the period 2007-2011.

Considering the nature of the trend in the apparent consumption of corrugated iron sheet it is assumed that the growth rate registered in the past will also continue in the near future. During the period 2002 – 2011 total supply of corrugated iron sheet has registered an average annual growth rate of 76.65% which is on the high side. Hence, in order to be conservative a growth rate of 10% is considered.

Accordingly, taking the average apparent consumption during the period 2009-2011 as a base and applying a growth rate of 10% the present effective demand (2012) for corrugated iron sheet is estimated at 705,195 tons.

2. Projected Demand

The demand for corrugated iron sheet depends mainly on the performance of its end-user (i.e. the construction sector or more specifically the building 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 corrugated iron sheet 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 15% which is slightly higher than the expected growth rate of the country’s GDP during the GTP period (2011 – 2015) is used. Moreover, it is assumed that the highest local production during 2002 – 2011 indicates the current local production capacity of corrugated iron sheet.

Based on the above assumption and using the estimated present demand as a base the projected demand for corrugated iron sheet and demand supply gap is shown in Table 3.5.

Table 3.5

PROJECTED DEMAND FOR CORRUGATED IRON SHEET AND DEMAND SUPPLY GAP (TONS)

Year	Projected Demand	Existing Capacity	Demand Supply Gap
2013	810,974	786,000	24,974
2014	932,620	786,000	146,620
2015	1,072,513	786,000	286,513
2016	1,233,390	786,000	447,390
2017	1,418,399	786,000	632,399
2018	1,631,158	786,000	845,158
2019	1,875,832	786,000	1,089,832
2020	2,157,207	786,000	1,371,207
2021	2,480,788	786,000	1,694,788
2022	2,852,906	786,000	2,066,906
2023	3,280,842	786,000	2,494,842
2024	3,772,969	786,000	2,986,969
2025	4,338,914	786,000	3,552,914

3. Pricing and Distribution

The current retail price of gauge 30 corrugated iron sheet is Birr 60 per pieces. Considering wholesalers and retailers margin of 25% the recommended factory gate price for the envisaged factory is Birr 45 per pieces or Birr 10,000 per ton.

Considering the nature of the products and the characteristics of the end users a combination both direct distribution to end users (for bulk purchasers) and indirect distribution (using agents) is selected as the most appropriate distribution channel.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

The annual production capacity for the envisaged plant will be 15,000 tons. This is based on a single shift of 8 hours operation per day and for 300 days a year. When demand rises the production capacity will also be increased either by feeding or rolling multiple sheets at the same time or by introducing additional shifts. The product mix is scheduled as 50%, 30% and 20% for 32, 30 and 28 gauges, respectively.

2. Production Program

The production programme will be carried out in such a way that the plant will initially produce at 75% of its capacity, and then will raise its production to 85% in the second year. It will then attain full capacity production in the third and succeeding years. Such a gradual build-up of production is required in order to give opportunity for production workers and technicians to develop skills and experience on operation and maintenance on plant machinery and equipment. Table 3.3 shows production program.

Table 3.3**ANNUAL PRODUCTION PROGRAM**

Year	Capacity Utilization	Production	
		Gauge	Tons
1	75%	32	5,625
		30	3,375
		28	2,250
2	85%	32	6,375
		30	3,825
		28	2,550
3-15	100%	32	7,500
		30	4,500
		28	3,000

IV. MATERIALS AND INPUTS**A. RAW & AUXILIARY MATERIALS**

The raw material used for producing corrugated iron sheets is plain iron sheets. Depending on the required thickness of the iron sheet, the product can be of gauge thickness of 32, 30 and 28. Auxiliary materials required by the plant include printing ink, wooden stands, lead and sulphuric acid. The annual requirement of the raw & auxiliary material at full capacity production, including its cost is shown in Table 4.1.

Table 4.1**RAW AND AUXILIARY MATERIALS AND COST**

Sr. No.	Description	Qty (tons)	Unit Price (Birr)	Cost ('000 Birr)		
				FC	LC	TC
1	A. Raw Materials					
	Plain iron sheet					
	a) 28 gauge	3,000	8,700	26,100	-	26,100
	b) 30 gauge	7,500	8,700	65,250	-	65,250
	c) 32 gauge	4,500	8,700	39,150	-	39,150
	Sub-total	15,000		130,500		130,500
	B. Auxiliary Materials					
1	Printing ink	1,500	-	67.5	-	67.5
2	Lead	kg	-	9	-	9
3	Wooden stands	3,000	-	-	25	25
4	Sulphuric acid	kg	-	-	15	15
	As reqd.					
	As reqd.					
	Sub-total			76.5	40	116.5
	Bank, insurance and customs charges, transportation and material handling costs	-	-	-	150	150
	Total Landed Cost			130,576.5	190	130,766.50

Thus, the total annual raw and auxiliary materials cost at full production capacity of the plant is estimated at Birr 130.77 million.

B. UTILITIES

Electricity and water are inputs required for the envisaged plant. Annual requirements of electricity and water at full production capacity are estimated to be 1,000,000 kWh and 150m³, respectively. At the unit rate of Birr 0.5778 and 10/ m³ for electricity and water, respectively, the annual requirement of utilities is estimated to be Birr 706,116.

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The production process of making corrugated iron sheet consisted of cleaning the rust and other ingredients from the plain iron sheet, then drying by dry, hot air. Then the iron sheet is passed into the molten lead to attain the required thickness. It is then dried by forced air from where it is fed to feeding table by a suitable hoist or crane. Then they are conveyed to the corrugating machine. After corrugation, the product is passed to correcting machine where deformation is corrected. The product is then cut to standard size and trade mark of the company is printed.

2. Environmental Impact

Since the raw material used by the plant is pre coated steel sheet the production process does not have negative environmental impact.

B. ENGINEERING

1. Machinery and Equipment

The total cost of machinery and equipment is estimated at Birr 8.115 million, of which Birr 7.74 million is required in foreign currency, and the remaining Birr 0.375 million is in local currency. The machinery & equipment required for the envisaged plant and corresponding cost is depicted in Table 5.1.

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

Sr. No.	Description	Qty. No.	Cost ('000 Birr)		
			FC	LC	TC
1	Crane (10 tons) for loading and unloading	1	2,100		2,100
2	Feeding conveyor	1	900		900
3	Feeding table	1	90		90
4	Corrugating machine	1	1,800		1,800
5	Correcting machine	1	1,350		1,350
6	cutting (rimming) machine	1	900		900
7	Furnace (oil fired)	1	180		180
8	Boiler (oil fired)	1	330		330
9	Other auxiliary equipment	Req.	90		90
	Sub-total		7,740		7,740
	Bank, customs and insurance charges, transport and handling costs			375	375
	Total Landed Cost		7,740	375	8,115

2. Land, Building and Civil Works

Land is required to accommodate plant building, management offices, social building for workers, stores, internal roads, adequate space for expansion and other industry related activities. The total land area for the envisaged plant is estimated at 2,000 m². The built-up area is estimated at 1,000 m². At building rate of Birr 5,000 per m² the cost of building and civil works will be Birr 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 5000 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 532,000 of which 10% or Birr 53,200 will be paid in advance. The remaining Birr 478,800 will be paid in equal installments with in 28 years i.e. Birr 17,100 annually.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENT

A. HUMAN RESOURCE REQUIREMENT

The plant requires both direct and indirect labor. The direct labor requires engineer, production head, machine operators, technicians and unskilled workers. The indirect manpower consists of

plant manager and other office management personnel. The complete list of manpower and labor cost required by the plant is given in Table 6.1.

Table 6.1

MANPOWER REQUIREMENT AND LABOUR COST (BIRR)

Sr. No.	Description	Req. No.	Monthly Salary	Annual Salary
	A. Administration			
1	Plant manager	1	3,600	43,200
2	Secretary	1	1,200	14,400
3	Administrator	1	2,500	30,000
4	Accountant	1	2,500	30,000
5	Sales person	1	1,500	18,000
6	Store person	1	1,500	18,000
7	Clerk	2	800	18,000
8	Driver	2	750	19,200
9	Guard	4	450	18,000
10	Messenger and cleaner		350	4,200
	Sub-total	15	-	216,600
	B. Production			
1	Mechanical engineer	1	3,000	36,000
1	Production head	1	3,000	36,000
2	Machinery operators	5	1,200	72,000
3	Technicians	2	1,500	36,000
4	Crane operator	1	750	9,000
5	Unskilled workers	3	350	
	Sub-total	13		189,000
	Total			405,600
	Workers' benefit (25% of basic salary)			104,550
	Total Cost	28		522,750

B. TRAINING REQUIREMENT

Training is required for production workers including the engineer, production head, machinery operators, technicians and crane operator. The training program can be executed by making

special arrangements with either public or private industries that are engaged with similar activities. A total of Birr 50,000 is allotted to conduct the training programme that will take three to four weeks.

VII. FINANCIAL ANALYSIS

The financial analysis of the corrugated iron sheet 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	5 years
Bank interest	10%
Discount cash flow	10%
Accounts receivable	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 48.87 million (see Table 7.1). From the total investment cost the highest share (Birr 30.60 million or 62.62%) is accounted by initial working capital followed by fixed investment cost (Birr 14.31 million or 29.29%) and pre operation cost (Birr 3.95 million or 8.09%). From the total investment cost Birr 7.74 million or 15.83% 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	53.20		53.20	0.11
1.2	Building and civil work	5,000.00		5,000.00	10.23
1.3	Machinery and equipment	375.00	7,740.00	8,115.00	16.60
1.4	Vehicles	900.00		900.00	1.84
1.5	Office furniture and equipment	250.00		250.00	0.51
	Sub total	6,578.20	7,740.00	14,318.20	29.29
2	Pre operating cost *				
2.1	Pre operating cost	755.75		755.75	1.55
2.2	Interest during construction	3,197.72		3,197.72	6.54
	Sub total	3,953.47		3,953.47	8.09
3	Working capital **	30,607.73		30,607.73	62.62
	Grand Total	41,139.40	7,740.00	48,879.40	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 43.71 million. However, only the initial working capital of Birr 30.60 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 124.60 million (see Table 7.2). The cost of raw material account for 94.45% of the production cost. The other major components of the production cost are financial cost, depreciation and utility, which account for 2.47%, 1.75% and 0.51%, respectively. The remaining 0.82% is the share of repair and maintenance, direct labor, labor overhead, cost of marketing and distribution 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	117,690.30	94.45
Utilities	635.40	0.51
Maintenance and repair	218.70	0.18
Labor direct	181.80	0.15
Labor overheads	94.50	0.08
Administration Costs	180.00	0.14
Land lease cost	-	-
Cost of marketing and distribution	350.00	0.28
Total Operating Costs	119,350.70	95.78
Depreciation	2,179.15	1.75
Cost of Finance	3,077.80	2.47
Total Production Cost	124,607.65	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 9.91 million to Birr 12.02 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 147.20 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.

$$\text{Break Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 21,340,637$$

$$\text{Break Even Capacity utilization} = \frac{\text{Break even Sales Value}}{\text{Sales revenue}} \times 100 = 14\%$$

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 2 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 34.48% 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 67.82 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 28 persons. The project will generate Birr 32.15 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.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	91,537	104,614	117,690	130,767	130,767	130,767	130,767	130,767	130,767	130,767
Utilities	494	565	635	706	706	706	706	706	706	706
Maintenance and repair	170	194	219	243	243	243	243	243	243	243
Labour direct	141	162	182	202	202	202	202	202	202	202
Labour overheads	74	84	95	105	105	105	105	105	105	105
Administration Costs	140	160	180	200	200	200	200	200	200	200
Land lease cost	0	0	0	0	17	17	17	17	17	17
Cost of marketing and distribution	350	350	350	350	350	350	350	350	350	350
Total Operating Costs	92,906	106,128	119,351	132,573	132,590	132,590	132,590	132,590	132,590	132,590
Depreciation	2,179	2,179	2,179	2,179	2,179	225	225	225	225	225
Cost of Finance	0	3,517	3,078	2,638	2,198	1,759	1,319	879	440	0
Total Production Cost	95,085	111,825	124,608	137,390	136,968	134,574	134,134	133,694	133,255	132,815

Appendix 7.A.3
NET 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	105,000	135,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Less variable costs	92,556	105,778	119,001	132,223	132,223	132,223	132,223	132,223	132,223	132,223
VARIABLE MARGIN	12,444	29,222	30,999	17,777	17,777	17,777	17,777	17,777	17,777	17,777
in % of sales revenue	11.85	21.65	20.67	11.85	11.85	11.85	11.85	11.85	11.85	11.85
Less fixed costs	2,529	2,529	2,529	2,529	2,546	592	592	592	592	592
OPERATIONAL MARGIN	9,915	26,692	28,470	15,248	15,231	17,185	17,185	17,185	17,185	17,185
in % of sales revenue	9.44	19.77	18.98	10.17	10.15	11.46	11.46	11.46	11.46	11.46
Financial costs		3,517	3,078	2,638	2,198	1,759	1,319	879	440	0
GROSS PROFIT	9,915	23,175	25,392	12,610	13,032	15,426	15,866	16,306	16,745	17,185
in % of sales revenue	9.44	17.17	16.93	8.41	8.69	10.28	10.58	10.87	11.16	11.46
Income (corporate) tax	0	0	0	3,783	3,910	4,628	4,760	4,892	5,024	5,155
NET PROFIT	9,915	23,175	25,392	8,827	9,123	10,798	11,106	11,414	11,722	12,029
in % of sales revenue	9.44	17.17	16.93	5.88	6.08	7.20	7.40	7.61	7.81	8.02

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	15,074	138,831	135,004	150,004	150,000	150,000	150,000	150,000	150,000	150,000	150,000	49,965
Inflow funds	15,074	33,831	4	4	0	0	0	0	0	0	0	0
Inflow operation	0	105,000	135,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	0
Other income	0	0	0	0	0	0	0	0	0	0	0	49,965
TOTAL CASH OUTFLOW	15,074	126,738	118,415	131,197	147,763	143,097	143,374	143,066	142,758	142,450	137,746	0
Increase in fixed assets	15,074	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	30,634	4,372	4,372	4,372	2	0	0	0	0	0	0
Operating costs	0	92,556	105,778	119,001	132,223	132,240	132,240	132,240	132,240	132,240	132,240	0
Marketing and Distribution cost	0	350	350	350	350	350	350	350	350	350	350	0
Income tax	0	0	0	0	3,783	3,910	4,628	4,760	4,892	5,024	5,155	0
Financial costs	0	3,198	3,517	3,078	2,638	2,198	1,759	1,319	879	440	0	0
Loan repayment	0	0	4,397	4,397	4,397	4,397	4,397	4,397	4,397	4,397	0	0
SURPLUS (DEFICIT)	0	12,094	16,589	18,806	2,237	6,903	6,626	6,934	7,242	7,550	12,254	49,965
CUMULATIVE CASH BALANCE	0	12,094	28,683	47,489	49,726	56,629	63,256	70,190	77,432	84,982	97,236	147,202

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	105,000	135,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	49,965
Inflow operation	0	105,000	135,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	0
Other income	0	0	0	0	0	0	0	0	0	0	0	49,965
TOTAL CASH OUTFLOW	45,682	97,274	110,497	123,719	136,358	136,500	137,218	137,350	137,482	137,614	137,746	0
Increase in fixed assets	15,074	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	30,608	4,368	4,368	4,368	2	0	0	0	0	0	0	0
Operating costs	0	92,556	105,778	119,001	132,223	132,240	132,240	132,240	132,240	132,240	132,240	0
Marketing and Distribution cost	0	350	350	350	350	350	350	350	350	350	350	0
Income (corporate) tax		0	0	0	3,783	3,910	4,628	4,760	4,892	5,024	5,155	0
NET CASH FLOW	-45,682	7,726	24,503	26,281	13,642	13,500	12,782	12,650	12,518	12,386	12,254	49,965
CUMULATIVE NET CASH FLOW	-45,682	-37,956	-13,453	12,828	26,470	39,971	52,753	65,403	77,921	90,307	102,562	152,527
Net present value	-45,682	7,023	20,251	19,745	9,318	8,383	7,215	6,492	5,840	5,253	4,725	19,264
Cumulative net present value	-45,682	-38,658	-18,408	1,337	10,655	19,038	26,253	32,745	38,584	43,837	48,562	67,826

NET PRESENT VALUE 67,826
INTERNAL RATE OF RETURN 34.48%
NORMAL PAYBACK 2 years