

**179. PROFILE ON THE PRODUCTION OF
WIRE NAIL**

TABLE OF CONTENTS

		<u>PAGE</u>
I.	SUMMARY	179-2
II.	PRODUCT DESCRIPTION & APPLICATION	179-2
III.	MARKET STUDY AND PLANT CAPACITY	179-3
	A. MARKET STUDY	179-3
	B. PLANT CAPACITY & PRODUCTION PROGRAM	179-6
IV.	MATERIALS AND INPUTS	179-6
	A. RAW & AUXILIARY MATERIALS	179-6
	B. UTILITIES	179-7
V.	TECHNOLOGY & ENGINEERING	179-7
	A. TECHNOLOGY	179-7
	B. ENGINEERING	179-8
VI.	HUMAN RESOURCE & TRAINING REQUIREMENT	179-12
	A. HUMAN RESOURCE REQUIREMENT	179-12
	B. TRAINING REQUIREMENT	179-13
VII.	FINANCIAL ANALYSIS	179-14
	A. TOTAL INITIAL INVESTMENT COST	179-14
	B. PRODUCTION COST	179-15
	C. FINANCIAL EVALUATION	179-16
	D. ECONOMIC AND SOCIAL BENEFITS	179-18

I. SUMMARY

This profile envisages the establishment of a plant for the production of wire nail with a capacity of 1,200 tons per annum. Wire nail is used on building construction works for fixing together wooden structural parts and to build scaffoldings and ladders during the construction of high rise buildings.

The demand for wire nail is met both from local production and import. The present (2012) demand for wire nail is estimated at 28,213 tons. The demand for wire nail is projected to reach 56,746 tons and 114,137 tons by the year 2017 and 2022, respectively.

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

The total investment cost of the project including working capital is estimated at Birr 11.54 million. From the total investment cost the highest share (Birr 8.18 million or 70.91%) is accounted by fixed investment cost followed by initial working capital (Birr 2.10 million or 18.21%) and pre operation cost (Birr 1.25 million or 10.88%). From the total investment cost Birr 4.12 million or 35.77% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 27.48% and a net present value (NPV) of Birr 10.64 million discounted at 10%.

The project can create employment for 24 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 and furniture manufacturing sub sectors and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTIONS AND APPLICATIONS

Roofing and wire nails are being used on building construction works for fixing together wooden structural parts. Wire nails are also of key advantage to build scaffoldings and ladders during the construction of high rise buildings. The product has two main categories. One product being used for roofing purposes and the other for normal structure work purposes. The main types conceived in this project are Roofing Nails 1 size & Wire Nails 3 sizes

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Present Supply And Demand

The demand for nails in Ethiopia is being met both from local production and import. The historical data of imports and local production or apparent consumption of nail, during the period 2002 - 2011 is provided in Table 3.1.

Table 3.1

APPARENT CONSUMPTION OF NAIL

Year	In Ton		
	Local*	Import**	Total
2002	5,190	6,582	11,772
2003	5,330	3,282	8,612
2004	8,664	4,961	13,625
2005	15,335	4,025	19,360
2006	22,233	4,737	26,970
2007	21,944	2,824	24,768
2008	17,004	5,973	22,977
2009	20,394 ¹	6,206	26,599
2010	21,520	3,935	25,455
2011	19,639 ²	5,551	25,190

Source: ** Ethiopian Revenues & Customs Authority

* CSA, Report on Survey of MLS Manufacturing and Electricity Industries

As can be seen from Table 3.1 imports of nail were fluctuating between a maximum of 6,582 tons in year 2002 to a minimum of 2,824 tons in 2007 around a mean figure of 4,808 tons. Local production on the other hand, exhibits an increasing trend, registering an average annual growth rate of 20% over the period under consideration (2002 – 2010).

¹ CSA's local production data for the year 2009 which is 4,661 tons is extremely low as compared the previous four years hence for 2009 the average of 2006 – 2008 is considered to reflect local production level

² Local production data for the year 2011 is not available hence it is assumed that the average production during the previous three years (2008 – 2010) approximates local production during 2011

Total apparent consumption of nail during the period 2002 – 2011 ranged from 8,612 tones in 2003 to 26,970 tones (2006). The mean apparent consumption over the period under consideration was 20,533 tones. However, it can be clearly seen apparent consumption had grown significantly especially during the period 2006 -2011 where the mean apparent consumption is 25,327 tones. During the period under consideration (2002 – 2011) apparent consumption of nails has registered an average annual growth rate of 12%.

For estimating the present demand for nails, it is assumed that the growth rate registered in the apparent consumption of the product will continue at least in the near future. Accordingly, by taking the 2011 level of apparent consumption and applying a growth rate 12%, the present (2012) demand for nails is estimated at 28,213 tons.

2. Projected Demand

The demand for nail 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 nail 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 nail. Based on the above assumption and using the estimated present demand as a base the projected demand for nail and demand supply gap is shown in Table 3.2.

Table 3.2
PROJECTED DEMAND FOR NAIL (in tons)

Year	Projected Demand	Domestic Supply	Unsatisfied Demand
2013	32,445	22,200	10,245
2014	37,312	22,200	15,112
2015	42,908	22,200	20,708
2016	49,345	22,200	27,145
2017	56,746	22,200	34,546
2018	65,258	22,200	43,058
2019	75,047	22,200	52,847
2020	86,304	22,200	64,104
2021	99,250	22,200	77,050
2022	114,137	22,200	91,937
2023	131,258	22,200	109,058
2024	150,947	22,200	128,747
2025	173,588	22,200	151,388

3. Pricing and Distribution

The current retail price of nail is Birr 15/kg. Allowing a margin of 25% for distributors and retailers, the recommended factory gate price for the envisaged factory is Birr 12/kg.

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 PROGRAMM

1. Plant Capacity

The production capacity of the plant is selected to be 1,200 tons of assorted roofing and wire nails per annum on a single shift basis.

2. Production Program

The plant will start at 75% of its installed capacity during the first year of operation. During the second and third year and then after it will operate at 85% and 100%, respectively (see Table 3.3).

Table3. 3

PRODUCTION PROGRAM

	Year 1	Year 2	Year 3
Annual production (Ton)	900	960	1,200
Capacity %	75	80	100

IV. RAW MATERIAL AND INPUTS

A. RAW AND AUXILIARY MATERIALS

The production of wire nails require wires to be drawn into desired sizes and desired final wire nail sizes. In this project, drawn wires are being used as inputs with final specified dimensions and fixed sizes. Auxiliary materials required are sulphuric acid and saw dust. Except saw dust all the raw materials have to be imported. The raw material requirements by type and cost are shown in Table 4.1.

Table 4.1
RAW MATERIALS REQUIREMENT AND COST

No	Raw Materials	Description	Annual input		Cost (in 000 Birr)		
			Unit	Qty.	F.C	L.C	Total
1	M.S drawn wires	Dia.0.17-6mm	Ton	720	4,320	864.0	5,184.0
2	M.s Sheet metal	Thickness 0.6mm	Ton	480	2,880	576.0	3,456.0
3	Zinc bars		Ton	1	9	1.8	10.8
4	Sulphuric acid	Concentrated	lit.	3,000	24	4.8	28.8
5	Saw dust	powdered	Ton	1		3.0	3.0
	Total						8,682.60

B. UTILITIES

The major utility requirement of the plant is water and electricity. Annual cost of utilities is Birr 53,100. The quantity and cost of the material is indicated on Table 4.2.

Table 4.2
ANNUAL UTILITY REQUIREMENT AND COST

No.	Utility	unit	Qty	Cost (birr)
1	Electricity	Kwh	74,000	43,100
2	Water	mt. Cube	1,000	10,000
Total				53,100

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Process Description

The wire in the form of coil with diameters of 0.17-6 mm is first cleaned from rust and scale by mechanical scrapper. The cleaned wire in the form of coil is fed into automatic heading and pointing machines forming the final nail of desired size. This is collected for the next processing.

The collected piece is further transferred to tumbling machine for polishing and de-burring of the finished nail ready for packing.

2. Environmental Impact

The process of manufacturing mainly involves cutting and forming of wires and sheet metal this does not have any negative impact on the environment. The plant can be considered as safe to the environment.

B. ENGINEERING

1. Machinery and Equipment

Total cost of machinery and equipment is Birr 5.01 million. The required machines and equipments with their corresponding costs are indicated in Table 6.1.

Table 6.1
MACHINERY AND EQUIPMENT FOR WIRE NAIL PLANT

Sr. No.	Description	Qty.	Cost in '000 Birr		
			FC	LC	TC
1	Washer making machine	1	774.0	154.8	928.8
2	Nail making machine	4	2,138.1	464.4	2,602.5
3	Wire coil stand	4	21.7	4.3	26.1
4	Accessories	4 set	317.3	51.6	368.9
5	Head polisher	1 pc	165.5	40.2	205.7
6	Galvanizing equipment	1	479.9	103.2	583.1
7	Compressor	1	126.5	29.2	155.7
8	Surface grinder	1	104.6	20.9	125.5
9	Weighing scale	1	-	6.5	6.5
10	Hard pallet truck	1	-	9.0	9.0
	Total		4,127.7	884.1	5,011.8

2. Land, Building and Civil Works

The total land area required is 800 m² of which the total built-up area of the plant is estimated to be 400 m². The cost of building and civil work at the rate of Birr 5,000 per m² is estimated at Birr 2 million.

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

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

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

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

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

Regarding land allocation of industrial zones if the land requirement of the project is below 5,000 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 212,800 of which 10% or Birr 21,280 will be paid in advance. The remaining Birr 191,520 will be paid in equal installments with in 28 years i.e. Birr 6,840 annually.

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

A total of 24 workers are required to operate the plant of these 15 are technical workers. Annual cost of labour is estimated at Birr 511,200. The detail requirements with corresponding salaries are shown on table 6.1.

Table 6.1
HUMAN RESOURCE REQUIREMENT AND LABOR COST

Sr. No.	Description	No.	Salary (Birr)	
			Monthly	Annual
A. ADMINISTRATION				
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
Sub Total		9		220,800
B. PRODUCTION				
8	Forman	1	2,500	30,000
9	Machinery Operators	5	2,000	120,000
10	Assistant Operators	2	1,500	36,000
11	Mechanics	2	2,000	48,000
12	Quality controller	1	1,500	18,000
13	Laborers	4	800	38,400
Sub Total		15	-	290,400
Total basic salary				511,200
Employee's Benefit (25% Of Basic Salary)		-	-	100,080
Total		24	-	611,280

B. TRAINING REQUIREMENT

On the job demonstration of the operation of the machine would be enough for the operation of the machine for workers with basic technical background. The production technology is independent on the manual skill of the workers. This reduces a repeated cost of training that

would be required to up grade skills. An initial cost of demonstration and training during commissioning would be enough. This requires an amount of birr 12,000 for 15 workers.

VII. FINANCIAL ANALYSIS

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

Construction period	1 year
Source of finance	30 % equity & 70 loan
Tax holidays	3 years
Bank interest	10%
Discount cash flow	10%
Accounts receivable	30 days
Raw material local	30 days
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 11.54 million (See Table 7.1). . From the total investment cost the highest share (Birr 8.18 million or 70.91%) is accounted by fixed investment cost followed by initial working capital (Birr 2.10 million or 18.21%) and pre operation cost (Birr 1.25 million or 10.88%). From the total investment cost Birr 4.12 million or 35.77% 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	0.18
1.2	Building and civil work	2,000.00		2,000.00	17.33
1.3	Machinery and equipment	884.10	4,127.70	5,011.80	43.43
1.4	Vehicles	900.00		900.00	7.80
1.5	Office furniture and equipment	250.00		250.00	2.17
	Sub total	4,055.38	4,127.70	8,183.08	70.91
2	Pre operating cost *				
2.1	Pre operating cost	500.35		500.35	4.34
2.2	Interest during construction	754.91		754.91	6.54
	Sub total	1,255.26		1,255.26	10.88
3	Working capital **	2,101.04		2,101.04	18.21
	Grand Total	7,411.68	4,127.70	11,539.38	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 3.02 million. However, only the initial working capital of Birr 2.10 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 12.36 million (see Table 7.2). The cost of raw material account for 70.24% of the production cost. The other major components of the production cost are financial cost, depreciation, labor, and cost of marketing and distribution which account for 11.22%, 5.88%, 4.13% and 4.04% respectively. The remaining 4.49% is the share of utility, repair and maintenance, labour overhead and administration cost. For detail production cost see Appendix 7.A.2.

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

Items	Cost (000 Birr)	%
Raw Material and Inputs	8,683	70.24
Utilities	53	0.43
Maintenance and repair	150	1.21
Labour direct	511	4.13
Labour overheads	100	0.81
Administration Costs	250	2.02
Land lease cost	0	0.00
Cost of marketing and distribution	500	4.04
Total Operating Costs	10,247	82.90
Depreciation	1,387	11.22
Cost of Finance	727	5.88
Total Production Cost	12,361	100.00

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 1.50 million to Birr 2.83 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 24.60 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.

$$\text{Break Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 6,048,000$$

$$\text{Break Even Capacity utilization} = \frac{\text{Breakeven Sales Value}}{\text{Sales revenue}} \times 100 = 40.56\%$$

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 27.48% 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 principal 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 10.64 million which is acceptable. For detail discounted cash flow see Appendix 7.A.5.

D. ECONOMIC AND SOCIAL BENEFITS

The project can create employment for 24 persons. The project will generate Birr 7.06 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 and furniture manufacturing sub sectors and 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	6,078	7,815	8,683	8,683	8,683	8,683	8,683	8,683	8,683	8,683
Utilities	37	48	53	53	53	53	53	53	53	53
Maintenance and repair	105	135	150	150	150	150	150	150	150	150
Labour direct	358	460	511	511	511	511	511	511	511	511
Labour overheads	70	90	100	100	100	100	100	100	100	100
Administration Costs	175	225	250	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	7,323	9,272	10,247	10,247	10,254	10,254	10,254	10,254	10,254	10,254
Depreciation	1,387	1,387	1,387	1,387	1,387	105	105	105	105	105
Cost of Finance	0	830	727	623	519	415	311	208	104	0
Total Production Cost	8,710	11,490	12,361	12,257	12,160	10,774	10,670	10,566	10,463	10,359

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	10,080	12,960	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400
Less variable costs	6,823	8,772	9,747	9,747	9,747	9,747	9,747	9,747	9,747	9,747
VARIABLE MARGIN	3,257	4,188	4,653	4,653	4,653	4,653	4,653	4,653	4,653	4,653
in % of sales revenue	32.31	32.31	32.31	32.31	32.31	32.31	32.31	32.31	32.31	32.31
Less fixed costs	1,887	1,887	1,887	1,887	1,894	612	612	612	612	612
OPERATIONAL MARGIN	1,370	2,300	2,766	2,766	2,759	4,041	4,041	4,041	4,041	4,041
in % of sales revenue	13.59	17.75	19.21	19.21	19.16	28.06	28.06	28.06	28.06	28.06
Financial costs		830	727	623	519	415	311	208	104	0
GROSS PROFIT	1,370	1,470	2,039	2,143	2,240	3,626	3,730	3,834	3,937	4,041
in % of sales revenue	13.59	11.34	14.16	14.88	15.55	25.18	25.90	26.62	27.34	28.06
Income (corporate) tax	0	0	0	643	672	1,088	1,119	1,150	1,181	1,212
NET PROFIT	1,370	1,470	2,039	1,500	1,568	2,538	2,611	2,683	2,756	2,829
in % of sales revenue	13.59	11.34	14.16	10.42	10.89	17.63	18.13	18.64	19.14	19.64

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	8,683	12,975	12,971	14,406	14,400	14,400	14,400	14,400	14,400	14,400	14,400	4,960
Inflow funds	8,683	2,895	11	6	0	0	0	0	0	0	0	0
Inflow operation	0	10,080	12,960	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	0
Other income	0	0	0	0	0	0	0	0	0	0	0	4,960
TOTAL CASH OUTFLOW	8,683	10,217	11,740	12,311	12,551	12,483	12,795	12,722	12,650	12,577	11,466	0
Increase in fixed assets	8,683	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	2,140	599	300	0	1	0	0	0	0	0	0
Operating costs	0	6,823	8,772	9,747	9,747	9,754	9,754	9,754	9,754	9,754	9,754	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	643	672	1,088	1,119	1,150	1,181	1,212	0
Financial costs	0	755	830	727	623	519	415	311	208	104	0	0
Loan repayment	0	0	1,038	1,038	1,038	1,038	1,038	1,038	1,038	1,038	0	0
SURPLUS (DEFICIT)	0	2,757	1,231	2,094	1,849	1,917	1,605	1,678	1,750	1,823	2,934	4,960
CUMULATIVE CASH BALANCE	0	2,757	3,988	6,082	7,932	9,848	11,453	13,131	14,882	16,705	19,639	24,599

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	10,080	12,960	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	4,960
Inflow operation	0	10,080	12,960	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	0
Other income	0	0	0	0	0	0	0	0	0	0	0	4,960
TOTAL CASH OUTFLOW	10,784	7,911	9,566	10,247	10,890	10,926	11,342	11,373	11,404	11,435	11,466	0
Increase in fixed assets	8,683	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	2,101	588	294	0	1	0	0	0	0	0	0	0
Operating costs	0	6,823	8,772	9,747	9,747	9,754	9,754	9,754	9,754	9,754	9,754	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	643	672	1,088	1,119	1,150	1,181	1,212	0
NET CASH FLOW	-10,784	2,169	3,394	4,153	3,510	3,474	3,058	3,027	2,996	2,965	2,934	4,960
CUMULATIVE NET CASH FLOW	-10,784	-8,616	-5,222	-1,069	2,440	5,914	8,973	12,000	14,996	17,961	20,895	25,855
Net present value	-10,784	1,972	2,805	3,120	2,397	2,157	1,726	1,553	1,398	1,257	1,131	1,912
Cumulative net present value	-10,784	-8,813	-6,008	-2,888	-491	1,666	3,392	4,946	6,344	7,601	8,732	10,645

NET PRESENT VALUE 10,645
INTERNAL RATE OF RETURN 27.48%
NORMAL PAYBACK 4 years