

**157. PROFILE ON THE PRODUCTION OF
BOLTS AND NUTS**

TABLE OF CONTENTS

	<u>PAGE</u>
I. SUMMARY	157-2
II. PRODUCT DESCRIPTION & APPLICATION	157-2
III. MARKET STUDY AND PLANT CAPACITY	157-3
A. MARKET STUDY	157-3
B. PLANT CAPACITY & PRODUCTION PROGRAM	157-6
IV. MATERIALS AND INPUTS	157-6
A. RAW & AUXILIARY MATERIALS	157-6
B. UTILITIES	157-7
V. TECHNOLOGY & ENGINEERING	157-7
A. TECHNOLOGY	157-7
B. ENGINEERING	157-8
VI. HUMAN RESOURCE & TRAINING REQUIREMENT	157-13
A. HUMAN RESOURCE REQUIREMENT	157-13
B. TRAINING REQUIREMENT	157-13
VII. FINANCIAL ANALYSIS	157-15
A. TOTAL INITIAL INVESTMENT COST	157-15
B. PRODUCTION COST	157-16
C. FINANCIAL EVALUATION	157-17
D. ECONOMIC AND SOCIAL BENEFITS	157-19

I. SUMMARY

This profile envisages the establishment of a plant for the production of bolts and nuts with a capacity of 5,200 tons per annum. Bolts and nuts are used to fasten together loose parts mainly in industries and workshops.

The demand for bolts and nuts is met through import and domestic production. The present (2012) unsatisfied demand for bolts and nuts is estimated at 3,415 tons. The unsatisfied demand for bolts and nuts is projected to reach 5,500 tons and 8,858 tons by the year 2017 and 2022, respectively.

The principal raw materials required are M.S wires and Hexagonal bars which have to be imported.

The total investment cost of the project including working capital is estimated at Birr 44.35 million. From the total investment cost the highest share (Birr 31.95 million or 72.04%) is accounted by initial working capital followed by fixed investment cost (Birr 8.88 million or 20.01%) and pre operation cost (Birr 3.52 million or 7.95%). From the total investment cost Birr 3.12 million or 7.04% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 28.25% and a net present value (NPV) of Birr 54.42 million discounted at 10%.

The project can create employment for 49 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 manufacturing sub sector and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTIONS AND APPLICATIONS

Bolt is cylindrical piece of metal that fasten objects together. It is a piece of steel forged at one end to make hexagonal, square or round head and the shank fully or partially threaded at the other end. Nut is hexagonal or square piece with a threaded hole at the center. Bolts and nuts can

be zinc or cadmium plating to resist corrosion. Bolt and nut are used to fasten together loose parts mainly in industries and workshops.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Bolts and nuts are manufactured by few of the existing metal industries locally. However, there is no available data that indicates the level of local production. Moreover, since the bulk of the products supply comes through import for this project profile the unsatisfied demand for the product is estimated based on the trend in import. Accordingly, import of bolts and nuts during the period 2002 – 2011 is shown in Table 3.1.

Table 3.1
IMPORT OF BOLTS AND NUTS OF IRON & STEEL (TONS)

Year	Quantity
2002	776
2003	1,099
2004	1,276
2005	1,165
2006	2,022
2007	4,408
2008	2,599
2009	2,857
2010	3,537
2011	2,439

Source: Ethiopian Revenue & Customs Authority.

As can be seen from Table 3.1, import of bolts and nuts for the period 2002-2011 ranges from the lowest 776 tons (year 2002) to the high 4,408 tons (year 2007) with annual average of about 2,218 tons. Though import of bolts and nuts fluctuates from year to year, a general growth trend can be observed. For example average import during the first five years of the data set (2002 – 2006) was 1,268 tons which has increased to 3,168 during the next five years (2007-2011) average.

During the period under consideration (2002 – 2011) excluding 2002 and 2007 were compared to the other years import was exceptionally low and high respectively, import of the products has registered an average annual growth rate of 16%.

For estimating the present unsatisfied demand for bolts and nuts i.e. the demand which is currently being supplied through import, it is assumed that the growth rate registered in import of the product will continue at least in the near future.

Accordingly, by taking the average level of import during the recent three years (2009 -2011) as a base and applying a growth rate 16%, the present (2012) unsatisfied demand for bolts and nuts is estimated at 3,415 tons.

2. Demand Projection

Bolts and nuts are items which are used extensively in all industries either during manufacturing or repair and maintenance of engineering products and their demand is expected to increase with the development of the manufacturing, maintenance and construction sectors.

According to the government's "Growth and Transformation Plan (2011--2015)" during the plan period, the industrial sector, which includes the manufacturing and construction sectors, is expected to grow at an average annual growth rate of 20% during.

However, in order to be conservative a growth rate of 10% which is slightly lower than the anticipated growth rate of GDP during the Growth and Transformation period (11.4%) is used to

project the unsatisfied demand for bolts and nuts. Accordingly, using the estimated present unsatisfied demand as a base and applying a growth rate of 10% the projected unsatisfied demand for bolts and nuts is shown in Table 3.2.

Table 3.2

PROJECTED UNSATISFIED DEMAND FOR BOLTS AND NUTS (TONS)

Year	Quantity
2013	3,757
2014	4,132
2015	4,545
2016	5,000
2017	5,500
2018	6,050
2019	6,655
2020	7,320
2021	8,052
2022	8,858
2023	9,743
2024	10,718
2025	11,790

3. Pricing and distribution

The current retail price of bolts and nuts is Birr 38/kg. Allowing a margin of 25% for distributors and retailers, the recommended factory gate price for the envisaged factory is Birr 30.40/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 PROGRAM

1. Plant Capacity

The production capacity of the plant is selected to be 5,200 tons of assorted bolts and nuts. The plant will operate single shift of eight hours a day and 300 days per annum.

2. Production Program

The production program is worked out by considering the complexity of the production process and the time required for skill development. Accordingly, the plant is assumed to start its operation at 75% of its installed capacity and progressively increases to 85% and 100% in the second and third year and then after, respectively. The production programme is provided in Table 3.3.

Table 3.3
ANNUAL PRODUCTION PROGRAM

	Year 1	Year 2	Year 3
Production (Ton)	3,900	4,420	5,200
Capacity %	75	85	100

IV. RAW MATERIAL AND INPUTS

A. RAW AND AUXILIARY MATERIALS

The production of bolts and nuts require M.S wires and Hexagonal bars to be drawn into desired sizes and desired final bolts and nuts. In addition saw dust is required. Except saw dust the raw materials have to be imported. Table 4.1 shows the annual raw material requirements and cost at full capacity production.

Table 4.1**ANNUAL RAW MATERIAL REQUIREMENT AND COST**

Sr. No	Raw Materials	Quantity (Ton)	Cost (000 Birr)		
			F.C	L.C	Total
1	M.S drawn wires	5,720	102,960	15,444	118,404
2	Hexagonal bars	1,300	15,600	2,340	17,940
3	Saw dust/ sand	7		56	56
	Total		118,560	17,840	136,400

B. UTILITIES

The utilities required are electricity and water. At full capacity operation the annual cost of utilities is Birr 78,600. For details see Table 4.2.

Table 4.2**ANNUAL UTILITIES REQUIREMENTS AND COST**

No	Utility	Unit	Quantity	Cost(Birr)
1	Electricity	kWh	120,000	69,600
2	Water	Meter cube	900	9,000
	Total			78,600

V. TECHNOLOGY AND ENGINEERING**A. TECHNOLOGY****1. Process Description**

The processes involved in the production of bolts and nuts are discussed below.

➤ Bolt formation

The wire in the form of coil with diameters of 6, 8, 10,12mm is first cleaned from dust by mechanical scrapper. The cleaned wire in the form of coil is fed into automatic Heading

machines (in Header machine 1 dia.6,8mm and in Header machine 2 dia .8-12mm)The headed product is cut into pieces.

The Pieces from the header are fed into Head trimming machines (in dia6-8 and 8-12 trimming machines).

The prepared blanked pieces from the trimming machine are fed into thread rolling machine where thread of proper pitch and area formed.

The thread parts are fed into blackening machine where it is heated in a controlled furnace and dipped in black oil to prevent rusting.

➤ **Nut forming**

The Hexagonal wire rod tat are cut in sizes are loaded in to nut cutting and drilling machine.

The drilled nuts are fed into the nut threading machine where the final piece is further transferred to tumbling machine.

2. Environmental Impact

The process does not have any adverse impact on the environment. Scrapes from the process are fully recyclable in foundry.

B. ENGINEERING

1. Machinery and Equipment

Total cost of machinery and equipment is Birr 3,949,000 of which Birr 3,120,000 is required in foreign currency. The list of the required machines and equipments are indicated in Table 5.1.

Table 5.1**LIST OF REQUIRED MACHINERY AND EQUIPMENT**

Sr. No.	Description	Qty.
1	Automatic double stroke solid die cold heading machine capacity Ø 8-12mm	1
2	Automatic double stroke solid die cold heading machine capacity Ø 6-8mm	1
3	Automatic bolt head trimming & shank reducing machine capacity Ø 6-8mm.	1
4	Automatic bolt head trimming & shank reducing machine capacity Ø 8-12mm.	1
5	Automatic thread rolling machine capacity Ø 6-8mm.	1
6	Automatic thread rolling machine capacity Ø8-12mm.	1
7	Automatic nut cutting machine capacity Ø 6-8mm.	1
8	Automatic nut cutting machine capacity Ø 8-12mm.	1
9	Automatic nut tapping machine capacity Ø 6-8mm	1
10	Automatic nut tapping machine capacity Ø 8-12mm	1
11	Polishing Barrel	3
12	Inspection Gauges	1 Set
13	Standard working tools & handling equipment	1 Set
14	Center lathe between center distance 1000mm	1
15	Pillar type drilling machine capacity Ø 20mm	1
16	Surface grinder	1
17	Mechanical scraper (roller)	1
18	Blackening Tanks	1 Set

2. Land, Building and Civil Works

The envisaged plant requires a total land area of 1,000 m², of which 750 m² would be built-up area. Building construction cost at a rate of Birr 5,000/m² is estimated to be Birr 3.75 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 Comp 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 266,000 of which 10% or Birr 26,600 will be paid in advance. The remaining Birr 239,400 will be paid in equal installments with in 28 years i.e. Birr 8,550 annually.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENT

A. HUMAN RESOURCE REQUIREMENT

The plant requires a total of 49 persons of whom 38 are production workers and the remaining 11 are administrative workers. Annual cost of labor including employees benefit is Birr 1,048,200. Details of human resource by type of job and the monthly and annual salary are given in Table 6.1.

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 back ground. Birr 20,000 is required for demonstration and training of 32 workers.

Table 6.1
HUMAN RESOURCE REQUIREMENT AND COST

Sr. No.	Description	No.	Salary (Birr)	
			Monthly	Annual
A. ADMINISTRATION				
1	Plant Manager	1	5,000	60,000
2	Head, Finance & Administration Department	1	4,000	48,000
3	Head, Production and Technical Department	1	4,000	48,000
4	Secretary	1	2,500	30,000
5	Accountant	1	2,500	30,000
6	Salesman	1	2,500	30,000
7	Clerk	1	1,500	18,000
8	Cashier	1	2,000	24,000
9	General Service	3	800	28,800
Sub -Total		11		316,800
B. PRODUCTION				
13	Forman	1	2,500	30,00
14	Machinery Operators	20	2,000	480,000
15	Assistant Operators	10	1,500	180,000
15	Mechanics	2	2,000	48,000
16	Quality controller	1	1,500	18,000
17	Laborers	4	800	38,400
Sub -Total		38	-	767,400
				1,084,200
Employee's Benefit (25% Of Basic Salary)		-	-	271,050
Total		49	-	1,355,250

VII. FINANCIAL ANALYSIS

The financial analysis of the bolts and nuts 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 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 44.35 million (see Table 7.1). From the total investment cost the highest share (Birr 31.95 million or 72.04%) is accounted by initial working capital followed by fixed investment cost (Birr 8.88 million or 20.01%) and pre operation cost (Birr 3.52 million or 7.95%). From the total investment cost Birr 3.12 million or 7.04% 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	26.60		26.60	0.06
1.2	Building and civil work	3,750.00		3,750.00	8.46
1.3	Machinery and equipment	829.00	3,120.00	3,949.00	8.90
1.4	Vehicles	900.00		900.00	2.03
1.5	Office furniture and equipment	250.00		250.00	0.56
	Sub total	5,755.60	3,120.00	8,875.60	20.01
2	Pre operating cost *				
2.1	Pre operating cost	622.45		622.45	1.40
2.2	Interest during construction	2,901.26		2,901.26	6.54
	Sub total	3,523.71		3,523.71	7.95
3	Working capital **	31,948.48		31,948.48	72.04
	Grand Total	41,227.79	3,120.00	44,347.79	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 45.66 million. However, only the initial working capital of Birr 31.94 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 142.88 million (see Table 7.2). The cost of raw material account for 95.46% of the production cost. The other major components of the production cost are financial cost, depreciation and direct labor which account for 1.74%, 0.89% and 0.76% respectively. The remaining 1.15% is the share of utility, repair and maintenance, labor overhead, administration cost and cost of marketing and distribution. 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	136,400	95.5
Utilities	79	0.1
Maintenance and repair	197	0.1
Labor direct	1,084	0.8
Labor overheads	271	0.2
Administration Costs	350	0.2
Land lease cost	0	0.0
Cost of marketing and distribution	750	0.5
Total Operating Costs	139,131	97.4
Depreciation	1,269	0.9
Cost of Finance	2,394	1.7
Total Production Cost	142,794	100.0

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 10.70 million to Birr 13.14 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 132.22 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.

$$\text{Break Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 66,394,000$$

$$\text{Break Even Capacity utilization} = \frac{\text{Break even Sales Value}}{\text{Sales revenue}} \times 100 = 39\%$$

4. Pay-back Period

The payback 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 28.25% 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 54.42 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 49 persons. The project will generate Birr 36.24 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 manufacturing 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	95,480	109,120	122,760	136,400	136,400	136,400	136,400	136,400	136,400	136,400
Utilities	55	63	71	79	79	79	79	79	79	79
Maintenance and repair	138	158	178	197	197	197	197	197	197	197
Labour direct	759	867	976	1,084	1,084	1,084	1,084	1,084	1,084	1,084
Labour overheads	190	217	244	271	271	271	271	271	271	271
Administration Costs	245	280	315	350	350	350	350	350	350	350
Land lease cost	0	0	0	0	9	9	9	9	9	9
Cost of marketing and distribution	750	750	750	750	750	750	750	750	750	750
Total Operating Costs	97,617	111,455	125,293	139,131	139,140	139,140	139,140	139,140	139,140	139,140
Depreciation	1,269	1,269	1,269	1,269	1,269	175	175	175	175	175
Cost of Finance	0	3,191	2,792	2,394	1,995	1,596	1,197	798	399	0
Total Production Cost	98,886	115,916	129,355	142,794	142,404	140,911	140,512	140,113	139,714	139,315

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	110,656	126,464	142,272	158,080	158,080	158,080	158,080	158,080	158,080	158,080
Less variable costs	96,867	110,705	124,543	138,381	138,381	138,381	138,381	138,381	138,381	138,381
VARIABLE MARGIN	13,789	15,759	17,729	19,699	19,699	19,699	19,699	19,699	19,699	19,699
in % of sales revenue	12.46	12.46	12.46	12.46	12.46	12.46	12.46	12.46	12.46	12.46
Less fixed costs	2,019	2,019	2,019	2,019	2,028	934	934	934	934	934
OPERATIONAL MARGIN	11,770	13,740	15,710	17,679	17,671	18,765	18,765	18,765	18,765	18,765
in % of sales revenue	10.64	10.86	11.04	11.18	11.18	11.87	11.87	11.87	11.87	11.87
Financial costs		3,191	2,792	2,394	1,995	1,596	1,197	798	399	0
GROSS PROFIT	11,770	10,548	12,917	15,286	15,676	17,169	17,568	17,967	18,366	18,765
in % of sales revenue	10.64	8.34	9.08	9.67	9.92	10.86	11.11	11.37	11.62	11.87
Income (corporate) tax	0	0	0	4,586	4,703	5,151	5,271	5,390	5,510	5,630
NET PROFIT	11,770	10,548	12,917	10,700	10,973	12,019	12,298	12,577	12,856	13,136
in % of sales revenue	10.64	8.34	9.08	6.77	6.94	7.60	7.78	7.96	8.13	8.31

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	9,498	145,580	126,475	142,283	158,080	158,080	158,080	158,080	158,080	158,080	158,080	50,793
Inflow funds	9,498	34,924	11	11	0	0	0	0	0	0	0	0
Inflow operation	0	110,656	126,464	142,272	158,080	158,080	158,080	158,080	158,080	158,080	158,080	0
Other income	0	0	0	0	0	0	0	0	0	0	0	50,793
TOTAL CASH OUTFLOW	9,498	132,541	123,201	136,641	154,666	149,827	149,876	149,596	149,317	149,038	144,769	0
Increase in fixed assets	9,498	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	32,023	4,566	4,566	4,566	1	0	0	0	0	0	0
Operating costs	0	96,867	110,705	124,543	138,381	138,390	138,390	138,390	138,390	138,390	138,390	0
Marketing and Distribution cost	0	750	750	750	750	750	750	750	750	750	750	0
Income tax	0	0	0	0	4,586	4,703	5,151	5,271	5,390	5,510	5,630	0
Financial costs	0	2,901	3,191	2,792	2,394	1,995	1,596	1,197	798	399	0	0
Loan repayment	0	0	3,989	3,989	3,989	3,989	3,989	3,989	3,989	3,989	0	0
SURPLUS (DEFICIT)	0	13,039	3,273	5,642	3,414	8,253	8,204	8,484	8,763	9,042	13,311	50,793
CUMULATIVE CASH BALANCE	0	13,039	16,312	21,954	25,369	33,621	41,826	50,309	59,072	68,114	81,425	132,217

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	110,656	126,464	142,272	158,080	158,080	158,080	158,080	158,080	158,080	158,080	50,793
Inflow operation	0	110,656	126,464	142,272	158,080	158,080	158,080	158,080	158,080	158,080	158,080	0
Other income	0	0	0	0	0	0	0	0	0	0	0	50,793
TOTAL CASH OUTFLOW	41,447	102,172	116,010	129,848	143,718	143,843	144,291	144,410	144,530	144,650	144,769	0
Increase in fixed assets	9,498	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	31,948	4,555	4,555	4,555	1	0	0	0	0	0	0	0
Operating costs	0	96,867	110,705	124,543	138,381	138,390	138,390	138,390	138,390	138,390	138,390	0
Marketing and Distribution cost	0	750	750	750	750	750	750	750	750	750	750	0
Income (corporate) tax		0	0	0	4,586	4,703	5,151	5,271	5,390	5,510	5,630	0
NET CASH FLOW	-41,447	8,484	10,454	12,424	14,362	14,237	13,789	13,670	13,550	13,430	13,311	50,793
CUMULATIVE NET CASH FLOW	-41,447	-32,963	-22,509	-10,085	4,277	18,514	32,304	45,973	59,523	72,954	86,264	137,057
Net present value	-41,447	7,713	8,640	9,334	9,810	8,840	7,784	7,015	6,321	5,696	5,132	19,583
Cumulative net present value	-41,447	-33,734	-25,094	-15,760	-5,951	2,890	10,673	17,688	24,009	29,705	34,837	54,419

NET PRESENT VALUE 54,419
INTERNAL RATE OF RETURN 28.25%
NORMAL PAYBACK 4 years