

**80. PROFILE ON THE PRODUCTION OF MEDICAL
SYRINGE**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of medical syringe with a capacity of 50,000,000 pieces per annum. Medical syringes are used for injection purposes.

The demand for medical syringe is met entirely through import. The present (2012) demand for medical syringe is 100 million pieces. The demand for medical syringe is projected to reach 128,860,151 pieces and 164,461,835 pieces by the year 2017 and 2022, respectively.

The principal raw materials required are poly proplytene, poly ethylene, stamping foil, packaging paper, packaging foil, and cardboard boxes. All the raw materials except cardboard have to be imported.

The total investment cost of the project including working capital is estimated at Birr 69.60 million. From the total investment cost, the highest share (Birr 40.63 million or 58.38%) is accounted by fixed investment cost followed by initial working capital (Birr 22.60 million or 32.48%) and pre operation cost (Birr 6.36 million or 9.14%). From the total investment cost Birr 22.77 million or 32.72% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 25.21% and a net present value (NPV) of Birr 55.84 million, discounted at 10%.

The project can create employment for 58 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 backward linkage with plastic manufacturing sub sector and forward linkage with the health sector and also generates income for the Government in terms of tax revenue and payroll tax. .

II. PRODUCT DESCRIPTION AND APPLICATION

Before disposable medical syringes, made of plastics were developed, syringes made of glassware, were used for injection purposes. Glass syringes facilitate multiple use, provided they are cleaned and sterilized properly. When plastic disposable syringes were introduced, the glass

syringes disappeared from the market in many countries. The high labour and equipment cost of cleaning glass syringes was the distinct qualities and relative low price of disposable syringes made the latter more attractive.

In the medical world, with the introduction of disposable syringes, the incidence of hepatitis, due to unclean needles or syringes, has dropped dramatically. The use of disposable syringes is wide spread and should be considered as an essential feature of in modern medical practice. Currently, syringes are used in hospitals, health centers and clinics throughout the country. The demand for disposable syringes will increase with increase in health services.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The country's requirement for medical syringe is met through imports. The quantity of the product imported during the period 2002 - 2011 is shown in Table 3.1.

Table 3.1
IMPORTS OF MEDICAL SYRINGE

Year	Imported Quantity (psc)	Value (Birr)
2002	26,841,379	18,314,966
2003	104,867,700	47,882,382
2004	58,689,314	34,731,527
2005	81,908,331	34,233,853
2006	78,793,663	35,057,780
2007	25,550,328	38,084,079
2008	170,924,087	116,346,919
2009	100,965,300	68,726,426
2010	78,187,157	72,103,627
2011	53,784,656	70,133,406

Source: - Ethiopian Revenue and Customs Authority.

During the period under reference (2002 – 2011), import or apparent consumption of medical syringe exhibits substantial fluctuations from year to year averaging at 78.05 million pieces in terms of volume and Birr 53.26 million in terms of value. Given, the considerable fluctuations in the supply of the product, which comprises of only imports, the average annual supply during the recent four years (2008--2011) is assumed to approximate the effective demand for the product in year 2012. Accordingly, the present demand for the product (i.e., 2012) is estimated at 100 million pieces.

2. Demand Projection

Considering the commitment of the government to provide health service to the entire population of the country, it can be realistically assumed that the demand for medical syringe will register a rapid growth in the future. However, in order to be conservative the demand for medial syringes is projected to grow at rate of 5% which is slightly higher than the growth rate of urban population. Accordingly, using the estimated present demand for medical syringe as a base and applying an annual growth rate of 5%, the projected demand for the product is shown in Table 3.2.

Table 3.2
PROJECTED DEMAND (IN PIECES)

Year	Projected Demand
2013	106,013,565
2014	111,314,243
2015	116,879,955
2016	122,723,953
2017	128,860,151
2018	135,303,158
2019	142,068,316
2020	149,171,732
2021	156,630,319
2022	164,461,835
2023	172,684,926
2024	181,319,173
2025	190,385,131

3. Pricing and Distribution

Based on current average market price of the product and assuming margins for distributors, a factory -gate price of Birr 2.50 per pieces is recommended for the envisaged plant. The product can be distributed through existing pharmacies and directly to bulk purchasers such as hospitals.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

Considering the economic scale of production and available technology relative to the market demand projection the annual total production capacity of the plant is set to be 50,000,000 pieces of syringe from three most wanted sizes. The envisaged plant will operate in two shifts sixteen hours per day for three hundred days within a year considering 13 holidays and 52 Sunday per year and assuming that maintenance activities will be performed during off hours and Sunday

2. Production Program

The nature of manufacturing process of medical syringe involves precise tooling , testing , and skilled manpower in production tools arrangement and services, so the manpower will take a considerable time until they develop a skill in operation and troubleshooting of the production process and also in providing a manufacturing and maintenance services of production tools, and moulds. The envisaged plant will produce the three most wanted syringe sizes and their production share from the total capacity and their production program arrangement is shown in Table 3.3.

Table 3.3
PRODUCTION PROGRAM

Sr. No.	Description	Production Year			
		1	2	3	4
1	Capacity utilization rate (%)	75	85	90	100
2	Syringe size 2.5 ml	15,000,000	17,000,000	18,000,000	20,000,000
3	Syringe size 5 ml	15,000,000	17,000,000	18,000,000	20,000,000
4	Syringe size 10 ml	7,500,000	8,500,000	9,000,000	10,000,000

IV. MATERIALS AND INPUTS

A. RAW MATERIALS

The direct and auxiliary raw materials required for annual plant production capacity with their quantity and related cost is shown in Table 4.1 below.

Table 4.1
ANNUAL RAW MATERIAL CONSUMPTION & COST

Sr. No.	Description	Annual Consumption	UOM	Unit Cost (Birr) /Ton	Cost ("000) Birr		
					LC	FC	Total
1	Poly propylene	482	ton	35,600.00		17,159.20	17,159.20
2	Poly ethylene	449	ton	48,800.00		21,911.20	21,911.20
3	Stamping foil	124	ton	24,000.00		2,966.40	2,966.40
4	Packaging paper	810	ton	20,000.00		16,198.00	16,198.00
5	Packaging foil	819	ton	32,727.27		26,787.27	26,787.27
6	Cardboard boxes	500	ton	900.00	450.00		450.00
Total FOB						85,022.07	85,472.07
7	CIF (15%)				12,753.31		10,681.39
Total Raw Material Annual Cost					13,203.31	85,022.07	96,153.46

B. UTILITES

Electricity as a source of energy and water as a cooling and cleaning agent are the required utilities for the plant. Annual cost of utilities is Birr 299.5 thousand. The annual requirement with corresponding cost is given in Table 4.2.

Table 4.2

ANNUAL UTILITIES CONSUMPTION & COST

Sr. No.	Description	Annual Consumption	UOM	Unit Cost (Birr)	Cost (^000 Birr)
1	Electricity	400,000	kWh	0.58	232.00
2	Water	6,750	m ³	10.00	67.50
Total Annual Cost					299.50

V. TECHNOLOGY AND ENGINNERING

A. TECHNOLOGY

1. Production Process

The prepared granules are fed in to fully automatic injection mould machine where the cylinder and plunger are manufactured then they moved to buffer store and kept there for a certain time where they reach to final dimensions by aging.

Next the cylinder and plungers are transferred to the printing and assembly machine where scales and logos are printed on the cylinder and assembled with plunger .The assembled syringes are transported to the packing machine which is equipped with pocket dies .The syringes are placed manually in to the pocket and it will approach to the integrated sealing station where they are covered with packing paper and sealed with the necessary data printed onto the paper by integrated printing station. After cross cutting and longitudinal perforating the individual packing strips are discharged.

The packing strip are taken from the packing machine manually packed to small cardboard boxes labeled with the necessary data and will be transferred to sterilization chamber to quarantine store to allow desorption of residual ethylene oxide

2. Environmental Impact

The envisaged plant is a manufacturing plant with no chemical or any hazardous waste to the surrounding environment. Therefore, there will not be additional investment for environmental protection.

B. ENGINNERING

1. Machinery and Equipment

Total cost of machinery and equipment is Birr 26,192,230 out of which Birr 22,775,850 is required in foreign currency. The list of direct and auxiliary machinery, tools and equipments required for the plant and their estimated cost is given in Table 5.1.

Table 5.1
LIST OF MACHINERIES AND EQUIPMENTS & COST

Sr. No.	Description	Qty	Unit Cost (Birr)	Total Cost ("000) Birr		
				LC	FC	Total (Birr)
1	Injection moulding machine 6 oz (170 gm)	1.00	1,800,000.00		1,800.00	1,800.00
2	Injection moulding machine 4.5 oz (127 gm)	1.00	1,530,000.00		1,530.00	1,530.00
3	Injection moulding machine 3.5 oz (99 gm)	4.00	1,260,000.00		5,040.00	5,040.00
4	Injection moulding machine 2.5 oz (71 gm)	2.00	1,080,000.00		2,160.00	2,160.00
5	Screen printing and assembly machine for flat surface	4.00	972,000.00		3,888.00	3,888.00

Sr. No.	Description	Qty	Unit Cost (Birr)	Total Cost ('000) Birr		
				LC	FC	Total (Birr)
6	PVC crusher machine	2.00	180,000.00		360.00	360.00
7	Ethylene oxide sterilizer	2.00	450,000.00		900.00	900.00
8	High speed automatic packing machine	2.00	630,000.00		1,260.00	1,260.00
9	sealing machine	2.00	540,000.00		1,080.00	1,080.00
10	Air shower gate	2.00	734,400.00		1,468.80	1,468.80
11	Hand disc infector	2.00	187,200.00		374.40	374.40
12	Air conditioner	1.00	723,600.00		723.60	723.60
13	Molds 2.5 ml (plunger + barrel)	1.00	781,650.00		781.65	781.65
14	Molds 5 ml (plunger + barrel)	1.00	710,100.00		710.10	710.10
15	Molds 10 ml (plunger + barrel)	1.00	699,300.00		699.30	699.30
Total Fob Price					22,775.85	22,775.85
16	CIF (15%)			3,416.38		3,416.38
Grand Total Cost				3,416.38	22,775.85	26,192.23

2. Land, Building and Civil Works

The envisaged plant requires total land area of 3,500 meter square ,out of which built- up are is 2,500 meter square and the remaining area will be open for various logistic activities. At a rate of Birr 5,000 per m², the total cost of building and civil work is estimated at Birr 12.5 million.

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

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

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

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

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

Regarding land allocation of industrial zones if the land requirement of the project is below 5,000 m², the land lease request is evaluated and decided upon by the Industrial Zone Development and Coordination Committee of the City's Investment Authority. However, if the land request is above 5,000 m², the request is evaluated by the City's Investment Authority and passed with recommendation to the Land Development and Administration Authority for decision, while the lease price is the same for both cases.

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

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

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

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

Table 5.2

NEW LAND LEASE FLOOR PRICE FOR PLOTS IN ADDIS ABABA

Zone	Level	Floor Price/m²
Central Market District	1 st	1686
	2 nd	1535
	3 rd	1323
	4 th	1085
	5 th	894
Transitional zone	1 st	1035
	2 nd	935
	3 rd	809
	4 th	685
	5 th	555
Expansion zone	1 st	355
	2 nd	299
	3 rd	217
	4 th	191

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

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

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

Table 5.3

INCENTIVES FOR LEASE PAYMENT OF INDUSTRIAL PROJECTS

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

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

Accordingly, the total land lease cost at a rate of Birr 266 per m² is estimated at Birr 931,000 of which 10% or Birr 93,100 will be paid in advance. The remaining Birr 837,900 will be paid in equal installments with in 28 years i.e. Birr 29,925 annually.

VI. HUMANRESOURCE AND TRAINING REQUIREMENTS

A. HUMANRESOURCE REQUIREMENT

The plant will require a total of 58 persons. Annual cost of labor, including fringe benefits is Birr 1,284,480. The list of direct and indirect labor requirement and their monthly and annual cost is shown in Table 6.1.

Table 6.1
HUMAN RESOURCE REQUIREMENT & LABOR COST

Sr. No.	Description	Reqd. No.	Monthly Salary (Birr)	Annual salary ('000 Birr)
1	Plant manager	1	8,000.00	96.0
2	Secretary	1	2,500.00	30.0
3	Administration and finance	1	4,500.00	54.0
4	Accountant	1	3,000.00	36.0
5	Mechanic	2	2,200.00	52.8
6	Electrician	1	2,200.00	26.4
7	operators	20	1,400.00	336.0
8	production foreman	2	3,000.00	72.0
9	senior machinist	2	2,500.00	60.0
10	junior machinist	3	1,800.00	64.8
11	Clerk	1	800.00	9.6
12	Cashier	1	1,000.00	12.0
13	Assistant operator	15	700.00	126.0
14	Quality inspector	2	1,600.00	38.4
15	Store keeper	1	1,400.00	16.8
16	Time keeper	1	1,200.00	14.4
17	Guards	3	700.00	25.2
Sub-total		58	38,500.00	1,070.4
18	Employment benefits and allowances 20%		7,700.00	214.1
Total Annual Labor Cost (Direct +Indirect)				1,284.5

B. TRAINING REQUIREMENT

Since it is a manufacturing process, individual operators will be trained during machinery commissioning so that the operators and mechanics will be hired two months before the project implementation. In addition special training about the good practice of injection moulds maintenance should be given to the senior and junior machinists from the technology supplier during commissioning and the estimated cost of on job training is Birr 128,500.

VII. FINANCIAL ANALYSIS

The financial analysis of the medical syringe 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
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 69.60 million (see Table 7.1). From the total investment cost, the highest share (Birr 40.63 million or 58.38%) is accounted by fixed investment cost followed by initial working capital (Birr 22.60 million or 32.48%) and pre operation cost (Birr 6.36 million or 9.14%). From the total investment cost Birr 22.77 million or 32.72% 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	93.10		93.10	0.13
1.2	Building and civil work	12,500.00		12,500.00	17.96
1.3	Machinery and equipment	3,416.38	22,775.85	26,192.23	37.63
1.4	Vehicles	1,500.00		1,500.00	2.15
1.5	Office furniture and equipment	350.00		350.00	0.50
	Sub -total	17,859.48	22,775.85	40,635.33	58.38
2	Pre operating cost *				
2.1	Pre operating cost	1,809.61		1,809.61	2.60
2.2	Interest during construction	4,553.72		4,553.72	6.54
	Sub -total	6,363.33		6,363.33	9.14
3	Working capital **	22,608.26		22,608.26	32.48
	Grand Total	46,831.08	22,775.85	69,606.93	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 32.26 million. However, only the initial working capital of Birr 22.60 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 110.73 million (see Table 7.2). The cost of raw material account for 86.83% of the production cost. The other major components of the production cost are depreciation, financial cost and repair and maintenance which account for 5.81%, 3.39% and 1.18%, respectively. The remaining 2.78% is the share of labor, marketing and distribution, labor overhead, administration cost and utility. For detail production cost see Appendix 7.A.2.

Table 7.2**ANNUAL PRODUCTION COST AT FULL CAPACITY (YEAR FOUR)**

Items	Cost (in 000 Birr)	%
Raw Material and Inputs	96,153.00	86.83
Utilities	300.00	0.27
Maintenance and repair	1,310.00	1.18
Labor direct	1,070.00	0.97
Labor overheads	214.00	0.19
Administration Costs	500.00	0.45
Land lease cost	-	-
Cost of marketing and distribution	1,000.00	0.90
Total Operating Costs	100,547.00	90.80
Depreciation	6,435.37	5.81
Cost of Finance	3,756.82	3.39
Total Production Cost	110,739.19	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 6.88 million to Birr 13.22 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 135.99 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.

$$\text{Break -Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 43,624,122$$

$$\text{Break- Even Capacity utilization} = \frac{\text{Break- even Sales Value}}{\text{Sales revenue}} \times 100 = 36 \%$$

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 25.21% 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 55.84 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 58 persons. The project will generate Birr 32.18 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 backward linkage with plastic manufacturing sub sector and forward linkage with the health 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	67,307	76,922	86,538	96,153	96,153	96,153	96,153	96,153	96,153	96,153
Utilities	210	240	270	300	300	300	300	300	300	300
Maintenance and repair	917	1,048	1,179	1,310	1,310	1,310	1,310	1,310	1,310	1,310
Labour direct	749	856	963	1,070	1,070	1,070	1,070	1,070	1,070	1,070
Labour overheads	150	171	193	214	214	214	214	214	214	214
Administration Costs	350	400	450	500	500	500	500	500	500	500
Land lease cost	0	0	0	0	30	30	30	30	30	30
Cost of marketing and distribution	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total Operating Costs	70,683	80,638	90,592	100,547	100,577	100,577	100,577	100,577	100,577	100,577
Depreciation	6,435	6,435	6,435	6,435	6,435	535	535	535	535	535
Cost of Finance	0	5,009	4,383	3,757	3,131	2,505	1,878	1,252	626	0
Total Production Cost	77,118	92,082	101,411	110,739	110,143	103,616	102,990	102,364	101,738	101,112

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	84,000	108,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000
Less variable costs	69,683	79,638	89,592	99,547	99,547	99,547	99,547	99,547	99,547	99,547
VARIABLE MARGIN	14,317	28,362	30,408	20,453	20,453	20,453	20,453	20,453	20,453	20,453
in % of sales revenue	17.04	26.26	25.34	17.04	17.04	17.04	17.04	17.04	17.04	17.04
Less fixed costs	7,435	7,435	7,435	7,435	7,465	1,565	1,565	1,565	1,565	1,565
OPERATIONAL MARGIN	6,882	20,927	22,972	13,018	12,988	18,888	18,888	18,888	18,888	18,888
in % of sales revenue	8.19	19.38	19.14	10.85	10.82	15.74	15.74	15.74	15.74	15.74
Financial costs		5,009	4,383	3,757	3,131	2,505	1,878	1,252	626	0
GROSS PROFIT	6,882	15,918	18,589	9,261	9,857	16,384	17,010	17,636	18,262	18,888
in % of sales revenue	8.19	14.74	15.49	7.72	8.21	13.65	14.17	14.70	15.22	15.74
Income (corporate) tax	0	0	0	2,778	2,957	4,915	5,103	5,291	5,479	5,666
NET PROFIT	6,882	15,918	18,589	6,483	6,900	11,468	11,907	12,345	12,783	13,222
in % of sales revenue	8.19	14.74	15.49	5.40	5.75	9.56	9.92	10.29	10.65	11.02

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	42,445	111,301	108,020	120,020	120,000	120,000	120,000	120,000	120,000	120,000	120,000	44,412
Inflow funds	42,445	27,301	20	20	0	0	0	0	0	0	0	0
Inflow operation	0	84,000	108,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	0
Other income	0	0	0	0	0	0	0	0	0	0	0	44,412
TOTAL CASH OUTFLOW	42,445	97,984	95,146	104,474	116,581	112,929	114,258	113,820	113,381	112,943	106,243	0
Increase in fixed assets	42,445	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	22,747	3,238	3,238	3,238	3	0	0	0	0	0	0
Operating costs	0	69,683	79,638	89,592	99,547	99,577	99,577	99,577	99,577	99,577	99,577	0
Marketing and Distribution cost	0	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	0
Income tax	0	0	0	0	2,778	2,957	4,915	5,103	5,291	5,479	5,666	0
Financial costs	0	4,554	5,009	4,383	3,757	3,131	2,505	1,878	1,252	626	0	0
Loan repayment	0	0	6,261	6,261	6,261	6,261	6,261	6,261	6,261	6,261	0	0
SURPLUS (DEFICIT)	0	13,317	12,874	15,546	3,419	7,071	5,742	6,180	6,619	7,057	13,757	44,412
CUMULATIVE CASH BALANCE	0	13,317	26,191	41,737	45,156	52,227	57,969	64,149	70,768	77,825	91,581	135,993

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	84,000	108,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	44,412
Inflow operation	0	84,000	108,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	0
Other income	0	0	0	0	0	0	0	0	0	0	0	44,412
TOTAL CASH OUTFLOW	65,053	73,901	83,855	93,810	103,328	103,534	105,492	105,680	105,868	106,056	106,243	0
Increase in fixed assets	42,445	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	22,608	3,218	3,218	3,218	3	0	0	0	0	0	0	0
Operating costs	0	69,683	79,638	89,592	99,547	99,577	99,577	99,577	99,577	99,577	99,577	0
Marketing and Distribution cost	0	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	0
Income (corporate) tax		0	0	0	2,778	2,957	4,915	5,103	5,291	5,479	5,666	0
NET CASH FLOW	-65,053	10,099	24,145	26,190	16,672	16,466	14,508	14,320	14,132	13,944	13,757	44,412
CUMULATIVE NET CASH FLOW	-65,053	54,954	-30,809	-4,620	12,052	28,518	43,026	57,346	71,479	85,423	99,180	143,591
Net present value	-65,053	9,181	19,954	19,677	11,387	10,224	8,189	7,349	6,593	5,914	5,304	17,123
Cumulative net present value	-65,053	55,872	-35,918	-16,241	-4,854	5,370	13,559	20,908	27,501	33,415	38,718	55,841

NET PRESENT VALUE 55,841
INTERNAL RATE OF RETURN 25.21%
NORMAL PAYBACK 4 years