57. PROFILE ON THE PRODUCTION OF LIQUID DETERGENT

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I. SUMMARY

This profile envisages the establishment of a plant for the production of liquid detergent with a capacity of 200 tones per annum. Liquid detergent is extensive used in households, guest houses, hotels, canteens, hospitals, schools, higher institutions, offices, etc, as a general cleaning agent.

The country`s requirement of liquid detergents is largely met through import**.** The present (2012) demand for liquid detergents is estimated at 138 tons. The demand for liquid detergents is projected reach 196 tons and 262 tons by the years 2018 and 2023, respectively.

The principal raw materials required are Linear Alkyl Benzene Sulfuric Acid (LABSA), sodium hydroxide, urea, perfume, caustic soda and colorant. Caustic soda can be obtained locally while the other raw materials have to be imported.

The total investment cost of the project including working capital is estimated at Birr 7.22 million (see Table 7.1). From the total investment cost the highest share (Birr 5.23 million or 72.47%) is accounted by fixed investment cost followed by initial working capital (Birr 1.18 million or 16.41%) and pre operating cost (Birr 802.28 thousand or 11.11%).

The project is financially viable with an internal rate of return (IRR) of 24.31% and a net present value (NPV) of Birr 5.53 million, discounted at 10%.

The project can create employment for 29 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 service sector such as hotels, restaurants and hospitals and back ward linkage with the chemical manufacturing sub sector and also generates income for the Government in terms of tax revenue and payroll tax.

II PRODUCT DESCRIPTION AND APPLICATION

A liquid detergent is a surfactant or a mixture of surfactants with "cleaning properties in dilute solutions." These substances are usually alkyl benzene sulfonates, a family of compounds that are similar to soap but are more soluble in hard water, because the polar sulfonate (of detergents) is less likely than the polar carboxyl (of soap) to bind to calcium and other ions found in hard water.

Liquid detergent finds extensive use in households, guest houses, hotels, canteens, hospitals, schools and higher institutions, offices, etc, as a general cleaning agent. It is used to wash hands, dishes, cooking and other household utensils, tiles, walls, kitchens, motor vehicles, furniture, clothes etc. Industrially, liquid detergent is used in large quantities in manufacturing industries where conveyor belts are employed in their production lines in order to lubricate the rolling sections of the chains so as to allow easy and effective movement of the belts on these bearings. Such industries include but are not limited to breweries, food processing, pharmaceutical, beverage, chemical and allied industries, glass, etc.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The country`s requirement of detergents is largely met through import**.** Although some brands of detergents in a limited quantity are locally manufactured, the data which is published by the Central Statistical Agency on the survey of Medium and Large Scale and Electricity Industries lumps together with soap. Hence, in order to analyse the unsatisfied demand for detergents the data obtained from the Ethiopian Revenues and Customs Authority on the import of detergents for the past nine years is presented for analysis (see Table 3.1).

Table 3.1

IMPORT OF DETERGENTS

Year	Volume (Tons)	Value ('000 Birr)
2003	483.4	3,401
2004	405.3	2,788
2005	232.6	1,618
2006	2,316.6	12,005
2007	165.7	1,364
2008	1,096.6	8,554
2009	1,270.7	14,953
2010	780.3	13,674
2011	541.3	15,253

Source: - *Ethiopian Revenues and Customs Authority.*

As could be seen from Table 3.1, the imported quantity during the past nine years was highly erratic, which ranges from the lowest 165.7 tons (year 2007) to 2,313.6 tons (year 2006). In the absence of a clear trend in the data set the recent four years average is believed to indicate the present demand. Accordingly, present demand (year 2012) for detergents is estimated at 922 tons.

Since there is no disaggregated data on the amount of powdered and liquid detergents, the views of knowledgeable people in the area have been collected. Accordingly, it was learnt that about 85% of the total volume of imported detergents constitute powdered and the remaining 15% liquid. Taking this as a base, the current demand for liquid detergent is estimated at 138 tons.

2. Demand Projection

The factors that influence the future demand for detergents are numerous. Among the major ones population growth, income rise, urbanization, and increase of awareness of the population on sanitation can be cited. The population of the country in general is growing at a rate of about

3.2% per annum. The urban population, which is the major user of detergents, is also growing above 3.5%. Gross domestic product (GDP), which is one of the measures of income, has been growing by more than 11% in the past consecutive years and is forecasted to continue in the future. The sanitation awareness of the whole population is increasing due to the efforts underway by the Ministry of Health and other stakeholders. Hence, as the result of the above factors the demand for detergents in the urban as well as rural areas will increase substantially. By considering the combined effects of the above factors mentioned the future demand is forecasted to grow by 6% per annum. The demand projection made based on this assumption is presented in Table 3.2.

Table 3.2

DEMAND FORECAST FOR LIQUID DETERGENTS (TONS)

Year	Quantity
2013	146
2014	155
2015	164
2016	174
2017	185
2018	196
2019	207
2020	220
2021	233
2022	247
2023	262

The demand for liquid detergent will grow from 146 tons in 2013 to 196 tons and 262 tons by the years 2018 and 2023, respectively.

3. Pricing and Distribution

By considering the average imported price of detergent and adding costs of duty and other import related expenses, a factory gate price of Birr 43,814 per ton is recommended.

The product can be classified as a consumer item. The end users of the product are numerous and widely distributed throughout the country. Hence, the factory has to appoint a number of distributors in different locations of the country. The distributors will sell the products to the retailers to reach the final consumers of the product.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

The market study shows that demand for liquid detergent increases from 146 tons in the year 2013 to 262 tons in the year 2023. Based on the market study and period required to implement the project and market penetration and technical skill development, the envisaged plant capacity is 200 tons per annum on a single shifts of 8 hours per day and 250 working days per year.

2. Production Program

In order to develop the operators' skill in production and quality control, it is vital to have a gradual capacity buildup. In addition to this, a period is required to penetrate to the market. Hence, it is assumed that the plant will go into full capacity operation in four years' time starting with 70% capacity in the first year and progressively developing to 80%, 90% and 100% in the second, third and fourth year and then after respectively. The production program of the envisaged plant is given in Table 3.3.

Table 3.3

PRODUCTION PROGRAMME OF THE ENVISAGED LIQUID DETERGENT PLANT

Sr. No.	**Item Description**	**1st year**	**2nd year**	**3rd year**	**4th -10th**
1	Production of liquid detergent (tons)	140	160	180	200
2	Capacity utilization (%)	70	80	90	100

IV. MATERIALS AND INPTUS

A. MATERIALS

The principal raw materials required are Linear Alkyl Benzene Sulfuric Acid (LABSA), sodium hydroxide, urea, perfume, and colorant. Caustic soda can be obtained locally while the other raw materials have to be imported. Packing material is the only auxiliary material required by the envisaged plant. The total annual cost of raw material at full capacity operation is estimated at Birr 4,789,000. Caustic soda and packing materials will be sourced locally while the others have to be imported. The annual requirement of raw material and their estimated costs are presented in Table 4.1.

Table 4.1

ANNUAL REQUIREMENT FOR RAW AND AUXILIARY MATEIRALS AND THEIR COST

Sr .No.	Item Description	Quantity	Cost ('000 Birr)		
			LC	FC	TC
1	Linear Alkyl Benzene Sulfuric Acid(tons)	126.00	-	3,780.0	3,780.0
2	Caustic soda(tons)	22.05	220.5	-	220.5
3	Urea(tons)	50.40	-	252.0	252.0
4	Perfume (kg)	420.00	-	31.5	31.5
5	Colorant(kg)	2,100.00	-	105.0	105.0
6	Packing material	LS	400.0	-	400.0
	Total		**620.5**	**4,168.5**	**4,789.0**

B. UTILITIES

Utilities required are electricity and water. The total annual cost of utilities is estimated at Birr 287,348. The annual quantities and cost of utilities are estimated as shown in Table 4.2.

Table 4.2

ANNUAL UTILITY REQUIREMENT AND COST

Sr.No.	Description	Qty	Total
1	Electric Power (kWh)	150,600	87.34
2	Water (m^3)	20,000	200.00
	Total		**287.34**

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The process of manufacture consists of neutralization of Linear Alkaline Benzene Sulfuric Acid (LABSA). Measured quantity of LABSA is taken in stainless steel kettle and diluted with known quantity of water with continuous stirring. The ingredients are blended in simple mixers fitted with slow speed stirrer. A solution of caustic soda is prepared by dissolving measured quantity of caustic soda in measured quantity of water.

The acid slurry is neutralized by a slow addition of caustic soda solution till it is neutralized. The pH of the solution is maintained and acid slurry is taken in plastic containers. Then known quantity of urea is added and kept for settling. Small quantity of perfume and colorant is added to liquid detergent before packing.

Contact parts should be of Stainless Steel or other corrosion resistant material, to avoid contamination of the products. Mixing Tanks can be of Mild Steel coated with epoxy resin, as well as of Stainless Steel.

Liquid Detergents are packed usually in the containers viz. plastic bottles of various shapes and sizes and drums etc. The quality of the product can be controlled with help of a pH meter, viscometer and basic analytical facilities.

2. Environmental Impact Assessment

The process of production of liquid detergent involves simple mixing and packing and does not have any adverse impact in the environment.

B. ENGINEERING

1. Machinery and Equipment

The total cost of machinery and equipment is estimated at Birr 2.5 million, all of which is required in local currency. The list of machinery and equipment required for the envisaged plant is given in Table 5.1.

Table 5.1
LIST OF MACHINERY & EQUIPMENT

Sr. No.	Description	Qty.
1	Caustic soda tank	1
2	LABSA tank	1
3	Water tank	1
4	Liquid detergent tank	1
5	Mixing tank	1
6	Booster tank	1
7	Weighing balance	1
8	Pump	4
9	Packing machine	1

2. Land, Buildings & Civil Works

The total area required by the project is 1,200 m^2, of which 500 m^2 is built-up area. The cost of building at unit cost of Birr 4,000 per m^2 is, thus, estimated at Birr 2,000,000.

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

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

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

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

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

Regarding land allocation of industrial zones if the land requirement of the project is below 5,000 m^2, the land lease request is evaluated and decided upon by the Industrial Zone Development and Coordination Committee of the City's Investment Authority. However, if the land request is above 5,000 m^2, the request is evaluated by the City's Investment Authority and passed with recommendation to the Land Development and Administration Authority for decision, while the lease price is the same for both cases.

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

The new regulation classified the city into three zones. The first Zone is Central Market District Zone, which is classified in five levels and the floor land lease price ranges from Birr 1,686 to Birr 894 per m^2. The rate for Central Market District Zone will be applicable in most areas of the city that are considered to be main business areas that entertain high level of business activities.

The second zone, Transitional Zone, will also have five levels and the floor land lease price ranges from Birr 1,035 to Birr 555 per m^2 .This zone includes places that are surrounding the city and are occupied by mainly residential units and industries.

The last and the third zone, Expansion Zone, is classified into four levels and covers areas that are considered to be in the outskirts of the city, where the city is expected to expand in the future. The floor land lease price in the Expansion Zone ranges from Birr 355 to Birr 191 per m^2 (see Table 5.2).

Table 5.2

NEW LAND LEASE FLOOR PRICE FOR PLOTS IN ADDIS ABABA

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

Accordingly, in order to estimate the land lease cost of the project profiles it is assumed that all new manufacturing projects will be located in industrial zones located in expansion zones. Therefore, for the profile a land lease rate of Birr 266 per m^2 which is equivalent to the average floor price of plots located in expansion zone is adopted.

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

Table 5.3

INCENTIVES FOR LEASE PAYMENT OF INDUSTRIAL PROJECTS

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

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

Accordingly, the total land lease cost at a rate of Birr 266 per m^2 is estimated at Birr 319,200 of which 10% or Birr 31,920 will be paid in advance. The remaining Birr 287,280 will be paid in equal installments with in 28 years i.e. Birr 10,260 annually.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENT

A. HUMAN RESOURCE REQUIREMENT

Total human resource required is 29 persons. The total annual cost human resource is estimated at Birr 703,500. The details of the human resource requirement and the estimated annual labor cost including employees' benefit are given in Table 6.1.

Table 6.1

HUMAN RESOURCE REQUIREMENT AND ESTIMATED LABOR COST (BIRR)

Sr. No.	Description	No. of Persons	Monthly Salary	Annual Salary
1	General Manager	1	6,000	72,000
2	Executive Secretary	1	1,500	18,000
3	Production & Technical Head	1	4,000	48,000
4	Commercial Head	1	4,000	48,000
5	Finance & Administration Head	1	4,000	48,000
6	Accountant	2	5,000	60,000
8	Cashier	1	1,500	18,000
9	Purchaser	1	2,000	24,000
10	Store Keeper	2	2,400	28,800
11	Chemist	1	2,000	24,000
12	Shift Leader	1	2,000	24,000
13	Operator	3	3,600	43,200
14	Assistant Operator	3	2,700	32,400
16	Mechanic	1	1,200	14,400
17	Electrician	1	1,200	14,400
18	Driver	2	1,400	16,800
19	Guard	6	2,400	28,800
	Sub Total	**29**	**46,900**	**562,800**
	Employees benefit (25% of basic salary)		11,725	140,700
	Grand total		**58,625**	**703,500**

B. TRAINING REQUIREMENT

The production of liquid detergent is simple and involves simple mixing and does not need any special training.

VII. FINANCIAL ANALYSIS

The financial analysis of the liquid detergent 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 7.22 million (see Table 7.1). From the total investment cost the highest share (Birr 5.23 million or 72.47%) is accounted by fixed investment cost followed by initial working capital (Birr 1.18 million or 16.41%) and pre operating cost (Birr 802.28 thousand or 11.11%).

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	31.92	-	31.92	0.44
1.2	Building and civil work	2,000.00	-	2,000.00	27.70
1.3	Machinery and equipment	2,500.00	-	2,500.00	34.63
1.4	Vehicles	450.00	-	450.00	6.23
1.5	Office furniture and equipment	250.00	-	250.00	3.46
	Sub total	**5,231.92**	-	**5,231.92**	**72.47**
2	**Pre operating cost ***		-		
2.1	Pre operating cost	330.00	-	330.00	4.57
2.2	Interest during construction	472.28	-	472.28	6.54
	Sub total	**802.28**	-	**802.28**	**11.11**
3	**Working capital ****	**1,184.90**	-	**1,184.90**	**16.41**
	Grand Total	**7,219.10**	-	**7,219.10**	**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 1.74 million. However, only the initial working capital of Birr 1.18 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 7.50 million (see Table 7.2). The cost of raw material account for 63.81% of the production cost. The other major components of the production cost are depreciation, financial cost and direct labor, which account for 10.14%, 5.19% and 7.50%, respectively. The remaining 13.36% is the share of utility, repair and maintenance, labor overhead and administration cost. For detail production cost see Appendix 7.A.2.

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

Items	Cost (in 000 Birr)	%
Raw Material and Inputs	4,789	63.81
Utilities	287	3.83
Maintenance and repair	125	1.67
Labor direct	563	7.50
Labor overheads	141	1.87
Administration Costs	200	2.66
Land lease cost	0	0.00
Cost of marketing and distribution	250	3.33
Total Operating Costs	**6,355**	**84.67**
Depreciation	761	10.14
Cost of Finance	390	5.19
Total Production Cost	**7,505**	**100**

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 ranges from Birr 880 thousand to Birr 1.60 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 13.76 million. For profit and loss statement and cash flow projection see Appendix 7.A.3 and 7.A.4, respectively.

2. Ratios

In financial analysis financial ratios and efficiency ratios are used as an index or yardstick for evaluating the financial position of a firm. It is also an indicator for the strength and weakness of the firm or a project. Using the year-end balance sheet figures and other relevant data, the most important ratios such as return on sales which is computed by dividing net income by revenue, return on assets (operating income divided by assets), return on equity (net profit divided by

equity) and return on total investment (net profit plus interest divided by total investment) has been carried out over the period of the project life and all the results are found to be satisfactory.

3. Break-even Analysis

The break-even analysis establishes a relationship between operation costs and revenues. It indicates the level at which costs and revenue are in equilibrium. To this end, the break-even point for capacity utilization and sales value estimated by using income statement projection are computed as followed.

$$\text{Break -Even Sales Value} = \frac{\text{Fixed Cost + Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 3{,}680{,}460$$

$$\text{Break -Even Capacity utilization} = \frac{\text{Break -even Sales Value}}{\text{Sales revenue}} \times 100 = 38.03\%$$

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 24.31% 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 5.53 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 29 persons. The project will generate Birr 4.01 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 service sector such as hotels, restaurants and hospitals and back ward linkage with the chemical manufacturing sub sector and also generates income for the city administration in terms of tax revenue and payroll tax.

Appendix 7.A

FINANCIAL ANALYSES SUPPORTING TABLES

Appendix 7.A.1
NET WORKING CAPITAL (in 000 Birr)

Items	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Total inventory	838.08	957.80	1,077.53	1,197.25	1,197.25	1,197.25	1,197.25	1,197.25	1,197.25	1,197.25
Accounts receivable	376.95	427.82	478.70	529.57	530.43	530.43	530.43	530.43	530.43	530.43
Cash-in-hand	10.00	11.43	12.86	14.28	14.43	14.43	14.43	14.43	14.43	14.43
CURRENT ASSETS	**1,225.02**	**1,397.05**	**1,569.08**	**1,741.10**	**1,742.10**	**1,742.10**	**1,742.10**	**1,742.10**	**1,742.10**	**1,742.10**
Accounts payable	40.12	45.85	51.59	57.32	57.32	57.32	57.32	57.32	57.32	57.32
CURRENT LIABILITIES	**40.12**	**45.85**	**51.59**	**57.32**	**57.32**	**57.32**	**57.32**	**57.32**	**57.32**	**57.32**
TOTAL WORKING CAPITAL	**1,184.90**	**1,351.20**	**1,517.49**	**1,683.79**	**1,684.79**	**1,684.79**	**1,684.79**	**1,684.79**	**1,684.79**	**1,684.79**

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	3,352	3,831	4,310	4,789	4,789	4,789	4,789	4,789	4,789	4,789
Utilities	201	230	259	287	287	287	287	287	287	287
Maintenance and repair	88	100	113	125	125	125	125	125	125	125
Labour direct	394	450	507	563	563	563	563	563	563	563
Labour overheads	98	113	127	141	141	141	141	141	141	141
Administration Costs	140	160	180	200	200	200	200	200	200	200
Land lease cost	0	0	0	0	10	10	10	10	10	10
Cost of marketing and distribution	250	250	250	250	250	250	250	250	250	250
Total Operating Costs	**4,523**	**5,134**	**5,744**	**6,355**	**6,365**	**6,365**	**6,365**	**6,365**	**6,365**	**6,365**
Depreciation	761	761	761	761	761	105	105	105	105	105
Cost of Finance	0	520	455	390	325	260	195	130	65	0
Total Production Cost	**5,284**	**6,414**	**6,960**	**7,505**	**7,451**	**6,730**	**6,665**	**6,600**	**6,535**	**6,470**

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	6,134	7,010	7,887	8,763	8,763	8,763	8,763	8,763	8,763	8,763
Less variable costs	4,273	4,884	5,494	6,105	6,105	6,105	6,105	6,105	6,105	6,105
VARIABLE MARGIN	**1,861**	**2,126**	**2,393**	**2,658**	**2,658**	**2,658**	**2,658**	**2,658**	**2,658**	**2,658**
in % of sales revenue	30.33	30.33	30.34	30.33	30.33	30.33	30.33	30.33	30.33	30.33
Less fixed costs	1,011	1,011	1,011	1,011	1,021	365	365	365	365	365
OPERATIONAL MARGIN	**850**	**1,115**	**1,382**	**1,647**	**1,637**	**2,293**	**2,293**	**2,293**	**2,293**	**2,293**
in % of sales revenue	13.85	15.91	17.52	18.80	18.68	26.17	26.17	26.17	26.17	26.17
Financial costs		520	455	390	325	260	195	130	65	0
GROSS PROFIT	**850**	**596**	**927**	**1,258**	**1,312**	**2,033**	**2,098**	**2,163**	**2,228**	**2,293**
in % of sales revenue	13.85	8.50	11.75	14.35	14.97	23.20	23.94	24.68	25.42	26.17
Income (corporate) tax	0	0	0	377	394	610	629	649	668	688
NET PROFIT	**850**	**596**	**927**	**880**	**919**	**1,423**	**1,469**	**1,514**	**1,560**	**1,605**
in % of sales revenue	13.85	8.50	11.75	10.05	10.48	16.24	16.76	17.28	17.80	18.32

Appendix 7.A.4
CASH FLOW FOR FINANCIAL MANAGEMENT (in 000 Birr)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Scrap
TOTAL CASH INFLOW	**5,562**	**7,831**	**7,016**	**7,893**	**8,763**	**8,763**	**8,763**	**8,763**	**8,763**	**8,763**	**8,763**	**3,389**
Inflow funds	5,562	1,697	6	6	0	0	0	0	0	0	0	0
Inflow operation	0	6,134	7,010	7,887	8,763	8,763	8,763	8,763	8,763	8,763	8,763	0
Other income	0	0	0	0	0	0	0	0	0	0	0	3,389
TOTAL CASH OUTFLOW	**5,562**	**6,221**	**6,475**	**7,020**	**7,943**	**7,734**	**7,884**	**7,839**	**7,793**	**7,748**	**7,053**	**0**
Increase in fixed assets	5,562	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	1,225	172	172	172	1	0	0	0	0	0	0
Operating costs	0	4,273	4,884	5,494	6,105	6,115	6,115	6,115	6,115	6,115	6,115	0
Marketing and Distribution cost	0	250	250	250	250	250	250	250	250	250	250	0
Income tax	0	0	0	0	377	394	610	629	649	668	688	0
Financial costs	0	472	520	455	390	325	260	195	130	65	0	0
Loan repayment	0	0	649	649	649	649	649	649	649	649	0	0
SURPLUS (DEFICIT)	**0**	**1,611**	**541**	**872**	**820**	**1,029**	**879**	**924**	**970**	**1,015**	**1,710**	**3,389**
CUMULATIVE CASH BALANCE	**0**	**1,611**	**2,152**	**3,024**	**3,844**	**4,873**	**5,752**	**6,676**	**7,646**	**8,661**	**10,371**	**13,760**

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**	**6,134**	**7,010**	**7,887**	**8,763**	**8,763**	**8,763**	**8,763**	**8,763**	**8,763**	**8,763**	**3,389**
Inflow operation	0	6,134	7,010	7,887	8,763	8,763	8,763	8,763	8,763	8,763	8,763	0
Other income	0	0	0	0	0	0	0	0	0	0	0	3,389
TOTAL CASH OUTFLOW	**6,747**	**4,690**	**5,300**	**5,911**	**6,733**	**6,759**	**6,975**	**6,995**	**7,014**	**7,033**	**7,053**	**0**
Increase in fixed assets	5,562	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	1,185	166	166	166	1	0	0	0	0	0	0	0
Operating costs	0	4,273	4,884	5,494	6,105	6,115	6,115	6,115	6,115	6,115	6,115	0
Marketing and Distribution cost	0	250	250	250	250	250	250	250	250	250	250	0
Income (corporate) tax		0	0	0	377	394	610	629	649	668	688	0
NET CASH FLOW	**-6,747**	**1,444**	**1,710**	**1,976**	**2,030**	**2,004**	**1,788**	**1,768**	**1,749**	**1,730**	**1,710**	**3,389**
CUMULATIVE NET CASH FLOW	**-6,747**	**-5,303**	**-3,593**	**-1,616**	**414**	**2,418**	**4,206**	**5,974**	**7,723**	**9,453**	**11,163**	**14,552**
Net present value	-6,747	1,313	1,413	1,485	1,386	1,244	1,009	908	816	733	659	1,307
Cumulative net present value	-6,747	-5,434	-4,021	-2,536	-1,149	95	1,104	2,012	2,828	3,561	4,221	5,527

NET PRESENT VALUE	5,527
INTERNAL RATE OF RETURN	24.31%
NORMAL PAYBACK	4 years