

**101. PROFILE ON THE PRODUCTION OF GLASS
BOTTLES AND TUMBLERS**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of glass bottles and tumblers with a capacity of 10,500 tons; that is 5 million pieces of tumblers and 2.0 million pieces of glass bottles per annum. Glass bottles and tumblers are used for handling liquid, paste or powder products from beverage, cosmetic or pharmaceutical industries.

The demand for glass bottles and tumblers is met is both from domestic production and imports. The present (2012) unsatisfied demand for glass bottles and tumblers is estimated at 11,948 tons and 4,242 tons, respectively. The unsatisfied demand for glass bottles and tumblers is projected to reach 18,518 tons 5,980 tons, respectively by the year 2017. By the year 2022, the unsatisfied demand for glass bottles and tumblers is projected to reach 32,805 tons and 8,929 tons, respectively.

The principal raw materials required are silica, limestone, soda ash and cullet which are available locally.

The total investment cost of the project including working capital is estimated at Birr 45.03 million. From the total investment cost, the highest share (Birr 37.74 million or 83.81%) is accounted by fixed investment cost followed by pre operation cost (4.92 million or 10.92%) and initial working capital (Birr 2.37 million or 5.27%). From the total investment cost Birr 21.16 million or 47% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 20.24% and a net present value (NPV) of Birr 22.49 million, discounted at 10%.

The project can create employment for 76 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 the mining subsector and forward linkage with the beverage, cosmetic, and pharmaceutical sub sectors and also generates other income for the Government.

II. PRODUCT DESCRIPTION AND APPLICATION

Glass bottles and tumblers are vitreous silica compounds produced in a suction fed type blowing machine. Glass bottles are used for handling liquid, paste or powder products from beverage, cosmetic or pharmaceutical industries. Shape, color and size of glass bottles may vary according to clients demand, architecture and strength. Almost all glass bottles are flat bottom, straight with a 'neck' for corking or sealing.

Glass bottles are produced either clear, brown or in green color. Standard sizes for glass bottles may range from 50 cc to 1,000 cc. Typical sizes are 50,100,250,330,500,630,750 and 1,000 ccs.

Tumblers are flat bottom, straight clear drinking glass without handles. They are usually produced as 250 cc glasses.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply & Present Demand

The source of glass bottles and tumblers supply in Ethiopia is both domestic production and imports. The sole domestic producer of bottles is the Addis Ababa Bottle and Glass Factory. It has a production capacity of 30 tons per day at 85% efficiency. Working 341 days in a year, its annual capacity is, thus, 8,695.5 tons.

In order to estimate the present demand for the produces the unsatisfied demand i.e. the demand which is met through import is considered. Accordingly, the historical import of glass bottles and tumblers during the period 2002 -2011 is given in Table 3.1.

Table 3.1
IMPORT OF GLASS BOTTLES AND TUMBLERS (TONS)

Year	Bottles	Tumblers
2002	360	1,016
2003	752	1,421
2004	3,314	1,986
2005	6,237	2,323
2006	4,162	3,464
2007	10,180	1,588
2008	15,269	4,187
2009	9,145	4,373
2010	9,785	4,243
2011	13,111	4,166

Source: – *Ethiopian Revenue and Customs Authority.*

A can be seen from Table 3.1, import of glass bottle shows a general increasing trend though fluctuates from year to year. The growth in imports especially marked since in the recent five years (2007-2011) where on average about 11,498 tons of bottles were imported annually. During the previous five years (2002-2006) the yearly average level of import was 2,965 tons.

Similarly, import of tumblers during the recent four years (2008-2011) is exceptionally higher compared to the other years. The average annual glass tumblers import during the period 2002-2007 was 1,966 tons which has increased to an average annual of 4,242 tons during 2008-2011.

Considering the nature of import, it is assumed that the average import during 2007-2011 for glass bottles and the average import during 2008-2011 for glass tumblers is assumed to approximate the present unsatisfied demand for the products.

Accordingly, the present (2012) unsatisfied demand for glass bottles and tumblers is estimated at 11,948 tons and 4,242 tons, respectively.

2. Demand Projection

The future demand for bottles is a function of industries which are dependent on bottles for packaging and distributing their product. The demand for beverage be it alcoholic or non-alcoholic, is expected to exhibit continuous growth, thereby necessitating an increase on production capacity through both expansion and rehabilitation of existing plants as well as the establishment of new ones.

Hence, in order that production in these enterprises may not be constrained, and to avoid depending on imports which will entail lots of inconveniences, and loss of foreign exchange to the country, a reliable domestic supply of bottles must be assured. The pharmaceutical, food processing, cosmetics and personal care industries in Ethiopia are also showing good signs of growth and the demand emanating from these sectors will also constitute an increasingly important market. According to the GTP, during the period 2010/11 – 2014/15 the annual average planned targets of growth for the industrial sector is 20%. However, in order to be conservative a growth rate of 10% is considered to project the demand for glass bottles.

Being mass consumption goods, the demand for tumblers largely depends on the size and growth rate of the population. In the Ethiopian context, however, as far as glass-based products are concerned, the most important market is the urban population. The urban population grows at the rate of 4% per annum.

Although the size and growth rate of population is the most important determinant of demand for tumblers, demand is also affected by a host of other factors, including income and price. Hence in order to take in to account the impact of these other demand determining variables, the urban population growth rate of 4% is inflated to 7% and used to project future demand.

Accordingly, based on the above assumptions the projected unsatisfied demand for glass bottles and tumblers is shown in Table 3.2.

Table 3.2**PROJECTED UNSATISFIED DEMAND FOR BOTTLES & TUMBLERS (TONS)**

Year	Projected demand	
	Bottles	Tumblers
2013	12,648	4,539
2014	13,913	4,857
2015	15,304	5,197
2016	16,834	5,561
2017	18,518	5,950
2018	20,369	6,367
2019	22,406	6,812
2020	24,647	7,289
2021	27,112	7,799
2022	29,823	8,345
2023	32,805	8,929
2024	36,086	9,554
2025	39,694	10,223

3. Pricing and Distribution

Based on current market price for the products a factory gate price of Birr 4 and Birr 6 per piece of tumblers and bottles respectively is recommended.

The envisaged plant can distribute its products through the existing household goods retailers and directly to bulk end users such as beverage factories.

B. PLANT CAPACITY AND PRODUCTION PROGRAM**1. Plant Capacity**

According to the market study, the unsatisfied demand of bottles and tumblers in year 2013 is 12,648 tons and 4,539 tons, respectively. These figures are projected to grow to 39,694 tons and 10,223 tons in 2025, respectively.

Based on demand projection shown in Table 3.2, and taking 60% share of the year 2013 the annual production capacity of the envisaged plant would therefore be 10,500 tons of glass bottles and tumblers per annum. This would be 5 million pieces of tumblers and 2.0 million pieces of glass bottles.

The proposed plant is an energy intensive unit where large quantity of fuel oil is required in order to operate the glass melting furnace. Such a plant is required to operate continuously for 24 hours a day and for 350 days a year. Therefore, the proposed plant operates three shifts a day.

2. Production Program

In order to provide adequate time for developing the skill of producing glass bottles and tumblers, and develop market outlets at different locations of the country, it would be advisable to start production at a lower level and gradually build up the scale of production. Accordingly, the envisaged plant will start operation at 70% of its production capacity, during the first year of operation, and then raise up production to 80%, 90% and lastly to 100% during the next succeeding years. Table 3.3 below shows production program.

Table 3.3

PRODUCTION PROGRAM

Year	Capacity Utilization (%)	Production (Pcs.)	
		Glass Bottle	Tumblers
1	70	1.4 million	3.5 million
2	80	1.6 million	4 million
3	90	1.8 million	4.5 million
4-5	100	2 million	5 million

IV. RAW MATERIALS AND INPUTS

A. RAW & AUXILIARY MATERIALS

The major raw materials required for manufacturing of glass bottles and tumblers are silica, limestone, soda ash and cullet. Auxiliary materials include dolomite, ceramic color (enamel), and

packaging materials. Annual cost of raw & auxiliary materials at full capacity operation is estimated at about Birr 7.6 million. Annual consumption of these materials at full production capacity is given in Table 4.1.

Table 4.1

RAW AND AUXILLIARY MATERIALS REQUIREMENT & COST

Sr. No.	Description	Qty.	Cost in Birr ('000)		
			FC	LC	TC
	<u>RAW NATERIAL</u>				
1	Silica sand	6,410	-	649.00	649.00
2	Limestone	1,750	-	433.13	433.13
3	Soda Ash	1,950	-	6,142.5	6142.5
4	Cullet	1,770		79.65	79.65
	Sub – total	-	-	7,304.28	7,304.28
	<u>AUXILIARY MATERIAL</u>				
1	Dolomite	340	-	127.5	127.5
2	Cermaic Color (Enamel)	5.30	75	-	75.0
3	Packing Mateirals	As req.		97.5	97.5
	Sub-total	-	75.0	225.0	300.0
	Total Cost	-	75	<u>7,529.28</u>	<u>7,604.28</u>

B. UTILITIES

The utilities required for the envisaged plant are electricity, water and furnace fuel. The annual requirement of utilities and associated cost is shown in Table 4.2.

Table 4.2
ANNUAL UTILITIES REQUIRMENT & COST

Sr. No.	Description	Qty.	Unit Cost (Birr)	Total Cost ('000 Birr)		
				LC	FC	TC
1	Electricity (kWh)	4,000,000	0.58	2,320.00		2,320.00
2	Water (m ³)	350,000	10.00	3,500.00		3,500.00
3	Furnace fuel (lit)	159,200	14.50	2,309.03		2,309.03
4	Air (m ³)	300,000				
Grand Total				8,129.03		8,129.03

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The foreign matter and pieces of iron contained in the raw material will be removed and weighed in proportion to the mixing ratio with auxiliary material. Then, the mixture is proposed into molten, refined glass in the furnace at the temperature of approximately 1,500⁰c. It is molded by bottle forming and tumbler forming machines and cooled slowly in the annealing Lehar.

Going through inspection, the annealed product is packed and delivered. When necessary the bottle as well as the tumbler is printed in ceramic colors by multi-color decorating machine. After glazing, final inspection will be conducted for delivery.

2. Environmental Impact

Glass containers are wholly recyclable. The main impacts of this processing technology to the environment are noise to the residential areas, water pollution by NO_x and SO_x. Therefore the envisaged plant will be located in non-residential areas; and water treatment unit for neutralizing the acid wastes will be considered. The cost of waste water treatment unit is included in the cost of machinery and equipment.

B. ENGINEERING

1. Machinery and Equipment

The required machinery and equipment for the production of glass and tumblers plant will be acquired through import. The total machinery and equipment cost is estimated at Birr 26.453 million, out of which about Birr 21.16 million will be required in foreign currency. The detailed list of machinery and equipment is given in Table 5.1.

Table 5.1

LIST OF MACHINERY AND EQUIPMENT REQUIREMENT

Description	Qty. (pc)
1. Raw material preparation plant	1 set
2. Melting furnace	1 pc
3. Forming Machine	1 pc
4. Annealing Lehr	1 pc
5. Decorating and packing machine	1 set
6. Compressor	1 set
7. Boiler	1 pc
8. Generator	1 set
9. Pumps	2 pcs
10. Water treatment unit	Set

2. Land, Building and Civil Works

The envisaged plant will require a total land area of 5,000 m², out of which 2,000 m² will be covered by factory and office buildings, stores, etc. The total cost of building and civil works, estimated at a rate of Birr 5,000 per m², will be Birr 10 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 1,330,000 of which 10% or Birr 133,000 will be paid in advance. The remaining Birr 1,197,000 will be paid in equal installments with in 28 years i.e. Birr 42,750 annually.

VI. HUMAN RESOURCE AND TRAINING REQUIRMENT

A. HUMAN RESOURCE REQUIRMENT

The total human resource requirement of the envisaged project is 76 persons. The proposed human resource and the estimated annual labor cost are indicated in Table 6.1.

Table 6.1

HUMAN RESOURCE REQUIRMENT AND LABOUR COST

Sr. No.	Description	Req. No.	Monthly Salary (Birr)	Annual Salary (Birr)
1.	General Manager	1	6,000	72,000
2.	Executive Secretary	1	2,000	24,000
3.	Plan and Statistics Head	1	3,600	43,200
4.	Production and Technical Manager	1	5,000	60,000
5.	Commercial and Marketing Manager	1	4,600	55,200
6.	Finance Manager	1	4,600	55,200
7.	Administration Manager	1	5,000	60,000
8.	Personnel	1	3,000	36,000
9.	Secretary	3	1,600	57,600
10.	Glass Technologist	1	3,600	43,200
11.	Production Workers	30	800	288,000
12.	Technicians	10	1,200	144,000
13.	Sales man	4	1,000	48,000
14.	Store Head	1	1,000	12,000
15.	General Accountant	2	900	21,600
16.	Finance and Budget Accountant	2	900	21,600
17.	General Service	15	300	54,000
Sub-total		76		1,095,600
Employees Benefit (25% BS)				273,900
Total				1,369,500

B. TRAINING REQUIRMENT

Training is required for technical staff and operators for a period of one month. For this arrangements can be made with Addis Ababa Glass and Bottle Factory. A total of Birr 100,000 is allotted to execute the training programme.

VII. FINANCIAL ANALYSIS

The financial analysis of the glass bottles and tumblers 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
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 45.03 million (see Table 7.1). From the total investment cost, the highest share (Birr 37.74 million or 83.81%) is accounted by fixed investment cost followed by pre operation cost (4.92 million or 10.92%) and initial working capital (Birr 2.37 million or 5.27%). From the total investment cost Birr 21.16 million or 47% 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	133.00		133.00	0.30
1.2	Building and civil work	10,000.00		10,000.00	22.21
1.3	Machinery and equipment	5,293.00	21,160.00	26,453.00	58.75
1.4	Vehicles	900.00		900.00	2.00
1.5	Office furniture and equipment	250.00		250.00	0.56
	Sub total	16,576.00	21,160.00	37,736.00	83.81
2	Pre operating cost *				
2.1	Pre operating cost	1,972.65		1,972.65	4.38
2.2	Interest during construction	2,945.70		2,945.70	6.54
	Sub total	4,918.35		4,918.35	10.92
3	Working capital **	2,372.78		2,372.78	5.27
	Grand Total	23,867.13	21,160.00	45,027.13	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 3.61 million. However, only the initial working capital of Birr 2.37 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 28.20 million (see Table 7.2). Utility account for 28.83% of the production cost. The other major components of the production cost are the cost of raw material, depreciation, financial cost account for 26.97%, 22.31%, and 8.62%, respectively. The remaining 13.27% is the share of labor, and repair and maintenance marketing and distribution 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	7,604	26.97
Utilities	8,129	28.83
Maintenance and repair	1,323	4.69
Labor direct	1,096	3.89
Labor overheads	274	0.97
Administration Costs	350	1.24
Land lease cost	0	0.00
Cost of marketing and distribution	700	2.48
Total Operating Costs	19,476	69.07
Depreciation	6,290	22.31
Cost of Finance	2,430	8.62
Total Production Cost	28,196	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 2.66 million to Birr 6.67 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 62.24 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.

$$\text{Break -Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 13,440,000$$

$$\text{Break Even Capacity utilization} = \frac{\text{Break -even Sales Value}}{\text{Sales revenue}} \times 100 = 52.86 \%$$

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 5 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 20.24% 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 22.49 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 76 persons. The project will generate Birr 19.26 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 the mining subsector and forward linkage with the beverage, cosmetic, and pharmaceutical sub sectors 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	5,323	6,083	6,844	7,604	7,604	7,604	7,604	7,604	7,604	7,604
Utilities	5,690	6,503	7,316	8,129	8,129	8,129	8,129	8,129	8,129	8,129
Maintenance and repair	926	1,058	1,191	1,323	1,323	1,323	1,323	1,323	1,323	1,323
Labour direct	767	877	986	1,096	1,096	1,096	1,096	1,096	1,096	1,096
Labour overheads	192	219	247	274	274	274	274	274	274	274
Administration Costs	245	280	315	350	350	350	350	350	350	350
Land lease cost	0	0	0	0	43	43	43	43	43	43
Cost of marketing and distribution	700	700	700	700	700	700	700	700	700	700
Total Operating Costs	13,843	15,721	17,598	19,476	19,519	19,519	19,519	19,519	19,519	19,519
Depreciation	6,290	6,290	6,290	6,290	6,290	425	425	425	425	425
Cost of Finance	0	3,240	2,835	2,430	2,025	1,620	1,215	810	405	0
Total Production Cost	20,133	25,251	26,724	28,196	27,834	21,564	21,159	20,754	20,349	19,944

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	22,400	25,600	28,800	32,000	32,000	32,000	32,000	32,000	32,000	32,000
Less variable costs	13,143	15,021	16,898	18,776	18,776	18,776	18,776	18,776	18,776	18,776
VARIABLE MARGIN	9,257	10,579	11,902	13,224	13,224	13,224	13,224	13,224	13,224	13,224
in % of sales revenue	41.33	41.33	41.33	41.33	41.33	41.33	41.33	41.33	41.33	41.33
Less fixed costs	6,990	6,990	6,990	6,990	7,033	1,168	1,168	1,168	1,168	1,168
OPERATIONAL MARGIN	2,267	3,589	4,911	6,234	6,191	12,056	12,056	12,056	12,056	12,056
in % of sales revenue	10.12	14.02	17.05	19.48	19.35	37.68	37.68	37.68	37.68	37.68
Financial costs		3,240	2,835	2,430	2,025	1,620	1,215	810	405	0
GROSS PROFIT	2,267	349	2,076	3,804	4,166	10,436	10,841	11,246	11,651	12,056
in % of sales revenue	10.12	1.36	7.21	11.89	13.02	32.61	33.88	35.14	36.41	37.68
Income (corporate) tax	0	0	0	1,141	1,250	3,131	3,252	3,374	3,495	3,617
NET PROFIT	2,267	349	2,076	2,663	2,916	7,305	7,589	7,872	8,156	8,439
in % of sales revenue	10.12	1.36	7.21	8.32	9.11	22.83	23.72	24.60	25.49	26.37

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	39,709	27,860	25,620	28,820	32,000	32,000	32,000	32,000	32,000	32,000	32,000	12,448
Inflow funds	39,709	5,460	20	20	0	0	0	0	0	0	0	0
Inflow operation	0	22,400	25,600	28,800	32,000	32,000	32,000	32,000	32,000	32,000	32,000	0
Other income	0	0	0	0	0	0	0	0	0	0	0	12,448
TOTAL CASH OUTFLOW	39,709	19,303	23,362	24,835	27,448	26,848	28,320	28,037	27,753	27,469	23,136	0
Increase in fixed assets	39,709	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	2,514	351	351	351	4	0	0	0	0	0	0
Operating costs	0	13,143	15,021	16,898	18,776	18,819	18,819	18,819	18,819	18,819	18,819	0
Marketing and Distribution cost	0	700	700	700	700	700	700	700	700	700	700	0
Income tax	0	0	0	0	1,141	1,250	3,131	3,252	3,374	3,495	3,617	0
Financial costs	0	2,946	3,240	2,835	2,430	2,025	1,620	1,215	810	405	0	0
Loan repayment	0	0	4,050	4,050	4,050	4,050	4,050	4,050	4,050	4,050	0	0
SURPLUS (DEFICIT)	0	8,557	2,258	3,985	4,552	5,152	3,680	3,963	4,247	4,531	8,864	12,448
CUMULATIVE CASH BALANCE	0	8,557	10,815	14,800	19,352	24,504	28,183	32,147	36,394	40,924	49,789	62,236

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	22,400	25,600	28,800	32,000	32,000	32,000	32,000	32,000	32,000	32,000	12,448
Inflow operation	0	22,400	25,600	28,800	32,000	32,000	32,000	32,000	32,000	32,000	32,000	0
Other income	0	0	0	0	0	0	0	0	0	0	0	12,448
TOTAL CASH OUTFLOW	42,081	14,174	16,051	17,929	20,621	20,769	22,650	22,771	22,893	23,014	23,136	0
Increase in fixed assets	39,709	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	2,373	331	331	331	4	0	0	0	0	0	0	0
Operating costs	0	13,143	15,021	16,898	18,776	18,819	18,819	18,819	18,819	18,819	18,819	0
Marketing and Distribution cost	0	700	700	700	700	700	700	700	700	700	700	0
Income (corporate) tax		0	0	0	1,141	1,250	3,131	3,252	3,374	3,495	3,617	0
NET CASH FLOW	-42,081	8,226	9,549	10,871	11,379	11,231	9,350	9,229	9,107	8,986	8,864	12,448
CUMULATIVE NET CASH FLOW	-42,081	33,855	-24,307	13,436	-2,057	9,174	18,525	27,754	36,861	45,847	54,711	67,159
Net present value	-42,081	7,478	7,891	8,168	7,772	6,974	5,278	4,736	4,249	3,811	3,418	4,799
Cumulative net present value	-42,081	34,603	-26,712	18,544	-10,772	-3,799	1,480	6,215	10,464	14,275	17,693	22,492

NET PRESENT VALUE 22,492
INTERNAL RATE OF RETURN 20.24%
NORMAL PAYBACK 5 years