114. PROFILE ON THE PRODUCTION OF LAMINATED WOOD/ FORMICA

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I. SUMMARY

This profile envisages the establishment of a plant for the production of laminated wood/ *Formica* with a capacity of 3,000 tons per annum. Laminated wood/ *Formica* is a product consisting of resin impregnated layers of paper with decorative patterns such as wood, grain, marble and colored designs and its major applications include decoration of furniture and fixtures in house hold, commercial and transport sector.

The demand for laminated wood/ *Formica* is entirely met through import. The present (2012) demand for laminated wood/ *Formica* is estimated at 7,755 tons. The demand for laminated wood/ *Formica* is projected to reach 9,898 tons and 12,630 tons by the year 2017 and 2022, respectively.

The principal raw materials required are phenol formaldehyde, melamine, Kraft paper, and industrial alcohol which have to be imported.

The total investment cost of the project including working capital is estimated at Birr 33.80 million. From the total investment cost, the highest share (Birr 20.09 million or 59.46%) is accounted by initial working capital followed by fixed investment cost (10.99 million or 32.53%) and pre operation cost (Birr 2.71 million or 8.01%). From the total investment cost, Birr 4.25 million or 12.59% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 31.60% and a net present value (NPV) of Birr 45.12 million, discounted at 10%.

The project can create employment for 42 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 furniture and fixtures sub sector and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTION AND APPLICATION

Laminated wood/ Formica are characterized by a hard surface which is highly resistant to damage, such as scratching. It is a product consisting of resin impregnated layers of paper with decorative patterns such as wood, grain, marble and colored designs. The major applications of Formica include decoration of furniture and fixtures in house hold, commercial and transport sector.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

There are no local laminated wood (Formica) manufacturers. Therefore the demand for the product is met through import. The annual volume of import for laminated wood is presented in Table 3.1.

Table 3.1

IMPORTED OF LAMINATED WOOD

Year	Quantity (Tone)	Value (`000 Birr)
2002	1,599	4389
2003	1,748	4342
2004	511	3123
2005	672	3,799
2006	926	6,614
2007	964	7,743
2008	4,041	29,040
2009	7,407	71,899
2010	8,110	96,765
2011	7,748	101,819

***Source*:** *Ethiopian Revenues & Customs Authority.*

As can be seen from Table 3.1, the trend in the imported quantity of the product shows different characteristics during the past ten years. During the initial two years of the data set i.e. year 2002/03 the yearly average quantity of import was about 1,673 tons. A decline of import is registered during the following four years of 2004--2007. During this period the yearly average level of import was 768 tons. However, a sharp increase of import was registered during the recent four years, starting from year 2008 to 2011. During year 2008 the imported volume stood at 4,041 tons. Compared to the preceding year of 2007 it is more than four fold. Similarly, the imported quantity in the year 2009 and 2010 increased to 7,407 tons and 8,110 tons, respectively. Year 2010 import is two fold when compared to year 2008. By the year 2011 the imported quantity has remained almost the same as the year 2010 which is at 7,748 tons.

The huge increase in the demand for the product in the recent four years is believed to be as a result of the boom in the construction sector and expansion of the service sector mainly the hotel and tourism, transport, commerce and the like which have high demand for furniture and decoration articles that require laminated wood.

In order to estimate the current (2012) demand for the product the average import of the last three recent years (2009--2011) is taken as the effective demand for the year 2011. Applying a conservative growth rate of 4% (which is much below the expected growth rate of the construction, manufacturing and service sector) on the base year, current (year 2012) effective demand is estimated at 7,755 tons.

2. Demand Projection

The demand for laminated wood is directly related with the development of the construction sector, particularly housing building construction. Moreover, laminated wood is highly demanded by the household and office furniture manufacturers, decoration articles producers and the transport sector. As income increases due to economic development and urbanization expands the demand for the product will grow. By considering the above factors demand is forecasted using a conservative growth rate of 5% per annum. The projected demand for laminated wood is presented in Table 3.2.

Table 3.2

PROJECTED DEMAND FOR LAMINATED WOOD (TONS)

Year	Projected Demand
2013	8,143
2014	8,550
2015	8,977
2016	9,426
2017	9,898
2018	10,392
2019	10,912
2020	11,458
2021	12,030
2022	12,630
2023	13,264

The demand for laminated wood will increase from 8,143 tons in the year 2013 to 10,392 tons and 13,264 tons by the year 2018 and 2023, respectively.

3. Pricing and Distribution

The recent CIF price (year 2011) of the product is Birr 26,141per tone. For the envisaged product after taking consideration of customs duty and other import related costs a competitive factory-get price of Birr 33,983 per ton is recommended.

Distribution of laminated wood would be handled through direct delivery to major construction companies and furniture manufacturers whose orders are in bulk and through the existing shops of building material to small quantity purchasers.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

Based on the market study presented above, the envisaged laminated wood/ Formica manufacturing plant is estimated to have a production capacity of 3,000 ton per year working 300 days, single shift of eight hours a day. A further expansion of the plant after a couple of years, i.e., after achieving production and quality competence, could be considered since the demand is big.

2. Production Program

The plant is expected to start production at 75% of its capacity in the first year, and will increase to 85% and 100% in the second and third year and then after, respectively.

IV. MATERIALS AND INPUT

A. RAW MATERIALS

The raw and auxiliary materials for the production of laminated wood/ Formica are Phenol formaldehyde, Melamine, Kraft paper, Industrial alcohol, etc. Most of the raw materials have to be imported. The annual raw and auxiliary material requirement at full capacity production is presented in Table 4.1.

Table 4.1

RAW MATERIALS REQUIREMENT AND COST

Sr. No.	Description	Qty. (Tons)	Unit Cost ('000 Birr)	Total Cost ('000 Birr)		
				FC	LC	Total
1	Base paper (50-80gsm)	188	83.5	15,698	3,925	19,623
2	Kraft Paper	1,500	21.5	25,800	1,290	32,250
3	Tissue paper	121	16.45	1,592	80	1,990
4	Bopp film	240	19.9	3,821	191	4,776
5	Phenol formaldehyde	500	19.4	7,760	388	9,700
6	Melamine formaldehyde	200	48.7	7,792	390	9,740
7	Industrial alcohol (sprit)	350	21.7	6,076	304	7,595
	Total	**3099**		**68,539**	**6,567**	**85,674**

B. UTILITIES

Electricity, water and fuel are the three basic utilities required by the laminated wood plant. Total annual utilities requirement is estimated at Birr 667,500.00. The quantity of utilities required and costs at full capacity operation is shown in Table 4.2

Table 4.2

ANNUAL UTILITIES REQUIREMENT AND COST

Sr. No.	Description	Annual Consumption	UOM	Unit Cost (Birr)	Total Cost (000 Birr)
1	Electricity	250,000	kWh	0.65	162.50
2	Water	500	m^3	10.00	5.00
3	Fuel	25,000	m^3	20.00	500.00
Total Annual Cost					**667.50**

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The production process begins by soaking strips of paper in resin. Laminated wood can be manufactured in different grades or thickness, depending on its intended use. There may be from 7-18 layers of paper combined into the final sheet. The bottom layers are Kraft paper. The papers come in ribbons of different widths, commonly of three, four, or five feet. The Kraft paper is run through a “bath tub” or vat containing phenolic resins. The paper for the top layer of the sheet is translucent. This is run through a vat of melamine resin. The layer just beneath the top is the decorative layer. This is a sheet of paper printed with the color or design that will show through the clear top layer for the desired surface pattern. This sheet is also run through a melamine vat.

The resin-impregnated sheet is then put into a drying chamber. Next, they are cut and stacked in layers. The clear layer and the decorative layer are on top of the Kraft paper.

The layers of paper are then loaded onto a flat-bed hydraulic press for final curing. The press compresses the sandwich of resin-soaked paper at 1,400 psi, while heating it to a high temperature. The heat catalyzes a reaction in the resins. The phenol (or melamine) and formaldehyde molecules attach to each other in an alternating fashion, releasing water molecules in the process. The resin flow together and then set. Thermosetting converts the paper sheets in to one single, rigid laminated sheet. This sheet is dry and insoluble, and it cannot be shaped or molded, even at high temperatures.

The dry sheet is cut into desired size and shape. It may also be bonded to a building material such as ply wood, flake board, fiberboard, or metal.

2. Environmental Impact

To overcome some environmental problems created on the production process and the wastes during production additional investment for environmental protection of about Birr 200,000.00 is estimated.

B. ENGINEERING

1. Machinery and Equipment

The total investment cost of plant machinery and equipment is estimated at Birr 4,662,160.00. Plant machinery and equipment required for laminated wood/Formica is presented in Table 5.1.

Table 5.1

LIST OF MACHINERY AND EQUIPMENT AND COST

Sr. No.	Description	Qty.	Cost ('000 Birr)		
			LC	FC	Total
1	Resin preparation plant	2	256.5	855	1111.5
2	Hydraulic press with automatic loading and unloading attachment	1	315.0	1050	1365.0
3	Impregnating plant	1	112.5	375	487.5
4	Curing and trimming machine	2	40.5	135	175.5
5	Material handling (push-pull arrangement, moving trolleys, pallet trucks/forklift, etc.)	1 Set	51.3	171	222.3
6	Vacuum press plates (moulds, lifting device at book preparation and break down station)	1 Set	31.5	105	136.5
7	Vacuum cleaning arrangement	1 Set	16.2	54	70.2
8	Lab. & Testing equipments	LS	67.5	225	292.5
FOB			**891**	**2970**	**3,861**
9	Spare parts (5%)				**193**
10	CIF (15%)				**608**
Grand Total					**4,662**

2. Land, Building and Civil Works

The envisaged plant will require a total land area of 2,000 m^2. The floor space required for the building of and other facilities will be about 800m^2. The total estimated cost of building and civil works at the rate of Birr 4,500 per m^2 is about Birr 4,930,000.

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 532,000 of which 10% or Birr 53,200 will be paid in advance. The remaining Birr 478,800 will be paid in equal installments with in 28 years i.e. Birr 17,100 annually.

VI. HUMAN RESOURCE & TRAINING REQUIREMENT

A. HUMAN RESOURCEREQUIREMENT

The laminated wood/ Formica plant will require human resource both for administration and production activities. The total number of human resource is 42, of which 12 are administration staff and 30 are involved in production activities. The total number of labor cost is Birr 992,500. The detail human resource requirement and estimated annual salaries are presented in Table 6.1.

Table 6.1

HUMAN RESOURCE REQUIREMENT AND ANNUAL LABOR COST

Ser. No.	Job Title	Req.No.	Monthly Salary (Birr)	Annual Salary (Birr)
A. Administration				
1	General Manager	1	5,000	60,000
2	Executive Secretary	1	2,000	24,000
3	Finance and Administration Head	1	3,600	43,200
4	Accountant	1	1,600	19,200
5	Store Man	1	1,200	14,400
6	Clerk	1	700	8,400
7	General Service	6	400	28,800
	Sub-Total	**12**	**14,500**	**198,000**
B. Production				
8	Engineer (Production & Technique)	1	3,600	43,200
9	Supervisor	1	1,600	19,200
10	Quality Control Staff	1	1,300	15,600
11	Technician	2	1,500	236,000
13	Skilled Workers	10	1,300	156,000
14	Assistant Skilled Workers	15	700	126,000
Sub- Total		**30**	**10,000**	**596,000**
Worker's Benefit (25%)		-		198,500
Grand Total		**42**		**992,500**

B. TRAINING REQUIREMENT

The supervisor, skilled workers and quality control worker need at least two weeks training on the technology, maintenance and quality control. For the rest, on-the-job training will be sufficient on the start up period by the specialists. Total training cost is estimated at Birr 90,000.00.

VII. FINANCIAL ANALYSIS

The financial analysis of the laminated wood/ Formica project is based on the data presented in the previous chapters and the following assumptions:-

Construction period	1 year
Source of finance	30 % equity and 70% loan
Tax holidays	3 years
Bank interest	10%
Discount cash flow	10%
Accounts receivable	30 days
Raw material 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 33.80 million (see Table 7.1). From the total investment cost, the highest share (Birr 20.09 million or 59.46%) is accounted by initial working capital followed by fixed investment cost (10.99 million or 32.53%) and pre operation cost (Birr 2.71 million or 8.01%). From the total investment cost, Birr 4.25 million or 12.59% 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	53.20		53.20	0.16
1.2	Building and civil work	4,930.00		4,930.00	14.59
1.3	Machinery and equipment	608.11	4,254.05	4,862.16	14.39
1.4	Vehicles	900.00		900.00	2.66
1.5	Office furniture and equipment	250.00		250.00	0.74
	Sub total	**6,741.31**	**4,254.05**	**10,995.36**	**32.53**
2	**Pre operating cost ***				
2.1	Pre operating cost	495.86		495.86	1.47
2.2	Interest during construction	2,210.97		2,210.97	6.54
	Sub total	**2,706.83**		**2,706.83**	**8.01**
3	**Working capital ****	**20,094.04**		**20,094.04**	**59.46**
	Grand Total	**29,542.18**	**4,254.05**	**33,796.23**	**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 28.79 million. However, only the initial working capital of Birr 20.09 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 91.53 million (see Table 7.2). The cost of raw material account for 93.60% of the production cost. The other major components of the production cost are depreciation, financial cost, utility, and direct labor which account for 1.61%, 2.32%, 0.73%, and 0.65% respectively. The remaining 1.09% is the share of cost of marketing and distribution, 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 THREE)

Items	Cost (000 Birr)	%
Raw Material and Inputs	85,674	93.60
Utilities	668	0.73
Maintenance and repair	243	0.27
Labor direct	596	0.65
Labor overheads	199	0.22
Administration Costs	200	0.22
Land lease cost	0	0.00
Cost of marketing and	350	0.38
Total Operating Costs	**87,930**	**96.06**
Depreciation	1,474	1.61
Cost of Finance	2,128	2.32
Total Production Cost	**91,532**	**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 7.50 million to Birr 9.65 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 102.49 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.

$$\text{Break- Even Sales Value} = \frac{\text{Fixed Cost + Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 42{,}818{,}580$$

$$\text{Break -Even Capacity utilization} = \frac{\text{Break- even Sales Value}}{\text{Sales revenue}} \times 100 = 12.69\%$$

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 3 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 31.60% 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 45.12 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 42 persons. The project will generate Birr 26.28 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 furniture and fixtures sub sector and also generates other income for the Government.

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	14,992.95	18,205.73	21,418.50	21,418.50	21,418.50	21,418.50	21,418.50	21,418.50	21,418.50	21,418.50
Accounts receivable	5,138.00	6,232.75	7,327.50	7,327.50	7,328.93	7,328.93	7,328.93	7,328.93	7,328.93	7,328.93
Cash-in-hand	12.04	14.62	17.19	17.19	17.43	17.43	17.43	17.43	17.43	17.43
CURRENT ASSETS	**20,142.99**	**24,453.09**	**28,763.19**	**28,763.19**	**28,764.86**	**28,764.86**	**28,764.86**	**28,764.86**	**28,764.86**	**28,764.86**
Accounts payable	48.94	59.43	69.92	69.92	69.92	69.92	69.92	69.92	69.92	69.92
CURRENT LIABILITIES	**48.94**	**59.43**	**69.92**	**69.92**	**69.92**	**69.92**	**69.92**	**69.92**	**69.92**	**69.92**
TOTAL WORKING CAPITAL	**20,094.04**	**24,393.66**	**28,693.28**	**28,693.28**	**28,694.94**	**28,694.94**	**28,694.94**	**28,694.94**	**28,694.94**	**28,694.94**

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	59,972	72,823	85,674	85,674	85,674	85,674	85,674	85,674	85,674	85,674
Utilities	468	568	668	668	668	668	668	668	668	668
Maintenance and repair	170	207	243	243	243	243	243	243	243	243
Labour direct	417	507	596	596	596	596	596	596	596	596
Labour overheads	139	169	199	199	199	199	199	199	199	199
Administration Costs	140	170	200	200	200	200	200	200	200	200
Land lease cost	0	0	0	0	17	17	17	17	17	17
Cost of marketing and distribution	350	350	350	350	350	350	350	350	350	350
Total Operating Costs	**61,656**	**74,793**	**87,930**	**87,930**	**87,947**	**87,947**	**87,947**	**87,947**	**87,947**	**87,947**
Depreciation	1,474	1,474	1,474	1,474	1,474	222	222	222	222	222
Cost of Finance	0	2,432	2,128	1,824	1,520	1,216	912	608	304	0
Total Production Cost	**63,130**	**78,699**	**91,532**	**91,228**	**90,941**	**89,385**	**89,081**	**88,777**	**88,473**	**88,169**

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	71,364	91,754	101,949	101,949	101,949	101,949	101,949	101,949	101,949	101,949
Less variable costs	61,306	74,443	87,580	87,580	87,580	87,580	87,580	87,580	87,580	87,580
VARIABLE MARGIN	**10,058**	**17,311**	**14,369**	**14,369**	**14,369**	**14,369**	**14,369**	**14,369**	**14,369**	**14,369**
in % of sales revenue	14.09	18.87	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09
Less fixed costs	1,824	1,824	1,824	1,824	1,841	589	589	589	589	589
OPERATIONAL MARGIN	**8,234**	**15,487**	**12,545**	**12,545**	**12,528**	**13,780**	**13,780**	**13,780**	**13,780**	**13,780**
in % of sales revenue	11.54	16.88	12.31	12.31	12.29	13.52	13.52	13.52	13.52	13.52
Financial costs		2,432	2,128	1,824	1,520	1,216	912	608	304	0
GROSS PROFIT	**8,234**	**13,055**	**10,417**	**10,721**	**11,008**	**12,564**	**12,868**	**13,172**	**13,476**	**13,780**
in % of sales revenue	11.54	14.23	10.22	10.52	10.80	12.32	12.62	12.92	13.22	13.52
Income (corporate) tax	0	0	0	3,216	3,302	3,769	3,860	3,952	4,043	4,134
NET PROFIT	**8,234**	**13,055**	**10,417**	**7,505**	**7,706**	**8,795**	**9,007**	**9,220**	**9,433**	**9,646**
in % of sales revenue	11.54	14.23	10.22	7.36	7.56	8.63	8.84	9.04	9.25	9.46

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	**11,491**	**93,718**	**91,764**	**101,959**	**101,949**	**101,949**	**101,949**	**101,949**	**101,949**	**101,949**	**101,949**	**33,917**
Inflow funds	11,491	22,354	10	10	0	0	0	0	0	0	0	0
Inflow operation	0	71,364	91,754	101,949	101,949	101,949	101,949	101,949	101,949	101,949	101,949	0
Other income	0	0	0	0	0	0	0	0	0	0	0	33,917
TOTAL CASH OUTFLOW	**11,491**	**84,010**	**84,575**	**97,408**	**96,010**	**95,811**	**95,972**	**95,760**	**95,547**	**95,334**	**92,081**	**0**
Increase in fixed assets	11,491	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	20,143	4,310	4,310	0	2	0	0	0	0	0	0
Operating costs	0	61,306	74,443	87,580	87,580	87,597	87,597	87,597	87,597	87,597	87,597	0
Marketing and Distribution cost	0	350	350	350	350	350	350	350	350	350	350	0
Income tax	0	0	0	0	3,216	3,302	3,769	3,860	3,952	4,043	4,134	0
Financial costs	0	2,211	2,432	2,128	1,824	1,520	1,216	912	608	304	0	0
Loan repayment	0	0	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	0	0
SURPLUS (DEFICIT)	**0**	**9,708**	**7,189**	**4,551**	**5,939**	**6,138**	**5,977**	**6,189**	**6,402**	**6,615**	**9,868**	**33,917**
CUMULATIVE CASH BALANCE	**0**	**9,708**	**16,897**	**21,448**	**27,387**	**33,525**	**39,501**	**45,691**	**52,093**	**58,708**	**68,576**	**102,493**

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**	**71,364**	**91,754**	**101,949**	**101,949**	**101,949**	**101,949**	**101,949**	**101,949**	**101,949**	**101,949**	**33,917**
Inflow operation	0	71,364	91,754	101,949	101,949	101,949	101,949	101,949	101,949	101,949	101,949	0
Other income	0	0	0	0	0	0	0	0	0	0	0	33,917
TOTAL CASH OUTFLOW	**31,585**	**65,956**	**79,093**	**87,930**	**91,148**	**91,250**	**91,716**	**91,807**	**91,899**	**91,990**	**92,081**	**0**
Increase in fixed assets	11,491	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	20,094	4,300	4,300	0	2	0	0	0	0	0	0	0
Operating costs	0	61,306	74,443	87,580	87,580	87,597	87,597	87,597	87,597	87,597	87,597	0
Marketing and Distribution cost	0	350	350	350	350	350	350	350	350	350	350	0
Income (corporate) tax		0	0	0	3,216	3,302	3,769	3,860	3,952	4,043	4,134	0
NET CASH FLOW	**-31,585**	**5,408**	**12,661**	**14,019**	**10,801**	**10,699**	**10,233**	**10,142**	**10,050**	**9,959**	**9,868**	**33,917**
CUMULATIVE NET CASH FLOW	**-31,585**	**-26,177**	**-13,515**	**504**	**11,304**	**22,004**	**32,237**	**42,378**	**52,429**	**62,388**	**72,256**	**106,173**
Net present value	-31,585	4,917	10,464	10,533	7,377	6,644	5,776	5,204	4,689	4,224	3,805	13,077
Cumulative net present value	-31,585	-26,669	-16,205	-5,672	1,705	8,349	14,125	19,329	24,018	28,241	32,046	45,123

NET PRESENT VALUE	45,123
INTERNAL RATE OF RETURN	31.60%
NORMAL PAYBACK	3 years