

**74. PROFILE ON THE PRODUCTION OF
SYNTHETIC MARBLE**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of Synthetic Marble with a capacity of 30,000 m² per annum. Synthetic marble are used in roofing's, flooring, tiles used as wall products in different designs and coatings. The artificial marble tiles are gaining varied application in building project which are developing very fast.

The demand for synthetic marbles is entirely met through import. The present (2012) demand for synthetic marble is estimated at 25,923 m². The demand for synthetic marble is projected to reach 41,749 tons and 89,492 tons by the year 2017 and 2022, respectively.

The principal raw material required is polyester resin, catalyst, fillers and pigments. All the raw materials except the fillers are to be imported.

The total investment cost of the project including working capital is estimated at Birr 10.06 million. From the total investment cost, the highest share (Birr 5.97 million or 59.40%) is accounted by fixed investment cost followed by initial working capital (Birr 2.91 million or 29.97%) and pre operation cost (Birr 1.17 million or 11.64%). From the total investment cost Birr 1.8 million or 17.89% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 31.11% and a net present value (NPV) of Birr 11.70 million, discounted at 10%.

The project can create employment for 18 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 sector and forward linkage with the construction sector and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTION AND APPLICATION

Synthetic or Cultured Marble looks very much like natural marble, but is up to four times the tensile strength of natural marble, and unlike natural marble, will not stain easily. Natural marble is very porous and is primarily used in only flat installations whereas Cultured Marble can be formed into virtually any shape or size.

The major raw materials in Synthetic Marble production is fillers, synthetic resins, coating pigments and waxes. Calcium based filler (marble powder or ground limestone) takes the major portion that makes seventy to eighty percent of the raw materials, and the rest twenty to thirty percent are resins, coating pigments and waxes.

Synthetic marbles is virtually replacing the use of natural marble. The qualities of the artificial or synthetic marble are very much the same as those of natural marble and it is more durable than quarried natural marble. Synthetic marble is more resistant to stains, wear and damaging effects of household chemicals.

Synthetic marble is produced from fillers and synthetic resin which services as a binder. Calcium Carbonate filler is most widely used in synthetic marble production because of its low cost and widely availability.

The major areas where synthetic marble are used are roofing's, flooring, tiles used as wall products in different designs and coatings. The artificial marble tiles are gaining varied application in building project which are developing very fast.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The demand for synthetic marbles is entirely met through import. However, the import statistics of Revenue and Customs Authority does not show import of synthetic marbles separately. Hence, the demand for the product is estimated based on the demand for natural marble. The country's requirement of marble is largely met through local production and to some extent import. The data obtained from CSA on local production is given in Table 3.1.

Table 3.1
LOCAL PRODUCTION OF MARBLE (M²)

Year	Production
2002	209,803
2003	128,918
2004	344,452
2005	161,002
2006	200,408
2007	208,463
2008	264,539
2009	114,374
2010	152,421
2011	177,111*

Source: - "Report on Large and Medium Scale Manufacturing and Electricity Industries Survey" CSA.

* *Local Production data for 2011 is not available. Therefore the average local production during the previous three years (2009-2011) is considered as the production level in 2011.*

During the period 2002 -2011, the maximum local production of marble was 344,452 m² (year 2004), while the minimum 114,374 m² was registered in year 2019. In the remaining years, production was fluctuating between these two extremes, around a mean figure of 196,149 m². During the period under consideration (2002 – 2011) local production of marble though fluctuates from year to year has registered an average annual growth rate of 13.72%.

The other source of supply is import. Ethiopia imports processed marble from various countries. During the period 2002 – 2011 on average the country has imported 37,011 m² of marble annually (see Table 3.2).

Table 3.2**ANNUAL IMPORT OF MARBLE (IN M²)**

Year	Import
2002	5,414
2003	4,575
2004	17,047
2005	20,311
2006	52,038
2007	25,333
2008	54,260
2009	77,428
2010	65,205
2011	48,496

Source: – *Ethiopian Revenues & Customs Authority.*

Ethiopia also exports high quality marbles to various countries. During the period 2002 - 2011 on average the country has exported 24,302 m² of marble (see Table 3.3).

Table 3.3**ANNUAL EXPORT OF MARBLE (M²)**

Year	Export
2002	6,006
2003	1,315
2004	113
2005	1,128
2006	3,114
2007	21,342
2008	35,761
2009	45,868
2010	58,081
2011	70,293

Source: - *Ethiopian Revenues & Customs Authority.*

Accordingly, the apparent consumption of marble is composed of domestic production plus import minus export. Table 3.4 summarizes the past local production, import, export and apparent consumption of the product.

Table 3.4
APPARENT CONSUMPTION OF MARBLE (M²)

Year	Local	Import	Export	Apparent Consumption
2002	209,803	5,414	6,006	209,211
2003	128,918	4,575	1,315	132,178
2004	344,452	17,047	113	361,386
2005	161,002	20,311	1,128	180,185
2006	200,408	52,038	3,114	249,332
2007	208,463	25,333	21,342	212,454
2008	264,539	54,260	35,761	283,038
2009	114,374	77,428	45,868	145,934
2010	152,421	65,205	58,081	159,545
2011	177,111	48,496	70,293	155,314

As can be seen from Table 3.4, apparent consumption of marble shows a general increasing trend although, the annual consumption is erratic. However, during the time under consideration apparent consumption have registered an annual average growth rate of 11.27%.

For estimating the present demand for natural marble, it is assumed that the growth trend in the consumption of the product exhibited in the past will also continue at least in the near future. Accordingly, by taking the 2011 total supply as a base and applying a growth rate of 11.27% the present (2012) demand for natural marble is estimated at 172,818 m². Moreover assuming that the demand for synthetic marble will be 15% of the demand for natural marble, the present demand for synthetic marble is estimated at 25,923 m².

2. Demand Projection

The demand for synthetic marble is directly related with the growth in the construction sector in general and the housing construction sub sector in particular which in turn depends on the overall economic development of the country.

The contribution of the construction sector to the GDP during the period 2001 – 2010 have been growing at annual average growth rate of 13 percent which is above the average annual growth rate of real GDP during the period under consideration (11.4 %), indicating a rise in the share of the construction sector within the overall economy.

According to the GTP, during the period 2010/11 – 2014/15 the real GDP of the country (at a base case scenario) is expected to grow at an average annual growth rate of 11.2%. Moreover, during the same period the annual average planned targets of growth for the construction sector is 20%. Accordingly, by considering the above factors the demand for synthetic marble is conservatively assumed to grow at a rate of 10%. Projected demand is presented in Table 3.5.

Table 3.5
FORECASTED DEMAND FOR SYNTHETIC MARBLE (m²)

Year	Forecasted Demand
2013	28,515
2014	31,367
2015	34,503
2016	37,953
2017	41,749
2018	45,924
2019	50,516
2020	55,568
2021	61,124
2022	67,237
2023	73,961
2024	81,357
2025	89,492

The demand for synthetic marble is projected to reach at 41,749 m² and 89,492 m² by the year 2017 and 2022, respectively.

3. Pricing and Distribution

Based on current retail price of the product and allowing margin for distributors and retailers a factor gate price of Birr 575 per m² is recommended for the envisaged plant.

The product can be distributed through the existing building materials distribution enterprises.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

The envisaged project proposed the production of Synthetic Marble Plant with annual production capacity of 30,000 m².

2. Production Program

The proposed production plan will be it starts at 75% of full production capacity during the first year, grows to 85% in the second year and finally attain 100% in third year and then - after.

The selected technology of Synthetic Marble Production line is semi-automatic with 60 pcs/8hrs capacity that uses more labor. Hence the proposed production program is to operate 250 days per year in double shift per day.

IV. MATERIALS AND INPUTS

A. MATERIALS

The raw materials for Synthetic or artificial marble are polyester resin, catalyst, fillers and pigments. The major part of the raw material is fillers (calcium carbonate, marble powder, and coarse-grained sand) which make 70 to 80% and the rest are synthetic resin that serve as adhesives, pigments and additives which constitutes the rest 20-30%. All the raw materials except the fillers are to be imported.

The auxiliary materials constitute a various packing materials such as cartons. Total annual cost is estimated at Birr 300 thousand. The total raw material and auxiliary material cost is Birr 11.55 million out of which Birr 10.06 is in foreign currency. The unit cost, annual quantity, and total cost during full production is shown in Table 4.1.

Table 4.1
RAW MATERIAL REQUIREMENT AND COST

Description	Quantity (tons)	Unit Cost ('000 Birr)	Cost ('000 Birr)		
			LC	FC	Total
Polyester resin	384.00	16.88		6,480.00	6,480.00
Lightweight Aggregate	1,020.00	1.17	1,193.40		1,193.40
Pigment	12.00	157.50		1,890.00	1,890.00
Gel coat	20.60	68.88		1,419.12	1,419.12
Carnauba Wax	1.13	205.88		232.64	232.64
Additives	0.20	207.66		40.49	40.49
Grand Total					11,255.66

B. UTILITIES

The utilities required are water and electric power. The estimated cost of required annual utilities is Birr 360.00 thousand. The details of the required utility and cost are shown on the Table 4.2.

Table 4.2

ANNUAL REQUIREMENT OF UTILITIES AND THEIR COST

Utility	UOM	Annual Required Qty.	Cost (Birr)
Electricity	kWh	400,000	260,000.00
Water	M ³	10,000	100,000.00
Total			360,000.00

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

First, the molds will be set up, waxed, and it will be transfer to the Spray Booth where the gel coat will be applied with the Gel Coat Spray System. The gel coat will be cured by allowing the gel coat to stay for some times. Once your gel coat is cured, it will be moved to the vibrating table to be poured. The cultured marble, onyx, or granite matrix is mixed in a blender/mixer and poured on the mold while the vibrating table is turned on. The vibrating table levels the matrix, and allows the air inside the matrix to rise to the surface. Once the mold is filled, the mold will be moved to a Mold Storage Rack.

After the marble is sufficiently cured, the mold will be rolled to the de-mold line where the parts are removed for detailing and the mold is ready to run through the cycle again.

Every part you produce will have flashing around the edge that will need to be sanded off. A Dust Collector will keep the dust out of your factory creating a healthier environment and preventing contamination on your freshly gel coated molds.

2. Environmental Impact

The envisaged synthetic marble production plant is environmental friendly.

B. ENGINEERING

1. Machinery Equipment

The total cost of the required machinery and equipment of the envisaged project of Synthetic Marble is Birr 2.25 million. The detailed list of production machinery and equipment is presented in Table 5.1.

Table 5.1
MACHINERY AND EQUIPMENT REQUIREMENT& COST

Type of Machinery and Equipment	Qty.	FOB (million Birr)
Casting molds	1	
Cultured marble blender or mixer	1	
Vibrating table	1	
Transfer Cart	1	
Multi-level storage racks	1	
Conveyor lines	1	
Gel coat spray booth, etc.	1	
Electronic floor scales	1	
	1	

Type of Machinery and Equipment	Qty.	FOB (million Birr)
Ventilation system	1	
Dust collectors	1	
Work benches	1	
Miscellaneous tools and containers	1	
FOB		1.80
Freight, Insurance, Inland Transport, and Bank Charge etc (25%FOB Price)		0.45
Total Cost		2.25

2. Land, Building and Civil Works

The total land requirement of the project including provision for open space is 1,000 square meters. The total building area is 500 m² that includes production hall, offices, and storage halls. Total building cost based on a unit rate of 5,000 per m² is estimated at Birr 2.5 million.

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

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

Moreover, advance payment of lease based on the type of investment ranges from 5% to 10%.The lease price is payable after the grace period annually. For those that pay the entire amount of the lease will receive 0.5% discount from the total lease value and those that pay in

installments will be charged interest based on the prevailing interest rate of banks. Moreover, based on the type of investment, two to seven years grace period shall also be provided.

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

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

Regarding land allocation of industrial zones if the land requirement of the project is below 5,000m², 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 266,000 of which 10% or Birr 26,600 will be paid in advance. The remaining Birr 239,400 will be paid in equal installments with in 28 years i.e. Birr 8,550 annually.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENTS

A. HUMAN RESOURCE REQUIREMENT

The total human resource requirement is 18persons, out of which about 12 persons are skilled and the remaining are unskilled. The total labor cost is estimated at Birr 765 thousand per year. For details see Table 6.1.

Table 6.1
HUMAN RESOURCE REQUIREMENT AND LABOR COST

Sr. No.	Category	Number of Persons	Monthly Salary (Birr)	Monthly Salary (Birr)	Annual Salary (Birr)
1	Manager	1	8,000.00	8,000.00	96,000.00
2	Skilled worker	4	4000	16,000.00	192,000.00
3	Unskilled Workers	4	2,000.00	8,000.00	96,000.00
4	Supervisor	1	5,000.00	5,000.00	60,000.00
5	Guards	4	1,000.00	4,000.00	48,000.00
6	Secretary and Cashier	1	3,000.00	3,000.00	36,000.00
7	Purchaser	1	2,500.00	2,500.00	30,000.00
8	Sales Person	1	2,500.00	2,500.00	30,000.00
9	Store Keeper	1	2,000.00	2,000.00	24,000.00
	Sub -total	18		51,000.00	612,000.00
	Employees Benefit (25% of salary)				153,000.00
	Total				765,000.00

B. TRAINING REQUIREMENT

Training is proposed for two technical personnel of the project on quality control, product mixing, and machine operations. The total cost of training is Birr 200,000 which is in foreign currency.

VII. FINANCIAL ANALYSIS

The financial analysis of the synthetic marble 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 10.06 million (see Table 7.1). From the total investment cost, the highest share (Birr 5.97 million or 59.40%) is accounted by fixed investment cost followed by initial working capital (Birr 2.91 million or 29.97%) and pre operation cost (Birr 1.17 million or 11.64%). From the total investment cost Birr 1.8 million or 17.89% is required in foreign currency.

Table 7.1**INITIAL INVESTMENT COST ('000 Birr)**

Sr. No.	Cost Items	Local Cost	Foreign Cost	Total Cost	% Share
1	Fixed investment				
1.1	Land Lease	26.60		26.60	0.26
1.2	Building and civil work	2,500.00		2,500.00	24.85
1.3	Machinery and equipment	450.00	1,800.00	2,250.00	22.36
1.4	Vehicles	900.00		900.00	8.94
1.5	Office furniture and equipment	300.00		300.00	2.98
	Sub -total	4,176.60	1,800.00	5,976.60	59.40
2	Pre operating cost *				
2.1	Pre operating cost	512.50		512.50	5.09
2.2	Interest during construction	658.26		658.26	6.54
	Sub- total	1,170.76		1,170.76	11.64
3	Working capital	2,914.64		2,914.64	28.97
	Grand Total	8,262.00	1,800.00	10,062.00	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 3.87 million. However, only the initial working capital of Birr 2.91 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 14.69 million (see Table 7.2). The cost of raw material account for 76.60 % of the production cost. The other major components of the production cost are depreciation, financial cost and labor, which account for 5.87%, 4.31% and 4.16 %, respectively. The remaining 9.06% 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 three)**

Items	Cost (in 000 Birr)	%
Raw Material and Inputs	11,256.00	76.60
Utilities	360.00	2.45
Maintenance and repair	68.00	0.46
Labor direct	612.00	4.16
Labor overheads	153.00	1.04
Administration Costs	250.00	1.70
Land lease cost	-	-
Cost of marketing and distribution	500.00	3.40
Total Operating Costs	13,199.00	89.82
Depreciation	862.50	5.87
Cost of Finance	633.58	4.31
Total Production Cost	14,695.08	100

C. FINANCIAL EVALUATION**1. Profitability**

Based on the projected profit and loss statement, the project will generate a profit through out its operation life. Annual net profit after tax will grow from Birr 1.78 million to Birr 2.73 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 26.03 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.

$$\text{Break -Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 5,164,390$$

$$\text{Break - Even Capacity utilization} = \frac{\text{Break -even Sales Value}}{\text{Sales revenue}} \times 100 = 30\%$$

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 31.11%% 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 11.70 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 18 persons. The project will generate Birr 7.21 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 sector and forward linkage with the construction sub sector and also generates income for the Government in terms of payroll tax.

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	8,442	9,568	11,256	11,256	11,256	11,256	11,256	11,256	11,256	11,256
Utilities	270	306	360	360	360	360	360	360	360	360
Maintenance and repair	51	58	68	68	68	68	68	68	68	68
Labour direct	459	520	612	612	612	612	612	612	612	612
Labour overheads	115	130	153	153	153	153	153	153	153	153
Administration Costs	188	213	250	250	250	250	250	250	250	250
Land lease cost	0	0	0	0	9	9	9	9	9	9
Cost of marketing and distribution	500	500	500	500	500	500	500	500	500	500
Total Operating Costs	10,024	11,294	13,199	13,199	13,208	13,208	13,208	13,208	13,208	13,208
Depreciation	863	863	863	863	863	130	130	130	130	130
Cost of Finance	0	724	634	543	453	362	272	181	91	0
Total Production Cost	10,887	12,881	14,695	14,605	14,523	13,700	13,609	13,519	13,428	13,338

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	12,938	14,663	17,250	17,250	17,250	17,250	17,250	17,250	17,250	17,250
Less variable costs	9,524	10,794	12,699	12,699	12,699	12,699	12,699	12,699	12,699	12,699
VARIABLE MARGIN	3,414	3,869	4,551	4,551	4,551	4,551	4,551	4,551	4,551	4,551
in % of sales revenue	26.39	26.39	26.38	26.38	26.38	26.38	26.38	26.38	26.38	26.38
Less fixed costs	1,363	1,363	1,363	1,363	1,371	639	639	639	639	639
OPERATIONAL MARGIN	2,051	2,506	3,189	3,189	3,180	3,912	3,912	3,912	3,912	3,912
in % of sales revenue	15.85	17.09	18.48	18.48	18.43	22.68	22.68	22.68	22.68	22.68
Financial costs		724	634	543	453	362	272	181	91	0
GROSS PROFIT	2,051	1,782	2,555	2,645	2,727	3,550	3,641	3,731	3,822	3,912
in % of sales revenue	15.85	12.15	14.81	15.34	15.81	20.58	21.11	21.63	22.16	22.68
Income (corporate) tax	0	0	0	794	818	1,065	1,092	1,119	1,147	1,174
NET PROFIT	2,051	1,782	2,555	1,852	1,909	2,485	2,549	2,612	2,675	2,739
in % of sales revenue	15.85	12.15	14.81	10.74	11.07	14.41	14.77	15.14	15.51	15.88

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	6,489	16,553	14,669	17,259	17,250	17,250	17,250	17,250	17,250	17,250	17,250	6,058
Inflow funds	6,489	3,615	6	9	0	0	0	0	0	0	0	0
Inflow operation	0	12,938	14,663	17,250	17,250	17,250	17,250	17,250	17,250	17,250	17,250	0
Other income	0	0	0	0	0	0	0	0	0	0	0	6,058
TOTAL CASH OUTFLOW	6,489	13,640	13,312	15,321	15,441	15,384	15,540	15,476	15,413	15,350	14,381	0
Increase in fixed assets	6,489	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	2,957	389	583	0	1	0	0	0	0	0	0
Operating costs	0	9,524	10,794	12,699	12,699	12,708	12,708	12,708	12,708	12,708	12,708	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	794	818	1,065	1,092	1,119	1,147	1,174	0
Financial costs	0	658	724	634	543	453	362	272	181	91	0	0
Loan repayment	0	0	905	905	905	905	905	905	905	905	0	0
SURPLUS (DEFICIT)	0	2,914	1,357	1,938	1,809	1,866	1,710	1,774	1,837	1,900	2,869	6,058
CUMULATIVE CASH BALANCE	0	2,914	4,270	6,208	8,017	9,883	11,593	13,367	15,204	17,104	19,973	26,031

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	12,938	14,663	17,250	17,250	17,250	17,250	17,250	17,250	17,250	17,250	6,058
Inflow operation	0	12,938	14,663	17,250	17,250	17,250	17,250	17,250	17,250	17,250	17,250	0
Other income	0	0	0	0	0	0	0	0	0	0	0	6,058
TOTAL CASH OUTFLOW	9,404	10,407	11,869	13,199	13,993	14,026	14,273	14,300	14,327	14,354	14,381	0
Increase in fixed assets	6,489	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	2,915	383	575	0	1	0	0	0	0	0	0	0
Operating costs	0	9,524	10,794	12,699	12,699	12,708	12,708	12,708	12,708	12,708	12,708	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	794	818	1,065	1,092	1,119	1,147	1,174	0
NET CASH FLOW	-9,404	2,531	2,794	4,051	3,257	3,224	2,977	2,950	2,923	2,896	2,869	6,058
CUMULATIVE NET CASH FLOW	-9,404	-6,873	-4,079	-28	3,229	6,453	9,430	12,380	15,304	18,199	21,068	27,126
Net present value	-9,404	2,301	2,309	3,044	2,224	2,002	1,681	1,514	1,364	1,228	1,106	2,336
Cumulative net present value	-9,404	-7,103	-4,794	-1,750	474	2,476	4,157	5,671	7,034	8,262	9,368	11,704

NET PRESENT VALUE 11,704
INTERNAL RATE OF RETURN 31.11%
NORMAL PAYBACK 3 years

