

**84. PROFILE ON THE PRODUCTION OF PVC
FLOOR COVERING**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of PVC floor covering with a capacity of 2,500 tons per annum. PVC floor covering is used in almost all household and business interior decoration application.

The demand for PVC floor covering is met entirely through imports. The present (2012) demand for PVC floor covering is estimated at 9,618 tons. The demand for PVC floor covering is projected to reach 12,275 tons and 15,667 tons by the year 2017 and 2022, respectively.

The principal raw materials required are PVC resin and plasticizer which has to be imported.

The total investment cost of the project including working capital is estimated at Birr 52.55 million. From the total investment cost, the highest share (Birr 25.87 million or 49.23%) is accounted by fixed investment cost followed by initial working capital (22.38 million or 42.59%) and pre operation cost (Birr 4.30 million or 8.19%). From the total investment cost Birr 14.90 million or 28.36% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 18.61% and a net present value (NPV) of Birr 25.97 million, discounted at 10%.

The project can create employment for 63 persons. The project will generate Birr 15.29 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 construction sub sector and also generates other income for the Government.

II PRODUCT DESCRIPTION

PVC floor covering is a sheet with PVC lamination on the back which has plasticity and can be plastered on the floor by adhesives. And the main purpose of using PVC floor covering is interior decoration and they should be easy to be plastered, good interior decoration effect, washable and durability quality, good heat insulation quality and high resistance to fungus and moisture. Generally PVC floor covering is used in almost in all household interior decoration application and is available in the market in rolls.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

There is no plant that produces PVC floor coverings. Hence, the country's requirement of the product is met through import. Import of PVC floor covering for the period 2000 – 2011 is given in Table 3.1.

Table 3.1
IMPORT OF PVC FLOOR COVERING (TONS)

Year	PVC Floor Coverings
2000	906.5
2001	1,389.2
2002	1,757.1
2003	2,262.5
2004	2,112.4
2005	4,265.8
2006	4,881.1
2007	5,585.9
2008	6,235.0
2009	6,797.7
2010	7,268.0
2011	7,726.0

Source: - Ethiopian Revenues & Customs Authority.

As could be seen from Table 3.1, import of PVC floor covering increased from 906.5 tons in the year 2000 to 7,726 tons in the year 2011, registering an average annual growth rate of 24.49%.

In order to estimate the present demand for this product, it is assumed that the growth rate registered by the product's import during the period 2000-2011 will continue at least in the near future. Accordingly, taking the year 2011 level of import as a base and applying a growth rate of 24.29% the present demand is estimated at 9,618 tons.

2. Projected Demand

As the product is used by the urban population, the current annual growth rate of the urban population, which is 5%, is considered for demand projection.

Table 3.2

PROJECTED DEMAND FOR PVC FLOOR COVERINGS (TONS)

Year	Projected Demand
2013	10,099
2014	10,604
2015	11,134
2016	11,691
2017	12,275
2018	12,889
2019	13,533
2020	14,210
2021	14,921
2022	15,667
2023	16,450

As could be seen from Table 3.2, the demand for PVC floor covering is expected to grow from 10,099 tons in year 2013 to 16,450 tons in year 2023.

3. Pricing and Distribution

The current selling price of PVC floor coverings varies depending on the country of origin. According to the Ethiopian Customs Authority External Trade Statistics, the average CIF price of PVC floor coverings was Birr 32,722 per ton. Adding 25 import duty and other import related expenses, the recommended factory gate price for the envisaged plant is Birr 40,903/ ton.

The product will find its market outlet through the existing building materials distributing enterprises.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

Considering economic scale of production, production management, implementation period, and economic scale of production and the projection of the product demand from the market study the capacity of the plant is set to be 2,500 tones of plastic floor coverings per annum. And the envisaged plant will operate in two shifts sixteen hours per day for three hundred days within a year considering 13 holidays and 52 Sundays per year and assuming that maintenance activities will be performed during off hours and Sundays.

2. Production Program

The envisaged manufacturing plant will achieve its full production capacity in three after its implementation and till then the workers will acquire good experience of operation and troubleshooting and series of operation capacity after its implementation is shown below

Table 3.3
PRODUCTION PROGRAM

Description	Production Year		
	1	2	3
Capacity utilization rate (%)	80	90	100
Plastic floor covering (ton)	2000	2250	2500

IV. MATERIALS AND INPUTS

A. RAW MATERIALS

The major raw material for the manufacture of plastic floor coverings PVC resin, plasticizer, and auxiliary raw materials such as filer, stabilizers, pigments and other additives are all imported from abroad.

The raw materials will be mixed with specific percentage ratio to produce the required grade and the annual requirement of those raw materials and their related cost is shown in Table 4.1 below.

Table 4.1
ANNUAL RAW MATERIAL REQUIREMENT & COST

Sr. No.	Description	Annual Consumption	UOM	Unit Cost (Birr) /Ton	Cost (`000 Birr)		
					LC	FC	Total (Birr)
1	PVC resin	1,471	ton	38,400		56,486.40	56,486.40
2	Plasticizer	14	ton	12,000		168.00	168.00
3	Filler	750	ton	11,520		8,640.00	8,640.00
4	Stabilizers	228	ton	24,000		5,472.00	5,472.00
5	Pigments	14	ton	57,600		806.40	806.40
6	Other Additives	23	ton	12,000		276.00	276.00
Total FOB						71,848.80	71,848.80
7	CIF(15%)				10,777.32		10,777.32
Grand Total Cost					10,777.32	71,848.80	82,626.12

B UTILITES

The major utilities required are electricity and water. Annual cost of utilities is estimated at Birr 3.6 million. Details of annual consumption and the related cost are shown in Table 4.2.

Table 4.2
ANNUAL UTILITIES CONSUMPTION & COST

Sr. No.	Description	Annual Consumption	UOM	Unit Cost (Birr)	Total Cost (`000 Birr)
1	Electricity	3,240,000	kWh	0.60	2,106.00
2	Water	150,000	m ³	10.00	1,500.00
Total Annual Cost					3,606.00

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The production of plastic floor covering involves manufacturing process such as blending, compounding, mixing, calendaring, cooling, surface design, inspection and measuring as describes below.

Blending: - Here ,the raw materials such as PVC, plasticizers, filler, stabilizers and other additives are weighted according to the mixing ratio to be fed to blender to be blended ,evenly .

Compounding:- The mixture discharged from the blender is then intensively compounded by intensive mixer.

Mixing:- The compound discharged from intensive mixer is uniformly mixed by the first two roll mill and then by the second two roll mill.

Calendaring:- The compound is passed through the four rolls of calendar so that a flat film in the desired thickness can be formed .

Cooling:- The film with paper laminated is passed through cooling equipment to be cooled.

Winding and surface design:- The film is lastly wounded by turret winder and further be treated on strength of such auxiliary as embossing machine, printing machine, surface coating machine, foaming embossing machine to produce variety of PVC floor covering design .

2. Environmental Impact

The envisaged plant is a manufacturing plant with no chemical or any hazardous waste to the surrounding environment and process scrapes and wastes will be recycled or sold to surrounding market for different application. So that there will not be additional investment for environmental protection.

B. ENGINNERING

1. Machinery and Equipment

Total cost of machinery and equipment is Birr 17.139 million. The list production and auxiliary machineries, machine tools and equipments with their associated cost required for the envisaged plant is shown in Table 5.1.

Table 5.1

MACHINERY AND EQUIPMENT REQUIREMENT & COST

Sr. No.	Description	Qty.	UOM	Unit Cost (Birr)	Cost (`000 Birr)		
					LC	FC	Total (Birr)
1	Blending machine	1.00	pcs	900,000.00		900.00	900.00
2	Intensive mixer	1.00	pcs	540,000.00		540.00	540.00
3	Calendaring machine	2.00	pcs	3,600,000.00		7,200.00	7,200.00
4	Printing machine	2.00	pcs	720,000.00		1,440.00	1,440.00
5	Embossing machine	1.00	pcs	900,000.00		900.00	900.00
6	Surface coating machine	1.00	pcs	900,000.00		900.00	900.00
7	Valley printing machine	1.00	pcs	630,000.00		630.00	630.00
8	Foam embossing machine	1.00	pcs	864,000.00		864.00	864.00
9	Boiler	1.00	pcs	900,000.00		900.00	900.00
10	Compressor	1.00	pcs	630,000.00		630.00	630.00
Total Fob Price						14,904.00	14,904.00
11	CIF(15%)				2,235.60		2,235.60
Grand Total Cost					2,235.60	14,904.00	17,139.60

2. Land, Building and Civil Works

The envisaged plant requires total land area of 3,000 meter square out, of which built -up area is 1,500 meter square. At the rate of Birr 5,000 per m², the total cost of building and civil work is estimated at Birr 7.5 million.

According to the Federal Legislation on the Lease Holding of Urban Land (Proclamation No. 721/2004) in principle, urban land permit by lease is on auction or negotiation basis, however,

the time and condition of applying the proclamation shall be determined by the concerned regional or city government depending on the level of development.

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

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

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

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

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

Moreover, the Addis Ababa City Administration has recently adopted a new land lease floor price for plots in the city. The new prices will be used as a benchmark for plots that are going to

be auctioned by the city government or transferred under the new “Urban Lands Lease Holding Proclamation.”

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

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

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

Table 5.2

NEW LAND LEASE FLOOR PRICE FOR PLOTS IN ADDIS ABABA

Zone	Level	Floor Price/m²
Central Market District	1 st	1,686
	2 nd	1,535
	3 rd	1,323
	4 th	1,085
	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 798,000 of which 10% or Birr 79,800 will be paid in advance. The remaining Birr 718,200 will be paid in equal installments with in 28 years i.e. Birr 25,650 annually

VI. HUMANRESOURCE AND TRAINING REQUIREMENTS

A. HUMANRESOURCE REQUIREMENT

A total of 63 persons are required to operate the plant. Annual cost of labor is Birr 1,729,440. The detail list of direct and indirect labor requirement and their monthly and annual cost is shown in Table 6.1.

Table 6.1
HUMANRESOURCE REQUIREMENT & LABOR COST

Sr. No.	Description	Reqd. No.	Monthly Salary(Birr)	Annual Salary (`000 Birr)
1	Plant manager	1	10,000.00	120.0
2	Secretary	1	2,500.00	30.0
3	Operators	35	1,400.00	588.0
4	Administration And Finance	1	4,500.00	54.0
5	Production Manager	1	6,000.00	72.0
6	Production Engineer	2	3,500.00	84.0
7	Quality Supervisor	2	3,000.00	72.0
8	Designer	1	4,000.00	48.0
9	Accountant	1	3,000.00	36.0
10	Salesperson	2	3,500.00	84.0
11	Clerk	1	800.00	9.6
12	Cashier	1	1,800.00	21.6
13	Mechanic	4	2,200.00	105.6
14	Electrician	2	2,200.00	52.8
15	Assistant operators	5	700.00	42.0
16	Guards	3	600.00	21.6
Sub-total		63	49,700.00	1,441.2
13	Employment benefits and allowances 20%		9,940.00	288.2
Total Annual Labor Cost (Direct +Indirect)				1,729.4

B. TRAINING REQUIREMENT

For cost effectiveness and good transfer of knowledge, operators will be trained during machinery erection and commissioning so that the operators and mechanics will be hired two months before the project implementation and the estimated training cost of Birr 170,000.

VII. FINANCIAL ANALYSIS

The financial analysis of PVC floor covering project is based on the data presented in the previous chapters and the following assumptions:-

Construction period	1 year
Source of finance	30 % equity & 70% loan
Tax holidays	5 years
Bank interest	10%
Discount cash flow	10%
Accounts receivable	30 days
Raw material local	30 days
Raw material imported	120 days
Work in progress	1 day
Finished products	30 days
Cash in hand	5 days
Accounts payable	30 days
Repair and maintenance	5% of machinery cost

A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at Birr 52.55 million (see Table 7.1). From the total investment cost, the highest share (Birr 25.87 million or 49.23%) is accounted by fixed investment cost followed by initial working capital (22.38 million or 42.59%) and pre operation cost (Birr 4.30 million or 8.19%). From the total investment cost Birr 14.90 million or 28.36% 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	79.80		79.80	0.15
1.2	Building and civil work	7,500.00		7,500.00	14.27
1.3	Machinery and equipment	2,235.60	14,904.00	17,139.60	32.62
1.4	Vehicles	900.00		900.00	1.71
1.5	Office furniture and equipment	250.00		250.00	0.48
	Sub total	10,965.40	14,904.00	25,869.40	49.23
2	Pre operating cost *				
2.1	Pre operating cost	864.19		864.19	1.64
2.2	Interest during construction	3,437.90		3,437.90	6.54
	Sub total	4,302.09		4,302.09	8.19
3	Working capital **	22,379.23		22,379.23	42.59
	Grand Total	37,646.72	14,904.00	52,550.72	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 28.11 million. However, only the initial working capital of Birr 22.37 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 96.64 million (see Table 7.2). The cost of raw material account for 85.50% of the production cost. The other major components of the production cost are depreciation, financial cost, utility, and labor which account for 4.25%, 3.42%, 3.73% and 1.49%, respectively. The remaining 1.61% is the share 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 (in 000 Birr)	%
Raw Material and Inputs	82,626.00	85.50
Utilities	3,606.00	3.73
Maintenance and repair	514.00	0.53
Labour direct	1,441.00	1.49
Labour overheads	288.00	0.30
Administration Costs	250.00	0.26
Land lease cost	-	-
Cost of marketing and distribution	500.00	0.52
Total Operating Costs	89,225.00	92.33
Depreciation	4,105.76	4.25
Cost of Finance	3,308.98	3.42
Total Production Cost	96,639.73	100

C. FINANCIAL EVALUATION**1. Profitability**

Based on the projected profit and loss statement, the project will generate a profit throughout its operation life. Annual net profit after tax will grow from Birr 4.31 million to Birr 8.92 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 80.79 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.

$$\text{Break -Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 42,976,500$$

$$\text{Break -Even Capacity utilization} = \frac{\text{Break- even Sales Value}}{\text{Sales revenue}} \times 100 = 33.87\%$$

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 6 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 18.61% 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 25.97 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 63 persons. The project will generate Birr 21.53 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 construction sub sector and also generates other income for the Government.

Appendix 7.A

FINANCIAL ANALYSES SUPPORTING TABLES

Appendix 7.A.2
PRODUCTION COST (in 000 Birr)

Item	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Raw Material and Inputs	66,101	74,363	82,626	82,626	82,626	82,626	82,626	82,626	82,626	82,626
Utilities	2,885	3,245	3,606	3,606	3,606	3,606	3,606	3,606	3,606	3,606
Maintenance and repair	411	463	514	514	514	514	514	514	514	514
Labour direct	1,153	1,297	1,441	1,441	1,441	1,441	1,441	1,441	1,441	1,441
Labour overheads	230	259	288	288	288	288	288	288	288	288
Administration Costs	200	225	250	250	250	250	250	250	250	250
Land lease cost	0	0	0	0	26	26	26	26	26	26
Cost of marketing and distribution	500	500	500	500	500	500	500	500	500	500
Total Operating Costs	71,480	80,353	89,225	89,225	89,251	89,251	89,251	89,251	89,251	89,251
Depreciation	4,106	4,106	4,106	4,106	4,106	325	325	325	325	325
Cost of Finance	0	3,782	3,309	2,836	2,364	1,891	1,418	945	473	0
Total Production Cost	75,586	88,240	96,640	96,167	95,720	91,466	90,994	90,521	90,048	89,576

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	81,860	92,093	102,325	102,325	102,325	102,325	102,325	102,325	102,325	102,325
Less variable costs	70,980	79,853	88,725	88,725	88,725	88,725	88,725	88,725	88,725	88,725
VARIABLE MARGIN	10,880	12,241	13,600	13,600	13,600	13,600	13,600	13,600	13,600	13,600
in % of sales revenue	13.29	13.29	13.29	13.29	13.29	13.29	13.29	13.29	13.29	13.29
Less fixed costs	4,606	4,606	4,606	4,606	4,631	851	851	851	851	851
OPERATIONAL MARGIN	6,274	7,635	8,994	8,994	8,969	12,749	12,749	12,749	12,749	12,749
in % of sales revenue	7.66	8.29	8.79	8.79	8.76	12.46	12.46	12.46	12.46	12.46
Financial costs		3,782	3,309	2,836	2,364	1,891	1,418	945	473	0
GROSS PROFIT	6,274	3,853	5,685	6,158	6,605	10,859	11,331	11,804	12,277	12,749
in % of sales revenue	7.66	4.18	5.56	6.02	6.45	10.61	11.07	11.54	12.00	12.46
Income (corporate) tax	0	0	0	1,847	1,982	3,258	3,399	3,541	3,683	3,825
NET PROFIT	6,274	3,853	5,685	4,311	4,624	7,601	7,932	8,263	8,594	8,925
in % of sales revenue	7.66	4.18	5.56	4.21	4.52	7.43	7.75	8.08	8.40	8.72

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	26,734	107,807	92,109	102,341	102,325	102,325	102,325	102,325	102,325	102,325	102,325	35,984
Inflow funds	26,734	25,947	16	16	0	0	0	0	0	0	0	0
Inflow operation	0	81,860	92,093	102,325	102,325	102,325	102,325	102,325	102,325	102,325	102,325	0
Other income	0	0	0	0	0	0	0	0	0	0	0	35,984
TOTAL CASH OUTFLOW	26,734	97,427	91,670	100,070	98,636	98,325	99,126	98,795	98,464	98,133	93,075	0
Increase in fixed assets	26,734	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	22,510	2,808	2,808	0	2	0	0	0	0	0	0
Operating costs	0	70,980	79,853	88,725	88,725	88,751	88,751	88,751	88,751	88,751	88,751	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	1,847	1,982	3,258	3,399	3,541	3,683	3,825	0
Financial costs	0	3,438	3,782	3,309	2,836	2,364	1,891	1,418	945	473	0	0
Loan repayment	0	0	4,727	4,727	4,727	4,727	4,727	4,727	4,727	4,727	0	0
SURPLUS (DEFICIT)	0	10,380	440	2,272	3,689	4,000	3,199	3,530	3,861	4,192	9,250	35,984
CUMULATIVE CASH BALANCE	0	10,380	10,820	13,091	16,780	20,780	23,979	27,509	31,369	35,561	44,810	80,794

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	81,860	92,093	102,325	102,325	102,325	102,325	102,325	102,325	102,325	102,325	35,984
Inflow operation	0	81,860	92,093	102,325	102,325	102,325	102,325	102,325	102,325	102,325	102,325	0
Other income	0	0	0	0	0	0	0	0	0	0	0	35,984
TOTAL CASH OUTFLOW	49,113	74,272	83,145	89,225	91,075	91,232	92,508	92,650	92,792	92,934	93,075	0
Increase in fixed assets	26,734	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	22,379	2,792	2,792	0	2	0	0	0	0	0	0	0
Operating costs	0	70,980	79,853	88,725	88,725	88,751	88,751	88,751	88,751	88,751	88,751	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	1,847	1,982	3,258	3,399	3,541	3,683	3,825	0
NET CASH FLOW	-49,113	7,588	8,948	13,100	11,250	11,093	9,817	9,675	9,533	9,391	9,250	35,984
CUMULATIVE NET CASH FLOW	-49,113	41,525	-32,577	-19,477	-8,227	2,866	12,683	22,358	31,891	41,283	50,532	86,516
Net present value	-49,113	6,898	7,395	9,842	7,684	6,888	5,541	4,965	4,447	3,983	3,566	13,873
Cumulative net present value	-49,113	42,215	-34,820	-24,977	-17,293	-10,406	-4,864	101	4,548	8,531	12,097	25,970

NET PRESENT VALUE 25,970
INTERNAL RATE OF RETURN 18.61%
NORMAL PAYBACK 6 years