

**128. PROFILE ON THE PRODUCTION OF
ABSORBENT COTTON**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of absorbent cotton with a capacity of 300 tons per annum. Absorbent cotton is used in for sanitary purposes and surgical operations as well as for ordinary daily use.

The demand for absorbent cotton is met through import. The present (2012) demand for absorbent cotton is estimated at 305 tons. The demand for absorbent cotton is projected to reach 408 tons and 546 tons by the year 2017 and 2022, respectively.

The principal raw materials required is either virgin cotton or waste cotton which is available locally.

The total investment cost of the project including working capital is estimated at Birr 17.56 million. From the total investment cost the highest share (Birr 13.38 million or 76.19%) is accounted by fixed investment cost followed by initial working capital (Birr 2.12 million or 12.09%) and pre operation cost (Birr 2.06 million or 11.72%). From the total investment cost Birr 7.68 million or 38.28% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 31.29% and a net present value (NPV) of Birr 18.50 million discounted at 10%.

The project can create employment for 25 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 agricultural sector and forward linkage with the pharmaceutical and medical supplies sub sectors and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTION AND APPLICATION

Absorbent cotton is cleaned, de-oiled and bleached cotton packed in different sizes. Since absorbent cotton is a material which comes in direct contact with the human body, its quality is very important and should satisfy the required pharmaceutical parameters.

Either virgin cotton or waste cotton can be used as raw material. Combed waste cotton is desirable in case of waste cotton. The fiber of absorbent cotton is very elastic. It consists of (98-99.5%) cellulose which has a diameter of 16.30 mm, and a length of 12-40 mm. Absorbent cotton is mainly used for sanitary purposes and surgical operations as well as for ordinary daily use.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET TSUDY

1. Past Supply and Present Demand

Absorbent cotton is mostly used for medical purposes in hospitals, clinics and health stations. In addition, it is used in pharmacies, barbers shops, beauty salons and business organizations and households for various purposes. Currently, almost the entire requirement of absorbent cotton is met through import. However, the imported quantity is not distinctly stated in the data of the Ethiopian Revenues & Customs Authority. It is lumped with other absorbent fabrics that are used for plugging wounds or for controlling blood flow in body cavities such as tampons.

Due to the reasons mentioned above the end use approach have been utilized to estimate the demand for the product. Accordingly, data obtained on the number of health facilities and their corresponding requirement has been utilized. Based on a study made by IPS, the average requirement of absorbent cotton by different types of health facilities is as follows:

- Hospitals @ 27 kg per month
- Clinics @ 3 kg per month and
- Health centers, @ 1 kg per month

According to FDRE, Central Statistical Agency, Statistical Abstract of 2010, published in January 2011 the type and number of health facilities in the country during 2008/09 -2009/10 was as follows:-

- Hospitals.....190 (110 by Ministry of Health and 80 others)
- Clinics.....4,709 (2,429 by Ministry of Health and 2,280 others)
- Health centers.....1,800 (1783 by Ministry of Health and 17 others)

Based on the above stated requirement and number of health facilities, the monthly and annual requirement of absorbent cotton for the different health facilities is given in Table 3.1.

Table 3.1
MONTHLY AND ANNUAL REQUIREMENT OF ABSORBENT COTTON
AT COUNTRY LEVEL

Type of Health Facility	No. of Health Facilities	Total Monthly Requirement (kg)	Total Annual Requirement (Kg)
Hospitals	190	5,130	61,560
Clinics	4,709	14,127	169,524
Health Centers	1,800	1,800	21,600
Total	6,699	21,057	252,684

As could be seen from the above data, annual requirement of health facilities in 2009/10 was about 252,684 kg. In addition to the above health facilities there are more than 12,000 health posts and a number of hospitals and clinics that serve the Police and Defense force through out the country that are not computed in the above Table, which require a significant amount of the product. Barber shops, beauty salons, pharmacies and other business organizations are also users of the product for first aid and different purposes. Assuming other users to require about 15% of the requirement of health facilities, which is 37,902 kg, the total annual demand during year 2010/11 would come to about 290,586 kg or about 291 tons.

Taking the expansion of health facilities and population growth, a 5% growth rate is applied to arrive at the present (year 2012) effective demand. Accordingly, the current demand for absorbent cotton is estimated at 305 tons.

2. Projected Demand

The demand for absorbent cotton is directly related with the development and expansion of health facilities in the country. The Federal and Regional Governments have given high attention for expansion of health facilities to increase the coverage. Hence, considering the population growth and the high attention given by the Federal and Regional Governments, the demand for absorbent cotton is assumed to grow by 6%, annually. Based on this assumption, the projected demand at country level is given in Table 3.2.

Table 3.2
PROJECTED DEMAND FOR ABSORBENT COTTON (TONS)

Year	Quantity
2013	323
2014	343
2015	363
2016	385
2017	408
2018	432
2019	459
2020	486
2021	515
2022	546
2023	579

The demand for absorbent cotton will increase from 323 tons in the year 2013 to 432 tons and 579 tons in the year 2018 and 2023, respectively.

3. Pricing and Distribution

The current retail price of absorbent cotton ranges from Birr 30 to Birr 48 per pack of 500 gram or on the average Birr 78kg at Addis Ababa. Assuming a 35% margin for distributors, the recommended price for the envisaged project is Birr is 29 per pack of 500 gram or Birr 58per kg. The distribution of absorbent cottons could be handled through the existing distributors of drug and medical supplies enterprises.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

The basic determinant factors to be considered prior to determining the plant capacity are the outcome of the market study, available supply volume of raw materials and other technical factors. Accordingly, having considered all these factors, an annual production capacity of 300 tons is selected for the envisaged factory. This capacity is proposed to be achieved on the basis of 250 working days per annum and one shifts of 8 hours each per day.

2. Production Program

Due to technical reasons such as skill upgrading of the operators and acquaintance with the production machinery, it would be advisable and more appropriate to start production at lower capacity at the initial stage. Hence, it is suggested that the envisaged plant will go into full capacity utilization in three years time starting with 75% capacity in the first year, 85% during the second year and then to full (100%) capacity during the third year and then after. The detail production program is shown in Table 3.3

Table 3.3

PRODUCTION PROGRAM

Sr. No.	Description	Production Year		
		1	2	3
1	Capacity utilization rate (%)	75	85	100
2	Annual production (Tons)	225	255	300

IV. RAW MATERIALS AND INPUTS

A. RAW MATERIALS

The major raw material required for manufacturing of absorbent cotton is either virgin cotton or waste cotton which is available locally. Combed waste cotton is desirable in case of waste cotton. The fiber of absorbent cotton is very elastic. It consists of (98-99.5%) cellulose which has a diameter of 16.30 mm, and a length of 12-40mm.

From the experience of operating textile industries in the country, there is a loss of up to 25% depending on the content of short fiber and foreign matters. Therefore, up to 1.25 tons of raw cotton is required to manufacture one ton of finished goods. Hence, the total annual requirement of raw ginned cotton at full capacity production of the envisaged factory is estimated at 375 tons. Soda ash and caustic soda are other raw materials required, which can also be procured locally.

The annual requirement of raw materials and the corresponding cost is shown in Table 4.1.

Table 4.1
RAW MATERIALS REQUIREMENT AND COST

Sr. No	Description	Qty. (tons)	Unit Cost	Total Cost (Birr)
1	Raw Ginned Cotton	350	15,000	5,250,000
2	Caustic Soda	10	10,000	100,000
3	Soda Ash	7	8,500	56,100
4	Bleaching Agent	7	7,500	49,500
5	Misc. Chemicals	LS		105,952
6	Packing paper, labels, Gum, Polyethylene sheets, sacks, etc.	LS		3,000,000
	Total			8,561,552

B. UTILITIES

The major utilities required by the envisaged factory are electric power, water, furnace oil (fuel oil) to operate the boiler and lubricant oil for plant machinery and equipment. The total installed electric power of the plant machinery and equipment of the envisaged plant at its full capacity operation is 200 kW. The total electric power requirement of the envisaged plant, considering an average power utilization rate and 250 working days per annum each 8 hours per day is estimated at 200,000 kWh per annum. The annual consumption of furnace oil (fuel oil), lubrication oil and water is estimated to be 5,000 m³, 5,000 Lt and 50,000 m³ respectively. Accordingly, the annual requirements of the envisaged factory and associated costs of utilities at full production capacity is given in Table 4.2.

Table 4.2
ANNUAL UTILITIES REQUIREMENT AND COST

Sr. No.	Utility	Unit	Qty	Cost (Birr)
1	Electricity	kWh	200,000	116,000
2	Furnace oil	Lt	10,000	180,000
3	Water	M ³	25,000	250,000
4	Lubricant	Lt	5,000	250,000
	Total			796,000

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The technology of manufacturing absorbent cotton involves opening, cleaning and bleaching that can be performed automatically or manually in which the facilities are made as simple as to keep

the production cost low. In view of simplicity of operation and maintenance, the manual method is adopted in this profile.

Raw cotton is fed to opener and cleaner to free it from extraneous matter and to get the fibers loosened. Next, filling process is taken followed by bleaching them and hydro-extracting process for which dewatering is done. Then, opening and drying are carried out in order to facilitate the subsequent carding process. The dried cotton is further loosened finally by the opening machine and tested and carded. Finally winding, cutting and packing is performed.

2. Environmental Impact

Since the process uses hazardous chemicals like caustic soda and bleaching powder, a liquid waste treatment plant is necessary to control pollution of the environment. Therefore, the envisaged plant will implement a mechanism to prevent environmental hazardous with an expense of Birr 350,000.

B. ENGINEERING

1. Machinery & Equipment

The total cost of machinery and equipment is estimated at Birr 8,838,900; out of which Birr 7,686,000 is required in foreign currency. The list of machinery and equipment required for the production of absorbent cotton with their corresponding cost is given Table 5.1.

Table 5.1**LIST OF MACHINERY & EQUIPMENT AND COST**

No.	Description	Qty
1	Opening and cleaning unit	1 set
2	Filling unit	"
3	Bleaching unit	"
4	Hydro-extracting unit	"
5	Opening (for wet cotton)	"
6	Drying unit	"
7	Opening unit (for dried cotton)	"
8	Reserving unit	"
9	Carding unit	"
10	Winding and cutting	"
11	Packing machine	1
12	Air conditioning equipment	2
13	Boiler-1 tone per hour;	3
14	Water treatment facilities for fresh water (12 tone/day) softener	4
15	Testing equipment and tools	5

2. Land, Building and Civil works

The envisaged plant requires total land area of 1,500 meter square out of which built -up area is 600 meter square. The total cost of building and civil work at the rate of Birr 5,000 per m2 is estimated at Birr 3 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 399,000 of which 10% or Birr 39,900 will be paid in advance. The remaining Birr 359,100 will be paid in equal installments with in 28 years i.e. Birr 12,825 annually.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENT

A. HUMAN RESOURCE REQUIREMENT

The envisaged project requires a total of 25 employees. The annual salary and wages including fringe benefits and allowances is estimated at Birr 584,640. The details of human resource requirement and the estimated annual cost including employees' benefits are shown in Table 6.1.

Table 6.1

HUMAN RESOURCE REQUIREMENT AND COST

No.	Description	No.	Monthly Salary (Birr)	Annual salary (`000) Birr
1	General manager	1	6,000.00	72.0
2	Secretary	1	1,500.00	18.0
3	Administration and finance	1	3,500.00	42.0
4	Accountant	1	2,000.00	24.0
5	Mechanic	1	2,200.00	26.4
6	Electrician	1	2,200.00	26.4
7	operators	6	1,400.00	100.8
8	production foreman	1	3,000.00	36.0
11	Clerk	1	800.00	9.6
12	Cashier	1	1,000.00	12.0
13	Assistant operator	3	700.00	25.2
14	Quality supervisor	2	1,600.00	38.4
15	store keeper	1	1,400.00	16.8
16	time keeper	1	1,200.00	14.4
17	Guards	3	700.00	25.2
Total		25	29,200.00	487.2
18	Employees benefit and allowances 20%		5,840.00	97.4
Total Annual Labor cost (Direct +Indirect)				584.64

B. TRAINING REQUIREMENTS

The supervisor, skilled workers and quality control workers 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. Training program will be part of contractual agreement with machinery supplier and cost will be covered by the supplier.

VII. FINANCIAL ANALYSIS

The financial analysis of absorbent cotton 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
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 17.56 million (see Table 7.1). From the total investment cost the highest share (Birr 13.38 million or 76.19%) is accounted by fixed investment cost followed by initial working capital (Birr 2.12 million or 12.09%) and pre operation cost (Birr 2.06 million or 11.72%). From the total investment cost Birr 7.68 million or 38.28% 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	39.90		39.90	0.23
1.2	Building and civil work	3,000.00		3,000.00	17.09
1.3	Machinery and equipment	1,502.90	7,686.00	9,188.90	52.33
1.4	Vehicles	900.00		900.00	5.13
1.5	Office furniture and equipment	250.00		250.00	1.42
	Sub total	5,692.80	7,686.00	13,378.80	76.19
2	Pre operating cost *				
2.1	Pre operating cost	909.45		909.45	5.18
2.2	Interest during construction	1,148.73		1,148.73	6.54
	Sub total	2,058.18		2,058.18	11.72
3	Working capital **	2,122.12		2,122.12	12.09
	Grand Total	9,873.09	7,686.00	17,559.09	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 3.08 million. However, only the initial working capital of Birr 2.12 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 14.49 million (see Table 7.2). The cost of raw material account for 59.08% of the production cost. The other major components of the production cost are depreciation, financial cost, utility, and marketing and distribution which account for 16.18, 6.54%, 5.49%, and 3.45% respectively. The remaining 9.26% is the share of Labor direct, 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 Three)**

Items	Cost (000 Birr)	%
Raw Material and Inputs	8,562	59.08
Utilities	796	5.49
Maintenance and repair	459	3.17
Labor direct	487	3.36
Labor overheads	97	0.67
Administration Costs	300	2.07
Land lease cost	0	0.00
Cost of marketing and distribution	500	3.45
Total Operating Costs	11,201	77.28
Depreciation	2,345	16.18
Cost of Finance	948	6.54
Total Production Cost	14,493	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 3.79 million to Birr 4.23 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 39.57 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 follows.

$$\text{Break -Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 7,308,000$$

$$\text{Break- Even Capacity utilization} = \frac{\text{Break even Sales Value}}{\text{Sales revenue}} \times 100 = 36.62 \%$$

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 31.29% 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 18.50 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 25 persons. The project will generate Birr 8.60 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 agricultural sector forward linkage with the pharmaceutical and medical supplies 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	5,993	6,850	7,706	8,562	8,562	8,562	8,562	8,562	8,562	8,562
Utilities	557	637	716	796	796	796	796	796	796	796
Maintenance and repair	321	367	413	459	459	459	459	459	459	459
Labour direct	341	390	438	487	487	487	487	487	487	487
Labour overheads	68	78	87	97	97	97	97	97	97	97
Administration Costs	210	240	270	300	300	300	300	300	300	300
Land lease cost	0	0	0	0	13	13	13	13	13	13
Cost of marketing and distribution	500	500	500	500	500	500	500	500	500	500
Total Operating Costs	7,991	9,061	10,131	11,201	11,214	11,214	11,214	11,214	11,214	11,214
Depreciation	2,345	2,345	2,345	2,345	2,345	145	145	145	145	145
Cost of Finance	0	1,264	1,106	948	790	632	474	316	158	0
Total Production Cost	10,335	12,669	13,581	14,493	14,348	11,991	11,833	11,675	11,517	11,359

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	12,180	15,660	17,400	17,400	17,400	17,400	17,400	17,400	17,400	17,400
Less variable costs	7,491	8,561	9,631	10,701	10,701	10,701	10,701	10,701	10,701	10,701
VARIABLE MARGIN	4,689	7,099	7,769	6,699	6,699	6,699	6,699	6,699	6,699	6,699
in % of sales revenue	38.50	45.33	44.65	38.50	38.50	38.50	38.50	38.50	38.50	38.50
Less fixed costs	2,845	2,845	2,845	2,845	2,857	658	658	658	658	658
OPERATIONAL MARGIN	1,845	4,255	4,924	3,854	3,842	6,041	6,041	6,041	6,041	6,041
in % of sales revenue	15.14	27.17	28.30	22.15	22.08	34.72	34.72	34.72	34.72	34.72
Financial costs		1,264	1,106	948	790	632	474	316	158	0
GROSS PROFIT	1,845	2,991	3,819	2,907	3,052	5,409	5,567	5,725	5,883	6,041
in % of sales revenue	15.14	19.10	21.95	16.70	17.54	31.09	32.00	32.90	33.81	34.72
Income (corporate) tax	0	0	0	0	0	1,623	1,670	1,718	1,765	1,812
NET PROFIT	1,845	2,991	3,819	2,907	3,052	3,787	3,897	4,008	4,118	4,229
in % of sales revenue	15.14	19.10	21.95	16.70	17.54	21.76	22.40	23.03	23.67	24.30

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	14,288	15,506	15,668	17,408	17,400	17,400	17,400	17,400	17,400	17,400	17,400	6,004
Inflow funds	14,288	3,326	8	8	0	0	0	0	0	0	0	0
Inflow operation	0	12,180	15,660	17,400	17,400	17,400	17,400	17,400	17,400	17,400	17,400	0
Other income	0	0	0	0	0	0	0	0	0	0	0	6,004
TOTAL CASH OUTFLOW	14,288	11,317	12,209	13,121	14,033	13,584	15,048	14,937	14,827	14,716	13,026	0
Increase in fixed assets	14,288	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	2,177	305	305	305	1	0	0	0	0	0	0
Operating costs	0	7,491	8,561	9,631	10,701	10,714	10,714	10,714	10,714	10,714	10,714	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	0	0	1,623	1,670	1,718	1,765	1,812	0
Financial costs	0	1,149	1,264	1,106	948	790	632	474	316	158	0	0
Loan repayment	0	0	1,579	1,579	1,579	1,579	1,579	1,579	1,579	1,579	0	0
SURPLUS (DEFICIT)	0	4,189	3,459	4,287	3,367	3,816	2,352	2,463	2,573	2,684	4,374	6,004
CUMULATIVE CASH BALANCE	0	4,189	7,648	11,935	15,302	19,117	21,469	23,932	26,505	29,189	33,563	39,566

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	12,180	15,660	17,400	17,400	17,400	17,400	17,400	17,400	17,400	17,400	6,004
Inflow operation	0	12,180	15,660	17,400	17,400	17,400	17,400	17,400	17,400	17,400	17,400	0
Other income	0	0	0	0	0	0	0	0	0	0	0	6,004
TOTAL CASH OUTFLOW	16,410	8,288	9,358	10,428	11,202	11,214	12,837	12,884	12,931	12,979	13,026	0
Increase in fixed assets	14,288	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	2,122	297	297	297	1	0	0	0	0	0	0	0
Operating costs	0	7,491	8,561	9,631	10,701	10,714	10,714	10,714	10,714	10,714	10,714	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	0	0	1,623	1,670	1,718	1,765	1,812	0
NET CASH FLOW	-16,410	3,892	6,302	6,972	6,198	6,186	4,563	4,516	4,469	4,421	4,374	6,004
CUMULATIVE NET CASH FLOW	-16,410	12,518	-6,216	756	6,953	13,140	17,703	22,219	26,687	31,109	35,483	41,486
Net present value	-16,410	3,538	5,208	5,238	4,233	3,841	2,576	2,317	2,085	1,875	1,686	2,315
Cumulative net present value	-16,410	12,872	-7,664	-2,426	1,807	5,649	8,224	10,542	12,626	14,501	16,188	18,502

NET PRESENT VALUE 18,502
INTERNAL RATE OF RETURN 31.29%
NORMAL PAYBACK 3 years