

**88. PROFILE ON PRODUCTION OF SURGICAL
ADHESIVE TAPE**

TABLE OF CONTENTS

	<u>PAGE</u>
I. SUMMARY	88-2
II. PRODUCT DESCRIPTION & APPLICATION	88-2
III. MARKET STUDY AND PLANT CAPACITY	88-4
A. MARKET STUDY	88-4
B. PLANT CAPACITY & PRODUCTION PROGRAM	88-6
IV. RAW MATERIALS AND INPUTS	88-6
A. RAW & AUXILIARY MATERIALS	88-6
B. UTILITIES	88-7
V. TECHNOLOGY & ENGINEERING	88-8
A. TECHNOLOGY	88-8
B. ENGINEERING	88-8
VI. MANPOWER & TRAINING REQUIREMENT	88-13
A. MANPOWER REQUIREMENT	88-12
B. TRAINING REQUIREMENT	88-13
VII. FINANCIAL ANALYSIS	88-13
A. TOTAL INITIAL INVESTMENT COST	88-14
B. PRODUCTION COST	88-15
C. FINANCIAL EVALUATION	88-16
D. ECONOMIC & SOCIAL BENEFITS	88-18

I. SUMMARY

This profile envisages the establishment of a plant for the production of surgical adhesive tape with a capacity of 72 tons per annum. Surgical tape is a type of adhesive tape which is designed to be used to hold bandages in place and close wounds.

The country's requirement of surgical adhesive tape is met through import. The present (2012) demand for surgical adhesive tape is estimated at 64 tons. The demand for the product is projected to reach 88.48 tons and 188.38 tons by the years 2015 and 2022, respectively.

The principal raw materials required are cloth and adhesive mass. Cloth is locally available while adhesive mass has to be imported.

The total investment cost of the project including working capital is estimated at Birr 13.55 million. From the total investment cost, the highest share (Birr 11.22 million or 82.80%) is accounted by fixed investment cost followed by pre operation cost (Birr 1.61 million or 11.89%) and initial working capital (Birr 719.02 thousand or 5.30%). From the total investment cost Birr 6.98 million or 51.51% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 33.48% and a net present value (NPV) of Birr 16.54 million, discounted at 10%.

The project can create employment for 38 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 health sector and backward linkage with the textile sector and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTION & APPLICATION

Surgical tape is a type of adhesive tape which is designed to be used to hold bandages in place and close wounds. This tape comes in a variety of widths, lengths, and styles which are designed to meet an assortment of bandaging needs. Most drug stores and large markets carry

surgical tape, and it is also available through companies which specialize in medical supplies; surgical tape is a first aid kit must-have, since it is an extremely versatile and useful product.

Many companies make surgical tape which has been impregnated with zinc oxide or another substance which is designed to reduce the risk of infection. Surgical tape is also intended to breathe, allowing air to circulate around the wound. Studies have shown that healing times tend to be greatly improved when wounds are kept ventilated in addition to being cleaned, so surgical tape promotes a healthy flow of air across the wound, rather than suffocating the site.

A variety of materials can be used to make surgical tape, including various plastics, nylon, silk, cloth, paper, and foam. In all cases, the tape and the mild adhesive are supposed to be hypoallergenic, ensuring that surgical tape can be used on anyone. In addition to being available in a variety of widths, surgical tape is also very easy to cut, allowing people to create customized pieces for specific needs.

Adhesive dressings for medical purposes are surgical adhesive tapes made of various rigid or elastic backing materials wound on plastic rolls. The normal width measurements are 1.25, 2.5, 5, 7 and 10 cms; the normal length is usually 1 meter or 5 meters.

The backing material (carrier) is coated with acrylate adhesive or zinc oxide cautchonic adhesive. Acrylate adhesive is heat resistant, hypoallergenic and transparent for x-rays. Zinc – oxide-cautchonic adhesive is the classical adhesive mass.

Traditional adhesive dressings with continuous pad are based on cloth and pvc film in coil-folding length packed in cartons. Their measurements are 4 cm x 100 cm, 6 cm x 100 cm, 4 cm x 50 cm, 6 cm x 50 cm, and 4 cm x 25 cm, and 6cm x 25 cm.

The major end users of surgical adhesive tapes are hospitals, clinics, pharmacies and other health centers.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Health care service providers are the major end users of surgical adhesive tape. Currently, the demand for the product is met through imports and hence import data is used in estimating the demand for the product. The amount of imports of the product during 2000 - 2011 is depicted in Table 3.1. During this period, imports of surgical adhesive tape varied from 25.8 ton in 2010 to 149.6 tons in 2007.

Table 3.1
IMPORT OF ADHESIVE FOR MEDICAL PURPOSE (TONS)

Year	Quantity
2000	37.7
2001	60.0
2002	28.7
2003	51.8
2004	98.1
2005	82.5
2006	28.4
2007	149.6
2008	41.4
2009	60.6
2010	25.8
2011	42.7

Source:-Ethiopian Revenues & Customs Authority.

In estimating the demand for surgical adhesive tape the supply of the product, which constitutes imports is considered as a proxy for demand. Import of surgical adhesive tapes fluctuated from year to year without any trend. Due to absence of a trend in the data set the recent five years average is taken to fairly reflect the current demand. Accordingly current demand is estimated at 64 tons.

2. Demand Projection

The demand for surgical adhesive tape is mainly influenced by population growth, economic growth and expansion of the health sector. The health sector has been given due attention by the government. Due to the favorable environment created for private investment a number of health facilities including hospitals and clinics are being established throughout the country. Medical and health facilities registered an annual average growth of 11.4% over the past four years. Considering the rapid economic growth and the expansion of health facilities in the urban and rural areas, the demand for adhesive dressings for medical purposes is assumed to grow by 11.4% per annum. The result of the projection based on this assumption is presented in Table 3.2.

Table 3.2

PROJECTED DEMAND OF ADHESIVE DRESSINGS FOR MEDICAL PURPOSES (TONS)

Year	Quantity
2013	71.30
2014	79.42
2015	88.48
2016	98.56
2017	109.80
2018	122.32
2019	136.26
2020	151.80
2021	169.10
2022	188.38

3. Pricing and Distributions

Based on the recent import data obtained from Customs Authority a factory gate price of Birr 158,032 per ton is recommended. The product will find its market outlet through the existing medicine and medical equipment distribution enterprises.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

The market study of adhesive dressing for medical purposes indicated that the projected demand for the product in 2013 will be 71 tons. This figure will grow to 151.80 tons in 2020 and to 188.38 tons in 2022. In the technology of adhesive tape production, the speed of the coating machine is the limiting factor in plant capacity determination. Therefore, the standard size recommended for the plant in question is 300,000 m² per annum. This is in the order of 72,000 kgs or 72 tons per annum. The plant will operate 3 shifts of 8 hours each shift, and 300 days a year.

2. Production Program

The production program is scheduled on the basis of time required for a progressive build-up of labor productivity and establishment of potential market outlets. It is therefore suggested that the capacity utilization of the plant will be 70%, 85% and 100% in the 1st, 2nd and 3rd year of operation, respectively.

Table 3.3

PRODUCTION PROGRAM

Year	1	1	3
Capacity utilization (%)	70	85	100
Production (kgs)	50,400	61,200	72,000

IV. MATERIALS AND INPUTS

A. RAW AND AUXILIARY MATERIALS

The major raw materials for surgical adhesive tape manufacturing are cloth and adhesive mass. The required cloth can be obtained from local textile mills. Adhesive mass is not produced locally and has to be imported from foreign market. Auxiliary materials include labels, packing material and other inputs. Table 4.1 shows annual requirement of raw and auxiliary materials and related costs.

Table 4.1**ANNUAL REQUIREMENT OF RAW & AUXILIARY MATERIALS & COST**

Sr. No.	Description	Unit of Measure	Qty.	Cost ('000 Birr)		
				LC	FC	TC
	A. Raw Material					
1	Cloth	m ²	300,100	2,700.90	-	2,700.90
2	Adhesive Mass	Kg	45,000	157.50	315.00	472.50
	Sub -total		-	2,858.40	315.00	3,173.40
	B. Auxiliary Materials					
1	Labels	-	As reqd.	11.25	-	11.25
2	Packing materials	-	“	15.00	-	15.00
3	Other inputs	-	“	7.50	-	7.50
	Sub -total	-		33.75	-	33.75
	Grand Total	-		2,892.15	315.00	3,207.15

B. UTILITIES

Utilities required by the envisaged plant are water, electricity and steam. An oil- fired boiler will be used to generate steam required by the plant. Table 4.2 below shows the annual requirements of utilities together with related costs.

Table 4.2**UTILITIES REQUIREMENT AND COST**

Sr. No.	Description	Unit of Measure	Qty	Unit Cost (Birr)	Cost (Birr)
1	Electricity	kWh	124,000	0.58	71,920
2	Water	M ³	3,500	10.00	35,000
3	Fuel oil	Liter	30,000	14.88	446,400
	Total				553,320

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The acrylate adhesive mass used for coating is manufactured in an appropriate unit. The coating machine is designed for direct and transfer coating. In direct coating, the carrier material is directly coated with the contact adhesive as against to transfer coating, where the contact adhesive is applied to silicon paper. In the latter case, the contact adhesive is transferred on the actual carrier material after the drying process is complete.

The direct coating process is used with cloth and PVC film (which is a plasticized film laminated onto silicon paper). After passing through a drying tower, this material is rewound into large rolls.

The large rolls produced in this fashion, are further processed into spools on separate lines. A slither and rewinding machine is employed to cut the large roll width of spools, and wound onto rolls (stock rolls) with a diameter of 400 mm. The rolls cut by the slither machine are wound with special spooling machine into plastic spools. The spools are then inserted in snap-on plastic covers and packed in cardboards boxes.

2. Environmental Impact

The production process of surgical adhesive tape involves cloth cutting, coating and drying and hence doesn't have any adverse environmental effect.

B. ENGINEERING

1. Plant Machinery and Equipment

Machinery and equipment required by surgical adhesive tape manufacturing plant is indicated in Table 6.1 below. Total cost of machinery and equipment is estimated at Birr 8,501.9 thousand, of which Birr 6,981.75 thousand is required in foreign exchange.

Table 6.1
LIST OF MACHINERY & EQUIPMENT

Sr. No.	Description	Qty.	Cost ('000 Birr)		
			LC	FC	TC
1	Kneader, dispersion adhesive preparation	1		962.5	962.5
2	Coating machine	1		2,625.0	2,625.0
3	Drying oven	1		656.3	656.3
4	Storage station	1	612.5	-	612.5
5	Rewinding & measuring machine	1		388.5	388.5
6	Slitting machine	1		490.2	490.2
7	Spooling machine	1		573.5	573.5
8	Gas sterilization chamber	1		878.8	878.8
9	Laboratory equipment	Set		407.0	407.0
FOB price		-	612.5	6,981.5	7,594.3
Freight, Insurance, Bank, Customs, Material Handling		-	907.6	-	907.6
CIF Landed Cost		-	1520.1	6,981.8	8,501.9

2. Land, Building and Civil Works

Land area is required for factory building, administration building, space for social facilities, for internal roads and pathways, and space for future expansion. The total land area required is estimated to be 800 m². Of the total land area, 400 m² will be built-up area. At the rate of Birr 5,000 per m², the total cost of building is estimated at Birr 2,000,000.

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 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 212,800 of which 10% or Birr 21,280 will be paid in advance. The remaining Birr 191,520 will be paid in equal installments with in 28 years i.e. Birr 6,840 annually

VI. HUMAN RESOURCE & TRAINING REQUIREMENT

A. HUMAN RESOURCE REQUIREMENT

The mix of human resource required by the surgical adhesive plant including production workers (skilled and unskilled) and administration staff is 38 persons. Annual labor cost is estimated at Birr 885,960. The mix of manpower of the plant with related monthly salaries and annual wages is shown in Table 6.1.

B. TRAINING REQUIREMENT

Training is required for production workers particularly for main machine operators, production head, & quality control workers. Training program will be executed at the plant site during erection and commissioning. The machinery supplier will be responsible to conduct the training program. A total of Birr 90,000 will be allocated for the training program.

Table 6.1

HUMAN RESOURCE REQUIREMENT AND VLABOR COST(BIRR)

Sr. No.	Job Title	No. Req.	Monthly Salary	Annual Wages
	A. Administration			
1	Plant manager	1	5,000	60,000
2	Secretary	1	1,800	21,600
3	Personnel officer	1	2,500	30,000
4	Salesman	1	2,600	31,200
5	Store man	1	2,000	24,000
6	Accountant	1	2,000	24,000
7	Clerk	1	1,200	14,400
8	General service	4	3,200	38,400
	Sub - Total	11		243,600
	B. Production			
1	Production head	1	3,500	42,000
2	Quality control expert	2	3,000	36,000
3	supervisor	2	5,000	60,000
4	Skilled workers	12	19,200	230,400
5	Technicians	4	7,200	86,400
6	Unskilled workers	6	6,000	72,000
	Sub - Total	27		526,800
	Workers' benefit (15% WS)			115,560
	Total	38		885,960

VII. FINANCIAL ANALYSIS

The financial analysis of the surgical adhesive tape 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 13.55 million (see Table 7.1). From the total investment cost, the highest share (Birr 11.22 million or 82.80%) is accounted by fixed investment cost followed by pre operation cost (Birr 1.61 million or 11.89%) and initial working capital (Birr 719.02 thousand or 5.30%). From the total investment cost Birr 6.98 million or 51.51% 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	21.28		21.28	0.16
1.2	Building and civil work	2,000.00		2,000.00	14.76
1.3	Machinery and equipment	1,520.15	6,981.75	8,501.90	62.73
1.4	Vehicles	450.00		450.00	3.32
1.5	Office furniture and equipment	250.00		250.00	1.84
	Sub total	4,241.43	6,981.75	11,223.18	82.80
2	Pre operating cost *				
2.1	Pre operating cost	725.10		725.10	5.35
2.2	Interest during construction	886.71		886.71	6.54
	Sub total	1,611.81		1,611.81	11.89
3	Working capital **	719.02		719.02	5.30
	Grand Total	6,572.26	6,981.75	13,554.01	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 1.22 million. However, only the initial working capital of Birr 719.02 thousand 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 8.05 million (see Table 7.2). The cost of raw material account for 39.83% of the production cost. The other major components of the production cost are depreciation, financial cost, utility, and labor which account for 25.34%, 10.60%, 6.87%, and 6.54%, respectively. The remaining 10.82% is the share of, 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	3,207.15	39.83
Utilities	553.32	6.87
Maintenance and repair	255.06	3.17
Labour direct	526.80	6.54
Labour overheads	115.56	1.44
Administration Costs	200.00	2.48
Land lease cost	-	-
Cost of marketing and distribution	300.00	3.73
Total Operating Costs	5,157.89	64.06
Depreciation	2,040.40	25.34
Cost of Finance	853.46	10.60
Total Production Cost	8,051.75	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 2.41 million to Birr 4.28 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 34.81 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.

$$\text{Break- Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 4,779,000$$

$$\text{Break -Even Capacity utilization} = \frac{\text{Break- even Sales Value}}{\text{Sales revenue}} \times 100 = 36\%$$

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 33.48% 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 16.54 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 38 persons. The project will generate Birr 10.90 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 health sector and backward linkage with the textile 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	1,924	2,245	3,207	3,207	3,207	3,207	3,207	3,207	3,207	3,207
Utilities	332	387	553	553	553	553	553	553	553	553
Maintenance and repair	153	179	255	255	255	255	255	255	255	255
Labour direct	316	369	527	527	527	527	527	527	527	527
Labour overheads	69	81	116	116	116	116	116	116	116	116
Administration Costs	120	140	200	200	200	200	200	200	200	200
Land lease cost	0	0	0	0	7	7	7	7	7	7
Cost of marketing and distribution	300	300	300	300	300	300	300	300	300	300
Total Operating Costs	3,215	3,701	5,158	5,158	5,165	5,165	5,165	5,165	5,165	5,165
Depreciation	2,040	2,040	2,040	2,040	2,040	105	105	105	105	105
Cost of Finance	0	975	853	732	610	488	366	244	122	0
Total Production Cost	5,255	6,716	8,052	7,930	7,815	5,757	5,635	5,514	5,392	5,270

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	6,827	8,534	10,240	11,378	11,378	11,378	11,378	11,378	11,378	11,378
Less variable costs	2,915	3,401	4,858	4,858	4,858	4,858	4,858	4,858	4,858	4,858
VARIABLE MARGIN	3,912	5,133	5,382	6,520	6,520	6,520	6,520	6,520	6,520	6,520
in % of sales revenue	57.31	60.15	52.56	57.30	57.30	57.30	57.30	57.30	57.30	57.30
Less fixed costs	2,340	2,340	2,340	2,340	2,347	412	412	412	412	412
OPERATIONAL MARGIN	1,572	2,793	3,042	4,180	4,173	6,108	6,108	6,108	6,108	6,108
in % of sales revenue	23.02	32.73	29.70	36.74	36.67	53.68	53.68	53.68	53.68	53.68
Financial costs		975	853	732	610	488	366	244	122	0
GROSS PROFIT	1,572	1,818	2,188	3,448	3,563	5,621	5,743	5,864	5,986	6,108
in % of sales revenue	23.02	21.30	21.37	30.31	31.32	49.40	50.47	51.54	52.61	53.68
Income (corporate) tax	0	0	0	1,034	1,069	1,686	1,723	1,759	1,796	1,832
NET PROFIT	1,572	1,818	2,188	2,414	2,494	3,934	4,020	4,105	4,190	4,276
in % of sales revenue	23.02	21.30	21.37	21.21	21.92	34.58	35.33	36.08	36.83	37.58

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	11,948	8,472	8,541	10,260	11,378	11,378	11,378	11,378	11,378	11,378	11,378	3,290
Inflow funds	11,948	1,645	7	20	0	0	0	0	0	0	0	0
Inflow operation	0	6,827	8,534	10,240	11,378	11,378	11,378	11,378	11,378	11,378	11,378	0
Other income	0	0	0	0	0	0	0	0	0	0	0	3,290
TOTAL CASH OUTFLOW	11,948	4,860	6,017	7,597	8,143	8,063	8,558	8,472	8,387	8,302	6,997	0
Increase in fixed assets	11,948	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	758	122	367	0	1	0	0	0	0	0	0
Operating costs	0	2,915	3,401	4,858	4,858	4,865	4,865	4,865	4,865	4,865	4,865	0
Marketing and Distribution cost	0	300	300	300	300	300	300	300	300	300	300	0
Income tax	0	0	0	0	1,034	1,069	1,686	1,723	1,759	1,796	1,832	0
Financial costs	0	887	975	853	732	610	488	366	244	122	0	0
Loan repayment	0	0	1,219	1,219	1,219	1,219	1,219	1,219	1,219	1,219	0	0
SURPLUS (DEFICIT)	0	3,612	2,523	2,662	3,235	3,315	2,820	2,906	2,991	3,076	4,381	3,290
CUMULATIVE CASH BALANCE	0	3,612	6,135	8,798	12,033	15,348	18,168	21,073	24,064	27,140	31,521	34,811

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	6,827	8,534	10,240	11,378	11,378	11,378	11,378	11,378	11,378	11,378	3,290
Inflow operation	0	6,827	8,534	10,240	11,378	11,378	11,378	11,378	11,378	11,378	11,378	0
Other income	0	0	0	0	0	0	0	0	0	0	0	3,290
TOTAL CASH OUTFLOW	12,667	3,330	4,048	5,158	6,193	6,234	6,851	6,887	6,924	6,961	6,997	0
Increase in fixed assets	11,948	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	719	116	347	0	1	0	0	0	0	0	0	0
Operating costs	0	2,915	3,401	4,858	4,858	4,865	4,865	4,865	4,865	4,865	4,865	0
Marketing and Distribution cost	0	300	300	300	300	300	300	300	300	300	300	0
Income (corporate) tax		0	0	0	1,034	1,069	1,686	1,723	1,759	1,796	1,832	0
NET CASH FLOW	-12,667	3,497	4,486	5,082	5,185	5,144	4,527	4,491	4,454	4,417	4,381	3,290
CUMULATIVE NET CASH FLOW	-12,667	-9,171	-4,684	398	5,583	10,727	15,254	19,745	24,199	28,616	32,997	36,287
Net present value	-12,667	3,179	3,708	3,818	3,541	3,194	2,555	2,304	2,078	1,873	1,689	1,269
Cumulative net present value	-12,667	-9,489	-5,781	-1,962	1,579	4,773	7,329	9,633	11,711	13,584	15,273	16,542

NET PRESENT VALUE 16,542
INTERNAL RATE OF RETURN 33.48%
NORMAL PAYBACK 3 years