

**PROFILE ON THE PRODUCTION OF PACKED
JUICE AND SYRUP**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of fruit juice and syrup with a capacity of 300 tons per annum. Fruit juices are produced and consumed for their refreshing character and nutritional qualities being rich in vitamins and minerals. Syrup can be used as a garnish; tenderizer and meat marinade, or drizzled as a topping on desserts, pancakes or cereals.

The country's requirement of fruit juice and syrup is met through local production and import. The present (2012) demand for fruit juice and syrup is estimated at 8,122 tons. The demand for the product is projected to reach 10,844 tones and 13,230 tons by the year 2018 and year 2022, respectively.

The principal raw materials required are fresh fruits and sugar which are available locally.

The total investment cost of the project including working capital is estimated at Birr 12.82 million (see Table 7.1). From the total investment cost the highest share (Birr 10.11 million or 78.91%) is accounted by fixed investment cost followed by pre operation cost (Birr 1.36 million or 10.59%) and initial working capital (Birr 1.34 million or 10.50%). From the total investment cost Birr 3.5 million or 27.31% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 32.74% and a net present value (NPV) of Birr 14.34 million, discounted at 10%.

The project can create employment for 37 persons. The project will generate Birr 47.27 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 horticulture farming sub sector and sugar producers and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTION AND APPLICATION

Packed juice is the unfermented drink obtained from sound, ripe fruits, with or without parts. Packed juice can be produced from different fruits such as apple, mango, peach and the like. Concentrated juice may be added, provided that any added juice concentrate

shall not contribute more than one-fourth of the total juice solids in the finished apple juice. No water may be added directly to the finished food.

Juice drinks have a fruit content ranging between 6 and 30 percent, and also include water, fruit aromas, sugar and, in some cases, food acids. Food acids are organic acids and are used to give the desired sourness to food and drinks. Examples of food acids are malic or citric acid.

Syrup can be used as a garnish; tenderizer and meat marinade, or drizzled as a topping on desserts, pancakes or cereals. It is also excellent in drinks as a flavorsome additive. It can be added directly to a wide range of ingredients to enhance flavors and create a point of difference to baking.

Processing of juice and syrup should comply with Ethiopian Standard (ES 360:2001). The raw materials, additives and the processing procedures should be selected as per the standard.

Juice and syrup is a resource based product which has a local market as well as an export potential.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The source of supply for packed juice and syrup in general is mainly from import supported by some local production. Currently a few private companies have started to process fruit juice that includes apple, mango, peach and the like. Nevertheless, the Manufacturing Industries Survey shows the data for orange juice only. In the absence of data for domestic production of juice and syrup, the import data obtained from Customs Authority is utilized to analyze the unsatisfied demand for the product (See Table 3.1).

Table 3.1
IMPORT OF PACKED JUICE & SYRUP (TONS)

Year	Import
2001	496
2002	839
2003	696
2004	1,207
2005	2,249
2006	3,346
2007	5,319
2008	7,696
2009	9,430
2010	6,773
2011	8,164

Source: *-Ethiopian Revenue and Customs Authority.*

Table 3.1 reveals that import of juice and syrup has been generally rising with minor fluctuations in some of the years. The increasing trend could be clearly seen when the data set is analyzed by grouping in to different periods. During the period 2001--2003 the yearly average level of import was about 677 tons. During the next three consecutive years (2004--2006) the yearly average import level increased to 2,267 tons. By the years 2007--2008 and 2009--2011 average annual imported quantity increased to 6,718 tones and 8,122 tones, respectively. During the last 5 years period the average growth rate of total import was 15%.

Effective demand for the year 2012 was considered to be more reflected by the more recent trend and hence calculated by taking the average of the last three years, which is 8,122 tons.

2. Demand Projection

The future demand for processed and canned juice and syrup is a function of urbanization, income and change in the consumption habit of the population. Considering the above three main factors have been gaining moment over the study period and the anticipated similar trend, demand for the product is forecasted to grow by 5% per annum (see Table 3.2).

Table 3.2

DEMAND PROJECTION UNSATISFIED FOR JUICE& SYRUP (TONS)

Year	Projected Demand
2013	8,528
2014	8,955
2015	9,402
2016	9,872
2017	10,366
2018	10,884
2019	11,428
2020	12,000
2021	12,600
2022	13,230

Demand for packed juice will increase from 8,528 tons in the year 2013 to 10,844 tons and 13,230 tons by the year 2018 and year 2022, respectively.

3. Pricing and Distribution

Currently, fruit juices of various types sell for a price ranging from Birr 40 to Birr 50 per litre in the retail market. The average is therefore about Birr 39. Taking this as reference and allowing a 30% margin for wholesaler and retailers, a factory gate price of Birr 35 per litre is proposed.

The product will find its market outlet in the food stores, supermarkets and groceries throughout the country.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

Based on the demand projection indicated in the market study, capital requirement and minimum economic scale of production, the envisaged plant will have a production capacity 300 tons of packed juice and syrup per annum. This capacity is proposed on the basis of a single shift of 8 hours per day and 300 working days per annum. However, production can be increased by operating in two or three shifts a day based on actual market conditions.

2. Production Program

With an assumption that, the plant in the initial stage of the production period, requires some years to penetrate into the market and develop technical skill, it will start operation at 75% of the installed capacity which will grow to 85% in the second year. Full capacity operation will be achieved in the third year and onwards. Details of the production program are indicated in Table 3.3.

Table 3.4
ANNUAL PRODUCTION PROGRAM

Sr. No.	Description	Unit of Measure	Production Year		
			1st	2nd	3rd & Onwards
1	Packed juice and syrup	ton	225	255	300
2	Capacity utilization rate	%	75	85	100

IV. MATERIALS AND INPUTS

A. RAW MATERIALS

The major raw materials required for the envisaged plant are fresh fruits, like apple, mango, peach, etc and sugar. The annual raw materials requirement at full capacity production of the plant and the estimated costs are indicated in Table 4.1.

Table 4.1

ANNUAL RAW MATERIALS REQUIREMENT AND COST

Sr. No.	Description	Unit of Measure	Required Qty	Unit Price, Birr	Cost, ('000 Birr)		
					F.C.	L.C.	Total
1	Fruits - apple, mango, peach, guava, etc	ton	450	9,000		4,050	4,050
2	Sugar	kg	3,000	14		42	42
Total						4,092	4,092

The auxiliary materials required for the envisaged plant include plastic bottles and plastic sheets which can be obtained locally from plastic factories. The annual requirement for auxiliary materials at full capacity production of the plant and the estimated costs are shown in Table 4.2.

Table 4.2

ANNUAL AUXILIARY MATERIALS AND ESTIMATED COST

Sr. No.	Description	Unit of Measure	Required Qty	Unit Price, Birr/Unit	Cost, ('000 Birr)		
					F.C.	L.C.	Total
1	Plastic bottle	pc	300,000	1.00		300.00	300.00
2	Plastic sheet	ton	5	26,250.00		131.25	131.25
Total						431.25	431.25

B. UTILITIES

The major utilities required for the envisaged project include electric power, water and furnace oil. The annual requirement for utilities at full capacity operation of the plant and the estimated costs are indicated in Table 4.3.

Table 4.3

ANNUAL UTILITIES REQUIREMENT AND ESTIMATED COSTS

Sr. No.	Description	Unit of Measure	Required Qty	Unit Price, Birr/Unit	Cost, ('000 Birr)		
					F.C.	L.C.	Total
1	Electric power	kWh	120,000	0.5778		69.33	69.33
2	Water	m ³	3,000	10.00		30.00	30.00
3	Furnace oil	lt	60,000	14.84		890.40	890.40
Total						989.73	989.73

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The production process of packed juice and syrup involves mainly fruit selection and preparation; juice extraction, straining, filtration and clarification; juice preservation; juice evaporation for syrup; and packing and storage. Each operation is described briefly as follows.

a) Selection and Preparation of Fruits

After the fruits have undergone a quality inspection, i.e. after fresh, sound and suitable varieties have been properly selected, they are first washed by rotary brusher to remove soil and dirt from the grove and stems and leaves need to be removed from the fruit.

b) Extraction of Juice

The selected fruits must be crushed to a pulp before pressing, the result of this being what is known as the pumice. Pulping is often followed by the addition of enzymes, which break down the cell walls of the fruit and thus increase the amount of juice extracted. The pumice is finally pressed out in large presses. The solid matter left over from the pumice can be used as animal feed.

c) Straining, Filtration and Clarification

To clarify the juice, which is still cloudy, the juice is first centrifuged - during which process the larger particles such as broken fruit tissue, seed and skin, and various gums, peptic substances etc. settle to the bottom - and then filtered. This production step can also be supported by enzymes which break down the turbid particles before filtering starts, thus preventing the filters from blocking too quickly.

d) Preservation (for Juice Production)

After the juice becomes free from suspended impurities, refrigeration and pasteurization at 75°C for about half a minute be conducted for preserving the juice extracted. Finally, the pasteurized juice shall be cooled, filled, labeled and dispatched.

e) Juice Evaporation (for Syrup Production)

Juice evaporation proper, judging the end point of the syrup and cooling of finished syrup is carried out.

➤ Evaporation:

This is the most critical aspect of making high quality syrup. Evaporation should be done with uniform heating. Initially coagulation starts when juice temperature increases. This scum should be removed during slow heating.

➤ **Judging the End Point of the Syrup:**

As the syrup density increases, the boiling temperature rises gradually. Slow heating is required when frothing starts, as otherwise the syrup will get burned. When the desired temperature is achieved, heating should be completely stopped.

➤ **Cooling of Finished Syrup:**

This is an important step followed after making the syrup because if quick cooling is not carried out, the product will have a burnt taste and the color of the syrup will become dark brown. Therefore the syrup should be cooled quickly.

f) **Packing and Storage**

Packing and storage includes bottling, capping, and labeling.

➤ **Bottling**

A vacuum - based bottle filling machine has been used to fill and pack the juice/syrup so that its shelf - life is increased. The juice/syrup should be filled in sterilized bottles to avoid fungus problems.

➤ **Capping**

The bottles filled with the help of the bottling machine should be capped with a crown capping machine to make them air tight.

➤ **Labeling**

Capped bottles should be labeled properly. The label should give precise information about the juice/syrup ingredients, date of production and producer's details. Then, packaging is performed automatically.

2. Environmental Impact

The envisaged plant does not have any adverse impact on the environment. Thus the project is environment friendly.

B. ENGINEERING

1. Machinery and Equipment

The list of plant machinery and equipment required for the envisaged project along with the estimated costs is indicated in Table 5.1.

Table 5.1

LIST OF MACHINERY AND EQUIPMENT AND ESTIMATED COST

Sr. No.	Description	Unit of Measure	Required Qty	Cost, ('000 Birr)		
				F.C.	L.C.	Total
1	Intake equipment and bins	set	1	350	88	438
2	Inspection, washing, and sizing equipment	set	1	315	79	394
3	Rasper	set	1	175	44	219
4	Juice extractor	set	1	245	61	306
5	Finisher	set	1	210	53	263
6	Pasteurizer	set	1	280	70	350
7	Filler and sealer	set	1	315	79	394
8	Cooling machine	set	1	245	61	306
9	Labeler	set	1	245	61	306
10	Centrifuge	set	1	210	53	263
11	Vessels, with 2 pumps	set	1	210	53	263
12	Boiler	set	1	245	61	306
13	Conveying unit	set	1	210	53	263
14	Laboratory equipment	set	1	245	61	306
Total				3,500	875	4,375

2. Land, Buildings and Civil Works

The total land requirement of the envisaged project is 1,500 m², out of which 1,000 square meters is a built-up area. The construction cost of buildings and civil works at the rate of Birr 4,500 per square meter is estimated at Birr 4.5 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 5000 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.

NB: The land issue in the above statement narrates or shows only Addis Ababa's city administration land lease price, policy and regulations.

Accordingly the project profile prepared based on the land lease price of Addis Ababa region.

To know land lease price, police and regulation of other regional state of the country updated information is available at Ethiopian Investment Agency's website www.eia.gov.et on the factor cost.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENT

A. HUMAN RESOURCE REQUIREMENT

The total human resource required for the envisaged project is 37 persons. The human resource requirement along with the annual estimated labor cost including fringe benefits is shown in Table 6.1.

Table 6.1

HUMAN RESOURCE REQUIREMENT AND LABOR COST

Sr. No.	Job Title	Required No. of Persons	Salary, Birr	
			Monthly	Annual
1	General manager	1	4,500	54,000
2	Secretary	1	850	10,200
3	Marketing officer	1	2,250	27,000
4	Purchaser	1	850	10,200
5	Accountant	1	850	10,200
6	Personnel	1	850	10,200
7	Cashier	1	850	10,200
8	Production head	1	2,500	30,000
9	Quality controller (chemist)	1	2,300	27,600
10	Mechanic	1	900	10,800
11	Electrician	1	900	10,800
12	Store keeper	1	850	10,200
13	Driver	2	1,600	19,200
14	Operator	6	3,900	46,800
15	Laborer	14	5,600	67,200
16	Guards	3	1,200	14,400
Sub - total		37	30,750	369,000
Employees benefit, 20% of basic salary			6,150	73,800
Total			36,900	442,800

B. TRAINING REQUIREMENT

The production head, quality controller, electrician and mechanic should be given a two weeks on – the – job training by the expert of the equipment supplier during erection and commissioning. Machine operators should then be trained by in-house staff before the start– up of operation. The cost of training is estimated at Birr 150,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the juice and syrup 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 12.82 million (see Table 7.1). From the total investment cost the highest share (Birr 10.11 million or 78.91%) is accounted by fixed investment cost followed by pre operation cost (Birr 1.36 million or 10.59%) and initial working capital (Birr 1.34 million or 10.50%). From the total investment cost Birr 3.5 million or 27.31% 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	0.31
1.2	Building and civil work	4,500.00		4,500.00	35.11
1.3	Machinery and equipment	875.00	3,500.00	4,375.00	34.13
1.4	Vehicles	900.00		900.00	7.02
1.5	Office furniture and equipment	300.00		300.00	2.34
	Sub total	6,614.90	3,500.00	10,114.90	78.91
2	Pre operating cost *				
2.1	Pre operating cost	518.75		518.75	4.05
2.2	Interest during construction	838.54		838.54	6.54
	Sub total	1,357.29		1,357.29	10.59
3	Working capital **	1,345.50		1,345.50	10.50
	Grand Total	9,317.69	3,500.00	12,817.69	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 1.84 million. However, only the initial working capital of Birr 1.32 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 9.10 million (see Table 7.2). The cost of raw material account for 49.70% of the production cost. The other

major components of the production cost are depreciation, utility and financial cost which account for 15.04%, 10.88% and 8.87%, respectively. The remaining 15.51% is the share of labor, 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	4,523	49.70
Utilities	990	10.88
Maintenance and repair	219	2.40
Labor direct	369	4.05
Labor overheads	74	0.81
Administration Costs	250	2.75
Land lease cost	0	0.00
Cost of marketing and distribution	500	5.49
Total Operating Costs	6,924	76.09
Depreciation	1,369	15.04
Cost of Finance	807	8.87
Total Production Cost	9,100	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 ranges from Birr 2.72 million to Birr 3.05 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 30.37 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.

$$\text{Break -Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 4,830,000$$

$$\text{Break -Even Capacity utilization} = \frac{\text{Break even Sales Value}}{\text{Sales revenue}} \times 100 = 36.82\%$$

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 4 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 32.74% 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 14.34 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 37 persons. The project will generate Birr 6.18 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 horticulture farming sub sector and sugar producers and also generates income for the Government in terms of payroll tax.

Appendix 7.A
FINANCIAL ANALYSES SUPPORTING TABLES

Appendix 7.A.1
NET WORKING CAPITAL (in 000 Birr)

Items	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Total inventory	904.60	1,017.68	1,130.75	1,130.75	1,130.75	1,130.75	1,130.75	1,130.75	1,130.75	1,130.75
Accounts receivable	469.95	523.49	577.02	577.02	578.09	578.09	578.09	578.09	578.09	578.09
Cash-in-hand	10.13	11.39	12.66	12.66	12.84	12.84	12.84	12.84	12.84	12.84
CURRENT ASSETS	1,384.68	1,552.56	1,720.43	1,720.43	1,721.68	1,721.68	1,721.68	1,721.68	1,721.68	1,721.68
Accounts payable	39.18	44.08	48.98	48.98	48.98	48.98	48.98	48.98	48.98	48.98
CURRENT LIABILITIES	39.18	44.08	48.98	48.98	48.98	48.98	48.98	48.98	48.98	48.98
TOTAL WORKING CAPITAL	1,345.50	1,508.48	1,671.45	1,671.45	1,672.70	1,672.70	1,672.70	1,672.70	1,672.70	1,672.70

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	3,618	4,071	4,523	4,523	4,523	4,523	4,523	4,523	4,523	4,523
Utilities	792	891	990	990	990	990	990	990	990	990
Maintenance and repair	175	197	219	219	219	219	219	219	219	219
Labour direct	295	332	369	369	369	369	369	369	369	369
Labour overheads	59	66	74	74	74	74	74	74	74	74
Administration Costs	200	225	250	250	250	250	250	250	250	250
Land lease cost	0	0	0	0	12.83	12.83	12.83	12.83	12.83	12.83
Cost of marketing and distribution	500	500	500	500	500	500	500	500	500	500
Total Operating Costs	5,639	6,282	6,924	6,924	6,937	6,937	6,937	6,937	6,937	6,937
Depreciation	1,369	1,369	1,369	1,369	1,369	210	210	210	210	210
Cost of Finance	0	922	807	692	576	461	346	231	115	0
Total Production Cost	7,008	8,573	9,100	8,985	8,882	7,608	7,493	7,378	7,262	7,147

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	9,600	10,800	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500
Less variable costs	5,139	5,782	6,424	6,424	6,424	6,424	6,424	6,424	6,424	6,424
VARIABLE MARGIN	4,461	5,018	5,076	5,076	5,076	5,076	5,076	5,076	5,076	5,076
in % of sales revenue	46.46	46.46	44.14	44.14	44.14	44.14	44.14	44.14	44.14	44.14
Less fixed costs	1,869	1,869	1,869	1,869	1,882	723	723	723	723	723
OPERATIONAL MARGIN	2,592	3,149	3,207	3,207	3,194	4,353	4,353	4,353	4,353	4,353
in % of sales revenue	27.00	29.16	27.89	27.89	27.78	37.85	37.85	37.85	37.85	37.85
Financial costs		922	807	692	576	461	346	231	115	0
GROSS PROFIT	2,592	2,227	2,400	2,515	2,618	3,892	4,007	4,122	4,238	4,353
in % of sales revenue	27.00	20.62	20.87	21.87	22.76	33.84	34.84	35.85	36.85	37.85
Income (corporate) tax	0	0	0	0	0	1,168	1,202	1,237	1,271	1,306
NET PROFIT	2,592	2,227	2,400	2,515	2,618	2,724	2,805	2,886	2,966	3,047
in % of sales revenue	27.00	20.62	20.87	21.87	22.76	23.69	24.39	25.09	25.79	26.50

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	10,634	11,823	10,805	11,505	11,500	11,500	11,500	11,500	11,500	11,500	11,500	5,251
Inflow funds	10,634	2,223	5	5	0	0	0	0	0	0	0	0
Inflow operation	0	9,600	10,800	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500	0
Other income	0	0	0	0	0	0	0	0	0	0	0	5,251
TOTAL CASH OUTFLOW	10,634	7,863	8,525	9,052	8,769	8,668	9,719	9,638	9,557	9,477	8,243	0
Increase in fixed assets	10,634	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	1,385	168	168	0	1	0	0	0	0	0	0
Operating costs	0	5,139	5,782	6,424	6,424	6,437	6,437	6,437	6,437	6,437	6,437	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	1,168	1,202	1,237	1,271	1,306	0
Financial costs	0	839	922	807	692	576	461	346	231	115	0	0
Loan repayment	0	0	1,153	1,153	1,153	1,153	1,153	1,153	1,153	1,153	0	0
SURPLUS (DEFICIT)	0	3,961	2,280	2,453	2,731	2,832	1,781	1,862	1,943	2,023	3,257	5,251
CUMULATIVE CASH BALANCE	0	3,961	6,240	8,693	11,424	14,256	16,037	17,899	19,842	21,865	25,122	30,373

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	9,600	10,800	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500	5,251
Inflow operation	0	9,600	10,800	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500	0
Other income	0	0	0	0	0	0	0	0	0	0	0	5,251
TOTAL CASH OUTFLOW	11,979	5,802	6,445	6,924	6,926	6,937	8,105	8,139	8,174	8,208	8,243	0
Increase in fixed assets	10,634	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	1,345	163	163	0	1	0	0	0	0	0	0	0
Operating costs	0	5,139	5,782	6,424	6,424	6,437	6,437	6,437	6,437	6,437	6,437	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	1,168	1,202	1,237	1,271	1,306	0
NET CASH FLOW	-11,979	3,798	4,355	4,576	4,574	4,563	3,395	3,361	3,326	3,292	3,257	5,251
CUMULATIVE NET CASH FLOW	-11,979	-8,182	-3,826	749	5,324	9,887	13,282	16,643	19,969	23,261	26,518	31,769
Net present value	-11,979	3,452	3,599	3,438	3,124	2,833	1,917	1,725	1,552	1,396	1,256	2,025
Cumulative net present value	-11,979	-8,527	-4,927	-1,490	1,635	4,468	6,385	8,109	9,661	11,057	12,313	14,337

NET PRESENT VALUE 14,337
INTERNAL RATE OF RETURN 32.74%
NORMAL PAYBACK 4 years