PROFILE ON THE PRODUCTION OF MILK POWDER

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I. SUMMARY

This profile envisages the establishment of a plant for the production of milk powder with a capacity of 2,000 tons per annum. Milk powder is nutritious and healthy food used as a replacement of fresh milk.

The country`s requirement of milk powder is met through import. The present (2012) demand for milk powder is estimated at 2,136 tons. The demand for the product is projected to reach 2,702 tons and 3,288 tons by the years 2017 and 2022, respectively.

The principal raw materials required are cow milk and additives. Cow milk is locally available while additives have to be imported.

The total investment cost of the project including working capital is estimated at Birr 147.13 million. From the total investment cost the highest share (Birr 84.78 million or 57.62%) is accounted by initial working capital followed by fixed investment cost (Birr 50.45 million or 34.29%) and pre operation cost (Birr 11.89 million or 8.08%). From the total investment cost Birr 31.50 million or 21.41% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 18.37% and a net present value (NPV) of Birr 75.45 million, discounted at 10%.

The project can create employment for 27 persons. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports. The project will also create backward linkage with the livestock sector and forward linkage with food processing sub sector and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTION AND APPLICATION

Milk powder is a dairy product processed from cow milk. Cow milk basically contains water, fats, protein, sugar and ash. About 86% to 88% of cow milk by weight is water. Milk powder is prepared by skimming the cow milk whereby a considerable but proportional cream substance is extracted before it is powdered. The processed milk powder, after some vitamins are added is packed in fully galvanized metal cans.

Powdered milk is frequently used in the manufacture of infant formula, confectionery such as chocolate and caramel candy, and in recipes for baked goods where adding liquid milk would render the product too thin.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Ethiopia has remarkable milk potential. Yet its dairy industry still remains undeveloped. Among other things, livestock disease, low production breed and feed shortage has contributed to low milk production in the country. Moreover, the perishable nature of the product, poor marketing infrastructure, lack of refrigeration and preserving facilities are mentioned as the major impediments for the development of the dairy industry. Consequently, the milk consumption in the country has remained very low. According to some studies, the per capita consumption of milk in the country is about 20 kg which is below the average for Sub-Sahara Africa.

Due to the low level of milk production in the country, the gap between demand for and the supply of milk is bridged through imports of powdered milk. Besides commercial imports, food aid has also been another source of milk supply in the country. However, food aid is frequently associated with famine and emergency so that it is not considered as a regular source of supply.

In the absence of domestic production of powdered milk, imports are considered as a proxy for demand. Table 3.1 shows the commercial import of milk powder during the period 2001-2011.

Table 3.1

IMPORT OF MILK POWDER (TONS)

Year	Import
2001	1,082
2002	1,016
2003	1,631
2004	1,241
2005	1,149
2006	1,215
2007	2,021
2008	1,306
2009	1,650
2010	3,335
2011	1,423

Source: - *Ethiopian Revenues & Customs Authority.*

Table 3.1 shows that import of milk powder during the past eleven years fluctuates with an average of 1,551.7 tons. However, a close scrutiny to the data set reveals that there was a moderate increase in the amount of imports. During the period 2001--2006 the yearly average level of import was about 1,222 tons. In the following three consecutive years, i.e. 2007---2009, it increased to an annual average of 1,659 tons, with a yearly growth of 10%. In the recent two years 2010/11 the annual average reached to a level of 2,379 tons. This indicates that there was a yearly growth of about 20% compared to the previous years.

By considering the historical statistical data indicated above, effective demand for the year 2012 is estimated by taking the average of the recent three years. Accordingly, the present effective demand for powdered milk is set at 2,136 tons.

2. Demand Projection

The demand for milk powder is influenced by population size, income and consumption habit. Considering the trend in the import, total and urban population growth rates of 2.9% and 4%, respectively, and assuming growing income, nutritional awareness and a favorable change in attitude towards milk powder on the part of the public, a growth rate of 4% is considered in projecting demand for milk powder (see Table 3.2).

Table 3.2

PROJECTED DEMAND FOR MILK POWDER (TONS)

Year	Projected Demand
2013	2,310.2
2014	2,402.6
2015	2,498.7
2016	2,598.6
2017	2,702.5
2018	2,810.6
2019	2,923.0
2020	3,039.9
2021	3,161.5
2022	3,288.0

The demand for milk powder will increase from 2,310 tons in the year 2013 to 2,810 tons and 3,288 tons in the year 2018 and year 2022, respectively.

3. Pricing and Distribution

Different brands of milk powder are available in the market. Most of them are packed in different size and sold at different prices. The current average retail price of milk powder is Birr 225 per pack of 900 gram. Producing the envisaged product in Ethiopia means the firm will be a new entrant and needs to penetrate the market. Thus, to be competitive the factory gate price is proposed to be Birr 161 per a pack of 900 gm (Birr 178.88 per kg) or Birr 178,889 per ton by allowing 40% margin for distributors and retailers

As to the distribution, the envisaged plant can use wholesale and retail channels, which include supermarkets, groceries and small shops.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

The production capacity of the envisaged plant is planned to be 2,000 tons of milk powder and 20 tons of fresh butter. This capacity is based on a single shift of 8 hours per day and 250 working days per year. Since Sundays and public and national holidays are not considered as working days, the remaining days are allotted for preventive maintenance and unexpected down times.

2. Production Program

Considering the time required for development of skill in plant management and market penetration, it is planned that the plant will start operation at 75% of the installed capacity, which will grow to 85% in the second year. Full capacity production will be attained in the third year and onwards. Details of annual production program are given in Table 3.3.

Table 3.3

ANNUAL PRODUCTION PROGRAM

Sr. No.	Description	Unit of Measure	Production Year		
			1st	2nd	3rd & Onwards
1	Milk powder	ton	1,500	1,700	2,000
2	Cream, ton	ton	150	170	200
3	Capacity utilization rate	%	75	85	100

IV. MATERIALS AND INPUTS

A. RAW MATERIALS

The basic raw materials required for the production of milk powder and fresh butter are cow milk and additives. Cow milk can be available locally from the Addis Ababa city and surroundings. The additives have to be imported. Details of annual raw materials requirement at full capacity production of the plant and estimated costs are given in Table 4.1.

Table 4.1

ANNUAL RAW MATERIALS REQUIREMENT AND COST

Sr. No.	Description	Unit of Measure	Required Qty.	Unit Price, Birr/Unit	Cost, ('000 Birr)		
					F.C.	L.C.	Total
1	Cow Milk	ton	20,800	10,000		208,000.0	208,000.0
2	Additives	ton	18	21,000	302.4	75.6	378.0
Total					**302.4**	**208,075.6**	**208,378.0**

The auxiliary materials required for the plant are galvanized cans of different sizes and carton boxes for packing. The galvanized cans have to be imported while the carton boxes

can be available locally. Details of the annual requirement for auxiliary materials at full capacity production of the plant and the estimated costs are given in Table 4.2.

Table 4.2

ANNUAL AUXILIARY MATERIALS REQUIREMENT AT FULL CAPACITY COST

Sr. No.	Description	Unit of Measure	Required Qty	Unit Price, Birr/Unit	Cost,('000 Birr)		
					F.C.	L.C.	Total
1	Galvanized can, 2500gm	pc	600,000	12.0		7,200.0	7,200.0
2	Galvanized can,900gm	pc	445,000	7.0		3,115.0	3,115.0
3	Galvanized can, 400gm	pc	248,750	3.0		746.2	746.2
4	Carton box	pc	16,250,005	6.0		97,500.0	97,500.0
Total						**108,561.2**	**108,561.2**

B. UTILITIES

The power required for the plant is an electric power which is available from the national grid of EEPCo. Furnace oil and water are also available locally. Details of annual utilities requirement and the estimated costs at full capacity operation are indicated in Table 4.3.

Table 4.3

ANNUAL POWER AND UTILITIES REQUIREMENT AND COST

Sr. No.	Description	Unit of Measure	Required Qty	Unit Price, Birr/Unit	Cost, ('000 Birr)		
					F.C.	L.C.	Total
1	Electric power	kWh	72,000	0.58		41.76	41.76
2	Water	m^3	600	10.00		6.00	6.00
3	Furnace oil	lt	60,000	14.67		880.20	880.20
Total						**927.96**	**927.96**

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

Raw milk from the locality is first collected either by milk cans or road tankers. It is then stored and filtered. The filtered milk is then cooled to 6^{o}c.

The product is then pasteurized and sugar is added after cooling. Then regeneration and evaporation takes place where the skimmed milk is concentrated to 47% of total solid. It is then spray dried and cooled. Finally it is packed in standard containers and stored or delivered.

2. Environmental Impact

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

B. ENGINEERING

1. Machinery and Equipment

The principal machinery and equipment required for the production of milk powder include milk reception tanks, skimming machine, pasteurizer, and evaporator, spray drier, packing machine, boiler, compressor and cooler. The list of machinery and equipment and the estimated costs are indicated in Table 5.1. The total cost of machinery and equipment is estimated at Birr 39.375 million, out of which Birr 31.5 million will be required in foreign currency.

Table 5.1

MACHINERY AND EQUIPMENT REQUIREMENT AND ESTIMATED COSTS

Sr. No.	Description	Unit of Measure	Required Qty.	Cost ('000 Birr)
1	Milk reception tank	set	1	630.00
2	Skimming machine	set	2	3,150.00
3	Pasteurizer	set	2	5,040.00
4	Evaporator	set	2	3,780.00
5	Spray drier	set	2	3,150.00
6	Shaking fluid bed	set	2	4,410.00
7	CIP Cenyer	set	1	2,520.00
8	Packing machine	set	2	2,835.00
9	Boiler	set	1	1,260.00
10	Compressor	set	2	630.00
11	Piping and insulation	set	lump sum	945.00
12	Cooling plant	set	2	3,150.00
13	Freight, port handling, inland transport etc			7,875.00
Total				**39,375.00**

2. Land, Buildings and Civil Works

The overall area of land required for the proposed plant is 3,000 square meters. The total built – up area is 2,000 square meters. The total cost of buildings and civil works estimated at the rate of Birr 4,500 per square meter shall be Birr 9 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 m^2 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 m^2 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 m^2. 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 m^2 .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 m^2 (see Table 5.2).

Table 5.2

NEW LAND LEASE FLOOR PRICE FOR PLOTS IN ADDIS ABABA

Zone	Level	Floor Price/m^2
Central Market District	1st	1686
	2nd	1535
	3rd	1323
	4th	1085
	5th	894
Transitional zone	1st	1035

Zone	Level	Floor Price/m^2
	2nd	935
	3rd	809
	4th	685
	5th	555
Expansion zone	1st	355
	2nd	299
	3rd	217
	4th	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 m^2, 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 criterions 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 m^2 is estimated at Birr 798,000 of which 10% or Birr 79,800 will be paid in advance. The remaining Birr 718,200 will be paid in equal installments with in 28 years i.e. Birr 25,650 annually.

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 27 persons. The human resource requirement and the annual estimated labor cost, including the fringe benefit, is given in Table 6.1.

Table 6.1

HUMAN RESOURCE REQUIREMENT AND ESTIMATED COST

Sr. No.	Job Title	Required No. of Persons	Salary, Birr	
			Monthly	Annual
1	Plant manager	1	5,000	60,000
2	Secretary	1	1,200	14,400
3	Accountant - clerk	1	2,000	24,000
4	Cashier	1	1,500	18,000
5	Salesman /Purchaser	2	4,000	48,000
6	Store keeper	1	2,000	24,000
7	Technologist	1	4,000	48,000
8	Engineer	1	4,000	48,000
9	Quality controller/chemist	1	3,000	36,000
10	Mechanic	3	2,500	30,000
11	Operator	5	4,000	48,000
12	Production worker	4	4,200	50,400
13	Driver	1	2,200	26,400
14	Guard	4	2,100	25,200
Sub - total		**27**	**41,700**	**500,400**
Employees benefit, 20% of basic salary			**8,340**	**100,080**
Total			**50,040**	**600,480**

B. TRAINING REQUIREMENT

Since the envisaged plant is among the food and beverage sector industries, its personnel should be acquainted to cleaning in place (CIP) scheme. Hence, such training shall be given to five operators and four production workers in one of the local pharmaceutical industries. In addition, these employees including three mechanics and the quality controller should be given a two weeks on – the – job training on the production technology by the advanced technician of the equipment supplier. The total cost of these trainings is estimated at Birr 120,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the milk powder 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 147.13 million (See Table 7.1). From the total investment cost the highest share (Birr 84.78 million or 57.62%) is accounted by initial working capital followed by fixed investment cost (Birr 50.45 million or 34.29%) and pre operation cost (Birr 11.89 million or 8.08%). From the total investment cost Birr 31.50 million or 21.41% is required in foreign currency.

Table 7.1

INITIAL INVESTMENT COST ('000 Birr)

Sr. No	Cost Items	Local Cost	Foreign Cost	Total Cost	% Share
1	**Fixed investment**				
1.1	Land Lease	79.80		79.80	0.05
1.2	Building and civil work	9,000.00		9,000.00	6.12
1.3	Machinery and equipment	7,875.00	31,500.00	39,375.00	26.76
1.4	Vehicles	1,500.00		1,500.00	1.02
1.5	Office furniture and equipment	500.00		500.00	0.34
	Sub total	**18,954.80**	**31,500.00**	**50,454.80**	**34.29**
2	**Pre operating cost ***				
2.1	Pre operating cost	2,268.75		2,268.75	1.54
2.2	Interest during construction	9,625.11		9,625.11	6.54
	Sub total	**11,893.86**		**11,893.86**	**8.08**
3	**Working capital ****	**84,778.09**		**84,778.09**	**57.62**
	Grand Total	**115,626.76**	**31,500.00**	**147,126.76**	**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 106.09 million. However, only the initial working capital of Birr 84.77 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 340.74 million (see Table 7.2). The cost of raw material account for 93.02% of the production cost. The other major components of the production cost are financial cost and depreciation, which account for 2.72% and 2.65%, respectively. The remaining 1.61% is the share of utility, repair and maintenance, labor overhead and administration cost. For detail production cost see Appendix 7.A.2.

Table 7.2

ANNUAL PRODUCTION COST AT FULL CAPACITY (YEAR THREE)

Items	Cost (000 Birr)	%
Raw Material and Inputs	316,939	93.02
Utilities	928	0.27
Maintenance and repair	1,969	0.58
Labor direct	500	0.15
Labor overheads	100	0.03
Administration Costs	500	0.15
Land lease cost	0	0.00
Cost of marketing and distribution	1,500	0.44
Total Operating Costs	**322,436**	**94.63**
Depreciation	9,039	2.65
Cost of Finance	9,264	2.72
Total Production Cost	**340,739**	**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 20.72 million to Birr 24.42 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 240.04 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.

$$\text{Break- Even Sales Value} = \frac{\text{Fixed Cost + Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 150{,}259{,}200$$

$$\text{Break- Even Capacity utilization} = \frac{\text{Break -even Sales Value}}{\text{Sales revenue}} \times 100 = 28.62\%$$

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 8 years.

5. Internal Rate of Return

The internal rate of return (IRR) is the annualized effective compounded return rate that can be earned on the invested capital, i.e., the yield on the investment. Put another way, the internal rate of return for an investment is the discount rate that makes the net present value

of the investment's income stream total to zero. It is an indicator of the efficiency or quality of an investment. A project is a good investment proposition if its IRR is greater than the rate of return that could be earned by alternate investments or putting the money in a bank account. Accordingly, the IRR of this project is computed to be 18.37% 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 75.45 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 27 persons. The project will generate Birr 48.36 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 livestock sector and forward linkage with the food processing sub sector 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	63,387.84	71,311.32	79,234.80	79,234.80	79,234.80	79,234.80	79,234.80	79,234.80	79,234.80	79,234.80
Accounts receivable	21,520.76	24,195.23	26,869.70	26,869.70	26,871.84	26,871.84	26,871.84	26,871.84	26,871.84	26,871.84
Cash-in-hand	34.10	38.37	42.63	42.63	42.98	42.98	42.98	42.98	42.98	42.98
CURRENT ASSETS	**84,942.70**	**95,544.91**	**106,147.13**	**106,147.13**	**106,149.62**	**106,149.62**	**106,149.62**	**106,149.62**	**106,149.62**	**106,149.62**
Accounts payable	164.61	185.19	205.76	205.76	205.76	205.76	205.76	205.76	205.76	205.76
CURRENT LIABILITIES	**164.61**	**185.19**	**205.76**	**205.76**	**205.76**	**205.76**	**205.76**	**205.76**	**205.76**	**205.76**
TOTAL WORKING CAPITAL	**84,778.09**	**95,359.73**	**105,941.36**	**105,941.36**	**105,943.86**	**105,943.86**	**105,943.86**	**105,943.86**	**105,943.86**	**105,943.86**

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	253,551	285,245	316,939	316,939	316,939	316,939	316,939	316,939	316,939	316,939
Utilities	742	835	928	928	928	928	928	928	928	928
Maintenance and repair	1,575	1,772	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969
Labour direct	400	450	500	500	500	500	500	500	500	500
Labour overheads	80	90	100	100	100	100	100	100	100	100
Administration Costs	400	450	500	500	500	500	500	500	500	500
Land lease cost	0	0	0	0	25.65	25.65	25.65	25.65	25.65	25.65
Cost of marketing and distribution	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
Total Operating Costs	**258,249**	**290,343**	**322,436**	**322,436**	**322,462**	**322,462**	**322,462**	**322,462**	**322,462**	**322,462**
Depreciation	9,039	9,039	9,039	9,039	9,039	410	410	410	410	410
Cost of Finance	0	10,588	9,264	7,941	6,617	5,294	3,970	2,647	1,323	0
Total Production Cost	**267,288**	**309,969**	**340,739**	**339,416**	**338,118**	**328,166**	**326,842**	**325,519**	**324,195**	**322,872**

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	286,208	321,984	357,760	357,760	357,760	357,760	357,760	357,760	357,760	357,760
Less variable costs	256,749	288,843	320,936	320,936	320,936	320,936	320,936	320,936	320,936	320,936
VARIABLE MARGIN	**29,459**	**33,141**	**36,824**	**36,824**	**36,824**	**36,824**	**36,824**	**36,824**	**36,824**	**36,824**
in % of sales revenue	10.29	10.29	10.29	10.29	10.29	10.29	10.29	10.29	10.29	10.29
Less fixed costs	10,539	10,539	10,539	10,539	10,564	1,936	1,936	1,936	1,936	1,936
OPERATIONAL MARGIN	**18,920**	**22,602**	**26,285**	**26,285**	**26,259**	**34,888**	**34,888**	**34,888**	**34,888**	**34,888**
in % of sales revenue	6.61	7.02	7.35	7.35	7.34	9.75	9.75	9.75	9.75	9.75
Financial costs		10,588	9,264	7,941	6,617	5,294	3,970	2,647	1,323	0
GROSS PROFIT	**18,920**	**12,015**	**17,021**	**18,344**	**19,642**	**29,594**	**30,918**	**32,241**	**33,565**	**34,888**
in % of sales revenue	6.61	3.73	4.76	5.13	5.49	8.27	8.64	9.01	9.38	9.75
Income (corporate) tax	0	0	0	0	0	8,878	9,275	9,672	10,069	10,466
NET PROFIT	**18,920**	**12,015**	**17,021**	**18,344**	**19,642**	**20,716**	**21,642**	**22,569**	**23,495**	**24,422**
in % of sales revenue	6.61	3.73	4.76	5.13	5.49	5.79	6.05	6.31	6.57	6.83

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	**52,724**	**380,776**	**322,005**	**357,781**	**357,760**	**357,760**	**357,760**	**357,760**	**357,760**	**357,760**	**357,760**	**121,049**
Inflow funds	52,724	94,568	21	21	0	0	0	0	0	0	0	0
Inflow operation	0	286,208	321,984	357,760	357,760	357,760	357,760	357,760	357,760	357,760	357,760	0
Other income	0	0	0	0	0	0	0	0	0	0	0	121,049
TOTAL CASH OUTFLOW	**52,724**	**352,817**	**324,767**	**355,537**	**343,612**	**342,316**	**349,869**	**348,942**	**348,016**	**347,089**	**332,928**	**0**
Increase in fixed assets	52,724	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	84,943	10,602	10,602	0	2	0	0	0	0	0	0
Operating costs	0	256,749	288,843	320,936	320,936	320,962	320,962	320,962	320,962	320,962	320,962	0
Marketing and Distribution cost	0	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	0
Income tax	0	0	0	0	0	0	8,878	9,275	9,672	10,069	10,466	0
Financial costs	0	9,625	10,588	9,264	7,941	6,617	5,294	3,970	2,647	1,323	0	0
Loan repayment	0	0	13,235	13,235	13,235	13,235	13,235	13,235	13,235	13,235	0	0
SURPLUS (DEFICIT)	**0**	**27,959**	**-2,763**	**2,243**	**14,148**	**15,444**	**7,891**	**8,818**	**9,744**	**10,671**	**24,832**	**121,049**
CUMULATIVE CASH BALANCE	**0**	**27,959**	**25,196**	**27,440**	**41,588**	**57,032**	**64,923**	**73,741**	**83,485**	**94,156**	**118,987**	**240,036**

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**	**286,208**	**321,984**	**357,760**	**357,760**	**357,760**	**357,760**	**357,760**	**357,760**	**357,760**	**357,760**	**121,049**
Inflow operation	0	286,208	321,984	357,760	357,760	357,760	357,760	357,760	357,760	357,760	357,760	0
Other income	0	0	0	0	0	0	0	0	0	0	0	121,049
TOTAL CASH OUTFLOW	**137,502**	**268,831**	**300,924**	**322,436**	**322,439**	**322,462**	**331,340**	**331,737**	**332,134**	**332,531**	**332,928**	**0**
Increase in fixed assets	52,724	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	84,778	10,582	10,582	0	2	0	0	0	0	0	0	0
Operating costs	0	256,749	288,843	320,936	320,936	320,962	320,962	320,962	320,962	320,962	320,962	0
Marketing and Distribution cost	0	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	0
Income (corporate) tax		0	0	0	0	0	8,878	9,275	9,672	10,069	10,466	0
NET CASH FLOW	**-137,502**	**17,377**	**21,060**	**35,324**	**35,321**	**35,298**	**26,420**	**26,023**	**25,626**	**25,229**	**24,832**	**121,049**
CUMULATIVE NET CASH FLOW	**-137,502**	**-120,124**	**-99,065**	**-63,741**	**-28,420**	**6,878**	**33,298**	**59,320**	**84,946**	**110,175**	**135,006**	**256,055**
Net present value	-137,502	15,798	17,405	26,539	24,125	21,917	14,913	13,354	11,955	10,699	9,574	46,670
Cumulative net present value	-137,502	-121,704	-104,300	-77,760	-53,636	-31,718	-16,805	-3,451	8,503	19,203	28,776	75,446

NET PRESENT VALUE	75,446
INTERNAL RATE OF RETURN	18.37%
NORMAL PAYBACK	8 years