

22. PROFILE ON THE PRODUCTION OF TOMATO SAUCE AND KETCHUP

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I. SUMMARY

This profile envisages the establishment of a plant for the production of tomato sauce and ketchup with a capacity of 300 tons per annum. Tomato ketchup is mainly used as an appetizer during consumption of other food staffs whereas tomato sauce is used for food coloring, seasoning, soup preparation.

The country`s requirement of tomato sauce and ketchup is met through local production and import. The present (2012) demand for tomato sauce and ketchup is estimated at 8,799 tons. The local and export demand for the products is projected to reach 12,481 tones and 15,757 tones by the year 2018 and year 2022, respectively.

The principal raw materials required are fresh wholesome tomato fruit, salt, sugar, vinegar, spices which are locally available.

The total investment cost of the project including working capital is estimated at Birr 24.514 million. From the total investment cost the highest share (Birr 16.80 million or 68.53%) is accounted by fixed investment cost followed by initial working capital (Birr 5.19 million or 21.18%) and pre operation cost (Birr 2.52 million or 10.29%). From the total investment cost Birr 9.89 million or 40.34% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 18.25% and a net present value (NPV) of Birr 10.24 million, discounted at 10%.

The project can create employment for 34 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 horticulture farming and salt, sugar, vinegar produces 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

Tomato sauce and ketchup are flavored products processed from sorted, washed and fresh wholesome tomatoes and hot fruits. Tomatoes are one of the most widely grown vegetable

crops which are used in processing of different food products. Tomatoes are valuable sources of vitamins and minerals. Studies have shown that people who consume large amount of tomato products may be at or lower risk of especially cancer of prostate gland, lung and stomach. Thus, tomato sauce and ketchup are produced from fresh and wholesome tomatoes of intensive red color by washing, crushing into pulp, concentrating and seasoning with different ingredients and bottling or canning.

Tomato ketchup is mainly used as an appetizer during consumption of other food staffs whereas tomato sauce is used for food coloring, seasoning, soup preparation and also for reducing the amount of ground hot pepper in “*Wot*” (traditional hot sauce) without affecting the attractive red color of same. Tomato sauce and ketchup are consumed mainly by households, restaurants, hotels and by public institutions like hospitals, training centers, boarding schools, orphanages, etc.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past supply and present Demand

Tomatoes are one of the most widely grown and commercially important vegetable crops and are valuable sources of food minerals and vitamins, particularly vitamins A and C. Processed and canned tomato sauces and ketchups are consumed by urban households, restaurants, hotels, hospitals and the like. The demand for tomato sauce and ketchup in Ethiopia is met both by domestic production and through import (see table 3.1 & 3.2).

Table 3.1**DOMESTIC PRODUCTION OF TOMATO SAUCE AND KETCHUP**

Year	Production
2000/01	1,730
2001/02	555
2002/03	2,116
2003/04	1,846
2004/05	1,846
2005/06	1,790
2006/07	1,837
2007/08	2,343
2008/09	2,923
2009/10	4,292

Source: - CSA, *Large and Medium Scale Manufacturing and Electricity Industries Survey, Various Issues.*

As can be from Table 3.1, production of tomato sauce and ketch up which was 1,730 tons at the beginning of the period (2001/02) has grown to 4,292 tons at the end of the period (2009/10). A closer observation at the data set reveals that production of tomato ketchup and sauce over the study period has shown varying patterns that is, fluctuation (2000/01-2003/02), almost constant (2003/04- 2006/07) and then moderate rise (2007/08-2009/10). So, it was found more appropriate to take the average growth of the recent phase (33%) and apply it on the 2009/10 production in estimating the level of production in 2012. Accordingly, domestic production of tomato ketchup and sauce for 2012 is estimated at 7,591 tons.

Import of tomato sauce & ketchup covering the period 2001--2011 is shown in Table 3.2.

Table 3.2
IMPORT OF TOMATO SAUCE & KETCHUP (TONS)

Year	Import
2001	57
2002	235
2003	521
2004	478
2005	841
2006	248
2007	377
2008	44
2009	784
2010	1,365
2011	1,476

Source: - *Ethiopian Revenue and Customs Authority.*

As could be seen from Table 3.2, import of tomato sauce and ketchup which was 57 tons at the beginning of the period (2001) has grown to 1,476 tons by the end of the period (2011). A closer examination of the data set reveals that import of tomato ketchup and sauce has been fluctuating for most of the time. In the year 2001 the annual level of import was about 57 tons, it reached 521 tons by 2003 then declined to 248 tons in 2006 and this increased to 1,476 tons by the year 2011. During the recent three years i.e. 2009-2011 the annual average import has reached to a level of about 1,208 tons. This average of the recent three years import, that is 1,208 tons, has been taken as estimate of year 2012 import.

Therefore, summing the domestic production and import levels, the current effective demand for tomato ketchup and sauce is estimated at 8,799 tons.

2. Projected Demand

Demand for processed and canned tomato sauce and ketchup is mainly influenced by urbanization, income and change in the consumption habit of the population. As income rises

and urbanization progresses, a shift towards relatively expensive but conveniently packed foods is inevitable. Urban population in Ethiopia is growing by about 4% while GDP in the last few years has been growing by more the 7%. In addition, average growth rate of import in the last three years has been 41%. Considering these facts that demand for tomato souses and Ketchups can be expected to grow more rapidly. However, for the sake of conservatism, it is forecasted to grow by 6% per annum. Domestic production is expected to remain at 2012 estimated level i.e., 7,591 tons. The resulting total projected demand, production by existing domestic firms and the residual is shown in Table 3.3.

Table 3.3

PROJECTED DEMAND FOR TOMATO KETCHUP & SAUCE (TONS)

Year	Projected Demand	Existing production	Gap (Unsatisfied Demand)
2013	9,327	7,591	1,736
2014	9,886	7,591	2,295
2015	10,479	7,591	2,888
2016	11,108	7,591	3,517
2017	11,775	7,591	4,184
2018	12,481	7,591	4,890
2019	13,230	7,591	5,639
2020	14,024	7,591	6,433
2021	14,865	7,591	7,274
2022	15,757	7,591	8,166

3. Pricing and Distribution

Retail price of locally produced tomato sauce is Birr 50 per 850 grams in retail shops. This gives a retail price of Birr 58.82 per kg or Birr 58,820 per tone. Allowing 25% margin for distributors, a factory gate price of Birr 47,056 per tone is proposed as a factory gate price.

Experienced wholesalers in food staffs can be appointed to distribute the product. The end users of the product i.e. households and hospitality industries such as hotels and the like can obtain it at different general retail merchandised shops and super markets.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

Based on the market study and assuming the lowest share of the unsatisfied demand projection, the envisaged plant will have a capacity of producing 600 tons of tomato ketchup and sauce per annum, out of which 150 tons will be tomato ketchup and 450 tons tomato sauce. A capacity of 2 tones per day is considered on the basis of single shift of 8 hours per day and 300 working days per annum. This capacity, upon requirement, can be increased by increasing the number of shifts per day.

2. Production Program

At the initial stage of production, the plant may require some years to penetrate into the market. Therefore, in the first and second year of production, the capacity utilization rate will be 75% and 85%, respectively. From the third year onwards, 100% capacity production shall be attained. Details of the production program are shown in Table 3.3.

Table 3.3

ANNUAL PRODUCTION PROGRAM

Sr.No.	Description	Unit of Measure	Production Year		
			1st	2nd	3rd & Onwards
1	Tomato sauce	ton	337.5	382.5	450
2	Tomato ketchup	ton	113	128	150
3	Total product	ton	450	510	600
4	Capacity utilization rate	%	75	85	100

IV. MATERIALS AND INPUTS

A. RAW MATERIALS

The basic raw material required for the envisaged project is fresh wholesome tomato fruit of intense red color. Salt, sugar, vinegar, spices are also required for production of tomato sauce and ketchup.

Addis Ababa City Administration, being an urban center and capital city of the country, does not have adequate land for cultivation of tomatoes. However, the annual requirement for fresh tomato by the envisaged plant shall be satisfied by the local growers in the surrounding areas which stretch up to Debre Zeit, Modjo, Koka, Meki, Zeway and other localities.

Since the quality of tomato sauce and ketchup produced is determined largely by the quality of the tomato fruit used, great importance is attached to the procurement and reception of quality fresh tomato fruits as a raw material.

Besides the principal raw material, other preservative materials and additives are required in order to impart good taste and preserve the product during the accepted shelf life. Such materials include salt, sugar, vinegar, spices, onion, garlic, paprika and other ingredients. Annual raw materials requirement of the plant at full capacity operation and the estimated costs are shown in Table 4.1.

Table 4.1
ANNUAL RAW MATERIALS REQUIREMENT AT FULL CAPACITY
PRODUCTION AND ESTIMATED COST

Sr . No.	Description	Unit of Measure	Required Qty	Unit Price, Birr/Unit	Cost, ('000 Birr)		
					F.C.	L.C.	Total
1	Fresh tomato fruit	ton	2,500.00	6,000.00		15,000.00	15,000.00
2	Salt	kg	12.20	2.50		0.03	0.03
3	Sugar	kg	37.83	14.00		5.29	5.29
4	Vinegar	kg	15.50	30.00		0.46	0.46
5	Spices	kg	4.37	250.00		1.09	1.09
6	Others	kg	3.52	220.00		7.74	7.74
Total						15,014.63	15,014.63

The major auxiliary materials required for the plant are glass bottles, cans and carton boxes. The glass bottles and all other auxiliary materials can be procured locally, except laminated cans which have to be imported. Annual requirement for the 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 AND ESTIMATED COST

Sr. No.	Description	Unit of Measure	Required Qty	Unit Price, Birr/Unit	Cost, ('000 Birr)		
					F. C.	L.C.	Total
1	Glass bottles	pc	375,000	2.00		750.00	750.00
2	Laminated cans	pc	1,125,000	2.75	2475.00	618.75	3,093.75
3	Cartons	pc	62,696	2.40		150.47	150.47
Total					2,475.00	1,519.22	3,994.22

B. UTILITIES

The utilities required for the plant comprise electric power, water and fuel oil for boiler. The total annual requirement for utilities at 100% capacity utilization rate and the estimated costs are given in Table 4.3.

Table 4.3

ANNUAL UTILITIES REQUIREMENT AND ESTIMATED COST

Sr. No.	Description	Unit of Measure	Annual Requirement	Unit Price, Birr/Unit	Cost, ('000 Birr)		
					F.C.	L.C.	Total
1	Electric power	kWh	17,152	0.5778		9.91	9.91
2	Water	m ³	5,100	5.00		25.50	25.50
3	Furnace oil	lt	40,000	14.84		593.60	593.60
Total						629.01	629.01

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The major operations involved in the production of tomato sauce and ketchup include washing, crushing, concentrating, homogenizing, flavoring, bottling and/or canning, packing and dispatching. Each operation is discussed briefly as follows.

- **Washing:** The incoming fresh tomato is cleaned by washing in water. This task is accomplished using a special washing technique that enables the preservation of the fresh, natural qualities of ripe tomato.
- **Crushing:** Washed tomato is crushed into tomato pulp (Juice) which is then strained and filtered.
- **Concentration:** After crushing the filtered tomato pulp becomes preheated and concentrated to about one - third of its original volume by means of a continuous concentrator, for which a boiler plant is used. Since the concentration would be achieved in a very short time, a special technical know - how shall be employed. Instantaneous concentration is necessary since; otherwise, heating the tomato pulp would cause oxidation giving it a dark - reddish disagreeable color, which is different from the normal color of ripe natural tomato.
- **Homogenization:** Concentrated tomato pulp (juice) is homogenized.
- **Flavoring:** Salt, sugar, spices, vinegar & other ingredients are added in the seasoning room to give the tomato sauce & tomato ketchup the flavor associated with the products.
- **Bottling/canning:** The products are then filled into bottles and cans.
- **Packing and dispatching:** After bottling/canning, the products will be packed in carton box and dispatched.

There are various recipes employed for production of tomato ketchup and sauce. The recipe applied for tomato ketchup shows a considerable variation from the recipe used to produce tomato sauce. For production of tomato ketchup, spices are added to the vinegar and cooked at about 85°C, covered in a dried kettle for about 2-3 hours. Onion, garlic and paprika are then added directly to the ketchup.

2. Environmental Impact

The envisaged plant does not have any pollutant emitted except the washing water which has to be connected to a proper drainage line. Thus the project is environment friendly.

B. ENGINEERING

1. Machinery and Equipment

The plant machinery and equipment required for the envisaged project include tomato charging machine, washing and sorting machine, continuous concentrator, filter, homogenizer, mixer, bottling machine and boiler. The total cost of machinery and equipment is estimated at Birr 12,362,546, of which Birr 9,890,037 will be required in foreign currency. Details of the machinery and equipment and the estimated costs are indicated in Table 5.1.

Table 5.1**LIST OF MACHINERY AND EQUIPMENT AND ESTIMATED COSTS**

Item No.	Description	Unit of Measure	Required Qty	Cost, ('000 Birr)		
				F.C.	L.C.	Total
1	Tomato charging machine	set	1	494.50	123.63	618.13
2	Tomato washing and sorting machine	set	1	1,186.80	296.70	1,483.51
3	Continuous concentrator	set	1	1,087.90	271.98	1,359.88
4	Filter	set	1	593.40	148.35	741.75
5	Homogenizer	set	1	692.30	173.08	865.38
6	Seasoning mixer	set	1	692.30	173.08	865.38
7	Bottling machine	set	1	890.10	222.53	1,112.63
8	Cooler	set	1	890.10	222.53	1,112.63
9	Labeler	set	1	593.40	148.35	741.75
10	Packing machine	set	1	791.20	197.80	989.00
11	Water treatment facility	set	1	692.30	173.08	865.38
12	Boiler	set	1	791.20	197.80	989.00
13	Other auxiliary equipment	set	1	494.50	123.63	618.13
Total				9,890.03	2,472.50	12,362.54

2. Land, Buildings and Civil Works

The total area of land required for the project is 1,400 m². The total built-up area is 700 m². This includes production hall, finished products and raw materials stores, offices and social facilities. The total cost of buildings and civil work at a unit cost of Birr 4,500 per m², is estimated at Birr 3.15 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
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 372,400 of which 10% or Birr 37,240 will be paid in advance. The remaining Birr 335,160 will be paid in equal installments with in 28 years i.e. Birr 11,970 annually.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENT

A. HUMAN RESOURCE REQUIREMENT

The total human resource required for the project is 34 persons. The total human resource requirement along with annual estimated labor cost, including fringe benefits, is presented in Table 6.1.

Table 6.1
HUMAN RESOURCE REQUIREMENT AND LABOR COST

Item No.	Job Title	Required No. of Persons	Salary, Birr	
			Monthly	Annual
1	Plant manager	1	5,000	60,000
2	Secretary	1	900	10,800
3	Personnel	1	1,000	12,000
4	Financial manager	1	3,500	42,000
5	Accountant - clerk	1	800	9,600
6	Cashier	1	1,000	12,000
7	Salesman /Purchaser	2	1,800	43,200
8	Store keeper	1	900	10,800
9	Production and technical manager	1	3,800	45,600
10	Production supervisor	1	1,800	21,600
11	Quality controller/chemist	2	3,600	86,400
12	Mechanic	1	1,000	12,000
13	Electrician	1	1,000	12,000
14	Operator	3	1,800	64,800
15	Production worker	12	5,400	777,600
16	Driver	1	800	9,600
17	Guard	3	1,350	48,600
Sub - total		34	35,450	1,278,600
Employees benefit, 20% of basic salary			7,090	255,720
Total			42,540	1,534,320

B. TRAINING REQUIREMENT

One production supervisor and 3 operators should be given a one month on- the-job training in Merti Processing Plant before start up of operation. The total training cost is estimated at Birr 150,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the tomato sauce and ketchup project is based on the data presented in the previous chapters and the following assumptions:-

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

A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at Birr 24.514 million (see Table 7.1). From the total investment cost the highest share (Birr 16.80 million or 68.53%) is accounted by fixed investment cost followed by initial working capital (Birr

5.19 million or 21.18%) and pre operation cost (Birr 2.52 million or 10.29%). From the total investment cost Birr 9.89 million or 40.34% 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	37.24		37.24	0.15
1.2	Building and civil work	3,150.00		3,150.00	12.85
1.3	Machinery and equipment	2,472.51	9,890.03	12,362.54	50.43
1.4	Vehicles	900.00		900.00	3.67
1.5	Office furniture and equipment	350.00		350.00	1.43
	Sub total	6,909.75	9,890.03	16,799.78	68.53
2	Pre operating cost *				
2.1	Pre operating cost	918.13		918.13	3.75
2.2	Interest during construction	1,603.75		1,603.75	6.54
	Sub total	2,521.88		2,521.88	10.29
3	Working capital **	5,192.76		5,192.76	21.18
	Grand Total	14,624.38	9,890.03	24,514.41	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 6.55 million. However, only the initial working capital of Birr 5.19 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 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 26.83 million (see Table 7.2). The cost of raw material account for 70.85% of the production cost. The other major components of the production cost are depreciation, financial cost and labour, which account for 11.17%, 5.75% and 4.77%, respectively. The remaining 7.46% 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 (in 000 Birr)	%
Raw Material and Inputs	19,008.85	70.85
Utilities	629.01	2.34
Maintenance and repair	618.13	2.30
Labour direct	1,278.60	4.77
Labour overheads	255.72	0.95
Administration Costs	150.00	0.56
Land lease cost	-	-
Cost of marketing and distribution	350.00	1.30
Total Operating Costs	22,290.31	83.08
Depreciation	2,997.13	11.17
Cost of Finance	1,543.61	5.75
Total Production Cost	26,831.05	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 1.136 million to Birr 4.04 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 31.60 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.

$$\text{Break -Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 11,858,280$$

$$\text{Break -Even Capacity utilization} = \frac{\text{Break -even Sales Value}}{\text{Sales revenue}} \times 100 = 53.18 \%$$

4. Pay-back Period

The pay-back period, also called pay – off period is defined as the period required for recovering the original investment outlay through the accumulated net cash flows earned by the project. Accordingly, based on the projected cash flow it is estimated that the project's initial investment will be fully recovered within 6 years.

5. Internal Rate of Return

The internal rate of return (IRR) is the annualized effective compounded return rate that can be earned on the invested capital, i.e., the yield on the investment. Put another way, the internal rate of return for an investment is the discount rate that makes the net present value of the investment's income stream total to zero. It is an indicator of the efficiency or quality of an investment. A project is a good investment proposition if its IRR is greater than the rate of return that could be earned by alternate investments or putting the money in a bank account. Accordingly, the IRR of this project is computed to be 18.25% 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 10.24 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 34 persons. The project will generate Birr 9.031 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 and salt mining sectors and forward linkage with 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.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	15,207	17,108	19,009	19,009	19,009	19,009	19,009	19,009	19,009	19,009
Utilities	503	566	629	629	629	629	629	629	629	629
Maintenance and repair	495	556	618	618	618	618	618	618	618	618
Labour direct	1,023	1,151	1,279	1,279	1,279	1,279	1,279	1,279	1,279	1,279
Labour overheads	205	230	256	256	256	256	256	256	256	256
Administration Costs	120	135	150	150	150	150	150	150	150	150
Land lease cost	0	0	0	0	12	12	12	12	12	12
Cost of marketing and distribution	350	350	350	350	350	350	350	350	350	350
Total Operating Costs	17,902	20,096	22,290	22,290	22,302	22,302	22,302	22,302	22,302	22,302
Depreciation	2,997	2,997	2,997	2,997	2,997	161	161	161	161	161
Cost of Finance	0	1,764	1,544	1,323	1,103	882	662	441	221	0
Total Production Cost	20,899	24,858	26,831	26,611	26,402	23,345	23,125	22,904	22,684	22,463

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	22,587	25,410	28,234	28,234	28,234	28,234	28,234	28,234	28,234	28,234
Less variable costs	17,552	19,746	21,940	21,940	21,940	21,940	21,940	21,940	21,940	21,940
VARIABLE MARGIN	5,035	5,664	6,294	6,294	6,294	6,294	6,294	6,294	6,294	6,294
in % of sales revenue	22.29	22.29	22.29	22.29	22.29	22.29	22.29	22.29	22.29	22.29
Less fixed costs	3,347	3,347	3,347	3,347	3,359	523	523	523	523	523
OPERATIONAL MARGIN	1,688	2,317	2,947	2,947	2,935	5,771	5,771	5,771	5,771	5,771
in % of sales revenue	7.47	9.12	10.44	10.44	10.39	20.44	20.44	20.44	20.44	20.44
Financial costs		1,764	1,544	1,323	1,103	882	662	441	221	0
GROSS PROFIT	1,688	552	1,403	1,623	1,832	4,889	5,109	5,330	5,550	5,771
in % of sales revenue	7.47	2.17	4.97	5.75	6.49	17.31	18.10	18.88	19.66	20.44
Income (corporate) tax	0	0	0	487	550	1,467	1,533	1,599	1,665	1,731
NET PROFIT	1,688	552	1,403	1,136	1,282	3,422	3,576	3,731	3,885	4,040
in % of sales revenue	7.47	2.17	4.97	4.03	4.54	12.12	12.67	13.21	13.76	14.31

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	17,718	29,510	25,426	28,250	28,234	28,234	28,234	28,234	28,234	28,234	28,234	10,016
Inflow funds	17,718	6,923	16	16	0	0	0	0	0	0	0	0
Inflow operation	0	22,587	25,410	28,234	28,234	28,234	28,234	28,234	28,234	28,234	28,234	0
Other income	0	0	0	0	0	0	0	0	0	0	0	10,016
TOTAL CASH OUTFLOW	17,718	24,825	24,727	26,700	26,306	26,161	26,856	26,702	26,547	26,393	24,033	0
Increase in fixed assets	17,718	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	5,319	661	661	0	1	0	0	0	0	0	0
Operating costs	0	17,552	19,746	21,940	21,940	21,952	21,952	21,952	21,952	21,952	21,952	0
Marketing and Distribution cost	0	350	350	350	350	350	350	350	350	350	350	0
Income tax	0	0	0	0	487	550	1,467	1,533	1,599	1,665	1,731	0
Financial costs	0	1,604	1,764	1,544	1,323	1,103	882	662	441	221	0	0
Loan repayment	0	0	2,205	2,205	2,205	2,205	2,205	2,205	2,205	2,205	0	0
SURPLUS (DEFICIT)	0	4,685	699	1,549	1,928	2,073	1,378	1,532	1,687	1,841	4,201	10,016
CUMULATIVE CASH BALANCE	0	4,685	5,384	6,933	8,862	10,935	12,313	13,845	15,532	17,373	21,573	31,589

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	22,587	25,410	28,234	28,234	28,234	28,234	28,234	28,234	28,234	28,234	10,016
Inflow operation	0	22,587	25,410	28,234	28,234	28,234	28,234	28,234	28,234	28,234	28,234	0
Other income	0	0	0	0	0	0	0	0	0	0	0	10,016
TOTAL CASH OUTFLOW	22,911	18,548	20,742	22,290	22,779	22,852	23,769	23,835	23,901	23,967	24,033	0
Increase in fixed assets	17,718	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	5,193	645	645	0	1	0	0	0	0	0	0	0
Operating costs	0	17,552	19,746	21,940	21,940	21,952	21,952	21,952	21,952	21,952	21,952	0
Marketing and Distribution cost	0	350	350	350	350	350	350	350	350	350	350	0
Income (corporate) tax		0	0	0	487	550	1,467	1,533	1,599	1,665	1,731	0
NET CASH FLOW	-22,911	4,039	4,668	5,944	5,455	5,382	4,465	4,399	4,333	4,267	4,201	10,016
CUMULATIVE NET CASH FLOW	-22,911	18,871	-14,203	-8,259	-2,804	2,578	7,043	11,442	15,775	20,042	24,242	34,258
Net present value	-22,911	3,672	3,858	4,466	3,726	3,342	2,520	2,257	2,021	1,809	1,619	3,862
Cumulative net present value	-22,911	19,239	-15,380	10,915	-7,189	-3,847	-1,326	931	2,952	4,762	6,381	10,243

NET PRESENT VALUE 10,243
INTERNAL RATE OF RETURN 18.25%
NORMAL PAYBACK 6 years