

12. PROFILE ON THE PRODUCTION OF PROCESSED HONEY

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I. SUMMARY

This profile envisages the establishment of a plant for the production of processed honey with a capacity of 450 tons per annum. Honey is sweet edible substance produced by honey bees from the nectar of blossoms - secretions of the living parts of plants.

The country's requirement of processed honey is met through local production and import. The present (2012) local and export demand for processed honey is estimated at 1,954 tons. The local and export demand for the product is projected to reach 11,103 tons and 91,577 tons by the year 2017 and year 2022, respectively.

The principal raw material required is crude honey which is available locally.

The total investment cost of the project including working capital is estimated at Birr 19.03 million. From the total investment cost the highest share (Birr 9.20 million or 48.38%) is accounted by initial working capital followed by fixed investment cost (Birr 7.86 million or 41.33%) and pre operation cost (Birr 1.96 million or 10.29%). From the total investment cost, Birr 4.20 million or 22.07% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 29.64% and a net present value (NPV) of Birr 40.34 million, discounted at 10%.

The project can create employment for 24 persons. The establishment of such factory will have a foreign exchange saving and earning effect to the country by substituting the current imports and exporting its products to the international market. The project will also create backward linkage with the apiculture sub sector also generates income for the Government in terms of income and payroll tax.

II. PRODUCTION DESCRIPTION AND APPLICATION

Honey is sweet edible substance produced by honey bees from the nectar of blossoms - secretions of the living parts of plants which they collect, transform and combine with specific substance, and store in honey combs in the nest.

Honey consists essentially of different sugars, predominantly glucose and fructose. Honey contains also protein, amino acids, enzymes, organic acids, mineral substances etc. Honey varies in color from nearly colorless to dark brown. The flavor and aroma of honey vary but are usually derived from its plant origin.

Honey is generally used as a nutrient food and commonly used also in ayurvedic medicine system. In Ethiopia, honey is widely used for the preparation of favorite national drink called “*tej*” and for food in the form of bread spread or as sweetener in home baking and medication.

Processed honey in acceptable and attractive packaging is a resource based product with a considerable added value that that will substitute import and has an export potential as well.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Ethiopia has varied climate with diverse flora and fauna offering year round flowering. This condition provides best opportunity for honey production on a large scale. About 7,000 species of flowering plants are estimated to exist in the country. And they are believed to sustain the lives of 10 million honeybee colonies that exist in the country spread over many agro-ecologies (EARO, 2000). Nevertheless, even though there is a substantial potential in the country, the progress made so far in tapping this opportunity is not adequate. For example, although traditional, transitional and modern beehives have respective potential annual yields of 10 kg, 40 kg and 60 kg per hive, the current on-farm yields do not exceed 5 kg, 15 kg and 20 kg, respectively. This shows the fact that honey production in the country is below the potential.

The estimate of total honey production in Ethiopia in 2011 is about 39.89 million kilograms of which the greater portion is harvested from traditional hives (CSA 2012). Recently, attempts have been made to address problems associated with

production and marketing of honey. About 13% (of 169,000 holders contacted) have practiced honey and wax development package according to a survey by the same source. Currently, honey is produced in its crude form. And it is consumed domestically largely by tej. However, Crude honey could be processed into several important marketable products. These products include purified honey, beeswax, propolis, pollen, bee venom, and royal jelly. But, only a few enterprises are engaged in the processing of honey in Ethiopia. And the processed products of those are limited to purified honey and beeswax.

At present supermarkets, grocery shops and hotels are some of the major buyers of processed honey. According to the information obtained from supermarkets, the foreign community is also expected to constitute significant consumer of the product. Though there is no comprehensive consumption data for processed products in the country, an attempt has been made to arrive at an estimate of present demand. Processed honey is considered to be a commodity whose demand arises from urban population. According to CSA (2011), the population is 82 million out of which 13.75 million is urban dwellers. On the other hand, the per capita natural honey consumption is 60 grams. The apparent consumption of the product will therefore be 825, 000 kgs (or 825 tons). Hence, this figure has been taken as the present domestic effective demand (for year 2012) for processed honey.

The Ethiopian honey didn't yet capture a significant market share in the export market due to the traditional way of production which hardly meets the quality requirements of exotic markets as well as uncompetitive price (EAB 2012). Still, there is some export. Similarly, there is some amount of honey import. Honey imported to and exported from Ethiopia during year 2001--2011 is shown in Table 3.1

Table 3.1
HONEY EXPORT AND IMPORT (TONS)

Year	Export	Import
2001	3	4
2002	3	3
2003	8	3
2004	19	7
2005	23	8
2006	151	1
2007	387	2
2008	196	4
2009	274	1
2010	615	76
2011	729	3

Source: - *Ethiopian Revenue and Customs Authority.*

An examination of the data on Table 3.1 shows that export of honey has been generally increasing in the past eleven years. The exported quantity during the period 2001--2005 ranges from only 3 tons in the year 2001/02 to 23 tons in the year 2005. During this period, the annual average export was about 11 tons. A substantial increase in the volume of exported honey is observed starting year 2006. The yearly average quantity exported during 2006--2009 and 2010--2011 has reached to a level of 252 tons and 672 tons, respectively. Nevertheless, the data set also shows that there were two distinct phases i.e., 2001-2005 and 2006-2011. In the first phase, export grew by an average of 85 % from a small base. During the second phase it climbed up into higher ground, and grew by an average of 55 %. In estimating the 2012 export, the average growth of the recent (second) phase was applied on 2011 export. Accordingly, export of 2012 was estimated at 1,129 tons.

On the import side, honey weighing a few tons (except in 2010) has been imported. The pattern of import has been erratic. For example, import of 3-4 tons was registered

in the early phase, subsequently imports were up (7-8 tons) and later a fell to (1-2 tons). But, in the end the amount of import in 2011 was not significantly different from that of the 2001. In estimating the 2012 import, the average of recent three years (with exclusion of extreme values of 2009 & 2010) has been used. Accordingly, the import of 2012 is estimated 3 tons.

Accordingly, the domestic demand and export effective demand for processed honey is estimated at 1,954 tons.

2. Demand Projection

Future domestic demand for processed honey grows with the growth in urban population and income rise. Hence, the urban population growth rate, that is 4 %, is applied in projecting the future demand. Export is assumed to grow by recent years' average which is 55%.

Table 3.1
PROJECTED DEMAND FOR PROCESSED HONEY (TONS)

Year	Projected Demand		
	Total	Domestic	export
2013	2,608	858	1,750
2014	3,604	892	2,712
2015	5,132	928	4,204
2016	7,481	965	6,516
2017	11,103	1,003	10,100
2018	16,698	1,043	15,655
2019	25,350	1,085	24,265
2020	38,738	1,128	37,610
2021	59,468	1,173	58,295
2022	91,577	1,220	90,357

3. Pricing and Distribution

The price of honey varies according to its color, purity and season. Currently, the price of processed honey in supermarkets (domestic market) is on average 143 Birr /kg. Considering 30 % margin for whole sellers and retailers, the proposed project is recommended to set its ex-factory price at Birr 110 /kg. Ethiopian Honey FOB Price is US \$6,000--8,000 per ton. Price of US\$ 7,000 per ton has been proposed for the project.

The product can be distributed through wholesale- retail chain (such as supermarkets & groceries) domestically as it has to reach wide range of consumers in several towns. For export purpose, it is recommended that the factory engage in exporting the product by itself or appoint Agents in the importing countries.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

Based on the outcome of the market study and considering the minimum economic scale of production, the envisaged plant will have a capacity of 450 tons of processed honey per annum. This capacity is proposed on the basis of a single shift per day and 300 working days per annum.

2. Production Program

Assuming that the project will require enough time for market penetration and technical skill development, the plant will start operation at 80% of its rated capacity, which will reach 90% in the second year. Full capacity production will be attained in the third year and onwards. Details of the annual production program are shown in Table 3.3.

Table 3.3**ANNUAL PRODUCTION PROGRAM**

Sr. No.	Description	Unit of Measure	Production Year		
			1 st	2 nd	3 rd & Onwards
1	Processed honey	ton	360	405	450
2	Capacity utilization rate	%	80	90	100

IV. MATERIALS AND INPUTS**A. RAW MATERIALS**

The principal raw material required for the envisaged plant is crude honey. Honey and beeswax are widely produced in different regions of Ethiopia including Addis Ababa City Administration and Oromiya region in general. Traditional hive hanging on the tree branches is a common practice in the suburbs of the capital city. Bee keeping employing modern hives is also widely spreading in both the urban and rural areas of the country. Assuming that 90% refined honey in average will be extracted from crude honey, 500,000 kgs of crude honey per annum will be required for the envisaged plant.

Besides the raw material, different auxiliary materials are required for the project. These include sanitary chemicals, filter aids, filling and packing materials. Glass jars, plastic containers and drums for bulk honey are to be used for product filling while carton box, glue and labels are required for packaging. All the raw and auxiliary materials except the sanitary chemicals are available locally. The annual requirement of the envisaged plant for raw and auxiliary materials at full capacity operation of the plant along with the estimated costs is given in Table 4.1.

Table 4.1
ANNUAL RAW MATERIALS REQUIREMENT & COST

Sr. No.	Description	Unit of Measure	Required Qty.	Unit Price, Birr/Unit	Cost, ('000 Birr)		Total
					F.C.	L.C.	
1	Crude honey	kg	500,000	60.00		30,000.00	30,000.00
2	Sanitary chemicals	kg	46,800	15.75	589.68	147.42	737.10
3	Filter aids	pc	390	1,750.00		682.50	682.50
4	Glass jars	pc	780,000	1.00		780.00	780.00
5	Plastic containers	pc	975	350.00		341.25	341.25
6	Drums for bulk honey	pc	975	262.00		255.45	255.45
7	Lids	pc	975	175.00		170.62	170.62
8	Carton boxes	pc	39,000	6.00		234.00	234.00
9	Glue	kg	lump sum			68.25	68.25
10	Labels	pc	390,000	0.04		15.60	15.60
11	Other chemicals	kg	lump sum			87.50	87.50
Grand Total					589.68	32,782.59	33,372.27

B. UTILITIES

Electric power, water and furnace oil are the basic power and utilities required for the envisaged plant. When the plant operates at full capacity, it will require 100,140 kWh of electric power, 2,000 m³, of water and 250,000 liters of furnace oil per annum.

The annual requirement of the plant for power and utilities at a full capacity operation along with the estimated costs is given in Table 4.2.

Table 4.2
ANNUAL POWER AND UTILITIES REQUIREMENT AND COST

Sr. No.	Description	Unit of Measure	Required Qty.	Unit Price, Birr/Unit	Total
1	Electric power	kWh	100,140	0.5778	57.86
2	Water	m ³	1,000	10.00	10.00
3	Furnace oil	lt	250,000	14.34	3,585.00
Total					3,652.86

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

Honey contains mainly pollen, dust and air bubbles, which tend to include granulation (crystallization) of it. The crystals present in honey are dissolved by heating the honey to 45 ° C and by doing so its granulation can be retarded. Part of the pollen, foreign particles and wax are removed by filtration.

In order to prevent fermentation and destroy yeasts, honey is heated to a temperature of 65° C – 70 ° C for a specific time. Control of proper temperature and appropriate heating time is the most important factor for honey processing activity. An excessive heating increases the quality of “hydroxymethyl furfural” which is desirable while high temperature adversely affects the color and flavor of honey. To keep honey for a long period without contamination and granulation, it has to be cooled before packing. The production process of honey involves the following four steps.

- **Filtration:** The wax and foreign particles present in honey are removed by heating the crude honey to 45 ° C which is a temperature below the melting point of wax. Heating honey below this temperature is required also for decreasing its viscosity
- **Evaporation:** The filtered honey is then heated to 60 ° C - 65 ° C for 10 to 15 minutes and passed into a falling film evaporator. The water present in honey is boiled at lower temperature by simultaneous application of vacuum so that the moisture is separated and collected separately. This process also destroys the yeasts present in honey.
- **Cooling and Storing:** Honey is then cooled to an atmospheric temperature and stored in a cold vessel for 24 – 28 hours in order to settle and allow the air bubbles to go out.
- **Filling and Packing:** The processed honey is then filled immediately in glass jars, plastic containers or drums in bulk as required and then packed.

2. Environmental Impact

The plant does not have any pollutant emitted from the process. Thus, the project is environment friendly.

B. ENGINEERING

1. Machinery and Equipment

The list of plant machinery and equipment required for the envisaged plant and the estimated costs are given in Table 5.1. The machinery and equipment have to be imported.

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	Liquefier	set	1	252.00	63.00	315.00
2	Filter press	set	1	294.00	73.50	367.50
3	Falling film evaporator	set	1	252.00	63.00	315.00
4	Vacuum pump	set	1	294.00	73.50	367.50
5	Storage/settling tank	set	1	294.00	73.50	367.50
6	Water circulation pump	set	1	294.00	73.50	367.50
7	Preheating tank	set	1	210.00	52.50	262.50
8	Processing tank	set	1	210.00	52.50	262.50
9	Cooling tank/condenser	set	1	210.00	52.50	262.50
10	Moisture condensing tank	set	1	252.00	63.00	315.00
11	Honey circulation SS gear pump	set	1	294.00	73.50	367.50
12	Insulation (optional)	set	1	210.00	52.50	262.50
13	Control panel, level indicators, pressure gauges, temperature gauges, SS pipes and fittings.	set	1	252.00	63.00	315.00
14	Packing machine	set	3	378.00	94.50	472.50

Sr. No.	Description	Unit of Measure	Required Qty.	Cost, ('000 Birr)		
				F.C.	L.C.	Total
15	Labeling machine	set	1	294.00	73.50	367.50
16	Working table, metallic	set	1	210.00	52.50	262.50
Grand Total				4,200.00	1,050.0	5,250.0

2. Land, Buildings and Civil Works

The total area of land required for the envisaged project is 500 m² out, of which 300 m² is built-up area. The construction cost of buildings and civil works at a rate of Birr 4,500 per square meter is estimated at Birr 1.35 million.

According to the Federal Legislation on the Lease Holding of Urban Land (Proclamation No 721/2004) in principle, urban land permit by lease is on auction or negotiation basis, however, the time and condition of applying the proclamation shall be determined by the concerned regional or city government depending on the level of development.

The legislation has also set the maximum on lease period and the payment of lease prices. The lease period ranges from 99 years for education, cultural research health, sport, NGO, religious and residential area to 80 years for industry and 70 years for trade while the lease payment period ranges from 10 years to 60 years based on the towns grade and type of investment.

Moreover, advance payment of lease based on the type of investment ranges from 5% to 10%. The lease price is payable after the grace period annually. For those that pay the entire amount of the lease will receive 0.5% discount from the total lease value and those that pay in installments will be charged interest based on the prevailing interest rate of banks. Moreover, based on the type of investment, two to seven years grace period shall also be provided.

However, the Federal Legislation on the Lease Holding of Urban Land apart from setting the maximum has conferred on regional and city governments the power to issue regulations on the exact terms based on the development level of each region.

In Addis Ababa, the City's Land Administration and Development Authority is directly responsible in dealing with matters concerning land. However, regarding the manufacturing sector, industrial zone preparation is one of the strategic intervention measures adopted by the City Administration for the promotion of the sector and all manufacturing projects are assumed to be located in the developed industrial zones.

Regarding land allocation of industrial zones if the land requirement of the project is below 5,000 m², the land lease request is evaluated and decided upon by the Industrial Zone Development and Coordination Committee of the City's Investment Authority. However, if the land request is above 5,000 m² the request is evaluated by the City's Investment Authority and passed with recommendation to the Land Development and Administration Authority for decision, while the lease price is the same for both cases. Moreover, the Addis Ababa City Administration has recently adopted a new land lease floor price for plots in the city. The new prices will be used as a benchmark for plots that are going to be auctioned by the city government or transferred under the new "Urban Lands Lease Holding Proclamation."

The new regulation classified the city into three zones. The first Zone is Central Market District Zone, which is classified in five levels and the floor land lease price ranges from Birr 1,686 to Birr 894 per m². The rate for Central Market District Zone will be applicable in most areas of the city that are considered to be main business areas that entertain high level of business activities.

The second zone, Transitional Zone, will also have five levels and the floor land lease price ranges from Birr 1,035 to Birr 555 per m². This zone includes places that are surrounding the city and are occupied by mainly residential units and industries.

The last and the third zone, Expansion Zone, is classified into four levels and covers areas that are considered to be in the outskirts of the city, where the city is expected to expand in the future. The floor land lease price in the Expansion Zone ranges from Birr 355 to Birr 191 per m² (see Table 5.2).

Table 5.2**NEW LAND LEASE FLOOR PRICE FOR PLOTS IN ADDIS ABABA**

Zone	Level	Floor price/m²
Central Market District	1 st	1686
	2 nd	1535
	3 rd	1323
	4 th	1085
	5 th	894
Transitional zone	1 st	1035
	2 nd	935
	3 rd	809
	4 th	685
	5 th	555
Expansion zone	1 st	355
	2 nd	299
	3 rd	217
	4 th	191

Accordingly, in order to estimate the land lease cost of the project profiles it is assumed that all new manufacturing projects will be located in industrial zones located in expansion zones. Therefore, for the profile a land lease rate of Birr 266 per m² which is equivalent to the average floor price of plots located in expansion zone is adopted.

On the other hand, some of the investment incentives arranged by the Addis Ababa City Administration on lease payment for industrial projects are granting longer grace period and extending the lease payment period. The criteria are creation of job opportunity, foreign exchange saving, investment capital and land utilization tendency etc. Accordingly, Table 5.3 shows incentives for lease payment.

Table 5.3**INCENTIVES FOR LEASE PAYMENT OF INDUSTRIAL PROJECTS**

Scored Point	Grace Period	Payment Comp. 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 133,000 of which 10% or Birr 13,300 will be paid in advance. The remaining Birr 119,700 will be paid in equal installments with in 28 years i.e. Birr 4,275 annually.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENT

A. HUMAN RESOURCE REQUIREMENT

The total human resource required for the envisaged plant is 24 persons. The total human resource requirement and the estimated annual 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	4,000	48,000
2	Secretary	1	700	8,400
3	Personnel	1	750	9,000
4	Account - clerk	1	750	9,000
5	Commercial head	1	2,500	30,000
6	Purchaser	1	700	8,400
7	Sales man	1	750	9,000
8	Cashier	1	750	9,000
9	Production supervisor	1	2,000	24,000
10	Quality controller/chemist	1	2,000	24,000
11	Mechanic	2	1,600	19,200
12	Skilled worker	4	2,400	28,800
13	Production worker	4	1,600	19,200
14	Drive	1	700	8,400
15	Guard	3	1,200	14,400
Sub - total		24	22,400	268,800
Employees benefit, 20% of basic salary			4,480	53,760
Total			26,880	322,560

B. TRAINING REQUIREMENT

The production supervisor, quality controller, four skilled workers and mechanic should be given three weeks on – the – job training on production technology, machine operation and maintenance, quality control by an advanced expert of the equipment supplier during the erection and commissioning. The total cost of training is estimated at Birr 180,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the processed honey 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 19.03 million (see Table 7.1). From the total investment cost the highest share (Birr 9.20 million or 48.38%) is accounted by initial working capital followed by fixed investment cost (Birr 7.86 million or 41.33%) and pre operation cost (Birr 1.96 million or 10.29). From the total investment cost, Birr 4.20 million or 22.07% 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	13.30		13.30	0.07
1.2	Building and civil work	1,350.00		1,350.00	7.10
1.3	Machinery and equipment	1,050.00	4,200.00	5,250.00	27.59
1.4	Vehicles	900.00		900.00	4.73
1.5	Office furniture and equipment	350.00		350.00	1.84
	Sub total	3,663.30	4,200.00	7,863.30	41.33
2	Pre operating cost *				
2.1	Pre operating cost	712.50		712.50	3.74
2.2	Interest during construction	1,244.74		1,244.74	6.54
	Sub total	1,957.24		1,957.24	10.29
3	Working capital **	9,206.21		9,206.21	48.38
	Grand Total	14,826.75	4,200.00	19,026.75	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 11.52 million. However, only the initial working capital of Birr 9.20 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 40.92 million (see Table 7.2). The cost of raw material account for 81.56% of the production cost. The other major components of the production cost are utility, depreciation and financial cost, which account for 8.93%, 3.57% and 2.93%, respectively. The remaining 3.01% 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	%
Raw Material and Inputs	33,372.27	81.56
Utilities	3,652.86	8.93
Maintenance and repair	262.50	0.64
Labour direct	268.80	0.66
Labour overheads	53.76	0.13
Administration Costs	150.00	0.37
Land lease cost	-	-
Cost of marketing and distribution	500.00	1.22
Total Operating Costs	38,260.19	93.50
Depreciation	1,461.50	3.57
Cost of Finance	1,198.06	2.93
Total Production Cost	40,919.75	100

C. FINANCIAL EVALUATION**1. Profitability**

Based on the projected profit and loss statement, the project will generate a profit throughout its operation life. Annual net profit after tax will grow from Birr 6.13 million to Birr 7.80 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 78.76 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.

$$\text{Break -Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 20,790,000$$

$$\text{Break -Even Capacity utilization} = \frac{\text{Break- even Sales Value}}{\text{Sales revenue}} \times 100 = 16.71\%$$

4. Pay-back Period

The pay- back period, also called pay – off period is defined as the period required for recovering the original investment outlay through the accumulated net cash flows earned by the project. Accordingly, based on the projected cash flow it is estimated that the project's initial investment will be fully recovered within 3 years.

5. Internal Rate of Return

The internal rate of return (IRR) is the annualized effective compounded return rate that can be earned on the invested capital, i.e., the yield on the investment. Put another way, the internal rate of return for an investment is the discount rate that makes the net present value of the investment's income stream total to zero. It is an indicator of the efficiency or quality of an investment. A project is a good investment proposition if its IRR is greater than the rate of return that could be earned by alternate investments or putting the money in a bank account. Accordingly, the IRR of this project is computed to be 29.64% 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 40.34 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 24 persons. The project will generate Birr 21.50 million in terms of tax revenue. The establishment of such factory will have a foreign exchange saving and earning effect to the country by substituting the current imports and exporting its products to the international market. The project will also create backward linkage with the apiculture sub sector 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	26,698	30,035	33,372	33,372	33,372	33,372	33,372	33,372	33,372	33,372
Utilities	2,922	3,288	3,653	3,653	3,653	3,653	3,653	3,653	3,653	3,653
Maintenance and repair	210	236	263	263	263	263	263	263	263	263
Labour direct	215	242	269	269	269	269	269	269	269	269
Labour overheads	43	48	54	54	54	54	54	54	54	54
Administration Costs	120	135	150	150	150	150	150	150	150	150
Land lease cost	0	0	0	0	4.28	4.28	4.28	4.28	4.28	4.28
Cost of marketing and distribution	500	500	500	500	500	500	500	500	500	500
Total Operating Costs	30,708	34,484	38,260	38,260	38,264	38,264	38,264	38,264	38,264	38,264
Depreciation	1,462	1,462	1,462	1,462	1,462	89	89	89	89	89
Cost of Finance	0	1,369	1,198	1,027	856	685	513	342	171	0
Total Production Cost	32,170	37,315	40,920	40,749	40,582	39,038	38,867	38,696	38,525	38,353

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	39,600	44,550	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500
Less variable costs	30,208	33,984	37,760	37,760	37,760	37,760	37,760	37,760	37,760	37,760
VARIABLE MARGIN	9,392	10,566	11,740	11,740	11,740	11,740	11,740	11,740	11,740	11,740
in % of sales revenue	23.72	23.72	23.72	23.72	23.72	23.72	23.72	23.72	23.72	23.72
Less fixed costs	1,962	1,962	1,962	1,962	1,966	593	593	593	593	593
OPERATIONAL MARGIN	7,430	8,604	9,778	9,778	9,774	11,147	11,147	11,147	11,147	11,147
in % of sales revenue	18.76	19.31	19.75	19.75	19.75	22.52	22.52	22.52	22.52	22.52
Financial costs		1,369	1,198	1,027	856	685	513	342	171	0
GROSS PROFIT	7,430	7,235	8,580	8,751	8,918	10,462	10,633	10,804	10,975	11,147
in % of sales revenue	18.76	16.24	17.33	17.68	18.02	21.14	21.48	21.83	22.17	22.52
Income (corporate) tax	0	0	0	2,625	2,675	3,139	3,190	3,241	3,293	3,344
NET PROFIT	7,430	7,235	8,580	6,126	6,243	7,323	7,443	7,563	7,683	7,803
in % of sales revenue	18.76	16.24	17.33	12.38	12.61	14.79	15.04	15.28	15.52	15.76

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	8,576	50,086	44,554	49,504	49,500	49,500	49,500	49,500	49,500	49,500	49,500	13,566
Inflow funds	8,576	10,486	4	4	0	0	0	0	0	0	0	0
Inflow operation	0	39,600	44,550	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	0
Other income	0	0	0	0	0	0	0	0	0	0	0	13,566
TOTAL CASH OUTFLOW	8,576	41,195	38,715	42,320	43,624	43,508	43,799	43,679	43,560	43,440	41,608	0
Increase in fixed assets	8,576	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	9,242	1,150	1,150	0	0	0	0	0	0	0	0
Operating costs	0	30,208	33,984	37,760	37,760	37,764	37,764	37,764	37,764	37,764	37,764	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	2,625	2,675	3,139	3,190	3,241	3,293	3,344	0
Financial costs	0	1,245	1,369	1,198	1,027	856	685	513	342	171	0	0
Loan repayment	0	0	1,712	1,712	1,712	1,712	1,712	1,712	1,712	1,712	0	0
SURPLUS (DEFICIT)	0	8,892	5,840	7,185	5,876	5,992	5,701	5,821	5,940	6,060	7,892	13,566
CUMULATIVE CASH BALANCE	0	8,892	14,731	21,916	27,792	33,784	39,485	45,306	51,246	57,307	65,198	78,764

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	39,600	44,550	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	13,566
Inflow operation	0	39,600	44,550	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	0
Other income	0	0	0	0	0	0	0	0	0	0	0	13,566
TOTAL CASH OUTFLOW	17,782	31,854	35,630	38,260	40,886	40,940	41,403	41,454	41,506	41,557	41,608	0
Increase in fixed assets	8,576	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	9,206	1,146	1,146	0	0	0	0	0	0	0	0	0
Operating costs	0	30,208	33,984	37,760	37,760	37,764	37,764	37,764	37,764	37,764	37,764	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	2,625	2,675	3,139	3,190	3,241	3,293	3,344	0
NET CASH FLOW	-17,782	7,746	8,920	11,240	8,614	8,560	8,097	8,046	7,994	7,943	7,892	13,566
CUMULATIVE NET CASH FLOW	-17,782	10,036	-1,115	10,124	18,738	27,298	35,395	43,441	51,435	59,378	67,270	80,835
Net present value	-17,782	7,042	7,372	8,445	5,883	5,315	4,571	4,129	3,729	3,369	3,043	5,230
Cumulative net present value	-17,782	10,740	-3,368	5,077	10,960	16,275	20,846	24,975	28,704	32,073	35,115	40,345

NET PRESENT VALUE 40,345
INTERNAL RATE OF RETURN 29.64%
NORMAL PAYBACK 3 years

