22. PROFILE ON HONEY PROCESSING

TABLE OF CONTENTS

I. SUMMARY

This profile envisages the establishment of a plant for the production of 800 tonnes of processed honey per annum.

The current demand for the proposed product is estimated at 675.44 tonnes per annum and it is projected to reach 1,281 tonnes by the year 2015.

The project will create employment opportunity for about 19 persons.

The total investment cost of the project is estimated at about Birr 5.15 million, out of which Birr 755,300 is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 17% and a net present value (NPV) of Birr 1.72 million, discounted at 10.5%.

II. PRODUCT DESCRIPTION AND APPLICATION

Honey is made up of simple sugars; glucose, fructose, maltose, with some sucrose, and is produced by bees from the sucrose sugar found in the nectar of varying plant flowers. The nectar of flowers is ingested by worker bees and converted to honey in special sacs in their esophagi. It is stored and aged in combs in their hives. The colour and flavour depend on the age of the honey and on the source of the nectar.

Honey can be used as a table sugar substitute, or in drinks or cooking, or as a marinade or as a preservative. Vitamins, minerals and protein are present in honey in minuscule amounts, making them nutritionally insignificant. Honey may be made into beer or honey wine (mead) or used as an antibiotic for wound dressing and for alleviating dehydration due to dysentery.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Annual honey production in Ethiopia is estimated at 25,000 tonnes, which is mainly derived from traditional husbandry. Data on the Resource Potential Assessment of the region undertaken by IPS in 2003 indicate that on the average 3.5 tonnes of honey has been exported annually from 1977 to 2000. The exported amount of honey is extremely very low as compared to the existing production level.

The main reason for the low level of export is due to low quality in terms of moisture content, flavour, aroma, etc. The other reason is that a significant proportion of honey production in Ethiopia is consumed in preparing "tej".

The BGRS is one of the known potential areas in the country for honey production. According to the Resource Potential Assessment of the region, there are 136,074 beehives in the region. The average crude honey yield from traditional hive per year is estimated at 5 kg. Therefore, total annual crude honey production in the region is estimated at 680.4 tonnes. Furthermore, three is a practice of crude honey harvesting from the forest by hunting.

Processed honey is locally supplied by two private honey processing small scale industries located at Addis Ababa. The annual supply of processed honey from these two plants is estimated at 240 tonnes.

Since there is no disaggregated data on the consumption of honey for the production of the local drink “tej” and household consumption, the demand for processed honey is estimated based on an end-use approach. According to the recent Household Income,

Consumption and Expenditure Survey, CSA, the per capita consumption is about 60 grammes indicating total national consumption of 4,264 tonnes.

For the project under study, the target market is the urban population. Taking the average per capita consumption and size of urban households, the current effective demand is estimated at 671.94 tonnes. As mentioned earlier, the annual average export of honey is 3.5 tonnes. Hence, the total present effective demand for processed honey is estimated at 675.44 tonnes.

2. Projected Demand

Since urban population is the targeted consumers of the product, demand for processed honey is assumed to grow with the growth of urban population. On the other hand, if quality honey is produced, there would be wide export market in the Middle East and European countries. Considering the above two major factors, demand is assumed to grow by 6% per annum (see Table 3.1).

Table 3.1

PROJECTED DEMAND FOR PROCESSED HONEY (TONNES)

Year	Projected Demand	Existing Capacity	Unsatisfied Demand
2004	675	240	435
2005	716	240	467
2006	758	240	518
2007	804	240	564
2008	852	240	612
2009	903	240	663
2010	958	240	718
2011	1015	240	775
2012	1076	240	836
2013	1140	240	900
2014	1209	240	969
2015	1281	240	1041

3. Pricing and Distribution

The price of crude honey in BGRS varies from season to season as well as from woreda to woreda. According to the data obtained from Resource Potential Assessment, the price ranges from Birr 5 to Birr 10 per Kg. Assuming better quality of honey to be processed and modern packing materials to be used, an ex-factory price of Birr 16.50/kg is proposed. The product can be exported directly without involving intermediaries. For the local market, it is recommended that the envisaged plant shall distribute its products using commissioned or hired medium and large food item distributing outlets.

B. PLANT CAPACITY & PRODUCTION PROGRAMME

1. Plant Capacity

Based on the demand projection indicated herein, the proposed plant will have a capacity to produce 800 tonnes of processed honey per annum. The plant is envisaged to operate in one shift of 8 hours a day and for 264 days per year. However, it is also possible to work in two shifts based on actual market conditions.

2. Production Programme

Based on the fact that the processing of honey is not complicated, it can be assumed that it will take only a short time to develop the skills of the workers to produce quality honey. However, it is recommended to start at relatively lower capacity since it may take time to penetrate the local market as well as to start exporting. Hence, the production build-up is made to start at relatively lower (70%) and then gradually rise to full capacity in the 4^{th} year of operation.

Table 4.1

PRODUCTION PROGRAMME

Year of Production	1st year	2nd year	3rd year	4th year
Production in %	70%	80%	90%	100%
Honey (Tonnes)	560	640	720	800

IV. MATERIALS AND INPUTS

A. RAW MATERIALS

The main raw material required for the production of commercial honey is crude honey. The beehives population in the country, including the region, insures a constant and reliable supply of crude honey. In addition to honey, sanitary chemicals, filter materials, packaging containers, cartons …etc are also considered. The direct and indirect materials required by the project are indicated in Table 4.1.

Table 4.1

LIST OF DIRECT & INDIRECT MATERIALS AND COSTS

Sr. No.	Description	Unit of Measure	Qty.	Cost in ('000 Birr)
1.	Raw honey	Tonnes	950	6,650.00
2.	Different sanitary articles			12.00
3.	Container glasses (jam-jar)	Pcs	3,801,00	4,371.15
4.	Carton	m^2	176,000	704.00
5.	Leaflets	m	3,801,000	380.10
6.	Glue	kg	3,800	28.50
7.	Others			33.00
Grand Total				**12,150.25**

B. UTILITIES

The plant will use electrical energy and water as main utilities. Estimated annual utility consumption along with corresponding price is indicated in Table 4.2.

Table 4.2

UTILITY CONSUMPTION AND COST OF THE PLANT AT FULL CAPACITY

Utility	Unit of Measure	Consumption	Unit Cost (Birr)	Total (Birr)
Electrical energy	kWh	41,400	0.4736	12,65
Water	m^3	1,240	1.67	2,07
Grand Total				**14,72**

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The main honey processing activities are pre-heating, liquification, straining, micro-filtration, inactivation of yeast cells, cooling and packing. Honey being a biological substance and intended for food & pharmaceutical use, needs greater attention in quality and its handling. Honey should be processed as soon as possible after removal from the hive. Honey processing is a difficult operation, in which time and patience are required to achieve the best results.

If the moisture content is more than 20%, the honey is liable to spoilage due to fermentation & granulation. Considering the present practice of collection, storage & handling of honey under uncontrolled conditions including climatic factors, the honey needs processing, reduction of moisture & packing by utmost care to protect the valuable natural properties.

2. Source of Technology

Currently, there are few private and cooperatives engaged in commercial honey processing that process and sell honey using conventional (not highly mechanized) equipment. However, to be more competitive in both local and international markets, it is recommended to acquire modern processing technology from abroad (Far East, Europe or America) as a source of technology and machinery among which the following companies are recommended.

Maxant Industries Inc.
P. O. Box 454
Ayer, Massachusetts P.O. Box 01432,
USA.

B. ENGINEERING

1. Machinery and Equipment

The machinery and equipment required by the project will be procured from foreign sources. The total cost of machinery and equipment is estimated to be Birr 755,300, of which Birr 491,000 will be required in foreign currency. The list of required honey processing machinery and equipment is given in Table 5.1.

Table 5.1

LIST OF REQUIRED MACHINERY AND EQUIPMENT

Sr. No.	Machinery / Equipment Description	Qty
1	Honey melter separator	2
2	Honey filter	4
3	Honey clarifier	2
4	Honey heating & storage tank	2
5	Blender mixer	3
6	Honey pumps	4
7	Bottling tanks	4
8	Labeling machine	2
9	Automatic Honey packer	2
10	100 m Food grade clear flex 1" tubing	1

2. Land, Building and Civil Works

The required area for both building and open space by the envisaged plant is estimated to be 1300 m^2, out of which 500 m^2 will be a built up area. The total cost of building and civil works is estimated to be Birr 750,000. The total cost of land lease, at the rate of Birr 2.5 per m^2 and for a period of 70 years land holding, is estimated at Birr 227,500. The total land lease cost is assumed to be paid in advance.

3. Proposed Location

Based on the availability of infrastructure and market, the location of the envisaged plant is proposed to be at Assosa town.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The plant will require about 19 workers at the beginning of the plant operation. The breakdown of manpower allocation and corresponding labour cost is indicated in Table 6.1.

Table 6.1

MANPOWER REQUIREMENT AND ANNUAL LABOUR COST

Sr. No.	Description	Required Number	Salary	
			Monthly	Annual
1	Plant Manager	1	1,500	18,000
2	Finance & Admin. Manager	1	1,000	12,000
3	Accountant & cashier	1	800	9,600
4	Production & Techn Dept. Head	1	1,000	12,000
5	Operators	6	2,400	28,800
6	Electro-mech. maintenance	1	600	7,200
7	Prod. Officer & Tech. helpers	3	900	10,800
8	Commercial Dept. Manager	1	1,000	12,000
9	Sells & Purchase Clerk	1	500	6,000
10	Store Keeper	1	400	4,800
11	Driver	2	1,000	12,000
	Sub Total	**19**		**133,200**
	workers benefit 125% of basic salary			33,300
	Grand Total			**166,500**

B. TRAINING REQUIREMENT

The modern way of commercial honey processing is not complicated. However, it is recommendable to train the production and technical manager for at least two weeks to get enough knowledge that enable to process quality honey that can be sold in both local

and international markets. The trained personnel can also give training to the operators. Such training is estimated to cost Birr 56,400.

VII. FINANCIAL ANALYSIS

The financial analysis of the honey processing project is based on the data presented in the previous chapters and the following assumptions:-

Construction period	2 years
Source of finance	30 % equity
	70 % loan
Tax holidays	3 years
Bank interest	10.5%
Discounted cash flow	10.5%
Repair and maintenance	5 % of the total plant and machinery
Accounts receivable	30 days
Raw material, local	60 days
Work in progress	2 days
Finished products	30 days
Cash in hand	5 days
Accounts payable	30 days

A. TOTAL INITIAL INVESTMENT COST

The total initial investment cost of the project including working capital is estimated at Birr 5.15 million, of which about 9.5% will be required in foreign currency.The major breakdown of the total initial investment cost is shown in Table 7.1

Table 7.1

INITIAL INVESTMENT COST ('000 BIRR)

Sr. No.	Cost Items	Foreign Currency	Local Currency	Total
1	Land	-	227.50	227.50
2.	Building and Civil Work	-	750.00	750.00
3.	Plant Machinery and Equipment	491.00	264.30	755.30
4.	Office Furniture and Equipment	-	75.00	75.00
5.	Vehicle	-	250.00	250.00
6.	Pre-production Expenditure*	-	491.59	491.59
	Total Investment cost	**491.00**	**1,931.31**	**2,549.39**
7	Working Capital	-	2,601.25	2,601.25
	Grand Total	**491.00**	**4,659.63**	**5,150.63**

B. PRODUCTION COST

The annual production cost at full operation capacity of the plant is estimated at Birr 12.57 million (see Table 7.2). The material and utility cost accounts for 94 per cent while repair and maintenance take 0.30 per cent of the production cost.

---

* *Pre-production expenditure include interest during construction (Birr 314,510 thousand), training (Birr 56,400), and costs of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

Table 7.2

ANNUAL PRODUCTION COST ('000 BIRR)

Items	Year			
	3	**4**	**7**	**10**
Raw Material and Inputs	8,511.50	9,721.47	12,150.25	12,150.25
Labour direct	55.99	63.94	79.92	79.92
Utilities	10.31	11.78	14.72	14.72
Maintenance and repair	26.46	30.22	37.77	37.77
Labour overheads	23.33	26.64	33.30	33.30
Administration cost	37.32	42.63	53.29	53.29
Total Operating Costs	**8,664.91**	**9,896.68**	**12,371.17**	**12,369.24**
Depreciation	203.78	203.78	203.78	123.78
Cost of Finance	198.14	186	141.39	81.21
Total Production Cost	**9,066.83**	**10,286.46**	**12,716.34**	**12,574.22**

C. FINANCIAL EVALUATION

1. Profitability

According to the projected income statement, the project will start generating profit in the first year of operation. Important ratios such as profit to total sales, net profit to equity (Return on equity) and net profit plus interest on total investment (return on total investment) show an increasing trend during the life-time of the project. The income statement and the other indicators of profitability show that the project is viable.

2. Break-even Analysis

The break-even point of the project is estimated by using income statement projection.

$$Be = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable cost}} = 20\ \%$$

3. Pay-Back Period

The investment cost and income statement projection are used to project the pay-back period. The project's initial investment and working capital will be fully recovered within 7 years.

4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 17 % and the net present value at 10.5% discount rate is Birr 1.72 million.

D. ECONOMIC BENEFITS

The project can create employment for 19 persons. In addition to supply of the domestic needs, the project will generate Birr 3.13 million in terms of tax revenue. Moreover, the Regional Government can collect employment, income tax and sales tax revenue.