HONEY SECTOR INVESTMENT OPPORTUNITY BRIEF

Honey and Beeswax Refinery Plant in High Potential Regions

EXECUTIVE SUMMARY

This apiculture sector investment opportunity brief highlights the establishment of a refinery unit for honey and beeswax in high production potential but highly disorganized regions of the country. The business envisages the establishment of a plant for the production of high quality table honey and beeswax with a capacity of 337.5 tons and 112.5 tons per annum respectively. The investment presents the opportunity to supply products to both the local and export markets.

Currently, there is an increased demand for honey and beeswax products in Ethiopia as well as in the international markets. Ethiopia has plenty of honey bees ready to meet the growing demand of honey. The country has the potential of producing up to 500,000 tons of honey and 50,000 tons of beeswax per annum.

The average annual demand for honey products in Ethiopia in the next ten years (2013-2022) is expected to reach at 90,357 tons. This is as a result of the current high population and future growth trends, a growing number of urban centers and urbanized lifestyles, and finally the economic growth rates registered by the country and visible increased income levels of the general population.

In terms of economic contribution, bee products; mainly honey and beeswax are among the highly marketed livestock products of Ethiopia. Further, in terms of exports commodities, honey and by-products, mainly beeswax, are among the main livestock export products of the country.

The total estimated investment requirement is approximately ETB 22,854,626, out of which ETB 6,689,000 is required for the construction of the processing plant and storage of the raw honey, ETB 1,500,000 is for the purchase of machinery and other equipment and ETB 2,500,000 will be used for the purchase of vehicles. The processing plant will create employment opportunities for 45 individuals and provide steady and secure income for more than 1,250 smallholder farmers (input suppliers). The initial goal of this business is to establish a honey refinery plant in order to produce high quality honey and beeswax in different honey potential areas for distribution. The project is financially viable with an average annual net profit of ETB 7,192,676, an average net profit margin of 10% and a ten-year internal rate of return (IRR) of 34% and NPV of ETB 40,604.321.

PRODUCT DESCRIPTION

Table Honey:

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

The proposed opportunity will be marketing quality, organic and traceable purified table honey and beeswax. The company purchases honey and beeswax in bulk from producer groups, cooperatives and unions. The large volume of honey is purchased during the harvest seasons and is marketed after purification during the seasons. The beeswax, on the other hand, is extracted from the honey and it is collected in its 'sefef' form throughout the year. During the non-honey seasons, beeswax purification and marketing will be the business's activity.

MARKET BACKGROUND

Although honey consumers are almost everywhere on the planet, only four countries (China, Ukraine, USA, Turkey) dominate global production of honey and less than a dozen countries (China, Argentina, Mexico, Brazil) drive the global exports. In the case of Africa, Ethiopia is the largest producer of honey, followed by Tanzania and Zambia. On the side of buyers, the main importer countries are rich (USA, Germany, Japan, UK). In this picture of global honey market, there is currently a significant concern over diseases (CCD-Colony Collapse Disorder) and quality issues (honey flux mainly in the Asia region). In 2013, globally, a limited honey production, an increasing worldwide

demand and extreme global climate conditions have taken place.

Concerning the global production and market of beeswax, major producers are few (India, Argentina, Turkey) including Ethiopia. But these major producers are not the top exporters. The top exporters include China, Malaysia, USA, Germany, France, Netherlands, Canada, Ethiopia and Spain. Most of the top beeswax exporters are also top importers showing that these countries (Germany, France and USA-the top three) dominate the global beeswax market. In 2012-13, global beeswax production has been around 60,000 tons per year having relatively stable prices. But due to the bee diseases, and extreme climate conditions, global demand for beeswax has been increasing. The EU imports around 6,000 tons per year and approximately 50% of this is sourced from developing countries. From the continent of Africa, similar to the case in honey, Ethiopia is the largest producer of beeswax. Even at the global level, Ethiopia is among the top four beeswax producers and this is considerably attributed to the predominantly traditional system of production, which has relatively higher beeswax product per hive.

Based on the evident global honey and beeswax market conditions, the demand for these products is deemed unsatisfied. This is tangibly demonstrated in the bulk supply requests made to Ethiopian honey and beeswax exporters by buyer agents from foreign markets: mainly from Middle East (Yemen, Saudi Arabia, Emirates), Far East (China, Japan) and Europe (Norway, Germany). The inability of the largest Ethiopian exporter companies to cater for this sizeable demand illustrates the apparent market opportunity and the room for new players in the Ethiopian honey and beeswax processing industry. Based on the existing reality, the envisaged business will be operating in an industry where there are significant market opportunities; facing sufficient, if not overwhelming, demand for its table honey and beeswax products.

SUPPLY

Ethiopia has varied climate with diverse flora and fauna offering year round flowering. This condition provides an ideal opportunity for honey production on a large scale. About 7,000 species of flowering plants are estimated to exist in the country. These plants 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 that the production of honey in the country is below its potential.

The estimate of total honey production in Ethiopia in 2011 is about 40 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 consumed domestically largely by Tej (honey wine). However, Crude honey could be processed into several important marketable products. These products include purified honey, beeswax, propels, 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.

Processing and supplying table honey to the local market helps to brand honey types by region, color, flora and packages. The business opportunity can supply its honey products to the existing market channels including wholesalers, retailers, supermarkets, and institutional users; hotels, hospitals, universities, etc.

Table 1: supply trend of honey to the export market (in tons)

Year	Volume (in tons)
2001	3
2002	3
2003	8

2004	19
2005	23
2006	151
2007	387
2008	196
2009	274
2010	615
2011	729

Source: - *Ethiopian Revenue and Customs Authority*

The above table shows that export of honey has been generally increasing in the past eleven years. The country's production and supply capacity of honey and related products has also increased.

Beeswax is supplied to the export and domestic market for various applications. Of the total production of wax produced, the major part is utilized for the traditional production of candle, which is called *"twaf".* Studies made by IPS some years back indicate that about 750 tons of bees wax is utilized for the production of *'twaf'* consumed mainly by about 25,000 Ethiopian Orthodox Churches. In addition more than 220 tons of wax is consumed by existing candle producing enterprises.

Data on the domestic production of beeswax are not available since it is produced at small-scale levels, mostly homemade. However, since beeswax is associated with the production of honey, it can be deduced using the standard ratio of 10 kg honey: 1kg wax. Accordingly, with an annual production of more than 25,000 tons of honey in Ethiopia, the volume of wax to be obtained is estimated at 2,500 tons.

DEMAND

At present, supermarkets, grocery shops and hotels are some of the major buyers of processed honey. According to the information obtained from supermarkets, the increasing expat community is also expected to constitute significant consumption 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 kg (or 825 tons). Hence, this figure has been taken as the present domestic effective demand (for year 2012) for processed honey.

The Ethiopian honey has not yet captured a significant market share in the export market due to the traditional way of production, which hardly meets the quality standards of exotic markets, as well as the uncompetitive offering price (EAB 2012). Still, there is some export of honey as well as some amount of honey import.

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%.

On the import side, honey weighing a few tons (except in 2010) has been imported. The pattern of import has been erratic. For example, an 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). However, 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 was also estimated to be 3 tons while the domestic demand and export effective demand for processed honey is estimated at 1,954 tons.

Table 2: The import of honey (in tons)

Year	Volume (in tons)
2001	4
2002	3
2003	3
2004	7
2005	8
2006	1
2007	2
2008	4
2009	1
2010	76
2011	3

Source: *Ethiopian Revenue and Customs Authority.*

Table 3: Projected demand for processed honey (in 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

Ethiopia imports a small amount of beeswax and exports a large quantity. Data obtained from the Ethiopian Revenue and Customs Authority (ERCA), with regard to import and export of beeswax for the period between 2001 to 2011 are given in Table below.

Table 4: Import of bee wax and other insect waxes

Year	Quantity (Tons)	Value (Birr)
2001	0.11	6,024
2002	0.82	13,062
2003	0.98	10,382
2004	1.84	32,256
2005	242.03	1,284,049
2006	631.29	3,513,510

2007	1.35	112,007
2008	1.01	26,264
2009	1.95	84,708
2010	2.13	107,016
2011	2.39	77,797

Source: - *Ethiopian Revenue and Customs Authority*

Wax is used in hundreds of applications around the world. According to the above source global consumption of wax is expected to grow at an average annual growth rate of more than 2% from 2010 to 2020 but with insufficient supply growth or even a supply decline. Hence, this indicates that there is a wide export market for the product if it is supplied in the required quality and quantity.

Table 5: Projected export demand for Ethiopian bees wax (in tons)

Year	Projected Demand
2013	378
2014	397
2015	417
2016	437
2017	459
2018	482
2019	506
2020	532
2021	558
2022	586

Source: - *Ethiopian Revenue and Customs Authority*

PRICING

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. The business at its first year of operation will be selling processed honey and beeswax at a price of ETB140/kg and ETB 120/kg respectively.

PLANT CAPACITY

Based on the outcome of different market studies and considering the minimum economic scale of production, the envisaged plant will have a capacity of 337.5 tons of processed honey per annum and 112.5tons of beeswax. This capacity is proposed on the basis of a single shift per day and 270 working days per annum. The processing plant will start production at 75% of its installed capacity, which will grow to 85% in the second year. Full capacity production will be attained after the fifth year and onwards.

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 Oromia region in general. To this end, the business will source bulk, quality, organic and perfectly traceable raw honey from well-known and recognized high honey production areas.

The major crude honey sources are smallholder farmers located in honey potential areas. An out-grower scheme will be established to secure supply for the long-term and closely work with farmers in capacity development; technical and knowledge transfer. In line with the development of farmers' capacity, the envisaged business opportunity will distribute modern beehives on a credit basis in the next five years. The farmers will pay back the

company in kind that is by honey. As the honey industry is the main supply source of input for Tej brewing, in return Tej houses are major suppliers of crude wax.

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.

UTILITIES

Electric power and water are the basic power and utilities required for the envisaged plant. The cost of these services is estimated to be minimal at slightly above ETB 39,600 per year.

PRODUCTION PROCESS

As honey is a seasonal product, the purification and marketing activities associated with it are also likely to be seasonal. In this regard, the business will be collecting, purifying and marketing beeswax in the remaining period of the year.

Honey contains mainly pollen, dust and air bubbles, which tend to include granulation (crystallization). The crystals present in honey are dissolved by heating the honey to 45 ^{0} 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^{0} C – 70 ^{0} 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 fur-fail” 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 ^{0} 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 ^{0} C - 65 ^{0} 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.

Beeswax:

During beeswax processing, dark honeycombs should first be soaked in water to remove non-wax components (honey, pollen …etc). Otherwise, while melting the wax emulsion is formed in the water reducing wax quality. Soft water is required for this purpose as hard water contains cations of some metals contributing to the emulsion formation. As wax contains uncombined fatty acids that react the metals of which the equipment is made and change the wax coloring (e.g. iron colors wax in brown, zink-in dark-blue, copper - in green), that facilitates emulsion formation and deteriorates wax quality. So, it is necessary to use technological equipment produced from non-corrosive materials, enameled metals, aluminum, wood or ceramics. Water enulgated in wax is removed by long settling of melted wax. Water and not-containing wax components will fall out and the wax quality will be improved.

While melting raw wax materials again, wax may store some insoluble admixtures. The coarse ones are removed by another melting in soft water and by settling of melted wax. The length of settling depends on the degree of wax pollution and its temperature. Very small admixtures that are commonly kept in wax by the forces of absorption and electrostatics are removed by adding of sulphuric and hydrochloric acids to melted wax (5.0 – 30.0 cm^3 per 10 kg of wax). Wax is carefully mixed with the acid and kept to mature in melted state. Sometimes, it is washed repeatedly in cold boiled water until dark wax gains yellow colorings.

Beeswax withstands the atmospheric influence and does not need any special storage facilities. Wax is not liable to damage of moth that is common in raw wax materials. It retains its properties, content and quality under long storage and heating.

ENVIRONMENTAL IMPACT

The plant does not have any pollutant emitted from the process. Thus, the project is environment friendly. While the processing of wax involves the usage of sulfuric and hydrochloric acid in small amount, the liquid waste to be generated during the production process of bee wax has to be collected and neutralized before disposal in order to avoid the adverse impact on environment.

MACHINERY AND EQUIPMENT

The processing plant machinery and equipment required for the project is estimated to cost ETB 1,500,000. These include the necessary inputs and equipment to produce table honey and beeswax.

LAND, BUILDINGS AND CIVIL WORKS

The purifying plant of the business is located in a high honey production area by securing land from the city administration, while a warehouse for stock storage and a first phase processing plant will be constructed.

STAFFING

The human resources of the company consist of skilled and experienced individuals in the field of honey processing. The total human resource required for the envisaged farm is 45 persons. The estimated annual salary requirement is anticipated to be ETB 1,316,604. At time of processing machine installation, training will be provided to operators and management team on how to properly operate and maintain equipment.

FINANCIAL ASSUMPTIONS

The financial model of the project is based on the following assumptions;

Installed Capacity	1	450,000	Kg
		450	tons

Product Mix

Description	Production Mix	Total Production (KG)
Honey	75%	337,500.00
Beeswax	25%	112,500.00
Total		**450,000.00**

Selling Price

	Honey (Price/ETB)	Bee Wax (Price/ETB)
Year 1	140.00	120.0
Year 2	147.00	126.0
Year 3	154.35	132.3
Year 4	162.07	138.9
Year 5	170.17	145.9

Revenue

	Honey (Price/ETB)	Bee Wax (Price/ETB)	**Total Revenue**
Year 1	47,250,000.00	13,500,000.00	**60,750,000**
Year 2	49,612,500.00	14,175,000.00	**63,787,500**
Year 3	52,093,125.00	14,883,750.00	**66,976,875**
Year 4	54,697,781.25	15,627,937.50	**70,325,719**
Year 5	57,432,670.31	16,409,334.38	**73,842,005**

Revenue at capacity utilization rate

Project Year	Capacity Rate	**Total Revenue (Birr)**
1	75%	**45,562,500.00**
2	85%	**54,219,375.00**
3	95%	**63,628,031.25**
4	95%	**66,809,432.81**
5	95%	**70,149,904.45**

Costs

Raw Material

Raw honey 55 br

Material Specification	Quantity/Kg	Unit Price (ETB)	**Total cost/Kg**
Year 1	675,000	55.00	**37,125,000.00**
Year 2	708,750	57.75	**40,930,312.50**
Year 3	744,188	60.64	**45,125,669.53**
Year 4	781,397	63.67	**49,751,050.66**
Year 5	820,467	66.85	**54,850,533.35**

Cost of raw material is estimated to increase by 5% per year

5%

TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated to be ETB 22,854,626. The following table summarizes the total investment cost breakdown.

Table 6: Investment Breakdown

Description	Cost (in ETB)
Land and Building	6,689,000
Machinery and Equipment	1,500,000
Office furniture and Equipment	1,500,000
Vehicles	2,500,000
Working Capital (Inventory)	10,665,626
Total	**22,854,626**

FINANCIAL ANALYSIS

Based on the projected financial statement, the project will generate profit throughout the projected period (10 years). Annual average net profit after tax is projected to be ETB 7,192,676 with an average margin of 10%. The IRR after tax of the project will be 34% indicating the financial viability of the business. The NPV after tax, at a 10% discount rate, is expected to be ETB 40,604,321.

	Project Years									
Description	1	2	3	4	5	6	7	8	9	10
Sales Revenue	**45,562,500**	**54,219,375**	**63,628,031**	**66,809,433**	**70,149,904**	**73,657,400**	**77,340,270**	**81,207,283**	**85,267,647**	**89,531,030**
Operating Costs:										
Raw Material Cost	37,369,688	41,207,625	45,435,607	50,060,988	55,160,471	57,918,494	60,814,419	63,855,140	67,047,897	70,400,292
Wages and Salaries	1,316,604	1,382,434	1,451,556	1,524,134	1,600,340	1,680,357	1,764,375	1,852,594	1,945,224	2,042,485
Transportation Expense	540,000	623,700	654,885	687,629	756,392	794,212	833,922	875,618	919,399	965,369
Utilities	39,600	43,560	47,916	50,312	52,827	55,469	58,242	61,154	64,212	67,423
Insurance	245,335	257,602	270,482	284,006	298,206	313,117	328,772	345,211	362,472	380,595
Repair and Maintenance	-	563,780	591,969	621,567	652,646	685,278	719,542	755,519	793,295	832,960
Stationary & P.T.T	10,000	11,500	13,225	15,209	17,490	20,114	23,131	26,600	30,590	35,179
Legal & Audit fee	20,000	23,000	26,450	30,418	34,980	40,227	46,261	53,200	61,180	70,358
Miscellaneous	50,000	55,000	60,500	66,550	73,205	80,526	88,578	97,436	107,179	117,897
Total Operating Costs	**39,612,402**	**44,190,435**	**48,575,935**	**53,365,325**	**58,672,296**	**61,614,818**	**64,705,620**	**67,952,269**	**71,362,734**	**74,945,407**
NP BTIDA	5,950,099	10,028,940	15,052,096	13,444,108	11,477,608	12,042,581	12,634,650	13,255,014	13,904,913	14,585,623
Less: Interest and Other Charges	178,522	146,174	110,641	71,611	28,738	(0)	(0)	(0)	(0)	(0)
NP BTDA	5,771,576	9,882,767	14,941,455	13,372,497	11,448,870	12,042,581	12,634,650	13,255,014	13,904,913	14,585,623
Less: Depreciation & Amortization	1,434,450	1,434,450	1,434,450	1,434,450	1,434,450	1,544,450	1,544,450	1,544,450	1,544,450	1,544,450
Profit Before Income tax	4,337,126	8,448,317	13,507,005	11,938,047	10,014,420	10,498,131	11,090,200	11,710,564	12,360,463	13,041,173
Less: Income tax	1,301,138	2,534,495	4,052,101	3,581,414	3,004,326	3,674,346	3,881,570	4,098,698	4,326,162	4,564,410
Net Profit	**3,035,989**	**5,913,822**	**9,454,903**	**8,356,633**	**7,010,094**	**6,823,785**	**7,208,630**	**7,611,867**	**8,034,301**	**8,476,762**
Profit Margin	7%	11%	15%	13%	10%	9%	9%	9%	9%	9%