

PROFILE ON BEEHIVES

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I. SUMMARY

This profile envisages the establishment of a plant for the production of beehives with a capacity of 15,000 pieces per annum.

The major raw materials required to make beekeeping equipment are wood planks, nails/screws and meshes, which are available locally.

The present demand for the proposed product is estimated at 212,102 pieces per annum. The demand is expected to reach at 380,905 pieces by the year 2020.

The total investment requirement is estimated at about Birr 5.19 million, out of which Birr 150 thousand is required for plant and machinery. The plant will create employment opportunities for 18 persons.

The project is financially viable with an internal rate of return (IRR) of 23.85% and a net present value (NPV) of Birr 3.28 million, discounted at 8.5%.

The project will create a forward linkage effect with the apiculture sub-sector.

II. PRODUCT DESCRIPTION AND APPLICATION

One of the modern bees keeping equipment comprises improved beehives. The manufacturing and availing of this item will have a profound impact on the development of the apiculture sub-sector in the country.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Ethiopia is one of the countries in the world with a long tradition of beekeeping. The country is estimated to have the largest bee colonies in Africa with over ten million bee colonies. The most important honey production regions in Ethiopia are Oromia (about 46 percent of total production), Southern Nations Nationalities and Peoples Regional State, S.N.N.P.R., 22%) and Tigray (5%).

The large majority of beekeepers in the country are still producing honey using traditional hives. Apiculture experts all agree that beekeepers who have adopted wooden frame hives can easily increase their production of honey manifold compared to the traditional or the intermediate hives. Currently, the demand for modern beehives is met through domestic production.

According to Ministry of Agriculture as of 2006 there are estimated 11,143,030 beehives, of which 10,605,120 are traditional, 509,800 are modern and 28,110 are intermediate.

In determining the present demand for beehive frames it is conservatively assumed that existing traditional beehives will be replaced with modern ones in the coming 50 years. The present effective demand for beehive frames is thus estimated at 212,102 pieces per annum (i.e. 2% of the existing traditional beehives).

2. Projected Demand

On the average, traditional, intermediate and modern hives respectively yield about 5 kg, 15 kg and 25 kg of honey annually. This marked difference in output will induce farmers to replace traditional beehives with modern and improved ones. However, in

order to be conservative a 5% growth rate is used. The projected demand for the product is shown in Table 3.1.

Table 3.1
PROJECTED DEMAND FOR BEEHIVE FRAME (PIECES)

Year	Projected Demand
2009	222,708
2010	233,843
2011	245,535
2012	257,812
2013	270,702
2014	284,238
2015	298,449
2016	313,372
2017	329,040
2018	345,492
2019	362,767
2020	380,905

3. Pricing and Distribution

According to knowledgeable source, the price of beehive frame is about Birr 225 per piece. This price is adopted for the product of the envisaged plant.

The product can get its market outlet through the existing agricultural inputs and equipment distributing enterprises throughout the country. Close collaboration with the Region's Bureau of Agriculture is imperative to promote the product.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

Table 3.1 of the market study indicates that the projected demand for modern beehives at a national level is 222,708 pieces in 2009, and 380,905 pieces in 2020. Considering 5% of the average annual demand for Addis Ababa (based on the population of Addis Ababa and its environs in comparison to the national population), the annual capacity of beehives production project will be 15,000 pieces, based on 300 working days and double shift of 16 hours per day.

2. Production Programme

Table 3.2 shows the production programme of the envisaged project. At the initial stage of the production period, the plant requires some year to penetrate in to the market. Therefore, in the first and second year of production, the capacity utilization rate will be 75 % and 85 %, respectively. In third year and thereafter, full capacity production shall be attained.

Table 3.2

PRODUCTION PROGRAMME

Sr. No.	Production	Production Year		
		2007	2008	2009 – 2016
1	Beehives (pcs)	11,250	12,750	15,000
2	Capacity Utilization (%)	75	85	100

IV. MATERIALS AND INPUTS

A. RAW MATERIALS

Raw materials of the project are seasoned wood (Timber). The wood should be termite proof, resistant to the rotting effect of the sun and rain-proof and non – bee repellent.

The city of Addis Ababa is not endowed with the major forest resource. However, seasoned wood is available in regional states like SNNPRS (i.e, particularly, in Kaffa, Shaka and Bench Maji zones). It is, therefore, possible to transport timber from these areas to an area in Addis Ababa where this project will be established. The auxiliary materials required are glue and nails which are available from the local manufacturers. The total annual cost of raw material is estimated at Birr 1,428.30 thousand. Table 4.1 indicates the annual requirement of row material of the proposed project.

Table 4.1
RAW MATERIALS REQUIREMENT AND COST
(AT FULL CAPATYI)

Sr. No.	Raw Material	Unit of Measure	Qty.	Cost ('000 Birr)
1	Seasoned Wood /Timber	m ³	900	1,356.30
2	Glue	kg	1,500	30.00
3	Nails	kg	2,250	27.00
4	Varnish, Stucco, Sand paper, etc	LS	-	15.00
	Total	-	-	1,428.30

B. UTILITIES

Electricity and water are the principal utilities of the project. The annual utilities requirement and cost are indicated in Table 4.2.

Table 4.2
UTILITIES REQUIREMENT AND COST

Sr. No	Raw Material	Unit of Measure	Qty.	Cost ('000 Birr)
1	Electricity	kWh	150,000	71.04
2	water	m ³	5000	16.25
	Total			87.29

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production process

Seasoned wood /Timber are cut in to size to produce the different component of the beehives. The width of the wood must be exactly 32mm. the tropical honey bee builds a comb which has a thickness of 25mm. the comb is usually attached to the center of the top- bar. A space of 3.5 mm is, thus left at either side of the comb. When two or more top- bars fixed with combs are placed side by side, the inner space becomes 7mm. This space vital to the bees, is usually called as the “bee space”. These bee spaces are also found between the combs and the hive body. They serve the bees as path in which they can move freely, such intricate construction demands relatively good quality wood and expertise in carpentry.

Production of beehives is environmental friendly. The by-products that are left over during beehive production are files and pieces of wood that can be used as household energy.

2. Source of Technology

Selam Technical vocational College

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Addis Ababa

Ethiopia

B. ENGINEERING

1. Machinery and Equipment

The list of machinery and equipment is indicated in table 5.1 the total cost of machinery is estimated at Birr 150,000. The production equipment can be obtained from local markets. Hagbes, UNI-MAG and other importers can be contacted.

Table 5.1

MACHINERY AND EQUIPMENT REQUIREMENT AND COST

Sr. No.	Description	Qty. (No.)	Cost(Birr)
1	Circular Saw	1	21,000
2	Thickness planner	1	34,500
3	Drilling machine	2	40,500
4	Bench grinder	1	18,000
5	Set of carpentry tools	2	10,500
6	Set of c-clamps	3	7,500
7	Set of parallel clamps	3	6,000
8	Work bench	4	12,000
	Total Cost	-	150,000

2. Land, Building and Civil works

The plant requires a total of 1000m² area of land out which 500 m² is built – up area which includes manufacturing area (150 square meters) raw material and finished product stock area (200 square meters) , office (100 square meters) , the remaining 50 square meters for general purpose building , and space for future expansion. Assuming construction area of Birr 2300 per m², the total cost of construction is estimated to be Birr 1,150,000 .

According to the Federal Legislation on the Lease Holding of Urban Land (Proclamation No 272/2002) 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.

The land lease price in the industrial zones varies from one place to the other. For example, a land was allocated with a lease price of Birr 284 /m² in Akakai-Kalti and Birr 341/ m² in Lebu and recently the city's Investment Agency has proposed a lease price of Birr 346 per m² for all industrial zones.

Accordingly, in order to estimate the land lease cost of the project profiles it is assumed that all manufacturing projects will be located in the industrial zones. Therefore, for this profile which is a manufacturing project a land lease rate of Birr 346 per m² 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 5.2 shows incentives for lease payment.

Table 5.2**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 period of lease for industry is 60 years .

Accordingly, the total lease cost, for a period of 60 years with cost of Birr 346 per m², is estimated at Birr 20.76 million of which 10% or Birr 2,076,000 will be paid in advance. The remaining Birr 18.68 million will be paid in equal installments with in 28 years, i.e., Birr 667,286 annually.

VI MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The manpower requirement of the envisaged project is 18 persons. The list of manpower is indicated in the Table 6.1. The total annual labor cost including fringe benefits is estimated at birr 195,750.

Table 6.1
MANPOWER REQUIREMENT AND LABOUR COST

Sr. No	Position	Req. No.	Monthly salary (Birr)	Annual Salary (Birr)
1	General Manager	1	3,000	36,000
2	Secretary/cashier	1	900	10,800
3	Production head	1	2,500	30,000
4	Operators	4	2,400	28,800
5	Fitters	4	1800	21,600
6	Laborers	5	1,750	21,000
7	Guard	2	700	8,400
	Sub-Total	18		156,600
	Workers' Benefit (25% of BS)			39,150
	Total Cost			195,750

B. TRAINING REQUIREMENT

Currently, government, private and other institutions are training several students on wood work. In addition, experienced operators and fitters can be assigned for the job. Therefore, there is no need of training arrangement for the envisaged project.

VII. FINANCIAL ANALYSIS

The financial analysis of the bee hives 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	2 years
Bank interest	8.5%
Discount cash flow	8.5%
Accounts receivable	30 days
Raw material local	30 days
Work in progress	1 days
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 5.25 million. 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	Local Cost	Foreign Cost	Total Cost
1	Land lease value	2,076.00	-	2,076.00
2	Building and Civil Work	1,150.00	-	1,150.00
3	Plant Machinery and Equipment	150.0	-	150.00
4	Office Furniture and Equipment	100.00	-	100.00
5	Vehicle	450.00	-	450.00
6	Pre-production Expenditure*	359.86	-	359.86
7	Working Capital	123.40	-	123.40
	Total Investment Cost	4,409.26	-	4,409.26

* *N.B Pre-production expenditure includes interest during construction (Birr 311.97 thousand) and Birr 100 thousand costs of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

B. PRODUCTION COST

The annual production cost at full operation capacity is estimated at Birr 2.14 million (see Table 7.2). The raw material cost accounts for 66.73 per cent of the production cost. The other major components of the production cost are financial cost, depreciation and direct labour which account for 10.51%, 9.18% and 4.39% respectively. The remaining 9.18% is the share of utility, repair and maintenance, labour overhead and other administration cost.

Table 7.2

ANNUAL PRODUCTION COST AT FULL CAPACITY ('000 BIRR)

Items	Cost	%
Raw Material and Inputs	1,428.30	66.73
Utilities	87.29	4.08
Maintenance and repair	7.50	0.35
Labour direct	93.96	4.39
Labour overheads	39.15	1.83
Administration Costs	62.64	2.93
Land lease cost	-	-
Total Operating Costs	1,718.84	80.31
Depreciation	196.50	9.18
Cost of Finance	224.95	10.51
Total Production Cost	2,140.29	100

C. FINANCIAL EVALUATION

1. Profitability

Based on the projected profit and loss statement, the project will generate a profit through out its operation life. Annual net profit after tax will grow from Birr 745.69 thousand to Birr 1.19 million during the life of the project. Moreover, at the end of the project life the accumulated cash flow amounts to Birr 8.93 million.

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 of the project including cost of finance when it starts to operate at full capacity (year 3) is estimated by using income statement projection.

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 28\%$$

4. Payback Period

The pay back period, also called pay – off period is defined as the period required to recover 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 4 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 23.85 % 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 principal a project is accepted if the NPV is non-negative.

Accordingly, the net present value of the project at 8.5% discount rate is found to be Birr 3.28 million which is acceptable.

D. ECONOMIC BENEFITS

The project can create employment for 18 persons. In addition to supply of the domestic needs, the project will generate Birr 2 million in terms of tax revenue. The project will create a forward linkage effect with the apiculture sub-sector.