Pre-Feasibility Study

Honey Production, Processing, Packaging & Marketing

(SMEDA DOCUMENT)

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Government of Pakistan

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1. PROJECT PROFILE

Honey is a sweet and viscous fluid produced by honeybees from the nectar of flowers. Honey has been regarded a food with high nutritional value and enigmatic healing and preserving powers. Religion, human civilizations and history all have regarded honey a valuable and sacred food. It has been used by the ancient civilization for the purpose of mummification. Medicinal use of honey was very common among all nations of the ancient civilizations. Honey was also one of the favorite appetites of Muhammad (PBUH) and his disciples. Besides, we see that in Quran, both honeybee and honey are referred to as a wholesome food and a great healer for diseases.

Human beings have been relying on wild honey historically; however, there are some ancient evidences suggest that in Chinese reared honeybees for the first time, producing honey for their personal use, not commercial purposes. By the introduction of modern agricultural techniques in different areas in order to increase productivity and meet growing human requirement of food, farming of livestock became an extremely attractive and financially profitable business in rural areas.

Honeybee farming is also one of the areas where impressive achievements were noticed globally as well as locally. Through research and development efforts of Pakistan Agriculture & Research Council, European honeybee was introduced in Pakistan in 1980s for the purpose of commercial bee farming. Currently there are more than 300,000 bee colonies exist in Pakistan[1].

Definition of Honey
(According to Pakistan Standards Quality Control Authority - PSQCA)[2]

Honey is the natural sweet substance produced by honey bees from the nectar of flowers. It is also produced from blossoms or secretions of living parts of plants or excretions of plant sucking insects, however, honeybees collect, transform and combine nectar with specific substances of their own, store and leave in the honey comb to ripen and mature.

Bees produce blossom honeys from nectar and honeydew honey from honeydew. Honeydew is the product of small plant sucking insects. Honey is significantly sweeter than table sugar and has attractive chemical properties for baking. Honey has a distinctive flavor which leads some people to prefer it over sugar and other sweeteners.

Liquid honey does not spoil. Because of its high sugar concentration, it kills most bacteria by crenation. Natural airborne yeasts cannot become active in it because the moisture content is too low. Moisture content in natural raw honey varies from 14% to 18%. As long as the moisture content remains under 18%, virtually no organism can successfully multiply to significant amounts in honey, though, importantly, enough

[1] **Pakistan Year Book 2005-06, Ministry of Food, Agriculture and Livestock, Govt. of Pakistan**

[2] **PSQCA: PS 1934:1992 (1st Revision) – honey**

bacteria survive to make honey dangerous for infants (especially Clostridium botulinum).

Honey consists essentially of different sugars, predominate glucose and fructose. The colour of honey varies from nearly colorless to dark brown. The consistency can be fluid, viscous or partly to entirely crystallized. The flavor and aroma vary, but usually derive from the plant origin. It should not contain any sweetening agents and additions.

1.1 OPPORTUNITY RATIONALE

In Pakistan, honey has been used both as a food product and medicine. Particularly, aging people and children are considered to be in more need of honey and its products. However, food table particularly of children and the older people is considered incomplete without the bottle of honey. The proportion of children and the old people would be the primary target market, which is, more than 50% of the total current population.

Unlike other countries where honey is consumed throughout the year irrespective of the fact that how far they are located from North Pole and what weather conditions are there, in Pakistan, use of honey is traditionally discouraged during summer due to a perception about honey that it is hot in nature and should not be used during hot weather or in excess quantities which is perhaps not true at all as Arab countries where weather conditions are even more severe, honey is consumed in larger quantities both in winter and summer seasons. Nevertheless, in Pakistan and abroad, the consumption of honey increases substantively during winter and remain limited during summer (Except for medicinal use).

However, an entrepreneur should rationalize the whole situation. While average household income patterns are steadily improving, honey, being an expensive item is purchased by a limited number of households in limited quantity. On the other hand, both eastern and western pharmaceutical companies extensively use honey for the manufacturing of medicines. Particularly, eastern pharmaceutical companies are the largest consumer of the honey using it in almost all major prescription/medicine. It is suggested that honey business as a trader would best be suitable for those operating other food products business i.e. spice, pickle, jam & jellies etc.

Pakistan has a large agricultural base. During different cropping seasons, honeybee farming can be adopted as a side business to produce honey on commercial level. Honeybees also serve as agents for the crop pollination. It helps for gaining high yield rate and healthy production.

Crop pollination:
The share of honeybees in crop pollination is 80 %. It improves the quality of fruits, vegetable and yield of seed crops.

Bee hives value-added by-products:

Royal jelly, pollen and propolis are used as health food and beeswax in cosmetics. The production and value addition of by-products would supplement the income of beekeepers.

1.2 PROJECT BRIEF

The project of honey production, processing, packaging and marketing envisages the farming of honeybees, extraction of honey, its processing in the factory, followed by packaging and then distribution or supply to the consumer market. The proposed business will start with 600 beehives initially, however, within a few months it will reach around 1500 hives which will be settled in Punjab or NWFP in the farming areas where wild plantation or crop farming is common. In such areas, the prospective entrepreneur may sign a contract with the local farmers or the land owners to allow the placement of beehives in the locality (although it is not necessary and most of the honey producers work without any formal agreement) and their subsequent movement from one place to another so that bees find enough flowers in the apiary site to fill the honey comb. The site owners may or may not charge rent against this facility, however, the proposed project will incur expenses on this account[3].

Once the hive is ready and filled with honey, it will be extracted using prevalent extraction techniques and will be stored in large plastic drums. Processing and packaging will be performed in the production facility while Quality Testing will be outsourced to third party. In the end, packaged honey of different grades will be supplied to the local market through distributors.

1.3 MARKET ENTRY TIMING

Honey is used as food mostly during winter season which lasts almost three to four months in the entire country. Honey demand increases during chilly winter when children and aged people need honey to keep them warm and protected from cough and other seasonal diseases. This is the best time to market the product.

On the other hand, when we assess supply side of honey, it was informed by the honey producers that March, April, May, September, October and November are the months when honey is produced by the bees, while during rest of six months production is either stopped or so small that can only feed bees of the hive. Therefore, it would be appropriate to start production from September and bring your product in the market from November. This would help business integrate its production and marketing operations.

1.4 PROPOSED BUSINESS LEGAL STATUS

The legal status of business tends to play an important role in any setup; the proposed Honey Processing and Packaging Unit is assumed to operate on Sole Proprietorship basis.

[3] **Pakistan Agriculture Research Center**

1.5 PROPOSED CAPACITY

Production capacity of the proposed Honey production, processing and packaging business would be around 200,000 Kilogram during first year. Project will utilize 60% of its total production capacity (only for processing and packaging plant and machinery) which will increase @10% every year.

1.6 PROJECT COST

Honey processing and packaging involves a simple process of refining and packaging which needs necessary equipment and machinery. During discussions with the existing stakeholders and sector experts, it was found that most of the honey producers use local equipment and machinery, however, for the proposed project we have assumed Indian honey processing plant, while, other equipment and machinery would be procured from local sources. The total project cost of the Honey production, processing packaging and marketing business would be approximately Rs. 18.2 million.

1.7 RECOMMENDED PROJECT PARAMETERS

Capacity	Human Resource	Technology/Machinery	Location
200,000 kg / year	281	Imported and Local Machinery	Punjab, N.W.F.P. & Sindh

Financial Summary

Project Cost	IRR	NPV (Rs)	Payback Period	Cost of Capital (WACC)
Rs. 18.2 million	31%	11,124,153	3 Years 6 Months	17.5%

1.8 PROPOSED LOCATION

Honey production and processing procedures are simple and can be performed in a small facility. With limited need of electricity and other utilities, it is expected that a small factory in a small industrial area will be suitable for this business. Besides, skilled manpower and availability of raw material are the key elements driving the decision on facility location. Honey processing unit will be located in Karachi, while, production facility will operate across Punjab as production is a mobile activity in which hives are moved according to weather and availability of flowers. It is proposed that Punjab and Sindh & N.W.F.P would be suitable as an apiary site (honey production site).

1.9 KEY SUCCESS FACTOR

Key success factors in honey business include the following:

- Generation of demand during season
- Consistent supply of honey from the production facility
- Availability of skilled manpower

Honey business is dominated by the manufacturers who also do some other businesses i.e. spices, Fruit Jams and Jellies etc. During winter, honey demand increases to its maximum than at any other time of the year. Extensive promotional campaigns and sales discount schemes for retailers, distributors and wholesales would be helpful in increasing demand. Besides that, networking with the honey suppliers from all over the country would be necessary to meet any excess requirement or shortfall in the business' own production.

2. SECTOR & INDUSTRY ANALYSIS

2.1 SECTOR CHARACTERISTICS AND OVERVIEW

Honey extraction, processing, packaging and marketing is considered to be a small scale business in Pakistan. There are two types of honey known in the market , one is wild honey for which the largest source is FATA areas and Changa Manga (Punjab), while, farm honey is produced largely in Punjab and some areas of NWFP.

Based on our discussions with the honey producers operating farms across the country, following areas have been identified where extensive opportunities for honeybee farming are not only available but also being exploited by the honey producers:

Mustard (Sarso) Honey Areas	Acacia (Pholai) Honey Areas	Plum (Beri) Honey Areas	Orange and Barseen Honey Areas
Bahawalpur	Jhelum	Bannu	Sargodha
Multan	Attock	Karak	Kot Momin
Lodhra	Islamabad	Noushehra	Bhalwal
Sahiwal	Bhalwal	Attock	Shaheen Abad
Kusur	Haripur	Kohat	Faisalabad
	Tallagang		Mandi Bahauddin
	Azad Kashmir		Gujrat
	Swat		Sheikhupura
	Gujar Khan		Gujranwala
	Hundi		Duska
	Kahota		Sialkot
	Bannu		
	Chakwal		
	Sahiwal		
	Mandi Bahauddin		

Sargodha is the only identified location where Sunflower honey is produced. During discussions with the honeybee farmers, it was noted that on average 15 kg honey is produced from one hive of the size 22"x17". Average time it takes to be filled in the peak season (March to May) is mentioned to be 12-20 days. However, during Monsoon the production is almost zero and farmers may require to feed honeybees in this season. Leftover honey in the hive primarily used by the honeybees and farmers avoid to extract honey in this season. Tarnab farm market in Peshawar is considered to be the center of honey business. Honey machinery suppliers [except for processing machinery which is generally imported from India, China and Germany] and traders are located in

this market. During discussions with the honeybee farmers and researchers from Honey Research Centre Islamabad, commercial scale honey processing plant is used by only producer which is Islamabad based honey producer and trader. Most of the setups in Pakistan use crude process of honey refining.

Honeybee farming is a quite interesting work. Hives which are used as honey combs are transported to the apiary sites in vehicles. During night time hives are placed at different locations (generally along the river banks, beside main highways within the safe distance) with reasonable distance between two hives. Sliding panes of the hives remain closed and removed early morning before sunrise so that bees are free to fly. Side panes of the hive are shut down after sun sets in the evening. In every two three days beehives are moved three to four kilometers ahead from their existing position in the apiary territory selected by the farmer in order to get rid of empty flowers sucked by the honeybees. The purpose of this relocation is to provide honeybees with a new field full of fresh flowers. The process continuous till the time farmer finds the hive completely filled with honey. Honey is extracted using extractors from the mature hives in large sized tumblers or pots in the field. The extracted honey is then gathered on a site and transported to the processing and packaging factory, while apiary site operations continuous till the end of season. It has been suggested by the existing operators that with the radius of 3 km, a maximum of 50 to 100 hives of standard size can be settled effectively.

The sector is largely operating informally and no specific data is available as to how many extractors (honey producers) are in the industry; and who are the main suppliers. However, according to Ministry of Food, Agriculture and Livestock, Pakistan, there are 300,000 apiary sites currently operating in Pakistan. While looking at the FATA honey suppliers who are the biggest wild honey suppliers, they collect honey from a number of small scale bee keepers who have 25 to 50 hives within a radius of 3-4 kilometer. Generally, the honey collectors are Khans and Maliks of the area and use their social and political influence to raise financial benefit from the natural resources. Collected honey is packed in large sized plastic drums which are stored in natural caves for a certain time period until all honey is collected. The stored quantity is then supplied through trucks and heavy vehicles to the traders who pay the highest prices. Peshawar is the main market for the procurement of honey.

2.1.1 Composition of Honey

Honey is a mixture of sugars and other compounds. The specific composition of any batch of honey will depend largely on the mix of flowers consumed by the bees that produced the honey.

As a natural product, the composition of honey is highly variable; however, standards as general reference are provided in the following table[4]:

[4] http://www.nhb.org (National Honey Bee)

	Average	Range
Fructose/Glucose Ratio	1.23	0.76 - 1.86
Fructose, %	38.38	30.91 - 44.26
Glucose %	30.31	22.89 - 40.75
Minerals (Ash) %	0.169	0.020 - 1.028
Moisture, %	17.2	13.4 - 22.9
Reducing Sugars, %	76.75	61.39 - 83.75
Sucrose, %	1.31	0.25 - 7.57
pH	3.91	3.42 - 6.10
Total Acidity, mg / KG	29.12	8.68 - 59.49
True Protein mg / 100g.	168.6	57.7 - 567

The analysis of the sugar content of honey is used for detecting adulteration.

2.1.2 Interesting Facts

Honey Bee

- Bees fly an average of 13-15 miles per hour.
- A bee's wings beat 180 times per second.
- During the production period, or spring and summer, a worker bee's average life span is six weeks.
- Worker bees are all female.
- Honeybees visit approximately two million flowers to make one pound of honey.
- A bee travels an average of 1600 round trips in order to produce one ounce of honey - as far as 6 miles per round trip.
- To produce 2 pounds of honey, bees travel a distance equal to 4 times around the earth.
- Bees from the same hive visit approximately 225,000 flowers per day - one bee usually visits between fifty and a thousand flowers per day, but sometimes up to several thousand.
- Approximately 8 pounds of honey is consumed by bees to produce 1 pound of beeswax.
- Queens will lay approximately 2,000 eggs per day at a rate of 5 or 6 per minute - between 175,000 and 200,000 eggs are laid per year.
- The queen may mate with up to 17 drones over a 1-2 day period of mating flights.
- The queen stores the sperm from her mating voyage, giving her a lifetime supply. She only mates once in her lifetime.

Hives

- Bees do not sleep; however, they can be found resting in empty cells.
- There are 40,000 to 60,000 bees in a beehive during honey-gathering season.
- The average temperature of a hive is 93.5 degrees Fahrenheit.

Honey

- Honey is 80% sugar and 20% water.

- Honey has been used as a topical dressing for wounds since microbes cannot live in it. It also produces hydrogen peroxide.
- Honey has been used to embalm bodies.
- Fermented honey, known as mead, is the most ancient fermented beverage.
- The term "honey moon" originated with the Norse practice of consuming large quantities of mead during the first month of a marriage.
- Honeybees are the only insects that produce food for humans.

2.1.3 Types of Honey

Blended

Most commercially available honey is blended, meaning that it is a combination of honeys from different sources. China is the world's largest producer of honey, followed by the United States, Argentina, and Turkey.

Polyfloral

Polyfloral honey is derived from the nectar of many types of flowers.

Monofloral

Different monofloral honeys have a distinctive flavor and colour due to differences between their principal nectar sources. Beekeepers keep monofloral beehives in an area where the bees have access to only one type of flower, because of that flower's properties. In practice, because of the difficulties in containing bees, a small proportion of any honey will be from additional nectar from other flower types. Some of the main types of monofloral honey (and their main countries of production) include: apple blossom (United Kingdom), acacia (Bulgaria, Hungary and Romania), cherry blossom (United Kingdom), clover (Canada, New Zealand), eucalyptus (Australia), heather (United Kingdom), lavender (France, Spain), lime blossom (China, Poland), orange blossom (France, Spain), tupelo (United States), wild thyme (France, Greece, New Zealand) and sunflower (France, Spain).

2.1.4 USE OF HONEY

The main uses of honey are in pharmaceutical companies, cooking, baking, spreading on bread or toast, and as an addition to various beverages such as tea. Because honey is hygroscopic (drawing moisture from the air), a small quantity of honey added to a pastry recipe will retard staling. Raw honey also contains enzymes that help in its digestion, several vitamins and antioxidants. Honey is also used in traditional folk medicine and apitherapy, and is an excellent natural preservative.

2.1.5 HONEY AS A PRODUCT

Honey processing

- **Comb honey** is a popular honey product in the western countries. Comb honey was once packaged by installing wooden framework in special supers, but this

labor intensive method is dying, and is being replaced by plastic rings or cartridges. After removal from the hive, a clear cover is usually fitted onto the cartridge so customers can see the product.

- **Raw honey** - Honey as it exists in the beehive or as obtained by extraction, settling or straining without adding heat above 120 degrees Fahrenheit. Raw honey contains some pollen and may contain small particles of wax. Local raw honey is sought after by allergy sufferers as the pollen impurities are thought to lessen the sensitivity to hay fever. Most of the honey suppliers and marketers in Pakistan offering this type of honey as modern processing techniques are either out of reach or costly for rural producers.
- **Chunk honey** - Honey packed in wide-mouth containers consisting of one or more pieces of comb honey surrounded by extracted liquid honey. This type of honey is preferred in the USA.
- **Strained honey** or **filtered honey** - Honey which has been passed through a mesh material to remove particulate material (pieces of wax, propolis, other defects) without removing pollen. Preferred by the health food trade - it has a cloudy appearance due to the included pollen, but it also tends to crystallize more quickly than ultra-filtered honey.
- **Ultra-filtered honey -** Honey processed by very fine filtration under high pressure to remove all extraneous solids and pollen grains. Ultra-filtered honey is very clear and has a longer shelf life, because it crystallizes more slowly. Preferred by the supermarket trade.

Honey products

Products which do not meet the compositional criteria for honey, but are products consisting in whole or in part of honey.

Imitation or artificial honey is a mixture of sweeteners, colored and flavored to resemble honey. This product does not meet the definition of honey or honey products. As such, it is inappropriate to include the word honey on the label of such a product.

This is a partial and constantly growing list intended to standardize the vocabulary used in the honey trade.

1. **Deionized Honey**: A honey product where honey has been processed to remove selected ions.

2. **Deproteinized Honey**: A honey product from which protein has been removed by appropriate processing.

3. **Dried Honey**: Honey which has been dehydrated and in which edible drying aids and processing adjuncts may be included to facilitate processing and improve product stability.

4. **Honey Extract**: Any product formed by removing selected components from honey. The nature of the component (flavor, color, etc.) determines the type of extract.

5. **Honey Spread**: A variety of edible, extremely viscous honey products made from honey or creamed honey. Honey spread is sometimes blended with other ingredients (such as: fruits, nuts, flavors, spices or margarine but excluding refined sweeteners).

6. **Natural Honey Flavor**: A substance obtained (often by extraction) only from honey that contains the flavor constituents of honey.

7. **Ultra-filtered Sweetener Derived from Honey**: Honey from which all materials not passing a specified submicron membrane pore size have been removed. Materials removed include most proteins, enzymes and polypeptides. Evaporation required in the processing may also remove some volatile flavor and aroma constituents.

2.1.6 Precautions

Honey is not always edible. Because it is gathered from flowers in the wild, there are situations in which it may be toxic. Therefore, it is recommended to test the honey received from the honey collector and ensure that it is not injurious for the human health.

Honey, corn syrup and other natural sweeteners are a potential and acute threat to infants. Harmless to adults because of a mature person's stomach acidity, botulinum spores are widely present in the environment and are among the few bacteria that can survive in honey. Since an infant's digestive juices are non-acidic, ingestion of honey creates an ideal medium for botulinum spores to grow and produce sufficient levels of toxins to cause infant **botulism**. For this reason, it is advised that neither honey, nor any other sweetener, be given to children under the age of 18 months. Once a child is eating solid food, the digestive juices are acidic enough to prevent the growth of the spores.

Benefits of honey and its uses in daily life

Honey is an important nutritive food containing various kinds of sugar, protein, free amino acids, minerals, trace elements, enzymes and vitamins with a fairly high caloric value. Its main sugars - laevulose and dextrose are absorbed directly into the blood and provide rapid energy.

Species of honeybee are available in Pakistan

Four species of honeybees are found in Pakistan. Three are indigenous and one is imported and established in Pakistan. These species are present in different ecological areas of the country. The indigenous species are Apis dorsata, Apis cerana, and Apis florea. The occidental species is Apis mellifera. Department of Agricultural Research of Pakistan may be contacted for further information on honey and honey bee.

Government Initiatives for the Sector Development [5]

- Honeybee Research Program (HBRP), NARC of Pakistan Agricultural Research Council (PARC) is one of the important programs for the income generation and poverty alleviation.
- Established the occidental honeybee in Pakistan after more than 16 unsuccessful attempts from 1927 to 1977.
- Developed management technologies for higher honey production.
- Introduced the use of honeybees for pollination of vegetable-seed, oil-seed, fodder-seed crops and fruit trees for yield increase and quality seed.
- Organized 17 national and 72 regional beekeeping training courses.
- Strengthened Provincial beekeeping units at Faisalabad and Tarnab, Peshwar and established new units in Quetta, Hyderabad and Azad Kashmir.
- Set up beekeeping units at Gilgit and Nagar with the collaboration of The Aga Khan Rural Support Program.
- Set up beekeeping unit at University of the Punjab, Lahore for teaching, demonstration and research purposes.

3. MARKET INFORMATION

Majority of the honey producers are operating in the informal sector, therefore, no precise data on the annual production of honey is available; however, during discussions with the industry stakeholders, researchers and Ministry of Food, Agriculture and Livestock, Pakistan report different data. Through research and development efforts of PARC, European honeybee was introduced in Pakistan in 1980s. Now more than 300,000 bee colonies exist in Pakistan, producing well over 3000 metric ton valued at Rs. 600 million honey annually, making Pakistan an exporter of honey earning US $ 220-250 million annually[6]. However, according to the estimates of Honey Research Center, Islamabad, annual production of farm honey is around 7500 metric ton annually. On the other hand, honeybee farmers report an annual production of about 3500 metric ton.

While looking at major honey markets and honey demand, Karachi is considered to be the biggest urban market which consumes about one-third of the total production. However, it is not possible to say as to how much is supplied to the industrial users (Pharmaceutical companies), what quantity is further shipped to interior Sindh and what volumes are left for the retail users.

[5] **Pakistan Agriculture Research Council**

[6] **Pakistan Year Book 2005-06, Ministry of Food, Agriculture and Livestock, Govt. of Pakistan**

3.1 MARKET POTENTIAL

Pakistan is basically an Agri base economy and major portion of the population still lives in rural areas and beekeeping can be a profitable business for them. About 7,000 beekeepers are now rearing exotic species, Apis mellifera in the modern beehives. There are about 300,000 colonies producing 7,500 metric ton honey annually. Congenial climate conditions and bee flora in the country provide excellent opportunities for the expansion of beekeeping. Honeybee flora is present on vast areas in all the provinces including Northern areas, FATA and AJK and can support 1,000,000 honeybee colonies.

Pakistan Agricultural Research Council (PARC) can provide training to the individuals and groups of various organizations and also arrange special training courses on request. The investment and income is worked out for beekeepers for honey production having 50,100 and 200 colonies. These colonies need to be migrated to different locations depending upon the availability of honeybee flora.

3.1.1 Future of Honey

The bee farming industry is the basic industry on which the whole honey supply chain depends. This sector is becoming progressively more mechanized. Migratory farming is getting more efficient as trucks, complete with loading devices and portable extracting equipment become more prominent. Beekeepers are accepting that they need to travel huge distances each year to work the nectar resource. They possess a phenomenal knowledge that allows them to apply the principles of beekeeping to the climate and vegetation around them.

Apiculture can provide a comfortable living, provided the apiarist is willing to become a producer. A successful beekeeper will need plenty of experience, energy and a good location.

Herbal medicine has now become a recognized industry in the developed countries. Besides that, in the western pharmacopeias use of honey is increasing leading to a huge industrial demand of honey.

3.1.2 Current Market Players with Product Prices

Weight	Retail Price (in Rs.)					
	Salman's	Langnese	Al-Shifa	Hijazi	Syed	Heaven
150 gm	50	100	50	65	40	45
250 gm	90	150	90	115	70	85
500 gm	160	260	165	200	125	145
1000 gm			240			

3.1.3 Retailer and Distributor Role

Distributor and retailers are of primary importance in marketing Honey products. Easy availability of alternatives and very low per capita consumption of honey across the

country makes life difficult for a new entrant. That is the reason, unlike other consumer goods, distribution and retailer margins are relatively higher on Honey Products. For distributor and retailer, around 25% profit margins are normally given by the manufacturer, especially by those with small to medium sized operations.

The distribution network desirable for marketing and distribution of Honey products will be one which provides complete solution from pickup of product from the manufacturer's premises, distribution and ensuring space availability for the product on the retail outlets. This kind of distribution solutions can be availed at the cost of 30 to 35% of the gross sales.

This type of distribution network is proposed for the reason that being a new business setup, it would be difficult for the manufacturer (owner) to handle logistics involved in managing distribution; therefore commissioning such kind of solution will make it possible for the manufacturer to concentrate on product development and broaden market niche. Once the product become successful, the distribution cost will gradually be reduced.

3.1.4 Demand

On average, total demand of the honey and its products in Karachi is around 50-100 metric ton per month which also includes industrial demand of honey. Honey is more demanded in winter, while, after discussion with the industry experts, it was noted that its demand decrease by 60%-70% during summer.

3.1.5 Source of Honey and Target Market-Segment

Children less than 12 years and old population of age above 50 year are considered to be the target for honey and honey products. People of all age and demography like to use honey; however, as it is an expensive item, low purchasing power of general consumer in Pakistan sets limit to the potential market for honey.

During discussions with the industry operators, it has been mentioned that around 90% of the overall honey demand is fulfilled by Farm Honey suppliers from Punjab and NWFP, whereas remaining demand is covered by wild honey from FATA region.

3.1.6 Source /Procurement of Honey

Although the proposed project will depend on its own production, in order to meet additional production requirements and shortage in own honey production, the source for honey will be other honey producers and suppliers. There are many local suppliers of raw honey working at Karachi and other cities who could be contacted for obtaining honey for further processing; however, during the course of study following supplier in touch and have available stock of raw honey.

M/S: HAQ TRADERS
Contact Person: Anwarul Haq
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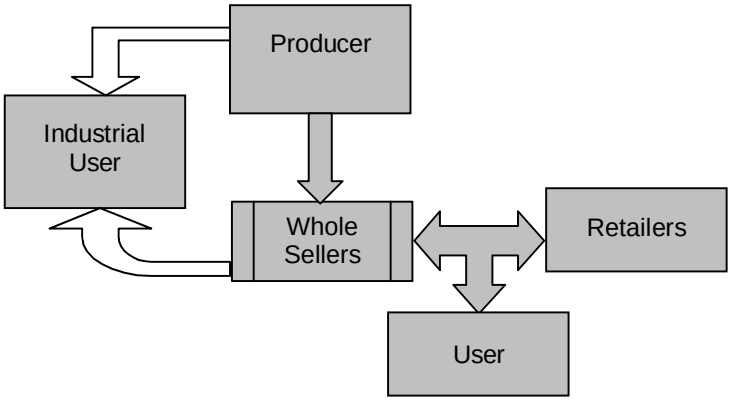
3.1.7 Channel of Distribution:



4. PRODUCTION PROCESS

Following production process is generally followed:

Extraction

The honeycombs are inserted into an extractor, a large drum that employs centrifugal force to draw out the honey. Because the full combs can weigh as much as 5 lb (2.27 kg), the extractor is started at a slow speed to prevent the combs from breaking. As the extractor spins, the honey is pulled out and up against the walls. It drips down to the cone-shaped bottom and out of the extractor through a spigot. Positioned under the spigot is a honey bucket topped by two sieves, one coarse and one fine, to hold back wax particles and other debris. The honey is poured into drums and taken to the processing facility.

Processing/refining

Modern processing facilities include heating and cooling units, filter presses and pumps that deliver the finished product to the packing line. Following are the key steps during refining process of honey:

- Liquification
- Pre-Heating and Straining
- Micro-filtration
- Inactivation of Yeast Cells (Processing)
- Vacuum Evaporation/moisture reduction
- Cooling of Honey

Filling

Lines include bottle cleaning, filling, capping, front and back labeling and packing. All finished goods are delivered to storage areas by a system of conveyors.

Labeling

Pre-printed front and back labels are pasted through machines to make certain that accurate names and sizes match up with every bottle turns out.

Warehousing

Finally, the finished products are stored in the warehouse and distributed according to the plan throughout the year as shelf life of honey is generally higher then other perishable items.

4.1 PSQCA STANDARDS AND REQUIREMENTS

4.1.1 METHODS OF PROCESSING [7]

Extracted Honey is honey only obtained by centrifuging decapped broodless combs.

Pressed Honey is honey obtained by pressing broodless combs with or without the application of moderate heat.

Drained Honey is honey obtained by draining decapped broodless combs.

Styles – honey which meets all the compositional and quality criteria of Essential composition & quality factors (mentioned in next section) of this standard may be presented as follows:

a. *Honey:* which is honey in liquid or crystalline state or a mixture of the two;
b. *Comb Honey:* which is honey stored by bees in the cells of freshly built broodless combs and which is sold in sealed whole combs or sections of such comb.
c. *Chunk Honey:* which is honey containing one or more pieces of comb honey;
d. *Crystallized or Granulated Honey:* which is honey that has undergone a natural process of solidification as a result of glucose crystallization;
e. *Creamed (or Creamy or set) Honey:* which has a fine crystalline structure and which may have undergone a physical process to give it that structure and to make it easy to spread,

[7] **PSQCA : PS 1934:1992 (1sr Revision) – Honey Section 2.3.2**

4.1.2 ESSENTIAL COMPOSITION & QUALITY FACTORS [8] - PSQCA

Honey shall not have any objectionable flavor, aroma, or taint ossorbed from foreign matter during its processing and storage. The honey shall not have begun to ferment or effervescence.

Honey shall not be heated to such an extent that its essential composition and quality is impaired.

Apparent reducing sugar content, calculated as invert sugar.

a. Honey not listed below	Not less than 65%
b. Honeydew honey	Not less than 60%
c. Blackboy (Xanthorrhoes precissii)	Not less than 53%

Moisture content:

a. Honey not listed below	Not more than 21%
b. Heather honey (Calluna)	Not more than 23%
c. Clover Honey (Trifolium)	Not more than 23%

Apparent Sucrose Content:

a. Honey not listed below	Not more than 5%
b. Honey dew honey, blends of honeydew honey and blossom	Not more than 10%
c. Red bell (calothmnus sanguineus), white stringy bark (eucalyptus Scabra), Grand Banksia, & Blackboy	Not more than 15%

Water Insoluble Solids Contents:

a. Fornhoneys other than pressed honey	Not more than 0.10%
b. Pressed	Not more than 0.5%

Minéral Content (ash):

a. Honey not listed below	Not more than 0.10%
b. Honeydew honey or a mixture of honeydew honey and blossom honey.	Not more than 1.0%

Acidity: Not more than 40 milli equivalents acid per 1000 grams.

Diastase Activity:

[8] **PSQCA : PS 1934:1992 (1sr Revision) – Honey Section 3**

Diastase Activity Determined after processing and blending	Not less than 3

Hydroxy methyl furfural Content: Not more than 80 mg/Kg

HYGIENE[9]:

It is recommended that the product covered by the provisions of this standard be prepared in accordance with PS: 1825 – 1987 (good manufacturing practice in manufacturing processing, packing or holding human food.)

Honey should be free from visible mould and, as far as practicable, be free from inorganic or organic matters foreign to its composition, such as, insects, insect debris, brood or grains of sand, when the honey appears in retail trade or is used in any product for human consumption.

Honey shall not contain toxic substances arising from microorganisms or plants in an amount which may constitute a hazard to health.

LABELING[10]:

PS 1485:1980 labeling of prepackaged foods shall apply and also the following provision apply.

1. Name of the food
2. Net contents

PROCEDURE[11]:

PREPARATION OF TEST SAMPLES:

Honey solution: 10.0 gram honey is weighted into a 50 ML beaker and 5.0 ML acetate buffer solution is added, together with 20 ML water to dissolve the sample. The sample is completely dissolved by stirring the cold solution. 3.0 ML sodium chloride solution is added to a 50ML volumetric flask and the dissolved honey sample is transferred to this and the volume adjusted to 50ML.

Note: it is essential that the honey should be buffered before coming into contact with sodium chloride.

STANDARDIZATION OF THE STARCH SOLUTION:

[9] **PSQCA : PS 1934:1992 (1sr Revision) – Honey Section 5**

[10] **PSQCA : PS 1934:1992 (1sr Revision) – Honey Section 6**

[11] **PSQCA : PS 1934:1992 (1sr Revision) – Honey Section 7.4**

The starch solution is warmed to 40^{o}C and 5 ML pipetted into 10ML of water at 40^{o}C and mixed well. 1 ML of this solution is pipetted in to 10ML 0.0007 N iodine solution, diluted with 35 ML of water and mixed well. The color is read at 660 nm against a water blank using a 1 cm cell.

The absorbance should be 0.760 ± 0.020. is necessary the volume of added water is adjusted to obtain the correct absorbance.

ABSORBANCE DETERMINATION:

Pipette 10 ML honey solution into 50 ML graduated cylinder and place in 40^{o}C ± 2^{o}C water bath with flask containing starch solution. After 15 minutes, pipette 5 ML starch solution into the honey solution mix, and start stop watch. At 5 minutes interwals remove 1 ML aliquots and add to 10.00 ML 0.0007 N iodine solutions. Mix and dilute to standard volume. Determine absorbance at 660 nm is spectrophotometer immediately using 1 cm cell. Continue taking 1 ML aliquots at intervals until absorbance of less than 0.235 is reached.

By-products / Waste

Four major byproducts of the honey-making process: beeswax, pollen, royal jelly, and propolis. Beeswax is produced in the bee's body as the nectar is transforming into honey. The bee expels the wax through glands in its abdomen. The colony uses the wax to cap the filled honeycomb cells. It is scrapped off the honeycomb by the beekeeper and can be sold to commercial manufacturers for use in the production of drugs, cosmetics, furniture polish, art materials, and candles.

Pollen sticks on the worker bee's legs as she collects flower nectar. Because pollen contains large amounts of vitamin B_{12} and vitamin E, and has a higher percentage of protein than beef, it is considered highly nutritious and is used as a dietary supplement. To collect it, the beekeeper will force the bees through a pollen trap—an opening screened with five-mesh hardware cloth or a 0.1875-in (0.476-cm) diameter perforated metal plate. The single- or double-screened opening allows the pollen to drop from the bees' legs as they fly through. The pollen drops into a container and is immediately dried and stored.

Royal jelly is a creamy liquid produced and secreted by the nurse bees to feed the queen. Nutrient rich with proteins, amino acids, fatty acids, sugars, vitamins, and minerals, it is valued as a skin product and as a dietary supplement. Proponents believe it prolongs youthfulness by improving the skin, increases energy, and helps to reduce anxiety, sleeplessness, and memory loss.

Propolis is plant resin collected by the bees from the buds of plants and then mixed with enzymes, wax and pollen. Bees use it as a disinfectant, to cover cracks in the hive, and to decrease the hive opening during the winter months. Commercially it is used as a disinfectant, to treat corns, receding gums, and upper respiratory disease, and to varnish violins.

4.5 PSQCA Quality Standard

Under the PSQCA honey processing and packaging standards followed by all the companies engages in the business of honey processing and packaging under the standard of "**PS: 1934:1992(1st Revision) – Honey**" which have a Scope: "This standard applies to all honeys produced by honey bees and covers all styles of honey presentation which are offered for direct consumption".

4.6 PSQCA Certification requirement

- Information about unit
- Manufacturing capacity
- Manufacturing, processing and total number of employees
- Quality control system
- Laboratory facilities
- QC Staff list and Experience
- Equipment Detail

4.7 Product Mix Offered

Following product mix will be offered by the business:

Grams	%age of total	Retail Price (Rs.)
250	14%	90
375	25%	115
500	27%	150
1000	33%	230

4.8 Raw material requirement

Honey and the packaging material will be the main raw material required for the honey business. For the packaging purpose, following material will be required:

- *Bottles with stickers and labels and Packing Cartons*
  For the proposed project honey will be packaged in bottles in the quantities of 150, 250, 375, 500 and 1000 gram. Glass bottles will be used for this purpose which will provide cost efficiency. The glass bottles will be packed in cardboard boxes or cartons which will then be shipped to the customers (wholesalers).

Honey will be supplied from business' own production facility, however, for the procurement of other material, following suppliers may be contacted.

For labels and cartons

Akmal print house
A-70 Manghopir Road

For Glass Bottle

Ghani Glass Ltd
12- D/3 Chandni Chowk

Opp. Kulsoom Bai Valika Hospital
Karachi. PH. 2595301

KDA Scheme # 7 & 8
Karachi.

Bottle Market
Bottle Gali, Light House, Karachi

4.8 Technology Options

Honey Processing Machinery

Honey being a biological substance and intended for food & pharmaceutical use, needs greater attention in quality and its handling.

The moisture content in honey plays an important role in deciding the quality of honey. Honey with more than 20% moisture is thinner in consistency. The moisture content in honey increases due to hygroscopic nature of honey in which the surrounding atmosphere moisture is absorbed by honey.

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, honey needs processing, reduction of moisture & packing by utmost care to protect the valuable natural properties.

4.9 Machinery Requirement

Both local and imported machinery is required for the processing of honey. Local machinery reportedly gives good quality output. Following machinery will be required for setting up a Honey production, processing and packaging business:

Machine/Equipment	Capacity	No. of units	Unit cost	Total Cost
Hive	**15 kg**	**1,480**	**5,500**	8,140,000
Standard Langstroth			4,500	
Comb Foundation			200	
Nucleus Hives			500	
Pollen Traps			200	
Miscellaneous Tools			100	
Packaging Machine	15-22 bottles/minute	1	250,000	250,000
Processing Plant with Moisture Reduction Unit	1000 kg/8 hour	1	950,000	950,000
Capping Unit	2500-8500/ 8 hour	3	24,000	72,000
Steel fabrication and support structures			150,000	150,000
Honey Extractor		60	2,000	120,000
Total Cost				**9,682,000**

Honey extractors and hives can easily be procured from Tarnab Farm market Peshawar. Honey processing plant is not readily available in Pakistan. For the proposed project Indian honey processing plant has been proposed and following supplier can be contacted for the supply of machinery:

Mr. Tanveerul Hasan
Cosmos Inernational
S-6, A-206, Block 13-C
Gulshan-e-Iqbal
Karachi
Ph: 021-4209680
021-4816594
Fax: 4979574
Email: cosmosinternat@yahoo.com
cosmosinternat@hotmail.com

There are many local suppliers of Honey packaging machinery working at Karachi and other cities who could be contacted for obtaining packaging machinery; however, during the course of study for this pre-feasibility we have contacted the following local manufacturer:

Bizko Tech Engineering
Orangi No. 5, Near Police Station, Karachi.
Phone +9221-5427334

4.9.1 Machinery Maintenance

Machinery is expected to be serviced on an annual basis. During the projection period, maintenance expenses are estimated to be around 3% of the total cost of machine.

5. LAND AND BUILDING REQUIREMENT

5.1 Site Development

The honey processing, packaging and marketing project is estimated to require a total area of 120-200 yards plot. This area will be used for setting up the Processing facility, Packaging, storage and office.

5.2 Renovation and Customization Cost

As per discussion with market experts, 120 – 200 Sq. Yards area is sufficient on rent for the processing and packaging facility. The factory would be located at any place in Karachi, where basic industrial infrastructure is available. Factory space will be obtained on rent and some customization and alteration in the facility will be required. For this purpose approximately Rs. 400,000/- has been assumed.

6. HUMAN RESOURCE REQUIREMENT

Honeybee farming is a labor intensive business if done on commercial scale. Operations of the honey processing unit (factory) do not require specialized and skilled staff; however, farming is the area where specialized and trained staff would definitely be needed. For the proposed project a total of 250 bee attendants will be required to look after 1480 hives. Whereas, 25 staff will be required for processing and packaging purposes. Total approximate manpower requirement for the business operations along with the respective salaries are given in the table below:

Staff Title	No of Persons	Individual Salary	Monthly Salary	Annual Salary
1. Business Unit Manager/Owner				
Production Staff				
Quality Controller	1	25000	25,000	300,000
Marketing Manager	1	20000	20,000	240,000
Supervisor	12	12000	144,000	1,728,000
Packaging Staff	5	5500	27,500	330,000
Processing Staff	4	6000	24,000	288,000
Bee Attendants	250	4500	1,125,000	13,500,000
Total Production Staff	**273**		**1,365,500**	**16,386,000**
General Administration/ Selling Staff				
Accountant	1	12000	12,000	144,000
Other Administrative Staff	2	6000	12,000	144,000
Guard	1	5000	5,000	60,000
Driver	4	5000	20,000	240,000
Total G A /S Staff	**8**		**49,000**	**588,000**
TOTAL	**281**		**1,414,500**	**16,974,000**

7. FINANCIAL ANALYSIS & KEY ASSUMPTIONS

The project cost estimates for the proposed "Honey Production, Processing, Packaging and Marketing Business" have been formulated on the basis of discussions with industry stakeholders and experts. The projections cover the cost of land, machinery and equipment including office equipment, fixtures etc. Assumptions regarding machinery have been provided, however, the specific assumptions relating to individual cost components are given as under.

7.1 LAND & BUILDING

Land for setting up the proposed Honey Processing and Packaging unit would be on rental basis which will cost around Rs. 25,000/- per month for a 200 Sq. Yards area.

It has been assumed that it would be a developed land with basic infrastructure available. However, for the necessary alteration and customization of the facility, Rs. 400,000/- will be required, which has been assumed to be depreciating at 10% per annum using diminishing balance method.

7.2 OVERALL FACTORY & OFFICE RENOVATION

To renovate the factory / office premises in Year 5 and Year 10, a cost would be incurred for which an amount equivalent to 5% of the total factory/office construction cost is estimated.

7.3 FACTORY / OFFICE FURNITURE

A lump sum provision of Rs. 100,000/- for procurement of office/factory furniture is assumed. This would include table, desk, chairs, and office stationery. The breakup of Factory Office Furniture & Fixtures is as follows:

Item	Number	Cost	Total Cost
Table & Chair for Owner	1	20,000	20,000
Tables & Chairs for QC Incharge & Marketing	2	15,000	30,000
Waiting Chairs	8	1,000	8,000
Curtains & Interior Decoration for office	1	15,000	15,000
Electrical Fittings & Lights	1	30,000	30,000
Others	1	7,000	7,000
Total			**110,000**

7.4 DEPRECIATION TREATMENT

The treatment of depreciation would be on a diminishing balance method at the rate of 10% per annum on the following. The method is also expected to provide accurate tax treatment.

1. Machinery
2. Land & Building Construction
3. Vehicles
4. Furniture and Fixtures etc.

7.5 UTILITIES

Honey processing and packaging unit will be operated using electricity for packaging purposes, while water is required for processing of honey. The cost of the utilities including electricity, Gas, and telephone is estimated to be around Rs. 120,000/- per month. Approximate cost of utilities has been given below:

Utility	Total Monthly Cost (Rs.)	Total Annual Cost (Rs.)	Annual %age Increase
1. Electricity	50,000	600,000	5%
2. Gas	50,000	600,000	5%
3. Water	10,000	120,000	5%
4. Telephone	20,000	240,000	5%
Total	**130,000**	**1,560,000**	

7.6 WORKING CAPITAL REQUIREMENTS

It is estimated that an additional amount of Rs. 6 Million (approximately) will be required as cash in hand to meet the working capital requirements. These provisions have been estimated based on the following assumptions for the proposed business.

Description	Amount in Rs.
First Three Months Salaries (Production staff)	4,096,500
First Three Months Other Utilities Charges	465,000
First Three Months Misc. Expenses	15,000
First Three Months Rent Expense	75,000
Raw Material Inventory – 03 month	1,498,946
Total	**6,045,446**

7.7 VEHICLE FOR SUPPORT AND MAINTENANCE SERVICES

At-least four loading vehicle would be required for providing services for the transportation of production and material. For this purpose a transportation vehicle has been proposed which will cost of a vehicle is around Rs. 400,000.

7.8 SELLING & DISTRIBUTION EXPENSES

For the purpose of this pre-feasibility, it has been assumed that the Honey processing and packaging unit is engaged in local sales. For the purpose of increasing awareness about its product, the entity will be required to place some advertisements in local publications. These arrangements would result in additional cost to the business for which an amount equivalent to 2% of the annual sales has been assumed.

7.9 DISTRIBUTION AND RETAILER MARGIN

Distributor and retailers are of primary importance in marketing Honey products. This is the reason that, unlike other consumer goods, distribution and retailer margins are relatively higher on Honey Products. For distributor and retailer, around 25% profit margins are normally given by the manufacturer, especially by those with small to medium sized operations.

7.10 MISCELLANEOUS EXPENSES

Miscellaneous expenses of running the business are assumed to be Rs. 5,000 per month. These expenses include various items like office stationery, daily consumables, traveling allowances etc. and are assumed to increase at a nominal rate of 10% per annum.

7.11 RAW MATERIAL INVENTORY

Based on our assumptions for the processing facility and orders, it would be necessary to maintain one month raw material i.e. unprocessed honey, glass bottles, labels and cartons in order to cover any urgent order requirement.

7.12 FINISHED GOODS INVENTORY

The proposed setup is assumed to maintain finished goods inventory to meet any unforeseen demand. For this purpose finished products equivalent to 15 days finished honey would be maintained.

7.13 REVENUE PROJECTIONS

The Proposed business setup would be able to process around 200,000 kilograms honey in a year. Entire production of the facility will cater the demand of local market of Pakistan, particularly Karachi. For the projection purpose, annual revenue growth rate of 10% has been assumed which would cover anticipated growth in the industry as well price.

REVENUE PROJECTIONS – BY PRODUCTS

Following table presents product mix with total annual sales for each product for the proposed project:

Grams	No. of Units	Retail Price	Sales Price
250	114,074	80	9,125,920
375	133,333	110	14,666,630
500	109,630	140	15,348,200
1000	66,667	260	17,333,420
Total			**56,474,170**

7.14 ACCOUNTS RECEIVABLES

It has been assumed that 30% of the sales will be on cash, whereas, remaining 70% sales will be on credit. A collection period of one month is assumed for the credit sales.

A provision for bad debts has been assumed which is equal to 2% of the annual credit sales.

7.15 FINANCIAL CHARGES

It is assumed that long-term financing for 5 years will be obtained in order to finance the project investment cost. This leasing facility would be required at a rate of 15% (including 1% insurance premium) per annum with 60 monthly installments over a period of five years. The installments are assumed to be paid at the end of every month.

7.16 TAXATION

The business is assumed to be run as a sole proprietorship; therefore, tax rates applicable on the income of a non salaried individual taxpayer are used for income tax calculation of the business.

7.17 COST OF CAPITAL

The cost of capital is explained in the following table:

Particulars	Rate
Required return on equity	20%
Cost of finance	15%
Weighted Average Cost of Capital	17.5%

The weighted average cost of capital is based on the debt/equity ratio of 50:50.

7.18 OWNER'S WITHDRAWAL

It is assumed that the owner will draw funds from the business once the desired profitability is reached from the start of operations. The amount would depend on business sustainability and availability of funds for future growth.

7.19 ANNEXURES

7. 19.1 Summary of Key Assumptions

7. 19.2 Cost and Revenue Sheet

7. 19.3 Projected Income Statement

7. 19.4 Projected Balance Sheet

7. 19.5 Projected Cash Flow Statement

Summary of Key Assumptions

(in Pak. Rs.)

Sr. No.	PARTICULARS	TOTAL COST/DETAILS
	Fixed Capital	
	Plant & machinery	**1,542,000**
	Capital Expenditure - Hives	8,140,000
	Vehicle for support and transportation	1,600,000
	Consruction & Renovation	400,000
	Factory / Office Furniture	110,000
	Advance Deposit (6 months)	150,000
	Preliminary Expenses	100,000
	Total Fixed Capital	**12,042,000**
	Working Capital	
	Utilities - Three Months (Office & Factory)	**465,000**
	1. Electricity/Month	50,000
	2. Gas & Water	60,000
	3. Office Rent	25,000
	4. Telephone/Month	20,000
	Salaries - Three Months (Production Staff)	**4,096,500**
	Raw Material Inventory - three months	**1,586,410**
	Misc. Expenses - Three months (@ 5000 /month)	**15,000**
	Total Working Capital	**6,162,910**
	TOTAL PROJECT COST	**18,204,910**
	Loan Finance	**9,102,455**
	Equity Financing	**9,102,455**
	Debt:Equity Ratio (50:50)	**50.00%**
	PROJECT RETURNS AND OTHER FINANCIAL	
	IRR	31%
	NPV	11,124,153
	Payback Period (Years)	3 Years 6 Months
	Debt Equity Ratio	50:50'
	Cost of finance	15%
	Weighted Average Cost of capital	17.50%
	OTHER ASSUMPTIONS	
	Depreciation	10%
	Machinery Annual Repair & Maintenance (as %age of total cost of Machinery)	3.00%
	Selling & Distribution Expenses	2.00%
	Factory Operations and Capacity Utilisation Assumptions	
	Increase in Production (Annual)	5%
	Annual sales price increase	5%
	Operational Hrs./day	12
	Operational Days / Month	26
	Operational Months	12
	Annual Operational Days	312
	Economy related assumptions	
	Electricity charges growth rate	5%
	Increase in Salaries	10%
	Increase in Misc. Expenses	10%
	Price growth of hives	5%
	Tax Rate	20%
	Cash Flow Assumptions	
	Sales on Credit - as %age of total	70%
	Sales on Cash - as %age of total	30%
	Accounts Receivable period (months) - only for 70% credit sales	1
	Provision for bed debts (only on 30% credit sales)	2%
	Distribution & Retailer Margin	25%
	Raw Material Inventory	30
	Finished Goods Inventory	15

No. of Hives	**1,481**											
REVENUE COMPUTATION												
Approx. Output of Hive	135	KG/hive / Year										
Total Output	**200,000**	**KG per Year**										
Revenue Assumption - Per Bee Hive												
Honey produced from 1 Beehive		15	KG									
Honey produced from 1 Beehive per annum		135	KG									
Grams	**Bottles**	**In Kg**	**Retail Price**	**Revenue**								
250	9	2	80	684								
375	10	4	110	1,100								
500	8	4	140	1,151								
1000	5	5	260	1,300								
		15		**4,236**								
Revenue from 135 KG / Hive/annum				**38,120**								
Cost Assumption												
Quality testing and outsourcing cost	2,500	per 1000	kg									
Operating Cost per Hive for 135 KG	280	per Year/Hive										
Packaging Cost for 135 KG	1,857	per Year/Hive										
Transportation Cost	1,800	per Year/Hive										
Supplement Feeding	3,600	per Year/Hive										
Rent of Apiary Site	3,600	per Year/Hive										
Cost	**11,137**											
Increase in Production - Growth Rate	10%											
Capital Expenditure	**Year 0**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**	
Yearly Production (Kg/Year)	200,000	200,000	220,000	242,000	266,200	292,820	322,102	354,312	389,743	428,718	471,590	
Production 1 from Hive	135	135	135	135	135	135	135	135	135	135	135	
No. of Hives Required	1481	1481	1630	1793	1972	2169	2386	2625	2887	3176	3493	
Capital Cost Schedule	8,148,148	8,148,148	9,411,111	9,859,259	10,845,185	11,929,704	13,122,674	14,434,941	15,878,436	17,466,279	19,212,907	
Yearly Investment	**8,148,148**	**8,148,148**	**1,262,963**	**448,148**	**985,926**	**1,084,519**	**1,192,970**	**1,312,267**	**1,443,494**	**1,587,844**	**1,746,628**	
Book Value		8,148,148	7,333,333	7,333,333	7,406,667	7,553,333	7,774,067	8,070,333	8,444,341	8,899,051	9,438,205	
Capital Investment - Yearly		-	814,815	896,296	985,926	1,084,519	1,192,970	1,312,267	1,443,494	1,587,844	1,746,628	
Revised Value		**8,148,148**	**8,148,148**	**8,229,630**	**8,392,593**	**8,637,852**	**8,967,037**	**9,382,601**	**9,887,835**	**10,486,895**	**11,184,833**	
Depreciation on Beehives		**814,815**	**814,815**	**822,963**	**839,259**	**863,785**	**896,704**	**938,260**	**988,783**	**1,048,689**	**1,118,483**	
Yearly Plan		**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**	
Revnue - Yearly		56,474,074	62,121,481	68,333,630	75,166,993	82,683,692	90,952,061	100,047,267	110,051,994	121,057,193	133,162,913	
Cost - Yearly		16,498,667	18,148,533	19,963,387	21,959,725	24,155,698	26,571,268	29,228,394	32,151,234	35,366,357	38,902,993	
Outsourcing Cost - Research Cost		500,000	550,000	605,000	665,500	732,050	805,255	885,781	974,359	1,071,794	1,178,974	
Estimated Finished Goods Inv		2,715,100	2,986,610	3,285,271	3,613,798	3,975,177	4,372,695	4,809,965	5,290,961	5,820,057	6,402,063	
Estimated Raw Material Inventory		1,586,410	1,745,051	1,919,556	2,111,512	2,322,663	2,554,930	2,810,423	3,091,465	3,400,611	3,740,672	

Honey Production, Processing and Packaging

Projected Income Statement (Rs.)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net (Adjusted Sales)	**53,006,349**	**61,849,972**	**68,034,969**	**74,838,466**	**82,322,312**	**90,554,543**	**99,609,998**	**109,570,997**	**120,528,097**	**132,580,907**
Cost of Sales	**34,944,667**	**38,361,133**	**42,115,347**	**46,240,886**	**50,774,680**	**55,757,339**	**61,233,523**	**67,252,347**	**73,867,828**	**81,139,370**
Labor (Production Staff)	16,386,000	18,024,600	19,827,060	21,809,766	23,990,743	26,389,817	29,028,799	31,931,678	35,124,846	38,637,331
Processing Cost	1,560,000	1,638,000	1,719,900	1,805,895	1,896,190	1,990,999	2,090,549	2,195,077	2,304,830	2,420,072
Research Cost	500,000	550,000	605,000	665,500	732,050	805,255	885,781	974,359	1,071,794	1,178,974
Gross Profit	**18,061,682**	**23,488,838**	**25,919,622**	**28,597,579**	**31,547,632**	**34,797,205**	**38,376,475**	**42,318,650**	**46,660,269**	**51,441,537**
Gross Profit Margin	**34%**	**38%**	**38%**	**38%**	**38%**	**38%**	**39%**	**39%**	**39%**	**39%**
General Administrative & Selling Expenses										
Salaries	588,000	646,800	711,480	782,628	860,891	946,980	1,041,678	1,145,846	1,260,430	1,386,473
Factory/Office Miscellaneous Expenses	60,000	66,000	72,600	79,860	87,846	96,631	106,294	116,923	128,615	141,477
Rent Expense	300,000	330,000	363,000	399,300	439,230	483,153	531,468	584,615	643,077	707,384
Amortization of Preliminary Expenses	20,000	20,000	20,000	20,000	20,000	-	-	-	-	-
Depreciation Expense	1,180,015	1,143,495	1,118,775	1,105,490	1,103,393	1,114,351	1,134,142	1,165,078	1,207,354	1,261,281
Maintenance Expense	46,260	46,260	46,260	46,260	46,260	46,260	46,260	46,260	46,260	46,260
Distribution & Retailer Margin	13,251,587	14,576,746	16,034,420	17,637,863	19,401,649	21,341,814	23,475,995	25,823,595	28,405,954	31,246,549
Selling & Distribution Promotion Expense	1,060,127	1,236,999	1,360,699	1,496,769	1,646,446	1,811,091	1,992,200	2,191,420	2,410,562	2,651,618
Subtotal	***16,505,989***	***18,066,300***	***19,727,235***	***21,568,170***	***23,605,715***	***25,840,279***	***28,328,037***	***31,073,736***	***34,102,252***	***37,441,043***
Operating Income	**1,555,693**	**5,422,538**	**6,192,387**	**7,029,409**	**7,941,917**	**8,956,926**	**10,048,438**	**11,244,914**	**12,558,016**	**14,000,494**
Financial Charges (15% Per Annum)	1,276,952	1,064,498	817,890	531,639	199,372	-	-	-	-	-
Earnings Before Taxes	**278,741**	**4,358,040**	**5,374,497**	**6,497,770**	**7,742,545**	**8,956,926**	**10,048,438**	**11,244,914**	**12,558,016**	**14,000,494**
Tax	55,748	871,608	1,074,899	1,299,554	1,548,509	1,791,385	2,009,688	2,248,983	2,511,603	2,800,099
Net Profit	**222,993**	**3,486,432**	**4,299,598**	**5,198,216**	**6,194,036**	**7,165,541**	**8,038,750**	**8,995,931**	**10,046,413**	**11,200,395**
Monthly Profit After Tax	**18,583**	**290,536**	**358,300**	**433,185**	**516,170**	**597,128**	**669,896**	**749,661**	**837,201**	**933,366**

Honey Production, Processing and Packaging

Projected Balance Sheet (Rs.)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Assets											
Current Assets											
Cash & Bank Balance	4,568,352	(969,768)	450,307	401,022	(219,879)	(1,387,093)	(379,201)	(1,705,508)	(4,293,618)	(11,063,881)	(16,948,639)
Raw Material Inventory	1,586,410	1,374,889	1,512,378	1,663,616	1,829,977	2,012,975	2,214,272	2,435,700	2,679,269	2,947,196	3,241,916
Finished Goods Inventory	0	2,715,100	2,986,610	3,285,271	3,613,798	3,975,177	4,372,695	4,809,965	5,290,961	5,820,057	6,402,063
Accounts Receivable	0	3,135,940	3,607,915	3,968,707	4,365,577	4,802,135	5,282,348	5,810,583	6,391,642	7,030,806	7,733,886
Advnace Rent	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Total Current Assets	**6,304,762**	**6,406,161**	**8,707,209**	**9,468,614**	**9,739,473**	**9,553,194**	**11,640,115**	**11,500,740**	**10,218,255**	**4,884,178**	**579,227**
Fixed Assets											
Plant Machinery & Facility	1,542,000	1,387,800	1,249,020	1,124,118	1,011,706	910,536	819,482	737,534	663,780	597,402	537,662
Capital Expenditure	8,148,148	7,333,333	7,333,333	7,406,667	7,553,333	7,774,067	8,070,333	8,444,341	8,899,051	9,438,205	10,066,350
Factory Construction	400,000	360,000	324,000	291,600	262,440	256,196	230,576	207,519	186,767	168,090	171,281
Land	0	0	0	0	0	0	0	0	0	0	0
Furniture & Fixtures	110,000	99,000	89,100	80,190	72,171	64,954	58,459	52,613	47,351	42,616	38,355
Vehicle	1,600,000	1,440,000	1,296,000	1,166,400	1,049,760	944,784	850,306	765,275	688,748	619,873	557,886
Total Fixed Assets	**11,800,148**	**10,620,133**	**10,291,453**	**10,068,975**	**9,949,411**	**9,950,536**	**10,029,156**	**10,207,281**	**10,485,698**	**10,866,187**	**11,371,533**
Intangible Assets											
Preliminary Expenses	**100,000**	**80,000**	**60,000**	**40,000**	**20,000**	-	-	-	-	-	-
Total Assets	**18,204,910**	**17,106,294**	**19,058,663**	**19,577,589**	**19,708,883**	**19,503,730**	**21,669,271**	**21,708,021**	**20,703,952**	**15,750,365**	**11,950,760**
Owner's Equity	9,102,455	9,325,448	12,811,880	15,111,478	17,309,694	19,503,730	21,669,271	21,708,021	20,703,952	15,750,365	11,950,760
Long Term Liability	9,102,455	7,780,846	6,246,783	4,466,111	2,399,189	0	0	0	0	0	0
Total Equity & Liabilities	**18,204,910**	**17,106,294**	**19,058,663**	**19,577,589**	**19,708,883**	**19,503,730**	**21,669,271**	**21,708,021**	**20,703,952**	**15,750,365**	**11,950,760**

Honey Production, Processing and Packaging

Projected Statement of Cash Flows (Rs.)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cash Flow From Operating Activities											
Net Profit	0	222,993	3,486,432	4,299,598	5,198,216	6,194,036	7,165,541	8,038,750	8,995,931	10,046,413	11,200,395
Add: Depreciation Expense	0	1,180,015	1,143,495	1,118,775	1,105,490	1,103,393	1,114,351	1,134,142	1,165,078	1,207,354	1,261,281
Amortization Expense	0	20,000	20,000	20,000	20,000	20,000	-	-	-	-	-
(Increase) / decrease in Receivables	-	(3,135,940)	(471,975)	(360,792)	(396,871)	(436,558)	(480,213)	(528,235)	(581,058)	(639,164)	(703,081)
(Increase) / decrease in RM	-	211,521	(137,489)	(151,238)	(166,362)	(182,998)	(201,297)	(221,427)	(243,570)	(267,927)	(294,720)
(Increase) / decrease in FG Inventory		(2,715,100)	(271,510)	(298,661)	(328,527)	(361,380)	(397,518)	(437,270)	(480,996)	(529,096)	(582,006)
Net Cash Flow From Operations	**0**	**(4,216,511)**	**3,768,953**	**4,627,682**	**5,431,947**	**6,336,494**	**7,200,863**	**7,985,961**	**8,855,384**	**9,817,580**	**10,881,871**
Cash Flow From Financing Activities											
Receipt of Long Term Debt	9,102,455										
Repayment of Long Term Debt		(1,321,609)	(1,534,064)	(1,780,671)	(2,066,922)	(2,399,189)	-	-	-	-	-
Owner's Equity	9,102,455			(2,000,000)	(3,000,000)	(4,000,000)	(5,000,000)	(8,000,000)	(10,000,000)	(15,000,000)	(15,000,000)
Net Cash Flow From Financing Activities	**18,204,910**	**(1,321,609)**	**(1,534,064)**	**(3,780,671)**	**(5,066,922)**	**(6,399,189)**	**(5,000,000)**	**(8,000,000)**	**(10,000,000)**	**(15,000,000)**	**(15,000,000)**
Cash Flow From Investing Activities											
Processing and Packaging Machine	(3,142,000)					(20,000)					(20,000)
Capital Expenditure	(8,148,148)		(814,815)	(896,296)	(985,926)	(1,084,519)	(1,192,970)	(1,312,267)	(1,443,494)	(1,587,844)	(1,746,628)
Factory/Office Furniture	(110,000)										
Preliminary Operating Expenses	(100,000)										
Purchase of Raw Material Inventory	(1,586,410)										
Advance Rent	(150,000)										
Construction & Renovation	(400,000)										
Net Cash Flow From Investing Activities	**(13,636,558)**	**0**	**(814,815)**	**(896,296)**	**(985,926)**	**(1,104,519)**	**(1,192,970)**	**(1,312,267)**	**(1,443,494)**	**(1,587,844)**	**(1,766,628)**
NET CASH FLOW	**4,568,352**	**(5,538,120)**	**1,420,075**	**(49,285)**	**(620,901)**	**(1,167,214)**	**1,007,892**	**(1,326,306)**	**(2,588,110)**	**(6,770,263)**	**(5,884,757)**
Cash at the Beginning of the Period	**0**	**4,568,352**	**(969,768)**	**450,307**	**401,022**	**(219,879)**	**(1,387,093)**	**(379,201)**	**(1,705,508)**	**(4,293,618)**	**(11,063,881)**
Cash at the End of the Period	**4,568,352**	**(969,768)**	**450,307**	**401,022**	**(219,879)**	**(1,387,093)**	**(379,201)**	**(1,705,508)**	**(4,293,618)**	**(11,063,881)**	**(16,948,639)**