(Y. K. Baramatikar)
Dy. C.E.O. (VI/Honey Mission)

सत्यमेव जयते

खादी और ग्रामोद्योग आयोग
KHADI AND VILLAGE INDUSTRIES COMMISSION

सूक्ष्म लघु और मध्यम उद्यम मंत्रालय, भारत सरकार,
Ministry of Micro, Small and Medium Enterprises, Govt. of India
वनाधारित उद्योग निदेशालय
Directorate of Forest Based Industry

No. FBI/Honey Mission/2017-18 Date :- 02.02.2018

To
All Director/ Principal/Incharges
SO/DO/MDTCs/SBECs
Khadi & V. I. Commission

Sub :- Detail Scheme and Guidelines for implementation of Major Honey Mission for the year 2017-18 – reg

Sir,

Please find enclosed herewith Detail Scheme and Guidelines along with ***Revised Target*** for implementation of Major Honey Mission for the year 2017-18 (Pg No. 1 to 76 & Four Annexures) for further needful at your end.

Funds has been allocated for procurement of bee boxes along with colonies, tool kits, honey extractor, training as well as backward/forward linkages, monitoring etc.

Further, it is to inform that under **Major Honey Mission,** there are **TWO Phases.**

Phase- I : It includes Awareness Training, Procurement & Supply of Bee Boxes alongwith Colonies and Establishment of Apiaries. **Operational Guidelines** alongwith item wise modules will be communicated shortly.

Phase-II : It includes Launching of Marketing Network across the Country. It may be launched on Central level. For the same, work has been initiated at central Office level. Detailed directives will be communicated after approval of Competent Authority.

2/2/2018

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Date:- 02.02.2018

Honey Mission

Under Ministry of MSME
Govt. of India

Scheme & Guidelines

Prepared by
Directorate of Forest Based Industry
KHADI AND VILLAGE INDUSTRIES COMMISSION

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Khadi & Village Industries Commission

Executive Summery

Khadi & Village Industries Commission with the inspiration of Rastrapita Mahatma Gandhi took the task of development of beekeeping Industry with a view to uplift the financial status of people living in extremely interior rural areas by introducing and popularizing modern beekeeping.

Beekeeping has been carried out across many generations in India. It plays a vital role in the livelihoods of the rural communities in four dynamics;

(i) it is an income generating activity;
(ii) provides food and medicine - value of honey and other hive products are invaluable;
(iii) it supports agricultural activities through cross pollination and increase in yield of crops
(iv) it contributes immensely to forest conservation.

Beekeeping as the very low investment and skills, this Industry have the potential to offers direct employment to lakhs of people especially hill dwellers, tribal and farmers. Sustainability of this industry is therefore vital to the country's economic wellbeing and development.

Beekeeping in India is much disorganized, traditional and being practiced with shortcut methods. Most of the nectar & pollen sources available today are untapped due to different reasons. Due to common (basic) level of investment and skills, beekeeping offers direct employment to lakhs of people especially hill dwellers, tribal people and farmers. Sustainability of this industry is therefore vital to the country's economic wellbeing and development Prime Minister of India viewed this opportunities and advised the authorities to explore the possibilities to create employment in Tribal regions and Left Wing Effected (LWE) areas, Backward Districts of the country and announced to take up mass honey production as **Sweet Kranti (Sweet Revolution)**in the lines of "Swate Kranti" (White Revolution). Neeti Aayog is working towards achievement.

Prime Minister viewed this opportunities and advised the authorities to explore the opportunities to create employment in Tribal regions to induce beekeeping, develop beekeeping potential districts viz. Left Wing Effected (LWE) areas, Backward Districts. In response to that , Ministry of MSME in-principle approval / sanction of Rs. 49.78 Crores in favour of KVIC for Honey Mission with the aims to provide sustainable employment and income to rural & urban unemployed youth, both educated & uneducated, men & women by conserving the honeybee habitat and tapping untapped natural resources

Head	**Funds available (Rs. In Crores)**
SCC (Scheduled Cast Category)	Rs. 16.23
STC (Scheduled Tribes Category)	Rs. 8.80
NER (North Eastern Region)	Rs. 24.75
TOTAL	**49.78**

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The KVIC has proposed Action Plan and estimated outcome under the Honey Mission Project. brief is given below :

A).

Sr	Details of Projects	Total (In Nos.)	Category wise breakup				
-	-		Non North Eastern Zone (NON NEZ)		North Eastern (NEZ) (In Numbers)		
1	Total no of Beneficiaries		SC	ST	SC	ST	Gen
		10200	5862	2838	45	880	575
			Apis mellifera (In Numbers)		*Apis cerena* (In Numbers)		-
2.	Total no of bee hives with bee colonies to be distributed to beneficiaries	102000	73000		29000		-
							-
3	Total Project Cost		Non NEZ As per annexure-I (Cost of Bee hives & Bee colonies)		NEZ As per annexure-II (Cost of Bee Hives & Bee colonies)		Back ward Forward As per annexure-III
		4978.00 Lakhs	3020.00 Lakhs		504.88 Lakhs		1453.12 Lakhs

B) EXPECTED OUTCOME PROPOSED:

1. **Employment Generates :**

About **11000 employment** will generate out of which 10,200 direct employment and 800 indirect employment will provided under this project.

Estimated Production of honey and other bee hive products from 1,02, 000 bee colonies (73000 *Apis mellifera* and 29000 *Apis cerana*) and its estimated value which is expected at the end of second year from the distribution of bee colonies.)

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Sr. No	Name of the product	Production (In Tons)	Value (In Cro.)
1	Honey	2625	28.88
2	Wax	15.30	0.46
3	Pollen	18.00	0.54
4	Royal Jelly	3.60	3.60
5	Bee Vanom	0.0008	0.08
	TOTAL		33.56 Cr.

C. Marketing System : Marketing system will be launched across the country.

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Chapter-1

1. Introduction

Beekeeping has been carried out across many generations in India. It plays a vital role in the livelihoods of the rural communities in four dynamics; (i) it is an income generating activity; (ii) medicinal & food value of honey and other hive products is invaluable; (iii) it supports agricultural activities through cross pollination (iv)it contributes immensely to forest and agriculture conservation efforts.

2. Beekeeping Trends :-

i. Status of Beekeeping:

Beekeeping traditionally practiced for the harvesting honey from bee colonies in many parts of India.

Although nowadays crop pollination service can often provide a greater part of a commercial beekeeper's income, other hive products like pollen, royal jelly, and Propolis, which are also used for nutritional and medicinal purposes, and beeswax, which is used in cosmetics, medicinal, wood polish, which are giving good income to beekeepers. Further, the use of honey and other products has also increased in many countries because of the increasing health awareness and the high esteem of bee products in various processed and unprocessed forms.

During the last decades, the level of beekeeping and production knowledge in many developing countries has increased considerably and India is way behind. It was therefore considered necessary to provide further information for the expansion of beekeeping activities in order to increase income and stability as well as access to produce healthier hive products. Thus, this Mission is intended to provide tools, techniques, information on the utilization of all primary beekeeping products including pollination services and in this way, improve the possibilities for diversification in beekeeping activities.

ii. **BEEKEEPING - A SOURCE OF SUSTAINABLE LIVELIHOOD**

In India, beekeeping has been mainly forest and agro based. Several natural plant species provide nectar and pollen to honey bees. Thus, the raw material for production of honey is available free in nature. Bee hives neither demand additional land space nor do they compete with agriculture or animal husbandry for any input. The beekeeper needs only to spare a few hours in a week to look after his bee colonies. Beekeeping is therefore ideally suited to him as a part-time/ fulltime occupation. Beekeeping constitutes a resource of sustainable income generation to the rural and tribal farmers. It provides them valuable nutrition in the form of honey, protein rich pollen and brood. Bee products also constitute important ingredients of folk and traditional medicine.

India has number of unique plants, which are major Unifloral sources of honeybees. Sandal wood in Kadappa forest, Sula in Himalayan region, Jamun in Mahabaleshwar, Litchi in Bihar and U.P., Sunflower in Punjab, Mustard and Eucalyptus in U.P., Karanj in Bihar, Coriander in West Bengal, Coffee in

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Karnataka, Soapnut in coastal Karnataka and Andhra Pradesh, Mohua in Madhya Pradesh, Prosopis in Kutch, Rubber in Kerala, Citrus in Himachal Pradesh are among them. The plietesal species of Acanthaceae like Carvia callosa (Carvi), Thelapeeapale ixiocephala (Whyati), Strobilanthus scrobiculata, (Strobilanthus), Lepedagathis cuspidata (Achra), in Mahabaleswar, Achhmanthera sp (Jayanthola) in the hills of Himalayas, Nilagirianthus reticulates (Kurunju) in Nilgiris are important honeybee forage sources. The flower gregariously at the intervals of 4, 8, 12 years and give profuse yields of Unifloral honeys. In monsoon and post monsoon ground flora like Amaranthus, Tridax, Balsam, Mimosa, Parthenium, Plectranthus, Phyla etc. and maize and jowar cultivation has a major role for survival and development of the colony.

Among the southern states, Tamil Nadu ranks first in honey production followed by Kerala and Karnataka. Kanyakumari district has record numbers of beekeepers (over 5, 000) and bee-colonies (accounting for 2.50 Lakh). Natural vegetation, agro-horticulture crops available, tropical flora found in abundance and the proximity of the district to the Western Ghats makes beekeeping a viable trade in Kanyakumari. Honey production is a lucrative business and it generates employment. Kanyakumari district in Tamil Nadu is a pioneer in honey production and the beekeepers depend solely on the honey flow season (March –May) for improving their economic condition.

3. **Process of beekeeping**

3.1. The raw materials for the beekeeping industry are mainly pollen and nectar that come from flowering plants. Both the natural and cultivated vegetation in India constitute an immense potential for development of beekeeping. About 500 flowering plant species, both wild and cultivated, are useful as major or minor sources of nectar and pollen.

3.2. In India there are four Apis species producing honey namely:

3.2.1. *Apis cerana* - Indian hive bee constructing 7 - 8 parallel combs in dark enclosures,

3.2.2. *Apis dorsata* - rock bee constructing single comb 3 ft – 6 ft in the open on arboreal and terrestrial support in forest, farmland and urban areas,

3.2.3. *Apis florea* - dwarf honey bee constructing single comb 8 in – 2 ft in the open in shrubs and bushes and

3.2.4. *Apis mellifera* (European hive bee constructing 8 – 10 parallel combs in dark enclosures) and

3.2.5. Three species of the stingless bees constructing pitcher shaped cells for brood and storing honey in dark enclosures.

3.3 Several sub-species and races of these are known to exist. In recent years the exotic honey bee has been introduced. Together these represent a wide variety of bee fauna that can be utilized for the development of honey industry in the country. Side by side with the development of apiculture using the indigenous bee, *Apis cerana,* apiculture using the European bee, *Apis mellifera*, gained popularity in Jammu & Kashmir, Punjab, Himachal Pradesh, Haryana, Uttar Pradesh, Bihar and West Bengal. Wild honey bee colonies of the giant honey bee and the oriental hive bee have also been exploited for collection of honey. Beekeepers sell the honey to the co-operative society, if one exists in the area. In many parts of India, the beekeeper gets a much higher price if he sells it directly to the consumer.

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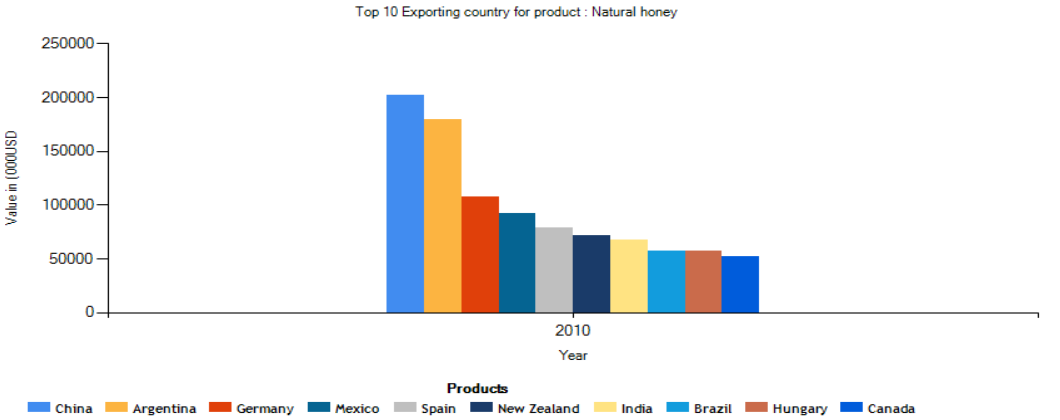
4. Market:

4.1. Forest honey is usually thin, contains large quantity of pollen, bee juices and parts, wax and soil particles. The honey collectors gets between Rs. 50 to 90/- per kilogram of the forest honey. Forest honey is mostly multiflora. In 1985, in Indian per capita consumption of honey was estimated to about 8.4 grams, while other countries, it was 200 grams, presently, it would be 2.5 Kg. In India, honey is consumed mainly as medicine and religious purposes. Small amount is used in pickles, jams and preserves. Large amount is consumed in Ayurveda pharmaceuticals. Now with the increasing production, there is increasing trend to use honey in food. This is obviously the case with the affluent segment of the population. Forest honey is used in pharmaceuticals, food, confectionery, bakery and cosmetics.

4.2. The apiary honey is produced about 35, 000 MT. This honey is extracted, filtered and exported and some portion is processed, bottled and marketed with Agmark and FSSAI certification. The total value of honey alone is about 805 Crores. The bee wax is the other product, which is much disorganized and beekeepers are getting exploited by paying very less price.

4.3. Key players dominating the Honey Market include Dabar, Vipro, Kahsmir Apiary, Royal Honey, among others. The report titled "Honey-A Global Strategic Business Report" announced by Global Industry Analysts, Inc., provides a comprehensive review of industry overview, product overview, product introductions/innovations, profiles of major players, and recent industry activity were published at . The study analyzes market data and analytics in terms of volume sales for regions including United States, Canada, Europe, Asia-Pacific, Latin America, and Rest of World.

4.4. **National & Global scenario:** Key players dominating the Honey Market include Dabar, Vipro, Kahsmir Apiary, Royal Honey, among others. The report titled "Honey-A Global Strategic Business Report" announced by Global Industry Analysts, Inc., provides a comprehensive review of industry overview, product overview, product introductions/innovations, profiles of major players, and recent industry activity. The study analyzes market data and analytics in terms of volume sales for regions including United States, Canada, Europe, Asia-Pacific, Latin America, and Rest of World.



(Source Agri Xchange by APEDA)

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India's position as an exporting country for product Natural honey India's Rank: 7 ; Value = 67071(000USD) Percentage Share= 4.56 Value in (000USD) Year: 2010

(Quantity in MT value in)

Rank	Country Exporting	Qty	Value	Share (%)
1.	China	1,18,353	2,02,068	13.74
2.	Argentina	58,626	1,79,666	12.22
3.	Germany	21,646	1,07,300	7.30
4.	Mexico	28,921	92,220	6.27
5.	Spain	21,551	79,024	5.37
6.	New Zealand	7,670	72,048	4.90
7.	India	25,805	67,071	4.56
8.	Brazil	19,334	57,555	3.91
9.	Hungary	12,850	57,039	3.88
10.	Canada	14,079	52,402	3.56

(Source Agri Xchange by APEDA)

Strengths & Scope: The abundance of fruit crops in the province is a strength for the pollination side of the beekeeping and this strength can result in an industry opportunity. Indeed, for some crops, notably Oranges, apple, raspberries, there may be almost complete dependence on honey bees for pollination. Because cranberries provide low nectar and pollen yields, cranberry growers must increase the number of honey bees per acre, adding more pollination contract opportunities for beekeepers.

India has potential to keep about 120 million bee colonies that can provide self-employment to over 6 million rural & tribal families. In-terms of production these bee colonies can produce over 1.2 million tons of honey and about 15, 000 tons of beeswax. Organized method of collection of forest honey and beeswax using improved methods can result in an additional production of at least 120, 000 tons of honey and 10,000 tons of beeswax, which is expected to generate 5 million tribal families. Further, from apiary beekeeping, there is a scope of 6 million bee boxes and other spares can create employment of 5000 persons more. *(Projection for 2009-10 based on recommendations of National Commission on Agriculture)*

- Encourage better beekeeping methodology
- Promote cooperation among the beekeepers of the state and nation
- Reach a common understanding regarding our problems and their solutions
- Maintain friendly and helpful relations among beekeeping advocates
- Develop markets for beekeeping products
- Foster closer cooperation among members of the NCSBA
- Improve purposes relating to honey bees and beekeeping exclusively for its members and the general public
- Push for a strong and efficient State organization through planning, communication and action.
- Develop methods and activities to strengthen local beekeepers
- Promote and maintain close communication among all Stake holders.
- Stress leadership development through the KVIC's Master Beekeeper Program.
- Maintain and develop close cooperation with beekeeping groups.

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- Render full support and promotion of honey bee research.
- Actively publicize and encourage support to the Apiculture Science Fund at CBRTI.
- Promote public awareness of honey bee importance.
- Pursue efforts to realize a permanent honey bee exhibit
- Increase the number of honey bee presentations by KVIC to schools and other groups.
- Schedule honey bee product marketing promotions annually in the State Farm Markets.
- Encourage more attractive and educational honey bee exhibits at local festivals and fairs.

5. **Strengths & Scope:**

5.1. On 28th June' 2015, Hon'ble Prime Minister laid a foundation of "Indian Agricultural Research Center at Hazariabaug, Jharkhand. P.M. appealed to all the States to develop Beekeeping at least in one District for honey production, knowing importance of honey as food and medicine and export potential.

5.2. FAO has estimated that the pollinating insect, particularly honeybee, through its pollination, contribute to the tune of Rs. 203 billions of Dollars' worth food production every year.

5.3. In America, honeybee colonies numbers has come down from 60 Lakhs to 30 Lakhs during the past few decades due to various reasons.

5.4. Dr. R.P. Phadke, Retd. Director of CBRTI indicated that the warnings are coming from scientists all over the world that deforestation, pollution, insecticides, etc. are threatening to the useful insects, particularly honeybee. This may reduce total food supply in India by 1/3 in coming decades. FAO has also launched a project "Conservation of pollinating insects for sustainable agriculture" and also banned some insecticides toxic to honeybees

5.5. In India, there is abundance of fruit crops in the province is a strength for the pollination side of the beekeeping and this strength can result in an industry opportunity. Indeed, for some crops, notably Mustered, Litchi, Eucalyptus, Karanj, Oilseeds, Pulses, oranges, apple, onion seeds are complete advantages for honey bees for pollination and growth of bees. This activity can boldly capture the untapped resource, if realized.

5.6. India has potential to keep about 120 million bee colonies that can provide self-employment to over 6 million rural & tribal families. In-terms of production these bee colonies can produce over 1.2 million tons of honey and about 15, 000 tons of beeswax. Organized method of collection of forest honey and beeswax using improved methods can result in an additional production of at least 1, 20, 000 tons of honey and 10,000 tons of beeswax, which is expected to generate income for 5 million tribal families. Further, from apiary beekeeping, there is a scope of 6 million bee boxes and other spares can create employment of 5000 persons more. *(Projection for 2009-10 based on recommendations of National Commission on Agriculture)*

5.7. There are 6, 07, 000/- villages as per the census 2011, if there would be 5 bee keepers with 5 bee colonies in each village, on an average, then there would be more than 3.04 million people can be engaged in beekeeping. But till today there 2.00 Lakhs beekeepers practicing beekeeping. It has good potential and large unrealized honey production with multi-seasonal plants and/or crops, which is untapped. ***

5.8. Beekeepers / village dwellers both women & men not necessarily own land to do beekeeping and only need to spend 8-15 hours in a week to look after their bee colonies for beginner's beekeeping. Thus, Beekeeping is ideally suited as a part-time occupation to beekeepers/ farmers and students in the beginning. A new beekeeper can be a Beekeeper after maintaining or taking care of 10 to 15 honey bee colonies in a period of one year after training. 50 honey bee colonies can provide sustainable income generation and nutritional supplement to the rural and tribal families.

5.9. Beekeeping Skills and knowledge are the driving forces of economic growth, increase in crop productivity and social development for the people in the country.

5.10. India currently faces a severe shortage of well-trained, beekeeping skilled workers in the field of Apiculture. Therefore, must focus on scaling up beekeeping skill/ apiculture techniques and training to meet the demands of beekeeping sector and drive economic growth.

5.11. Bees are best pollinators for crops due to its floral fidelity character. Oils seed, Pulses, Horticultural crops, Orchids are depending upon insect pollination. Day by day the pollinators are declining drastically due to indiscriminate use of insecticides and pesticides. Besides, this there no natural abodes due to deforestation. Thus it is necessary to protect honeybee and declare honeybee as National Insect.

6. **Role of Honeybees in Agriculture:**

6.1. One in three bites of food we eat is dependent on honey bees for pollination.

6.2. Of the 100 crops that provide 90 percent of the world's food, over 70 are pollinated by bees.

6.3. In North India, honey bees pollinate nearly 95 kinds of fruits such as almonds, Cherries, berries and apples and other tropical fruits.

6.4. More than three times as many colonies of honey bees are rented for the pollination of almonds than are used for the pollination of the next most important crop (apples). Similarly, it should be promoted to other oil seeds and pulses for increasing the yield.

6.5. Himachal is responsible for more than half the production of almonds in India.

6.6. Estimates for numbers of honey bee colonies rented for almond & apple pollination range between 0.30 million and 1.00 million.

6.7. The number of colonies rented for apple crops is estimated to be more than 75,000.

7. <u>Beekeeping as industry:-</u> The lowest valued product of beekeeping is honey. Other valuable products of beekeeping are beeswax, pollen, royal-jelly, propolis, bee venom are other unexplored in India. Bee pollinate Agri. & horticultural crops, which contributed additional crop yield up to 35%. There is great demand for honey throughout the world and increasing with awareness on health.

7.1. Consumption Of Honey & Hive Products**;** In India, Honey has been used since ancient times, as traditional medicine only as recommended in traditional Ayurveda system that honey acts as vehicle to carry the medicine effectively.

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7.2. Therefore, the consumption of honey is at 8 g. per capita. However, the scenario is changing very fast, due to the extensive awareness programs of KVIC (Khadi & Village Industries Commission) –CBRTI (Central Bee Research & Training Institute - SBEC and media publicity by a few private companies. The people are now beginning to realize the importance of honey as nutritious food and demand of honey has increased significantly in domestic as well as industrial sector.

7.3. As Compared to this, in most developed countries honey has been used as food and the rate of consumption is as high as 1.75 kg per capita. The highest rate of consumption is 2.50 kg in European countries like Germany, Switzerland etc. This is an eye opener for developing beekeeping / honey industry.

7.4. It is now realized across the globe that beekeeping has great importance in the agriculture based economy with pollination services, especially oil seeds and pulses production. According to Dr. Swami Nathan, second green revolution is possible only by increasing the pollinators, such as honeybee. In most of villages in India, beekeeping is more or less feasible.

7.5. Therefore, the HONEYBEE MISSION - known henceforth as addressed as Mission, which will provide the overall institutional framework to rapidly implement and scale up beekeeping skill development efforts across India in beekeeping potential states.

7.6. The vision, objectives and strategy of the Mission, draw on the lessons learnt from the implementation of beekeeping programs over the six decades. It seeks to provide the institutional linkages and training to a minimum of **10, 200 new/ novice Beekeepers** by the **year 2018-19**.

7.7. **These 10, 200 persons** shall be outreached and trained through State Beekeeping Extension Centers (SBEC), Central Bee Research & Training Institute, 150 Master Beekeepers / Professional Trainers / NABARD/ Beekeeping Cooperatives & NGOs/ State KVIBs and any other interested private stakeholders shall be the participant stakeholders

7.8. This Framework for Implementation will provide strategic direction to stakeholder and establish a clear line of action to enable beekeepers in India to achieve sustainable income and employment.

Products of beekeeping

- **Honey:** Production of honey is the prime objective of any person engaged in beekeeping. A beekeeper generally gets 10-15 kg from ***Apis cerana*** and 15-40 kg honey per colony from ***A. mellifera.*** However, commercial beekeepers in Himachal Pradesh, Punjab, Jammu and Kashmir and Bihar are obtaining 50-70 kg honey per colony of ***A. mellifera*** by 3 – 4 migrations. The maximum honey yield from a single colony of ***A. mellifera*** from Himachal Pradesh has been reported to be 110 kg. Honey has domestic, medicinal and industrial uses. There is a vast difference in price of raw honey and processed honey. Raw honey costs about Rs. 90 to Rs 100 per kg and processed honey @ Rs. 250 to Rs 300 per kg or more without any consideration of quality and packing. Raw white honey from `Shain' (***Plectranthus rugosus)*** is valued at @ Rs 300 to Rs. 350 per kg in some parts of Himachal Pradesh.

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- **Bee wax:** Honeybees secrete wax from their body as and when required for the construction of comb and store honey and pollen as food and eggs as brood. The bee wax is inert of any chemical reaction. When old and dark, bees discard it. Such old wax is then collected in hot water and made in to cakes for its further application in pharmaceuticals as base media and cosmetics. Beeswax is also called as natural resin. It is sold @ double the price of honey.

- **Pollen: Pollen is good source of protein.** It can be easily collected by placing a pollen trap at hive entrance. During a good pollen flow season, it is possible to harvest 0.5 to 1.0 kg of pollen per day from one hive of ***A. mellifera***. Maximum use of pollen is for feeding bees as pollen supplement during the dearth period. Pollen can also collected from wild Rock bees *A. dorsata*. Pollen is suitable for medical and prophylactic purposes. It is effective for treating hyper tension when mixed with honey (1:1). It can be used for complaints of nervous and endocrine systems. It is also used in various cosmetic preparations.

- **Royal jelly (*mellifera*) :**It is produced by nurse bees to feed the queen bee throughout her larval and adult life, and also young worker and drone larvae. Royal jelly can be produced from a queen-right colony or by de-queening a colony and harvesting the jelly from queen cells. On an average, it requires 1000, 3-day old cells to produce 500gm of royal jelly and sold @ Rs 25, 000/kg. Royal jelly has a reputation as a panacea, aphrodisiac and rejuvenator. It is used to make medicines and nutritional supplements.

- **Bee venom:** It can be commercially obtained by stimulating large number of bees by electric shock (8-12 volts) to sting through a sheet of nylon parchment taffeta above two sheets of thin polyethylene (0.025 mm thick), stretched over the collection board. Another method is to pass electric current through the sheet of gel or silicone and bees standing on this react by stinging in to it where it is deposited. About 50 mg venom can be obtained per colony and sold @ Rs 1000/g. It has been used to cure polyarthritis, infectious-polyarthritis, spondylosis deforming, neuralgia, rheumatism, certain eye diseases like iritis and irridocyclitis, skin diseases (tuberculosis of skin), inflammation of sciatic, facial and other nerves, hypertension etc. It is also known to lower down the cholesterol level.

- **Propolis *(mellifera)*:** It has anti-microbial properties and is effective in healing wounds as a medicine for removing corns and good aesthetic in dental medicine. It is used as veterinary ointments for treating cuts, abscesses and wounds of animals. About 300g of propolis can be obtained from one colony per year and sold @ Rs 500/kg.

Pollination Studies done by All India Coordinated Research Project on Honeybees & Pollinators:

- **PIGEON PEA:** Highest number of seed set/pod (3.46) was observed in open pollination and it was significantly superior over exclusive *Apis*

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- *cerana* pollination and without insect pollination. Exclusive *Apis cerana* pollination was at par with caged condition indicating the role **Indian Honeybee in pollination of Pigeon pea.** The highest pigeon pea productivity (983.47) Kg/ ha was recorded from open pollination, which was significantly superior over exclusively by *Apis cerana* pollination and without insect pollination.
- **SESAMUM:** the seed yield of sesamum was highest (5.2 q/ha) in open pollination followed by pollination exclusively by *Apis mellifera* (4.9 q/ha).
- **PEAR (SOFT PEAR):** In soft pear cv. Punjab Beauty), pollinator had a key role in increasing 1400 % in fruit setting. SWEET CHERRY, PEACH, GUAVA, LITCHI, BITTER GOURD,CORIANDER, WATERMELON, RIDGE GOURD

ATTRIBUTES OF BEEKEEPING

Beekeeping provides sustainable livelihood option for economically vulnerable communities because of its following attributes:

- Provide food and cash income without ownership of land
- Resilient when disaster happen
- Non extractive and sustainable
- Provide opportunity for small , medium and commercial farming
- Can be adopted as a spare time, part time, and full time occupation.
- Require a little investment and infrastructure
- The technology is simple and low cost.
- Help local craftsman to earn extra wages
- Hive product are low volume –high value with good self-life.
- Earn foreign exchange
- Diversifies the economic base.
- Enhance productivity levels of agricultural, horticultural and fodder crops through pollination services.
- Helps in overcoming the problem of malnutrition and human health
- Bee pollination is vital for life on earth in terms of bio-diversity conservation
- Provide effective linkages to other farming system with positive ecological consequences

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CHAPTER -2

QUALITY CONTROL OF HONEY: Honey is a natural sweet substance produced by honeybees from the nectar of blossoms or from secretions of plants, which honeybees collect, transform and store in honey combs for ripening. The ripe honey from sealed comb is then collected.

There are two types of honey.

a. **Apiary honey**
b. **Forest honey**

a. **Apiary honey**: - Honey produced by the Indian hive bees *Apis cerana* and European bee *Apis mellifera* in apiaries and collected by modern extraction method is called apiary honey. Apiary honeys are considerably transparent and are free from foreign materials like wax, pollen, brood, etc.

b. **Forest honey**:- Honey produced by rock bees *Apis dorsata, Apis flores* or wild nests of *Apis cerana* in forest and collected by the crude method of squeezing or pressing the comb are termed as forest honey. Forest honey is turbid due to the presence of a lot of pollen, wax brood and other parts of bees and plant materials.

Genuine honey contains about 80 per cent sugars and 20 per cent moisture. Cheap sugar solutions are therefore common adulterants of honey. Estimation of reducing and non-reducing sugar components of honey enables to detect this type of adulteration. Cane sugar, jaggery, gud, molasses are the common adulterants of honey. As all these sugars are non-reducing sugars, estimation of non-reducing sugars in honey, which should not be more than 5 %, gives conclusive method of detection of this type of adulteration.

GROSS COMPOSITION OF INDIAN HONEYS: About 100 samples of multiflora honeys from all parts of the country were collected by the Central Bee Research and Training Institute (KVIC) and analyzed for various physico-chemical characteristic. The average values of these areas under:

1.	Specific gravity	-	1.394
2.	Direct polarization	-	2. 21’
3.	Moisture	-	20.48 %
4.	Total dissolved solids	-	77.57 %
5.	Total sugars	-	73.88 %
6.	Reducing sugars	-	71.73 %
7.	Non-reducing sugar	-	2.75 %
8.	Levulose (Fructose)	-	37.51 %
9.	Dextrose (Glucose)	-	34.01 %
10.	Ratio L/D	-	1.108
11.	Dextrins(higher sugars)	-	1.97 %
12.	Acidity (as formic acid)	-	0.17 %
13.	Ash (minerals)	-	0.215 %
14.	Proteins	-	0.553 %
15.	Undetermined	-	2.128 %

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MORE ABOUT COMPOSITION OF HONEY

Once we know about the averages values of composition of honey, we can judge about the quality and purity of any given honey sample. Let us understand in brief the meaning of some of the important Physico-chemical characteristics of honey.

i) **Specific gravity:** The specific gravity of an average honey sample with 80 percent sugars and 20 percent moisture is about 1.4. Lower the specific gravity than this value higher is the moisture content. This value therefore gives an indication as to whether the honey is ripe or unripe.

ii) **Moisture content:** This is a very important characteristic of honey. As we will see later, high moisture content results into fermentation and spoilage of honey. On an average honey should contain less than 20 percent moisture. Moisture content up to 22 percent is tolerable. But honeys with more than 22 percent moisture are liable to ferment.

iii) **Total dissolved solids:** This value represents total water-soluble ingredients in honey. These comprise mostly of simple and complex sugars. These can be estimated with a single drop of honey placed on the prism of Sugar refractometer and directly reading on the scale for total dissolved solids in honey. This pocket size small instrument, indirectly gives water content in honey and is a very important tool for knowing whether the honey is ripe or not and for quality control of honey at field level

iv) **Total sugars:** Total sugars value represents sum of reducing sugars i.e. Levulose plus Dextrose and non-reducing sugars i.e. sucrose or ordinary cane sugar.

v) **Reducing sugars:** Laevulose (or fructose) and dextrose (or glucose) are known as reducing sugars and these are the two principal sugars present in honey. In nectars, though sucrose is a dominant sugar, laevulose and dextrose are also present in small quantities. Honeybees prefer nectars with high laevulose content. Thus percentage of laevulose in honeys is always more (Approx. 37 percent) than that of dextrose (Approx. 34 percent).

vi) **Levulose to Dextrose Ratio** (L/D Ratio): It is observed that, with rare exception, all the honeys contain more laevulose than dextrose. The ratio L/D is always more than1.0. This ratio is an indication about the purity and genuineness of honey.

vii) **Ash:** Average ash contents i.e. mineral content in Indian honeys varies from 0.1 to 0.3 percent. The color of the honey is directly correlated with the ash content. Darker the honeys higher are the ash content.

OTHER MINOR BUT IMPORTANT INGRADIENTS

In addition to above major ingredients, there are few minor but important ingredients present in honey. These are pollen grains, enzymes, Hydroxy-methyl-furfuraldehyde (HMF) and yeast cells.

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Pollen:

Honeybees collect floral nectar during their floral visits. An individual bee requires to visit many flowers to get its stomach completely filled with nectar. During this process, pollen grains of the flowers from which the bee has collected nectar, get incorporated in the nectar and thus in the final product, honey. The hairy body of the bee gets dusted with the pollen grains of the flowers visited by bees for nectar collection. In this manner, pollen grains of the flowers get incorporated into the honey during its collection and storage into the cells. Very rarely a genuine honey sample may not contain pollen grains, if it is collected from extra-floral nectarines like cotton or rubber etc. Except for such rare cases, all genuine honeys contain pollen grains.

Honeys containing pollen grains predominantly of a single plant species are termed as 'Unifloral Honeys' and are often sold under the name of their respective plant sources, as for example, clover honey, sage honey citrus honey etc. in foreign countries and Mustard honey, Litchi honey, Jamun honey etc. in India. Each of these Unifloral honeys has peculiar taste, color and flavor. Microscopic analysis of honey serves to confirm botanical source of such Unifloral honeys. In quantitative microscopic analysis if the honey sample contains pollen of a single plant species more than 45 percent of the total pollen grains, according to International Commission on Bee Botany, the sample is considered to have originated from that species principally and can be labeled after that plant source. If the pollens of two or three plant species dominate, the honey is termed as 'Multifloral'. Quantitative microscopic analysis of pollen grains in honey can thus be used to reveal mixture of different honeys as also their relative proportions in the sample and the geographic origin of the honey.

After quantitative analysis of large number of Indian apiary honey samples for pollen grains, it was observed that Indian apiary honeys on an average contains 13000 pollen grains per gram of honey with a range of 2400 to 42000. The International Commission on Bee Botany has made categories as under for honeys

1st less than 2000 pollen grains per gm of honey
2nd Between 2000 to 10000 -do-
3rdBetween 10000 to 50000 -do-

Majority of the foreign honey samples fall in the second category while majority of the Indian honeys fall in third category.

Pollen in Squeezed Honeys:

In addition to apiary-extracted honey, India produces large quantities of squeezed honey. This honey is mostly collected from **Apis dorsata**, the wild honeybees. Except for the turbidity due to large amount of pollen content and presence of foreign matter in this honey, the chemical composition of apiary extracted honey and squeezed honey is quite comparable. The squeezed honey after filtration is sometimes mixed with the apiary honey. It therefore became necessary to find out methods to distinguish between apiary honey and mixture of apiary and squeezed honey.Pollen count of honeys has provided a tool to solve this problem.When microscopic analysisof large number of squeezed honey samples was done it was found that average pollen count was 15.72 lakhs per gm of honey with a minimum of 1.3 lakhs and maximum of 31 lakhs, as against the average value of 13000 per gm of honey with a maximum of 42000 in apiary honey. Because of the high pollen count and turbidity of squeezed honey, transmittance of light through this honey is less than that of apiary honey. Pollen count and transmittance (or optical density) provides reliable methods for distinguishing between apiary and squeezed honeys. ***

Yeasts in Honeys: While doing microscopic examination of honey samples, one comes across large number of small cells in some honey samples. These are yeast cells. The yeast cells, under favorable conditions of temperature, moisture and food, multiply rapidly consuming the available food. There are large numbers of species of yeast, but all do not thrive in honey. The group that can thrive in honey consists of what are known as "osmophilic yeasrts" or "Sugar Tolerant Yeasts". These sugar tolerant yeasts, under certain conditions decompose the sugars in honeys and spoil the honey.

At high concentration of sugars (80 percent and above) and low temperatures (less than 10 degrees C.), the yeast cells, though alive, remain in dormant state. At lower concentration of sugars and at temperatures between 30 – 40 degrees C., the yeasts become very active and multiply very rapidly. The yeast cells decompose sugars in the honey into alcohol, acetic acid, water and corbon-di-oxide. At 65 degrees C. these yeasts are destroyed completely.

So far, 25 species of following five genera have been found in Indian honeys (1) ***Zygosaccharomyces*** in 35 %samples, ***Torulopsis*** in 33 % samples, ***Saccharomyces*** in 20 % samples, ***Pichia*** in 7 % samples and Hansenula in 5 % samples. The sugar tolerant yeast cells are present in air, on the flowers and even in the nectars of the flowers. Thus almost all honeys contain yeast cells in smaller or greater proportions. With their high initial number, chances of fermentation of honey are high. We shall see more about yeasts in following pages.

Enzymes in Honey: The enzymes in honey are among the most interesting constituents. It is reported that occurrence of enzymes in honey is due to (1) their presence in nectars itself, (2) secretion of enzymes in the salivary and pharyngeal glands of the honeybee and (3) presence of enzymes in the pollen grains of honey. The most common and important enzymes reported in honey are invertase, diastase and glucose-oxidase. The main sugar content of nectar- the sucrose is converted into glucose and fructose by the action of invertase secreted through the glands of the honeybee. The main interest of studying enzymes in honeys, in earlier years, was a possible means to distinguish between natural and artificial honeys. As the enzymes are very sensitive to heat, till recently research on enzymes was continued to control over-heating of honey or storage of honey at high temperatures. Overheating of honey during processing affects the color and flavor of honey and increases quantities of Hydroxy-methyl-furfuraldehyde (HMF). The intention of studying enzymes in honey has, therefore shifted from identification of adulteration to identification of overheating during processing and storage of honey at higher temperatures.

The diastase and invertase values of large number of Indian honeys were studied. Comparison of these values with honeys produced by European honeybees is as under;

	Diastase	Invertase
Apis cerana	7.88	36.50
Apis dorsata	6.55	19.32
Apis mellifera	25.63	41.50

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The Indian honey samples from different species of honeybees show low diastase value. The honey produced by ***Apismellifera*** colonies maintained in India showed significantly high diastase value compared to the honeys produced from the ***Apiscerana***bee colonies from the same locality. As far as invertase values are concerned, the values of ***Apiscerana***and of ***Apismellifera*** are quite comparable.

Another important enzyme in honey is glucose oxidase. This enzyme reacts with the glucose present in the honey and small quantities of hydrogen peroxide, acids and gluconolactone are formed. Even after neutralization, fresh quantities of peroxide are formed. This glucose-oxidizing enzyme, which forms acid and peroxide, was found in the hypopharyngeal gland of the honeybees. The acid and peroxide thus formed by the action of glucose and glucose oxidase enzyme has antibacterial and preservative properties.

Hydroxyl-Methyl-Furfualhyde: (HMF): Many a medicinal properties are attributed to honey and therefore honey has been a priced commodity, much costlier than other sweetening agents like cane sugar or jaggery. Cane sugar and jaggery had been common adulterants in honey for many years. The genuine honey contains less than 5 per cent sucrose (i.e. non-reducing sugars). Both the above adulterants are non-reducing sugars and their presence in honey can be determined by estimating non-reducing sugar component of honey.

With the development of methods of manufacturing commercial glucose and inverted sugar syrups i.e. the reducing sugars, the above method of deducting adulteration in a given honey sample became inconclusive. As the composition of reducing sugars of honey and composition of these new adulterants i.e. glucose and artificially inverted sugars is almost identical, it posed a great problem before the scientists.

A German scientist Fiehe in 1908 evolved a method to detect adulteration in honey with commercial glucose or artificially inverted sugars. Fiehe's Test depends on the presence of Hydroxy-Methyl-Furfuraldehyde (HMF) in commercial glucose. HMF is an unavoidable product formed during the process of manufacturing commercial glucose. Commercial glucose is manufactured by heating cane sugar or starch solution with small quantities of mineral acids at 110 to 120 degrees C. when perceptible quantities of HMF are produced.

Fiehe's Test was then accepted all over the world including India under Prevention of Food Adulteration Act, as criteria to detect adulteration in honey with commercial glucose. The nature of this test is qualitative. The color intensity in the test varies from pink to cherry red color depending upon the quantity of HMF present. The test therefore depended upon the discretion of the Analyst in distinguishing between the finer shades of red color and declaring the result as positive or negative. The test, therefore became a subject of controversy for many years, because it was observed that even genuine honeys contain small quantities of HMF and under certain conditions give positive Fiehe's test. The question then arise as to whether this test should remain in force or should be removed from the existing purity specifications for honey. More than 100 research papers have been published on formation of HMF in honeys during past couple of decades. The findings of the research work in brief is:

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1) Fructose sugar in the honey is heat sensitive and at 70 degree C. it starts decomposing into levulinic acid and HMF

(1) Formation of HMF in honey is a function of time and temperature, higher the temperature and longer the storage period, higher is the formation of HMF.

(2) Formation of HMF in dark colored honeys is more than that of light colored honeys.

(3) Fresh honeys contain nil or negligible quantity of HMF often less than 3 ppm. or 3mg/kg. of honey,

(4) At 15 degrees C. the rate of formation of HMF in honeys is negligible.

(5) The rate of formation of HMF in honeys is very slow upto 30 degrees C. and above this temperature rate of formation of HMF is very high and

(6) Formation of HMF at high storage conditions is initially comparatively less but is accelerated with the period of storage. Considering the available of research data, qualitative Fiehe's Test has been now replaced by quantitative test and is to be considered with enzyme value and Laevulose/Dextrose Ratio.

In order to prevent adulteration practices in food products and to protect consumers' interest Government of India has fixed purity standards for many food products under Prevention of Food Adulteration Act, (PFA). Several food commodities like, milk, ghee. Vegetable oils, wheat floor etc. etc. are covered under PFA. Honey is also covered under PFA. It may be remembered that PFA Rules are mandatory and Food Inspectors have the authority to draw samples of notified food products from any sale counter. The food samples, so collected, are analyzed at the Govt. Public Health Laboratories. The food samples, not conforming to the prescribed standards are considered as adulterated and fine and imprisonment is imposed on the seller. PFA standards are however very liberal to accommodate all natural variations in the food products. Under section A-07 of PFA, Sweetening Agents are listed and honey is listed under No. A-07-03. The text of the honey standards under PFA reads as under:

"Honey means the food derived directly from the work of honeybees operating upon the nectar of flowers and other sweet exudation of plants. It shall not contain more than (a) 25 % of moisture, (b) 0.5 % of ash and (c) 5% of sucrose except in the case of *Carvia callosa* and honey dew honey, where maximum sucrose content shall be 10 %. The minimum reducing sugar content (expressed as invert sugar) shall be 65 %, except in the case of *Carvia callosa* and honey dew honey where it shall be 60 %. Fructose/Glucose ratio shall not be less than 0.95. Fiehe's Test should be ordinarily be negative."

Different Standards for Honey

Characteristic	**P.F.A**	**B I S**			**AGMARK**			**CODEX**
		Special	**" A"**	**Standard**	**Special**	**" A"**	**Standard**	
Specific gravity at 27C	---	1.37	1.37	1.37	1.40	1.40	1.35	
Moisture per cent max	25	20	22	25	20	22	25	21
Reducing sugars per cent min	65	70	65	65	65	65	65	65
Sucrose per cent max	5	5	5	5	5	5	5	5
L/D ratio min	0.95	1	1	1	1	0.95	0.95	0.6

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Acidity percent max	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Ash percent max	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Fiehe's test		-ve	-ve	-ve	-ve	-ve	-ve	-ve
Pollen count / gm max		50000	50000	50000				
HMF mg/kg max		80	80	80				
Optical density Max at 600 Nm		0.3	0.3	0.3				
Diastase no. min								3
Water Insoluble Matters Max								0.1

SOME PROPERTIES OF HONEY

Viscosity of Honey

Honey is a highly viscous, i.e. not easy flowing, liquid. In other words, when honey flows over a surface or through a tube, it offers resistance against flowing. It has viscosity ranging from 50 to 100 poises. Viscosity of honey drops down rapidly with the increase in temperature and increase in moisture content. Viscosity of honey poses problems while its handling, particularly straining and bottling part of it.

Hygroscopisity

Honey is a highly hygroscopic material. This property of honey is attributed to its fructose content. When exposed to atmosphere, it absorbs moisture form the air and air exposed part of the honey becomes watery. Hygroscopic property of honey is useful for cosmetic and food preparations but poses a problem during handling of honey particularly during bottling etc. While bottling honey absorbs moisture if packing room is humid.

Moisture Content of Honeys

In India, honey is mostly produced from moist forests and coastal areas where relative humidity is comparatively very high. Humid atmosphere puts limits to the efficiency of honeybees in ripening of honey. Indian honeys therefore contain high moisture content (22 to 25 per cent) compared to European and American honeys. Species of the honeybee also contribute to this phenomenon. Honeys with high moisture content are liable to ferment particularly at places where ambient temperatures are high. Even though honey is a preservative by itself, high moisture content in honey deteriorates the quality of honey. In order to improve the quality of Indian honeys and to bring them on par with International standards, extracting honey from fully sealed super frames and use of honey processing-cum-moisture reduction units has become inevitable.

Granulation of Honey

Honey is a supersaturated solution of sugars in water. Under certain conditions glucose in honey crystallizes, separates out and makes its appearance visible. Almost all honeys granulate after storage. The rate of granulation however varies from honey to honey depending upon the source of the nectar. There are some extreme examples. Some honeys granulate even in combs before extraction while some honeys do not granulate even after storage of 4 to 5 years. ***

But these are exceptional cases and by and large most of the honeys granulate between 3 to 12 months after extraction. Some honeys granulate partially while some granulate fully. In some honeys granules are very small and soft while in others they are very big and course. The rate, degree and quality of granulation depends on 1) relative percentages of different sugars in honey, 2) water content in honey, 3)temperature of storage, 4)degree of presence of foreign material in honey (pollen, air bubbles, dust etc.) and 5) presence of microscopic size of glucose crystals in honey.

Though granulation is a natural phenomenon and granulation does not mean adulteration, granulation not only poses problems in handling of honey but it also leads to fermentation of honey. In a very ripe honey when granulation takes place, water content in the granulated portion of honey drops down and it increases in the liquid portion of honey to the level of 25 to 30 percent. Thus fermentation starts in the liquid portion of granulated honey and spreads all over.

Granulation is a natural phenomenon and it cannot be stopped completely. But it can be retarded or delayed by straining out the foreign material in honey and then heating the honey to about 65 degrees C. to dissolve the micro crystals of glucose present in honey.

Fermentation of Honey

The chemical changes in organic substances brought about by the action of enzymes is known as fermentation. Generally, fermentation results in the breakdown of complex organic substances into simpler ones through the action of enzymes. For example by the action of enzymes diastase, invertase and zymase, starch is broken down in steps first into complex sugars, then into simple sugars and finally into carbon-di-oxide, acids and water. Honey also undergoes above type of fermentation, if proper care during extraction and storage is not taken.

Fermentation of honey is caused by the microorganisms known as osmophilic yeasts. These osmophilic yeasts are present in air, water and even on flowers and in nectars and get asses to honey through nectar, pollen and water collected by the honeybees. These yeast cells also get asses to the honey through unclean honey extractors, knives, strainers and containers used while extracting honey. Almost all honeys thus contain honey fermenting yeast cells. The honey fermenting yeast cells can tolerate high concentration of sugars, even more than 80 per cent, and hence are also known as 'sugar-tolerant' yeasts. At high concentration of sugars and at temperatures below 10° C., these yeast cells remain in dormant or inactive state. These yeasts are heat-sensitive and are completely destroyed when heated to 60° C. for certain period.

In honeys, with water content more than 22 per cent and particularly when ambient temperature is between 25 to 40° C. These yeast cells become very active. When active, the yeast cells multiply and at the same time secrete two types of enzymes namely invertase and zymase. The former decomposes the sucrose in the honey into glucose and fructose and the latter enzyme decomposes glucose and fructose into alcohol, acid, water and carbon-di-oxide. This decomposition process being exothermic, liberates some heat. Thus conditions very favorable for the multiplication of yeast cells are created, resulting into rapid decomposition and fermentation of more and more quantity of honey. ***

Even ripe honeys, when exposed to moist atmosphere, absorbs moisture and a thin watery layer is formed on the top surface of honey, leading into fermentation.

Therefore, temperate zone honeybees are better suited for commercial honey production for India. Average honey production with A. mellifera is 30-40 kg/year/ colony but through migration, beekeepers are getting the high averages of 60-70 kg. Although, the beekeeping with introduced A. mellifera is flourishing in some states, the species should be quickly tested for its performance to spread to other potential regions with greater research and extension support.

Bee Flora

Information on different aspects of bee forage is essential for the efficient management of honeybee colonies. Management scheme for each apicultural region is closely correlated with the flowering of local honey and pollen producing plants as also the climatic conditions. Basic research in the area of forage ecology has been done and floral calendars for different regions have been prepared. On the basis of surveys potential beekeeping areas have been identified.

The most serious problem for Indian beekeeping has been the decline in flora due to deforestation and clearing of wastelands for extensive agriculture. Improvement of bee flora is not possible by individuals' efforts and a beekeeper has to adopt and adjust only to the cropping patterns of the area and forest wild flora available in the locality. Recently central and state Governments and local organizations have helped in expansion of planted areas of bee forage along highways, wastelands etc.

To get good results, plantation of selective trees and shrubs is essential and this should be done on the basis of multiple use principle including bee forage as one of the uses. Flowers of many plant species are visited by bees for nectar and or pollen but relative importance depends on the quality and quantity of rewards available and also on the density of the plant species. Intensive research in this area has generated this type of information on many of the important flora. The knowledge accumulated can be made use of while planning plantations on the basis of accessibility of the potential bee forage areas and migration schedules can be worked out. Migratory beekeeping is practiced by many commercial beekeepers in states like Himachal Pradesh, Bihar and south India but micro-regional survey of bee forage would be required for planning short and long distance migration schedules.

Equipment and Management

Efficient management requires the use of appropriate equipment and operations concerning the well-being of bees. Many types of hives had been in use in India and attention of the scientists was attracted to standardize the hives and with these efforts the ISI (BIS) hive specifications laid down on the basis of body size (bee space). Increase in brood and super chamber capacities has been suggested keeping in view the colony build up capacity and length of buildup and honey flow reasons. BIS have also formulated standards for other bee equipment.

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Knowledge of biometry of bees is helpful in standardizing bee equipment, for breeding work, and for gathering information on the races of a species. Good information on body size, tongue length and other morph metric characters is available for *A.C. indica*. Egg laying capacity of queens and consequently colony build up capacity varies from south to north of the country. Therefore, exhaustive studies are required for all the regions, to develop suitable queen excluders, comb foundation mills, bee escape, honey extractors, pollen traps etc. For A. mellifera only standard Langstroth hive is being used everywhere in India where so-ever the species is present. In these and other areas need might arise to make suitable amends in sizes and number of frames etc. to suit different zones. Timber is becoming expensive and cost of hives is increasing. To keep the investment in beekeeping low some alternative materials like polyurethane, polystyrene and compressed sheets etc. shall have to be tried.

Many other practices for better management of honeybee colonies have been worked out and standardized. Mass queen rearing for colony multiplication is a very useful practice. The queens (30-40) reared in one queen-less or queen right colony can be given to new divides just before the emergence. This saves the wastage of many days for queen rearing by each divide. Time and length of divides in regions have also been worked out. Over summering is a problem in many parts of our country because bees are troubled by high temperature and it is also no flora period. Methods have been recommended for successful summer management, which also includes feeding of pollen supplements, and substitutes to make colonies to continue rearing some brood.

India presents a variety of ecological conditions from north to south and east to west. To some extent the art of beekeeping can be uniformly adopted but some management problems, specific to different regions, are needed to be tackled on priority. Similarly, summer and rainy season dearth periods need immediate attention. Other problems that should attract the attention of bee scientists are strength of divides for colony multiplication etc. Little work has been done on the problem of swarming and absconding in A. cerana indica. In addition work on behavioral aspects of Apis spp. is needed to evolve the management calendar for bee apiaries. Limited information is available in India on communication behavior, foraging distance and nectar and pollen carrying capacity. Exhaustive information on these aspects is needed to standardize management practices for different ecological regions for efficient management of hive bees.

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Chapter –3

1. KVIC and Beekeeping infrastructure

Khadi & Village Industries Commission with the inspiration of Rastrapita Mahatma Gandhi took the task of development of the beekeeping Industry with a view to uplift the financial status of people living in extremely interior rural areas by introducing and popularizing modern beekeeping.

Until 1953, the beekeeping in Indian subcontinent was disorganized till this activity was taken over by All India Khadi & Village Industries Board and subsequently by the KVIC in 1957 and establishing Central Bee Research & Training Institute at Pune on 1st Nov' 1962.

Success of an Industry is measured by its achievement and the role of Khadi & Village Industries Commission (KVIC) in the uplifting Beekeeping Industry is spectacularly well established. Beekeeping is an ideal Forest and Agro Based subsidiary industry, providing supplementary income to a target group of people from rural, hilly and tribal tracts including horticulturists and agriculturists because of abundantly, widely, and well distributed, bee flora. Apart from the direct benefits of honey and bee wax, the indirect benefits through crop pollination etc. are almost impossible to quantify which may simply outclass the direct benefits.

The Khadi & Village Industries Commission's Act, Rules & Regulations indicates under the Schedule (section (2(h))) the "**beekeeping activity"** is the prime activity under Village Industries. KVIC is charged with the planning, promotion, organization, and implementation of program for the development of Khadi and Village Industries in the rural areas in Co-ordination with other agencies engaged in rural development, wherever necessary. The strength of KVIC in the overall development in beekeeping industry is being looked by the separate Directorate in the Head Quarters of KVIC in Mumbai. The main task of the Directorate is framing policies, schemes and promotional programs, awareness, training, linkages and handholding in development of beekeeping industry, through the available network of State / Divisional Offices, CBRTI and State Beekeeping Extension Centers. Unlike other village industries under KVIC, beekeeping industry is peculiar as it is an interaction of two living creatures in this industry. The bees and flowering plants.

To take advantage of these two interactions, State Beekeeping Extension Centers (SBEC) mechanism has been developed by the Directorate of Forest Based Industry with a view to impart training, tools supply, practical extension of beekeeping activities and technology dissemination at field level. These SBECs are closely connected with beekeepers enable to obtain the colonies of *Apis mellifera* and *Apis cerana* wherever the potential of these colonies are in existence. SBECs are also closely connected with bee box manufacturers, therefore, at the time of the execution of the beekeeping programs, the SBECs will play vital role.

The KVIC is responsible for taking Beekeeping Industry to the present height from a mere 800 colonies producing 1, 200 Kgs (i.e. 1.5 Kg per colony yield) to the honey production of 70, 000 MT valued Rs. 770.00 Crores (@ Rs110/-per Kg) in the country in the potential states. Contribution of the wild honey (Dorsata) is estimated to 50%. The success of the beekeeping industry lies in developing the entrepreneurship, when the trained persons desires to set up their micro small units by availing the ongoing existing scheme of PMEGP.

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The State / Divisional Directors have been asked to promote and provide preference to finance beekeeping activities in this regard. Moreover, wherever the group of beekeepers are available in larger scale, in the states and also those states which are having potential of flora and fauna have been identified for inducting new beekeepers through Honey Mission. Accordingly, action plan enclosed.

2. NETWORKING OF AVAILBLE INFRASTRUCTURE: the details are as under:

(i) Central Bee Research & Training Institute, Pune - 01
(ii) No. of Directly Aided Institutions - 100
(iii) State Beekeeping Extension Centers - 16
(iv) Beekeeping Clusters (under SFURTI/KRDP) - 15
(v) Technical Experts (Officials / staff) - **58**

3. Performance on promoting beekeeping & imparting training

(Rs. In Lakhs; Phy. No. of Persons))

Sr. No	Year	Financial		Physical (Training)	
		Target	Achieved	Target	Achieved
1	2	3	4	5	6
1.	2014-15	91.01	11.17	1790	1, 580
2.	2015-16	93.00	58.35	10, 000	8, 305
3.	2016-17	250.00	214.00	13, 900	9, 400
4.	2017-18 (up to December 2017)	600.00	500.70	14, 300*	12, 100*

Note: *No. of colonies

4. Beekeeping Training Programs conducted at SBECs

S.No.	Particulars
1.	5 days training program under AC
2.	5 days training program under AM
3.	Rock bee Training
4.	Queen Rearing Training Program
5.	Quality Control of Honey Training
6.	Seasonal Bee Management Training

5. <u>Regular Annual Promotional Programs undertaken by SBECs</u>

S.No.	Programs
1.	Awareness
2.	Advertisements
3.	Zonal Workshops
4.	Meeting with leading beekeepers
5.	Beekeeping In schools
6.	05 days training program under AC, SCSC
7.	05 days training program under AM SCSP
8.	Rock bee Training
9.	Queen Rearing Training Program
10.	Quality Control of Honey Training
11	Seasonal Bee Management Training
12	5 days beginners beekeeping / Skill Upgradation

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6. Training Programs under CBRTI, KVIC, Pune:

The Institute is one of the premier center for beekeeping training in the country and is recognized internationally as beekeeping training center for development conducted following courses with modern audio visuals aids:

S. No.	Name of the Training	Duration	Eligibility
1.	Diploma in Beekeeping	6 months	B. Sc. (Biology/ Agri./ Forestry)
2.	Certificate course in Beekeeping	1 month	SSC or equivalent
3.	Rock-bee handling	20 days	Honey Hunters / Tribal
4.	Elementary Beekeeping	15 days	SSC or equivalent
5.	Short term course in beekeeping	5 days	Hobbyist or Amateurs / Beginners
6.	Queen Rearing, pollination, bee pathology, CF Sheet, etc.	15 days	Persons with background in beekeeping / beekeepers.
7.	Honey Processing	5 days.	Any one – Not specified
8.	Analysis of honey	5 days	B.Sc. Chemistry
9.	Tailor made course	10-15 days	In-service persons of Govt. Org. / beekeeping cooperatives / NGOs
10.	Management of *Apis mellifera*	1 week	Persons with beekeeping background
11.	Melittopalynology pollen & propolis collection	1 week	Persons with beekeeping background
12.	Training in Honey Testing Kit	1 day	Anyone
13.	Hobbyist training	5 days	Anyone

7. STATE BEEKEEPING EXTENSION CENTER

Khadi & V.I. Commission plays vital role in popularization of beekeeping and standardization of management practices in various agro climatic conditions in the country. For the very purpose KVIC has a full-fledged Directorate of Beekeeping and a Research Institute, Central Bee Research & Training Institute at Pune. There are 19 State Beekeeping extension centers, the predecessor of Field Observation Stations are functioning in Beekeeping potential states.

8. FUNCTION OF THE STATE BEEKEEPING EXTENSION CENTRES

I. Training on Skill Up gradation for Apis mellifera & A. cerana:

(a) To conduct different level training courses of 5/15/30 days.
(b) To conduct training on queen rearing technique.
(c) Follow up action for making trainees as an entrepreneur.
(d) Distribution of beehives, colonies, CF sheet quality queen to Beekeepers in medium potential states
(e) Specific training on Quality Control of honey.

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II Skill Up gradation for Apis dorsata: -

(a) Training to wild honey collector for 15 days.
(b) Distribution of equipment in honey collector's kit. .
(c) Exclusive follow up of trained artisans.
(d) Specific training on quality control of honey.

III. Quality Up gradation by processing honey, through scientific honey processing units

Other Activities:-

1. Improvement in Design of levels, packaging & bottling.
2. To establish C.F.C./SFURTI/KRDP/PMEGP/Other schemes in the area for beekeeping activities
3. Testing of honey of beekeepers.
4. Extension visit to the institutions.
5. Meeting with Beekeepers, NGO, Marketing agents, Packers, Resource person in beekeeping in the area for integrated development.
6. Preparing Bee flora information & floral calendar district-wise.
7. Enlistment of beekeepers in the area.
8. Bee disease identification & suggesting preventive measure.

Strategy:-

1. Awareness and beginners beekeeping training.
2. Tools and technology supply
3. Skill up-gradation on queen rearing, seasonal bee management practices, Scientific honey harvesting.
4. Training Quality control of product as per Agmark& international standard.
5. Forming into beekeeping groups and linking with other schemes and projects.
6. Developing local brands to retain it's origin
7. Supply floral calendars and migratory routes
8. Inducting Good Beekeeping Practices for honey harvest and maintaining hive owners data.
9. Handholding

9. REGULAR MONITORING SYSTEM:

1. Conducting annual review cum orientation programs for monitoring the executed program. Reconciling the accounts, expenditure statements and unspent balances.
2. Maintaining the day-to-day record of colony maintained &developed at SBEC, floral conditions and management techniques.
3. Maintaining the trainees list at SO/ DO/ SBEC.

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Chapter-4

HONEY MISSION

1. Background:

1.1. Khadi & Village Industries Commission with the inspiration of Rastrapita Mahatma Gandhi took the task of development of beekeeping Industry with a view to uplift the financial status of people living in extremely interior rural areas by introducing and popularizing modern beekeeping.

1.2. Beekeeping has been carried out across many generations in India. It plays a vital role in the livelihoods of the rural communities in four dynamics;

(v) it is an income generating activity;

(vi) provides food and medicine - value of honey and other hive products are invaluable;

(vii) it supports agricultural activities through cross pollination and increase in yield of crops

(viii) it contributes immensely to forest conservation.

1.3. Because of the common (basic) level of investment and skills, the beekeeping industry offers direct employment to lakhs of people especially hill dwellers, tribal and farmers. Sustainability of this industry is therefore vital to the country's economic wellbeing and development.

1.4. Prime Minister viewed this opportunities and advised the authorities to explore the opportunities to create employment in Tribal regions to induce beekeeping, develop beekeeping potential districts viz. Left Wing Effected (LWE) areas, Backward Districts.

1.5. Meeting held on 26th April' 2017 at 11.00 AM in Udyog Bhawan, New Delhi under the Chairmanship of Hon'ble MoS (HPC) MSME, wherein Secretary, MSME informed that Hon'ble Prime Minister, in a meeting held on 23rd August' 2016 stated that Honey Production should be done on the similar lines of milk production through dairy cooperatives.

1.6. Hon'ble Prime Minister directed the Cabinet Secretary to coordinate the matter with multiple Departments / Ministries involved in Honey and honeybee. In compliance to the decision of Hon'ble PM, a meeting of Committee Cabinet of Secretaries held on 11th& 18th November' 2016 under the Chairmanship of Cabinet Secretaries to review the sector of MSME and informed that Hon'ble PM wishes to implement the program at village level so that employment is generated within village and this will help in curbing migration.

1.7. KVIC initiatives under Honey Mission from August' 2016 to till January 2018.

1.7.1. Established Apiaries by distribution of Bee boxes on Pilot basis in Banaskantha district of Gujarat association with Banas Dairy. Provided training and supplied 110 Apis mellifera colonies (bee boxes) to 79 farmers. 50 wild honey collectors were also trained in scientific way of Honey Collection from Wild Bees. About 1.50 tons of honey was collected, processed, packed and branded as Banas Honey.

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1.7.2. An amount of Rs. 6 Crore has been earmarked targeting about 1,500 farmers/tribal persons for training and to supply of 15, 000 modern bee boxes (bee hives) with live bee colonies in 21 States. Concentration is given in the tribal areas with modern beekeeping to increase the income of tribal population. About 10,728 *Apis mellifera / Apis cerana*bee colonies have been supplied to 1072 farmers / tribal persons / women **till 31-01-2018.**

1.7.3. Pollination services are being promoted among the beekeepers/ farmers, which will generate additional income to beekeepers.

1.7.4. Model Apiary at Rashtrapati Bhawan, New Delhi KVIC conducted a training program for the gardeners of Rashtrapati Bhawan and establish an apiary of 155 bee boxes in the Rashtrapati Bhavan gardens in July-2017 which will produce high quality honey and other bee products.

1.7.5. KVIC celebrated World Honeybee Day across the country on 19th August' 2017 and brought awareness on conservation of honeybees and distributed honey bottles of 100gm each to 10, 000 schoolchildren across the country.

1.7.6. Chairman KVIC has launched a campaign for agro-forestry and social forestry, by writing letters to the ministers and others and established apiaries in 10 potential location to support Honey Mission, which will not only supplement the farmers' income by larger yields, but also increase hone production.

1.8. Joint Secretary, MSME suggested that decentralized production of honey is what is envisaged, which when undertaken will generate earning for the farmers as well as additional employment generation.

1.9. Scheme formulated by KVIC to extend benefits of supporting 10 honeybee hives (boxes) with live colonies to beneficiaries (farmers / beekeepers/ un employed youth) for increase honey production and earnings for beneficiary.

1.10. Accordingly, KVIC submitted proposal and obtained in-principle approval / sanction for Rs. 49.78 Crores from the MSME.

1. Mission, Vision and Objectives

Efforts are to bring together the beekeepers, farmers/ growers, researchers, government agencies, agribusiness, conservation groups, manufacturers and brands to improve the beekeeping practices in the country, impart skills on beekeeping, supply necessary tools, disseminate technology & information, create awareness on good beekeeping practices, enhance the health of honeybee and use as a potential pollinator for higher crop yield.

The purpose:

- Encourage scientific beekeeping practices / Good Beekeeping Practices for enhancing the income of farmers and rural youth.
- Bee Plant propagation, transfer of technology& tools supply
- Promote cooperation among the beekeepers of the country and states.
- Reach to common possible solutions regarding beekeeping problems locally.
- Maintain friendly and helpful relation among beekeeping community and promote fair-trade.
- Develop market for beekeeping products.

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- Foster closer cooperation among beekeepers and other stake holders
- Demonstrate to common public, how beekeeping is an entrepreneurship by producing hive products (Bee Wax, Pollen, Propolis, Royal Jelly and Honey).

1.2 **Vision:** India should grow with well-informed and skilled beekeepers / beekeeping entrepreneurship, healthy &plentiful honeybees raise, prosperous beekeeping industry, as well as widespread appreciation for honey & hive products, and take advantage of critical role that honeybees play in pollination. Rapid multiplication and plant propagation in short.

1.3 **Mission:** To provide sustainable employment and income to rural & urban unemployed youth, both educated & uneducated, men & women by conserving the honeybee habitat and tapping untapped natural resources, while inducing Good Beekeeping Practices for qualitative and quantitative increase in all hive products in the country.

1. **Goals:** The Goal is to integrate apiculture into the Forestry & Social Forestry, Agri. & Horticulture Societies & Dept., Universities through KVIC network in the production and utilization of apiculture products in order to tap the natural resources, increase crop productivity and compete globally in export of honey and other bee products, while support tribal / rural population / forest dwellers.Increase revenue earning avenues though beekeeping and contribute to the attainment of countryside sustainable development through the honeybee industries and employment generation.

2. **Objectives of the Mission Program:**
   - 2.1. Create an end-to-end implementation framework for beekeeping skill development, which provides employment opportunities and income generation to agriculturists, beekeepers rural & urban unemployed youth.
   - 2.2. Enforce nationally acceptable standards of Good Beekeeping Practices (GPB) in the country.
   - 2.3. Develop a network of quality master trainers in the field of beekeeping for imparting Good Beekeeping / Apicultural Practices.
   - 2.4. Offer a passage for overseas market for hive products.
   - 2.5. Enable pathways from novice beekeepers to viable commercial beekeeping by handholding to credit linkages.
   - 2.6. Promote convergence and co-ordination between all the stakeholders of beekeeping in India.
   - 2.7. Maintain a national database, which will act as a portal for matching the demand and supply in the country. On the other hand, it will also serve as a platform for monitoring the performance of existing beekeepers and their skills, available bee colonies and their production in each state.
   - 2.8. To tap the local & rural natural resources for generation of income and employment to rural & tribal people in selected pockets.
   - 2.9. To bring qualitative & quantitative enhancement in honey & hive products for export and domestic market.
   - 2.10. To promote beekeeping for increasing the crop productivity and pollination services avenue for beekeepers and farmers.

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3. Implementation Method

3.1.1. Inaugurating the Scheme by organizing National Level Beekeeping Workshop and announcing the package.

3.1.2. The State / Divisional Offices will advertise in the local newspapers & KVIC website requesting for calling the participation in honeybee mission. Collecting candidates from known sources, personal efforts of officials. Short listing the beneficiaries as per the eligibility criterion given at Sr. No. 3.2 below

3.1.3. Zonal / State level beekeeping workshops

3.1.4. Advertisements and publicity and printing brochures, leaflets.

3.1.5. Identifying and nominating beneficiaries and master trainers for handholding

3.1.6. Organizing training through Honeybee Assistants/ Master Trainers and data collection and Preparation of training videos and tools, Data compilation and validation

3.1.7. All the proceedings, list of beneficiaries, bee colonies supplied with relevant data shall be uploaded on KVIC portal.

3.1.8. Ten Honeybee Assistant / Local skill trainers, be identified in each state and provided master beekeepers training at CBRTI / SBEC for maintaining the uniformity in training across the country, if necessary.

3.1.8.1. Honeybee Assistants / Local Skill trainers are responsible for maintaining the bee colonies supplied for 6 months before transferring the responsibility to the beneficiary.

3.1.8.2. All the 10 colonies provided / supplied should be multiplied to 18-20 bee colonies at the end of the year.

3.1.8.3. Maintain the data & information as per the Performa supplied and provide to State / Divisional Offices and State Beekeeping Extension centers (SBEC(s)).

3.1.8.4. Training should be in local language to study materials should be in local language to enable the trainees to conceive the subject.

3.1.8.5. Syllabus for the training should be provided by SBEC/ CBRTI. Enclosed.

3.1.9. Enlisting & Networking with Bee box manufacturers with bee colonies suppliers / commercial beekeepers to ensure the supply of bee hives and bee colonies to the beneficiaries

3.1.9.1. Necessary local networking mechanism should be established by the State Directors of KVIC. (Bee hives mfg. + Bee colonies + Master trainers + SBEC(s)/ MDTC/ KVIC/ NABARD/KVIB/KVK(s)/suitable Beekeeping NGO(s)

3.1.10. All the training programs should be scheduled monthly / quarterly by the each state indicating the venue (village) and number of trainees, so as enable the supply of bee boxes and bee colonies to the training venue by the identified suppliers

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3.1.11. All the selected bee colonies suppliers / commercial beekeepers should be given queen rearing and bee breeding training at SBEC and be supplied queen rearing kit to ensure the prolific queens and strong colonies supply consistently.

3.1.12. All the Data under Honeybee Mission should be maintained at Central Office, KVIC, Mumbai, State / Divisional Offices/ MDTC, State Beekeeping Extension Centers and CBRTI, KVIC, Pune to maintain transparency.

3.2. **Eligibility criteria for selection of beneficiary under Honey Mission:**

a) Beneficiary should belong to SC /ST/ NE State candidate.
b) Age limit not less than 18 years to 55 years; having Aadhar Card, in case of non-availability of Aadhar card/Voters ID with photographs and Ration Cards, etc.
c) One persons from one family will be eligible for 10 bee boxes, 10 bee colonies & tools kit (Bee veil, small smoker and hive tool. Persons maintaining more than 10 bee colonies are not eligible)
d) Persons already trained in beekeeping by KVIC/ KVIB /NABARD/KVK(s) /Agriculture – Horticulture Boards/ Eligible Beekeeping NGO(s), etc.
e) Farmers who are farming should be given preference or new beekeepers (Trained or untrained), **If not trained a suitable orientation beekeeping training may be provided.**
f) Undertaking should be submitted indicating, if the given 10 bee colonies are not multiplied in to 18 to 20 colonies within a span of one year; he / she should either return the bee hives and colonies available &tools available with him or may give a fresh undertaking to multiply the same with their own efforts. Later as decided by the state / local authorities for positive implementation mission.
g) Persons availed benefits from other Govt. Scheme shall not be eligible, declaration to this effect may be given by the beneficiary.
h) All the beneficiaries must be formed into groups and data (number of bee colonies multiplied and amount of honey collected & sold) should be maintained at group level. Similarly by respective State / Divisional Offices level / MDTC, State Beekeeping Extension Centers (SBEC(s)) and Master Trainer's levels too
i) Contribution of beneficiary and KVIC on the cost of bee hives along with colonies will be applicable as follows:

Sr	**Particulars**	**Beneficiaries contribution**			**KVIC Contribution**		
		SC	**ST**	**GEN**	**SC**	**ST**	**GEN**
1	**Non North Eastern States (Non NEZ)**	**20 %**	**20 %**	**-**	**80%**	**80%**	**-**
2	**North Eastern States (NEZ)**	**Nil**	**Nil**	**10 %**	**100 %**	**100 %**	**90%**

j) The contribution should be deposited by the beneficiaries to the respective SO/DO and MDTC of KVIC.

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k) Rs. 1, 500/- per persons should be collected from each beneficiary as training fee.

l) All beneficiaries must be formed into Beekeeping SHG / undivided family groups. However, persons not able to form into groups shall be given the reason and supported with an undertaking to this effect.

4. Eligibility for Honeybee Assistants/ Master Trainer / Beekeeping NGO:

4.1. The Trainer must be at least passed 10th OR 12th standard with beekeeping certificate from CBRTI/ SBEC / any reputed and recognized beekeeping institution / NGO.

4.2. At least three years' experience in imparting beginner's beekeeping training adopting good beekeeping practices.

4.3. Should maintain his / her /its own apiary with minimum 10-25 bee hives and colonies. Persons / NGO having 25 bee hives apiary shall be given preference.

4.4. He / she /NGO should be well acquainted with scientific honey harvesting, colonies division methods.

4.5. He / She / NGO must have one expert assistant in handling hives and colonies.

4.6. Having Beekeeping Training infrastructure will be preferred.

5. Release of funds:

a. After SFC (V.I.) approval, funds will be released in installments in terms of S.O. 1743 dated 18th Dec' 2015 to **respective field offices of** KVIC from Central Office KVIC Mumbai.

b. On the basis of the performance and Action Plan, the respective State Office will utilize the funds and expenditure statement will be submitted **monthly** to the Directorate FBI and U.C shall be submitted at the end of March.

c. The payments pertaining to Bee hives, bee colonies and hive tools shall be made directly to suppliers by the respective State Offices / Divisional Offices of KVIC.

d. Contribution of beneficiaries should be collected from the beneficiaries by S.O/D.O/MDTC well in advance for the payment of suppliers.

e. IRG should be collected by the field offices and then remitted to the Central Office KVIC, Mumbai.

f. Payments pertaining to Honey Bee Assistant / Master Trainer shall be made by field offices on the basis of batch wise training and apiary set up of beneficiary.

6. Monitoring:

6.1. Central Steering Committee for Honey Mission: Committee will meet once in quarter to review and validate the data provided by the field offices and report to MSME.

6.2. State Honey Mission Committee: - Committee will meet once in a month to review performance and validate the data and submit to Central office every 5th of each month.

6.3. Developing MIS through DIT, KVIC, Mumbai.

6.4. Directorate of FBI, will collect the data along with photographs from field offices / State level Nodal Officer & provide to DIT for uploading on KVIC website.

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6.5. A detailed record of the no. of hives and colonies distributed should be maintained by field offices.

6.6. Unique ID number to be given to each bee boxes for identification, the details of the same to be furnish to Head office for physical verification.

6.7. All respective field office will maintain all the data as per format strictly and furnish to C.O KVIC Mumbai.

7. Collection of honey Processing and Marketing:

- Centralized or decentralized system may be adopted for collection & marketing of honey and other bee hive products.
- Selected agency will be collected honey and other hive products from the apiary site of beneficiary and market it with help of their own network.
- The payment towards the cost of honey and other bee hive products will be given directly to the beneficiary through DBT by selected Agency.
- Honey produced by the apiaries will be processed, graded as per AGMARK/BIS/ FSSAI etc and branding and packaging by the Agency

8. Institutional Mechanisms (For Monitoring and Reporting)

8.1.1. There will be Honeybee Mission Team at the Central Office to steer, drive and execute the Mission's objectives. Key institutional mechanisms for achieving the objectives of the Mission have been divided into two tiers. The Mission Team will consist of a **Steering Committee and a Mission Directorate (Executive Committee) as the executing arm of the Mission**.

8.1.2. State Mission Team will be supported with available list (enclosed) of Bee Breeders, Beekeeping Equipment & Machinery Manufacturers; Local Beekeeping NGO (s), NABARD,– all of which will have linkages with **Mission Directorate** to facilitate smooth functioning.

8.1.2.1. Potential States will be encouraged to create State Honeybee Missions (Team) under the Chairmanship of respective Dy. CEO and State / Divisional Director as Member Conveners with members in the lines of Working Committee mentioned at **Sr. No. 8.3 and structure.** Wherever, SBEC not available, the neighboring State Beekeeping Extension Centers (SBEC(s)) may be involved, wherever the case maybe.

8.1.2.2. The organizational structure of the State Level Honeybee Mission Team is to be decided by the respective Dy. CEO in consultation with States/ Divisional Directors and inform the Steering Committee and CEO, KVIC. Steering Committee will work towards empowering State Missions through financial and policy supports.

8.2. **Composition and functions of these bodies have been described as follows: (Quarterly Review Meeting- monthly updating)**

8.2.1. **A Central Steering Committee**, Chaired by CEO

S. No.	Particulars of members	Position
1.	Chief Executive Officer	Chairman
2.	Dy. CEO (V.I.)	Member
3.	Director (Finance)	Member
4.	Director (CBRTI)	Member
5.	Beekeeping Expert (retired beekeeping experts of KVIC / outside)	Member
6.	Beekeeping expert(retired beekeeping experts of KVIC / outside)	Member
7.	Dy. Director I/C (FBI)	Member Convener

Functions of Central Steering Committee:

- Meeting shall be held once in a quarter to review all the activities and reports
- Program fund management including disbursement of funds to field offices.
- Validating and uploading Empanelment & engagement of State wise Beekeeping Equipment manufacturers, Master Beekeeping Trainers (Bee Assistants); Bee Breeders / Commercial Beekeepers for supply of boxes / colonies with their respective capacity of supply.
- Preparation of strategy and implementation plan.
- Set targets and approve Annual Targets &Quarterly Plans.
- Review overall progress of Mission activities on quarterly and yearly basis through video conferences.
- The power of allocation/re-allocation of resources to States/implementing agencies, as well as approval of their Annual Action Plans, will fall within the purview.
- Develop national portals for online submission of data.
- Appraisal of individual Mini & Micro Beekeeping Clusters
- Placing in the Commission /SFC Meeting for approval and sanction
- Monitoring and evaluation of the Honeybee Mission program and reporting.
- Any other as desired by the committee.

State Honey Mission Committee- Chaired by Zonal Dy. CEO, who will also act as Honeybee Mission Dy. CEO.**(Zonal Officer for the Mission)** (Meetings shall convene monthly once)

8.3 State Honey Mission Committee- Chaired by Zonal Dy. CEO, who will also act as Honeybee Mission Dy. CEO.**(Zonal Officer for the Mission)** (Meetings shall convene monthly once)

S. No.	Particulars of members	Position
1.	Dy. CEO (Respective Zone)	Chairman
2.	Respective State Director / Divisional Director / his representative not less than Asst. Director of respective States in the zone	Members
3.	Beekeeping Expert (retired beekeeping experts of KVIC / outside) / SBECs of the respective state	Member
4.	Representative of KVK/ KVIB / DIC	Member
5.	Representative of NABARD/ Local Bank	Member
6.	Representative of Panchayat Raj Institution	Member
7.	Local State / Divisional Directors	Member Convener

Functions of Committee:

1. Selection of Beneficiary/ Honey bee Assistant/ Master Trainers for the program.
2. Procurement of bee hives and bee colonies, tool kits and required bee equipments as per GFR.
3. To obtain and validate state wise action plans for awareness, Training , Apiary setup and backward/ Forward linkages covering entire Honey Mission Program.
4. To resolve all inter-departmental execution issues.
5. To evaluate the all technical reports and validate
6. Ensure to provide photos with appropriate captions and reports on the various events like training (if conducted), Orientation, field demonstrations, distribution of beehives, bee colonies and equipment, places of programs conducted, where the hives are located and name of the person responsible for the hives and handholding, collection of data on production & sale of honey, etc. under the State jurisdiction.
7. Ensure to maintain a detailed record of the number of boxes and colonies distributed. A **unique id number** for each of the bee hive, which is tamper proof should also be placed in the beehive, so that these beehives can be verified and located whenever required.
8. Converging beekeeping activities and other stake holders with Mission's objectives and gap findings.
9. To implement and monitor activities at state level /Zonal level.
10. To coordinate implementation of all decisions of Central Steering Committee.
11. To ensure quality training, linking social security schemes etc. across all beekeeping development programmes being implemented under honeybee mission.
12. To validate the annual training calendar.
13. Encourage to converge with local beekeeping NGOs, Master Trainers and Beekeepers in order to align objectives outlined in the Honey Mission's Action Plan.
14. Most importantly, focus on two verticals & credible Quality Assurance framework with **Good Beekeeping Practices (GBP)** and **Fair Trade Practices** to align the outcome and increase.

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15. Coordinate efforts and monitor performance of individual Missions to provide end-to-end solutions towards achieving the objectives of Missions.
16. Create & tie-ups with institutions to facilitate information sharing.
    Any other issues as desired by the Central Steering Committee.
17 To organize awareness camps, training, review meetings etc.

8.4 State Level Nodal Officer – An Officer not less than Executive (FBI/ V.I.)/ (ADO)/AD (V.I.) shall be nominated by each State Office / Divisional Office be nominated as Nodal Officer for KVIC- Honey Mission. He / She shall be assisted / handheld by the beekeeping technical persons in technical aspects, if happened to be non-beekeeping official. The KVIC- Honey Mission's Nodal Officer's functions, roles and responsibilities are as under:

Functions:

1. To advertise, make publicity and conduct awareness programs in the State in consultation with State / Divisional Offices and respective SBECs and select the candidates for the program, if the list of trained candidates trained by KVIC/KVIB/Agriculture – Horticulture Boards/ NABARD/ KVK(s)/ Eligible Beekeeping NGO(s), etc. not available.
2. To prepare state wise action plans in consultation with SBEC / technical staff of FBI / Beekeeping experts from the state committee.
3. To prepare time line for implementing the drawn action plan annual training calendar prepared by the each state.
4. To organize awareness camps, training, review meetings etc
5. To resolve all local execution issues.
6. Preparing and submitting the monthly progress report on Honey Mission in three different data collecting formats.
7. To coordinate implementation of all decisions of Steering Committee and State Committee.

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8. To ensure quality training, Aadhaar seeding and social security schemes etc. across all beekeeping development programmes being implemented under honeybee mission.
9. Ensure to collect photos with appropriate captions and reports on the various events like training, field demonstrations, distribution of beehives, bee colonies and equipment, places, where the hives are located.
10. Maintaining the list names of the person responsible for the hives, training and handholding, collection and sale of honey, etc. by the respective State / Divisional Directors.
11. Maintain a detailed record of the number of boxes and colonies distributed. A **unique id number** for each of the bee hive, which is tamper proof should also be placed in the beehive, so that these beehives can be verified and located whenever required.
12. Monthly reports should be sent to the Directorate of Forest Based Industry for placing before the Monitoring Committee
13. Coordinate and converge stakeholder's efforts in order to align them with the broad national objectives outlined in the Mission's Action Plan.
14. Coordinate efforts and monitor performance of individual Missions to provide end-to-end solutions towards achieving the objectives of Missions.
15. Create & tie-ups with institutions to facilitate information sharing.

16. Any other work assigned by Central Steering Committee, State Honey Mission Committee and Incharge of Directorate of FBI, Central Office, KVIC, Mumbai.
17. Most importantly, focus on two verticals & credible Quality Assurance framework with **Good Beekeeping Practices (GBP)** and **Fair Trade Practices** to align the outcome and increase.

National Level Task Advisory Committee

National Level Task Advisory Committee for KVIC-Honey Mission constituted with following members in order to have the suggestions, guidance, while formulating & executing the Honey Mission Program in the country. The Committee will evaluate the performance of the program and suggest line of action for effective implementation of the KVIC-Honey Mission program in State(s):

Sr. No.	**Name & designation**	
1.	Ms. Preeta Verma, CEO, KVIC, Mumbai. Email id: ceocell.kvic@gov.in Contact No. 022- 26711577	Chairperson
2.	Shri. Ashok Bhagat, Member (RD), KVIC. Email id: vikasbharati1983@hotmail.com Contact No. +91 9431118213 +91 9334381508	Expert Advisor
3.	Dr. R.C. Mishra, Ex. Director, ICAR. Email: rameshwarmishraroda@gmail.com Contact: +919816011253	Expert Advisor
4.	Dy. CEO (Honey Mission), KVIC, Mumbai. Email id: brmtkr@yahoo.co.in Contact No. +91 9923441062	Member

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5.	Dr. Padma Sudarshan, No. 23, Sankalp Chaitanya, Double Road, Kuvempu Nagar, Mysore – 570023 Karnataka, Mobile: 09731862533; Emailed: padma.sudarshan@gmail.com	Member
6.	Shri. B.P. Singh, Ex. Dy. Director (Beekeeping- FBI) Email id: bpsdd25@gmail.com; Contact No. +917526029829	Member
7.	Ms. Chayya Nanjappa, Nectar Fresh Mysore Email id: md@nectarfreshfoods.com Contact No. +919880055606	Member
8.	Shri. Jonty Randhwa, Big Bee Agro. GT Road, Village- Doraha, Ludhiana, Punjab – 141 421. Email id: bigbassociation@yahoo.com Cell: +91 7508600052	Member
9.	In-charge CBRTI/ Representative of CBRTI Not less than AD-II (Beekeeping), KVIC, Pune Tel. No. 020- 25655351 (Fax)	Member
10.	Dy. Director I/C, Forest Based Industry, KVIC, 3, Irla Road, Vile Parle (W), Mumbai- 56; Email id: fbi@kvic.gov.in Fax: 022 – 26708064	Member Convener

Note: There may be special invitees' provision for the committee with the permission of the Chair.

Terms of References for the Committee

1. The National Level Advisory Committee (NLAC) for KVIC-Honey Mission will meet in every quarter and submit their reports to the competent authority about ongoing performance of the honey mission.

2. The Committee will be responsible for supervising and implementation of prestigious honey mission program of KVIC and give the feedback from the field solving the difficulties, if any that are being faced by the KVIC/Beekeepers/ Farmers/ Honey processing Units/ Honeybee Entrepreneurs, etc. in the implementation of Honey Mission.

3. All the members of the Committee for Honey Mission including the special invitee will be given honorarium @ Rs.2, 000/- (Rupees Two Thousands Only) for one sitting and T.A. & D.A. admissible as per the Group "A" Officers of KVIC.

The committee will remain valid from the date of notification for two years unless until renewed with the due approval from competent authority.

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CHAPTER 5

THE MAJOR CONSTRAINTS FOR THE DEVELOPMENT OF BEEKEEPING IN INDIA ARE AS FOLLOWS

1. Using the Correct Species for Beekeeping

All over the world, the Italian honeybee is acclaimed to be the choice for commercial beekeeping. However, the controversy regarding the suitability of the species i.e. Asian honeybee, *A.c. indica* and the European bee *A. mellifera* for beekeeping in India, which has been going on for the last three decades, gave a severe setback. Thank God this has now been resolved and the two species have been accepted to be complementary to each other. Even then if we are to put India on the world honey map we must decide to use *A. mellifera* for commercial beekeeping in potential pockets all over India.

2. Lack of Technical Knowledge for Efficient Management of Colonies for High Honey Yields

This is a major constraint. Beekeepers are not aware of international methods of efficient management. Some of the wrong practices followed by beekeepers are: -

(a) Few beekeepers use queen excluders, Further the excluders that are locally available get rusted and damage the bees.

(b) We have heard of outdated concepts like queen gates being recommended for bee colonies to prevent bees from absconding.

(c) Efficient swarm control is not practiced by beekeepers and they are most unaware of these techniques. Most beekeepers just divide colonies to prevent swarming.

(d) Although maximum yields from *A. mellifera* are obtained when the colonies go up to 3 to 4 chambers with populations of 50,000 to 70,000 bees yet few colonies with beekeepers are raised to that level.

(e) Beekeepers do not know the concept of the food chamber as a measure of colony build up and mostly maintain colonies on a single chamber leading to weak colonies that die in dearth periods.

(f) Few beekeepers change queens every season before the honey flow leading to loss of queens during the crucial honey flow.

(g) Some beekeepers even do not use full comb foundation sheets and only use strips of wax sheets for the frames which leads to excessive drone comb construction besides wasting the time and effort of bees in making extra comb. Therefore, there is a great scope for improvement.

3. Lack of Infrastructure at the Grass Roots and National Level for Beekeeping

This is the major cause for the use of wrong management practices by beekeepers and needs to be urgently attended to for the success of beekeeping in India.

(a) Our agricultural universities do not have departments of Apiculture but only departments of Entomology where bees are just one of the insects in the department. Beekeeping has to be given the same status as poultry and dairying in our institutes and then only can we turn out beekeeping specialists from the universities who specialize in bee management, breeding, disease control, quality control and so on. At the moment the universities only turn out entomologists who have knowledge of beekeeping and who in any case are too few to be able to have any impact in the field.

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(b) There is no concept of beekeeping inspectors, or trainers in beekeeping at the village or even district level.

(c) Beekeeping, by its nature, has seasonal crises of disease, management and so on. It is not sufficient to have a few people in universities for advice on beekeeping. The only way that China managed to take up beekeeping so fast and so successfully was the availability of trained field workers in beekeeping at the village level. We must therefore have a hierarchy of beekeeping experts and trainers in the villages, blocks, Tehsils, Districts and then finally in the universities to be able to have effective feedback to and from the beekeepers.

(d) There are no organized forums for the meeting and discussions amongst beekeepers, which are essential and are available all over the world. In India beekeepers work in isolation and hence loose the benefits of interaction with others in the field. Whereas we have found during our visits and interactions with beekeepers in Europe, Australia etc. that there is free flow of beekeeping information and knowledge amongst beekeepers in those countries. In the field of beekeeping all over the world, new techniques and improved methods of beekeeping have essentially been developed in the field by this interaction amongst beekeepers and then scientists in the field.

It is thus essential to improve our infrastructure and communication for the success of beekeeping in India.

4. <u>Poor Quality Control for the Production of Honey</u>

This is a very important aspect of beekeeping and needs to be stressed on if we are to progress. It is not enough to produce large amounts of honey but that is more essential to produce quality honey. It is because of this reason which most Indian honeys do not come up to international quality standards. The beekeeper should therefore be quality conscious.

(a) Some beekeepers extract honey from brood frames which process damages the brood and the honey extracted is of poor quality.

(b) All beekeepers do not maintain separate super chambers for the production of honey. The honey is produced in old brood frames and so gets darker in color and also is not so clean as if extracted from only super frames. Dark honeys fetch very low prices internationally.

(c) Since many beekeepers do not use queen excluders, the queen lays eggs in the honey chamber thereby lower the honey quality.

(d) Many beekeepers do not wait for the honey to be properly sealed before extracting. Honey only develops the flavor, which is particular to each flower source if it is allowed to stay in the hive a little more after the bees seal the frames. Most beekeepers extract the honey while it is still fresh and not entirely sealed. This leads to high moisture content and low quality.

(e) Beekeepers do not use the technique of keeping supers in warm rooms with a forced airflow before extraction. This produces honey with excess moisture. In the absence of desired warm extraction, it cannot be sufficiently clear and so requires further heating before filtration, which causes deterioration of quality. Honey from warm supers can be easily extracted and cleaned straight away by simple filtration through muslin.

In case unripe honey is extracted, it is high in moisture content and lacking in color, flavor and quality. In order to be able to market our honey, we must improve its quality.

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Honey is also poorly stored by beekeepers in old tins, which rust and so darken the honey further. Besides, the honey in contact with the old tin plate becomes blackish in color and loses flavor, the tins being produced now are mainly for oils and ghee and do not have sufficient tin plating to be able to store honey cleanly. Lacquered tins are expensive and so beekeepers do not use them for storing honey. Food grade plastic containers need to be developed for storing honey.

5. **Emphasis on Production of Honey Instead of other Bee Products**

At the moment only honey is produced by the beekeepers. Honey bee can also produce pollen, Propolis, royal jelly, beeswax, bee venom which can add to the overall income from the bee live.

(a) Bees Wax: This is easily produced, has great demand in the world market and is used in the cosmetic and pharmaceutical industries. The most important producer of beeswax in India is Apis dorsata. This is not so pure as the beeswax obtained from Apis mellifera, which has a greater export demand. However to produce beeswax from the bee colonies, supers must have only 7 to 8 frames instead of 9 frames so that beekeepers can produce larger quantities of beeswax from the bees.

(b) Pollen: Pollen is not produced commercial in India. Pollen is a natural vegetarian protein source containing many nutritive elements and minerals and can do much to improve the general nutritional intake in rural areas. It also has a great demand in the export market. There is tremendous potential for pollen production by the bees, particularly from coconut, the mustard species of oilseeds, maize, sunflower etc. Pollen is easy to produce and beekeepers can use simple technology to supplement the income from the hive by inducing bees to collect pollen. Pollen can be produced in tons.

(c) Propolis: Propolis is the resinous substance collected by bees from trees to seal cracks in the hive. Propolis has been found to be a natural antibiotic and has many medicinal qualities when used externally or internally and is valuable in the field of Api-therapy. There is great demand for Propolis for export.Propolis collection is by the use of special Propolis screens and can be easily mastered by the average beekeeper. A.C. indica does not collect Propolis and there is great scope for the use of a mellifera for Propolis collection.

(d) Bee venom: This is an unexploited source of production from the bees in India; Bee venom has various medicinal uses in Homeopathy, Allopathic and systems of natural medicine. Extraction is complicated and can be done by beekeepers with great technical skill using special bee venom extractors in front of the hive.

(e) Royal Jelly: This is secreted by the bees from special glands in their body and is used to feed the queen bee larva. It is supposed to have rejuvenate and beneficial properties, like Ginseng. It contains various natural hormones and is a highly concentrated food. It has a great demand for exports. China has become a major producer and exporter of royal jelly. Royal jelly however, can only be produced by beekeepers having high technical knowledge.

All the above by-products from bees are not produced yet in India and can add to the income of beekeepers, besides having great scope for exports.

7. Disease Prevention, Control and Analysis

This is the major constraint for the development of beekeeping in India. We need to have regional and also central bee disease analysis laboratories. At the moment this is lacking and as has been seen in the recent outbreak of sac brood in the South, the beekeepers could not get timely help or advice regarding the disease that was killing their bees.

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a) We do not have disease control inspectors to visit the beekeepers all over India. These inspectors need to have detailed training in being able to identify all the bee diseases and also take samples from apiaries to have them tested.
b) There is no method of registration of apiaries and beekeepers all over India. In America disease inspectors are there in each state who register apiaries and take regular samples to declare them disease free.
c) Breeding apiaries must be registered as such and only those whose colonies are free of disease should be allowed to sell queens and bees all over India. This is followed in America where breeders get their bee colonies certified disease free before supplying queens to other beekeepers.
d) There is no control on the movement of bee colonies all over India. Only colonies free from bee diseases should be allowed to be moved all over for migratory beekeeping. This requires us to set up the infrastructure for sampling and analysis of bee colonies from each apiary.
e) Beekeepers use poor management techniques like continued use of old frames and extracting honey from brood chambers. Weak colonies are allowed to survive and have the danger of absconding and spreading disease. Honey is a carrier of brood diseases of honeybees and the practice of extracting honey from brood chambers is dangerous as brood can die when the honey is extracted and the dead brood in the frame is a source for the development of disease.
f) Beekeepers do not use good management practices of keeping their colonies clean and so the danger of disease is even more. Beekeepers need to be educated regarding these procedures.

As can be seen there is much to be done for disease analysis, prevention and control at the National and regional level.

8. <u>Lack of Sufficient Financial Help from Government and Lending Institutions for the Development of Beekeeping</u>

a) Beekeeping requires long-term loans at easy rates of interest. That is the procedure used by China to take up beekeeping in a big way. The bee colony produces honey only after almost a year initially and then seasonally. Beekeepers need help to be able to get finance for bee colonies and equipment.
b) Insurance of bee colonies needs to be done at a reasonable premium so that beekeepers can recover their losses in case of disease or the loss of bees due to other factors.

9. <u>No Tax or other Monetary Benefits for Beekeeping</u>

a) Beekeeping is neither considered an industry nor an agricultural activity and there is no tax benefit on beekeeping income. Beekeeping is a long-term developmental activity and requires to be given tax incentives for people to take it up in a big way. China gave the beekeepers many incentives for them to take up beekeeping and so had a quick growth in this field.
b) Beekeeping is also a high-risk activity and is dependent on the vagaries of the weather for production. Many times, even though flowering crops are available, nectar secretion is low because of climatic factors like moisture in the soil. Some times rain at the time of flowering causes the bees to collect little honey. The bee keeper has to be given financial support during seasons of bad honey harvest to sustain his colonies for the next season.

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10. No Control on the Use of Pesticides by Farmers Leading to Death of Bee Colonies in Field Locations

The indiscriminate use of pesticides leads to the destruction of bee colonies in the field

a) There is no legislation restricting the farmer from the use of pesticides that are harmful to bee colonies. In many countries farmers are required to inform beekeepers in their area as to when they may be spraying pesticides on their crops. India has no such system and bee colonies perish by the farmers using pesticides harmful to bees.

b) Only pesticides that are not harmful to bees should be used and should be propagated with farmers. Bees are very important pollinators and destroying them is a national loss as well.

11. Pricing Structures for Honey

There is a lot of lobbying by farmers, beekeepers and beekeeping societies to give the beekeeper high prices for honey. Himachal had fixed a support price for honey at Rs. 110 per kg. This has resulted in large stocks of honey lying unsold as beekeepers refuse to accept lower prices for their honey. International prices was around Rs. 200 per kg for the most superior quality honey. However, having realized the Indian beekeeping standards (extracting honey from brood chambers), the export of apiary honey was almost stopped and honey from Apis dorsata (wild honey) is in demand. If Australia and Europe can meet that basic price with their high basic costs as compared to India, why should Indian beekeepers expect more for their honey here which in any case is not even up to world quality standards? To get more income from honey, yields should be increased and not the prices.

12. Honey Bee Act

Honey bee being one of the largest pollinator in addition to honey provider for Agriculture, Horticulture and wild trees, there is no protection been given by the Indian Government with a “Honey Bee Act”.

Pesticide Poisoning to Honeybees

Tropical and subtropical climate of India presents suitable conditions for the outbreak and appearance of many pest problems. The pest problems have been further aggravated by the advancement in agricultural technology. Irrigated crops, intensive agriculture, introduction of crops and crop varieties and disturbing the indigenous and primitive cropping patterns have contributed in increasing the pest problem of crops. Reduction in uncultivated land, corners and bunds destroy nesting and hibernating places of wild pollinators and succession of nectar and pollen yielding flowers round the year is destroyed. Weedicides are used to control the weeds and hence lead to starvation of pollinating insects. The advanced agricultural technology has helped to destroy the agriculture cycle through indirect effect. There is also a prominent negative direct factor, i.e., the insect pollinators are killed by pesticide usage in crop protection. There is increasing use of pesticides for the control of rodents, mites, insects, nematodes and fungal and bacterial diseases of crop plants. The loss by bee kill is direct, i.e., loss of honey production and indirect inadequate pollination of crops resulting in reduced productivity.

Entomologists have been loudly talking about pest management or integrated pest management. Virtually speaking there is hardly any form of integrated pest management in India and blanket pesticide applications are given.

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Most farmers apply large quantities of pesticides at regular intervals and in most cases the pesticides are non-selective coupled with untimely application. Unfortunately honeybees are susceptible to many pesticides used in pest control programme. This problem is recently overshadowing all other problems in apiculture. Farmers in India have small holdings and hand sprayers/ dusters are commonly used for treating small area each day. This resulted into a continuous threat of chemical poisoning to bees. Moreover, there is no coordination between the beekeepers and the farmers by any Government decree and therefore, measures to save bees cannot be taken.

Large numbers of killed bees were found in front of the hives or in the fields by insecticidal poisoning. It is not possible to quantify the loss in terms of food production or to assess the financial value of the bees killed. Even more important is the loss in future crop yields because a beekeeper whose bees are killed gives up beekeeping and others too are discouraged to take up beekeeping. Therefore, a balance sheet between the gains in crop yields by control of pests and losses due to decreased pollinator activity and honey production by bee kill should be worked out. While controlling pests the scientists and farmers are looking on to one aspect of the economic considerations in insecticidal applications. Our primary aim should be to assess how crop pests can be kept under control without killing insect pollinators and to ensure optimum pollination by these insects. Widespread destruction of beneficial insects (including pollinators) often occurs as a consequence of irresponsible and improper use of pesticides. It should be accepted that some loss is inevitable in certain circumstances and that a realistic aim should be an acceptably low level of loss rather than complete protection of bees. In short the following constraints are important:

i. Use of inappropriate pesticides, ill timed, wrong methods of application, wrong formulations and unnecessary high doses;
ii. Over reliance on chemical methods of pest control; and
iii. Absence of certain essential instructions and legislation for using pesticides.

How is Bees Exposed to Pesticide Hazards

Many of the Indian crop plants need cross-pollination and about one-third of the cropped area is under entomophilies crops. These crops are infested by pests even during flowering and their depredations warrant the application of control measures. The pesticide control of the pests of crops which also serve as bee forage pose serious danger and eliminates large population of insect pollinators. Some points on the use of insecticides for pest control vis-a-vis insect pollination in some of the important crops are highlighted here.

Cotton. It is the most dangerous crop for bees. As many as 15-20 insecticidal applications at shorter and regular intervals are recommended for the control of various cotton pests. The flowering continues for about 2 months and during this period insecticides are regularly applied for the control of many pests like bollworms, aphids, bugs, etc. Foraging bees are killed by these sprays. New generation of bees develop in 3 weeks. Insecticidal applications at shorter intervals than this, kill more adult bees than can be replaced and ultimately the colonies die. But coordinated application of insecticides can minimize bee kill.

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(1) Flowering in cotton continues for about 2 months but flowers that set fruit appear within 3-4 weeks. Therefore, use of insecticides during this period should be reduced so that bees can be moved to the crop. (2) Nectar in flowers and extra floral nectarines is exhausted by midday and very few bees are foraging in the afternoon when insecticides can be applied with reduced hazards to bees. (3) Air spraying has picked up for cotton. In such a situation the colonies should be located away from the flight path of the plane.

Brassica and vegetable seed-crops. These are attacked by aphids, caterpillars and bugs during flowering and pod formation stage. These crops include oilseeds Brassica, seed crops of cauliflower, cabbage, radish, turnip, carrot, fennel and coriander. In these crops too the flowering is greatly extended, lasting for about 1-1½ months. These crops need insecticidal applications during flowering periods. But all these crops are also enthusiastically foraged by bees which are very useful pollinators of these crops. There is extensive pesticide poisoning to bees on these crops. There are no specific recommendations to safeguard bees and only general guidelines to reduce bee kill can be followed, though Singh (1969) sprayed Endosulphan on mustard to control aphids at 0800, 0900, 1630 or 1730 hrs and found that Apis spp. foraged between 1030 and 1530 hr without any effect on foraging intensity and no bees were killed.

Sunflower. Its cultivation is gaining importance in India. Bees contribute much in increased crop production by pollination services but bee losses have been reported by insecticidal sprays for the control of aphids and caterpillars. In India Endosulphan was found to be less toxic to honeybees than Fenthion, Carbaryl or Parathion and seed set and yield were not affected since bee activity was not reduced in Endosulphan sprayed plots (Ramakrishna et al., 1974; Bhattacharya et al., 1982). Bees mostly forage in the forenoon and there is limited activity till early afternoon. Therefore, evening or late in the afternoon is appropriate time for chemical control operations.

Sesame. It is automatic self-pollinated but natural cross-pollination also occurs. Honeybees are very active on the flowers of sesame. The crop at flowering stage suffers from the attack of aphids, brown leafhopper, sucking bugs, whiteflies and caterpillars. Chemical application at blossoming would cause hazards to bees also.

Seed crops. Like lucern and clovers these are rich bee forages. Under semi-arid tropics the legume flowers usually close in the afternoon and it allows time for safe application of pesticides afterwards against caterpillar pests.

Pulses. Like soybean, cajanus and others are self-pollinated crops but yield increases by bee pollination have been observed. Considerable mortality of honeybees from insecticide poisoning is reported in some countries but lack of knowledge in India is due to non-monitoring of hazards.

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Cucurbits. These require the control of fruit flies, pumpkin beetle and aphids when in flowering. Cover sprays of insecticides are given against these pests. Honeybees visit the flowers of melon and other cucurbits. Steps to minimize bee kill from these sprays are required.

Tobacco. In this case self-pollination is normal but honeybees and other insects visit the flowers for nectar, affecting some cross pollination. Aphids, whiteflies, thrips and caterpillars are the pests which may warrant insecticidal application during flowering which consequently would lead to bee hazards. Flowering period in coffee is short and insecticidal applications can be avoided during coffee flowering. Coffee may be attacked by bugs, leaf miner and thrips during flowering. In case of outbreak during flowering, the crop should be treated when bees are not active and less persistent insecticides be used.

Palm and stone fruits. Apple, peach, plum, apricot and almond are attacked by caterpillars at blooming time. Insecticidal use has been suggested by economic entomologists against blossom thrips, though economic losses by thrips have not been ascertained. The recommendations are made in ignorance of insecticidal bee hazards. Therefore, caution is important so that the huge benefits from bee pollination are not reduced.

Other fruit crops. Insecticides can be applied for pest control at flowering-time in citrus, litchi, olive, grapes, coconut and cocoa. Care should be taken because they are also visited by bees for floral rewards.

Symptoms and Effects of Pesticide Poisoning

Bees come in contact with pesticide deposits while foraging on treated crops or weeds where the chemicals are deposited by drifting. The nectar and pollen can also be contaminated with pesticides and there can be stomach toxicity to bees and also to brood when fed on contaminated pollen. Some pesticides may even cause hazards by fumigant action. After gaining entry into body, different pesticides have different modes of action. Atkins has given the detail of specific symptoms caused by poisoning of different groups of pesticides but general symptoms of pesticide poisoning are:

1. Appearance of large number of dead bees in front of the hive. Bees also die in the field and in between the field and the hive.
2. Bees become paralytic, lose the power of orientation; legs, wings and digestive tract stop functioning and poisoned bees show uncoordinated movements.
3. Abdomen becomes distended.
4. Bees are irritated and become aggressive; they sting heavily and guard bees are confused.
5. Regurgitation of gut contents can occur.
6. Brood chilling can occur due to reduced adult bee population.
7. Contaminated pollen can be collected by bees and stored as bee bread. This pollen fed to brood results into dead brood inside the colonies; young emerging bees are also killed.
8. Sometimes the queen is also affected. Queen may stop laying eggs or lays eggs in irregular pattern, there may be brood in only some of the cells of the brood area, as in case of colonies suffering from foul brood disease. In colonies, which survive, queen may be superseded. Sometimes uselessness may develop.
9. Longevity of adult bees is reduced due to sub-lethal doses of pesticides.

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Pesticides and their Relative Toxicity to Bees

Some insecticides have been screened in laboratory in India for their toxicity to bees. First study in this field was carried out by Cherian and Mahadevan with DDT and Gammexane against Apis cerana indica. Hameed allowed the worker bees of Apis mellifera to forage on cut flowers of mustard to which systemic and contact insecticides had been sprayed. On the basis of safety index Formothion, Vamidothion, Dimethoate and Phosalone were considered to be relatively safer to bees. Contact toxicity to Apis cerana of insecticide applied as sprays was compared with Menazon by Kapil. Taking the LC50 for Menazon as 100, the comparative values for Endosulphan, Eormothion, Methyl demeton, Endrin, Dieldrin, Malathion, Parathion, Phosphamidon, Lindane, Phorate and Mevinphos were 1.17, 1.18, 14.00, 15.70, 17.79, 22.25. 26.01, 28.45, 36.99, 57.96 and 64.24 respectively. Singh tested 15 insecticides and reported that Menazon and Endosulphan were least toxic and were considered nontoxic to Apis cerana at their recommended doses. According to Thakur et al.., (1981), Fenitrothion and Fenthion were highly toxic as compared to Endosulphan and Trichlorfon and Hinosan were moderately toxic as determined by residue film method. Comparative toxicity of organophosphates, chlorinated hydrocarbons and carbamates was worked out by Bai Attri also assessed the contact and oral toxicities of some insecticides. Toxicity of several organophosphates to Apis cerana was determined in the laboratory using topical application method. Determination of the kinetic parameters of the reactions by the authors showed that differences in anticholinestrase activity were due mainly to differences in affinity rather than to different chemical structure of the compounds.

Cholinestrase inhibition by insecticides in Indian honeybee was studied by Dale Bai reported that signs of poisoning in Apis cerana indica were first observable when acetylcholinestrase inhibition exceeded 35% and death occurred at 96% or more inhibition.

It is also reported that the inhibition of magnesium activated adenosine triphosphate as the criterion to determine the degree of organochlorine insecticide poisoning to Apis cerana indica. Digestive amylase and protease of Apis cerana indica were inhibited to the same level by the insecticide poisoning from different groups of insecticides. Studies on the level of ions of amino acids in the haemolymph of worker bees of Apis cerana indica treated topically showed pronounced stimulatory effect with organophosphates, a relatively strong inhibitory action with chlorinated hydrocarbons and an intermediary effect with carbamate pesticides.

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CHAPTER -6

POTENTIAL OF BEEKEEPING INDUSTRY

As per the report of National Commission on Agriculture (1976) there is a potential of sustaining 150 million bee colonies. India occupies a strategic position in Asia. The main land comprises seven regions i.e.

(1) The Himalaya and north eastern mountain range
(2) Indo-gangetic plains
(3) The desert
(4) Central high land and peninsular plateau
(5) East coast
(6) West coast
(7) Bordering sea and island.

The Indo-Gangetic plain and central high land and central region of the country have nectar and pollen sources in the agricultural and Horticultural crops. Especially mustard growing areas of Indo-Gangetic plain are very potential for beekeeping. As per the moderate estimation, India has to raise 10 million Bee colonies. But at present India has only one million colonies and thus 180 million tons of honey remains untapped every year.

POTENTIAL STATES & DISTRICTS

S. N	Name of States	Name of potential districts
1	J & K	Jammu, Badgam
2.	Himachal Pradesh	Shimla, Kullu, Mandi, Una, Kangra, Hamirpur, Bilaspur, Solan, Sirman, Kinnour, Chamba,
3.	Haryana	Ambala, Yamuna nagar, Kurukshetra
4.	Punjab	Gurudaspur, Jalandhar, Ropar, Patiala, Ludhiana, Amritsar, Fetehgarhsahib
5.	Rajasthan	Bharatpur
6.	U. P.	Gonda, Sitapur, Pratapgarh, Baharaiach, Ramnagar, Bulendsahar, Aligarh, Agra, Mizjapur, Gajipur, Meerut, Baliya, Varanasi, Gazipur Saharanpur
7.	Uttarachal	Dehradun, Haridwar, Kotdwar, Almora, Chamoli, Uttarkasi
8.	Bihar	Khagana, Muzaffarpur, Madubani, Mehsi, Samastipur, Saherasa, Sitamadhi, Vaishali, Champaran, Paschim Sarah, Rohtas, Deodhar Bhagalpur, Munher, Jamual
9.	Jharkhand	Ranchi, Gumla, Lohardaga, Singbhoom, Hasanbag
10.	Orissa	Koraput, Bhubaneshwar, Boipariguda, Dhenkal, Patasara, Cuttak, Sakhigopal
11.	West Bengal	24 Parganas (s), Midnapure, Murshiudabad, Nodia, Bankura, Jalpaiguri, Hoogly, Sundarban
12.	Assam	Nalbari, Kamrop, Sonitpur, Goalpura, Barrpda, Kokrajhar, Bongagaon, Dibrugarh, Sibsagar, Jorhat, Golaghat, Naugaon, Mangaon, Lakhimpur, Darang
13.	Manipur	Imphal, Churachandpur,
14.	Meghalaya	Cherapunj, Shillong
15.	Nagaland	Pheng, Dimapur, Kohima
16.	M.P.	Kasargad, Palakkad, Sarguja, Chindwara, Bilaspur.
17.	Maharashtra	Kolhapur, satara, Thane, Pune, Sindhudurga, Latur, Akola, Wardha
18	Andhra Pradesh	Guntur, East Godavari, Krishna, Vishakhapatnam, Kakkinada, Srikakulam
19	Karnataka	South Canara, Chikmanglor, Hassan, Dharwad, Coorg
20	Tamil Nadu	Kanyakumari, Tuticorin, Coimbatore, Tirunelveli, Madhurai, Salem, Gandhigram, Madurai, Theni, Vellur, Virudunagar, Dindigul, Kodaikanal, Chidambaram, Trichy, Periyar, Tanjavur, Aruppukttai, Sivkasi, Erode, Srivilliputur, Tiruchirapalli, Ramnad, Tirupoor
21	Kerala	Kochikode, Trichur, Cannanore, Trivendrum, Kottayam, Earnakulam, Kolam, Idukki, Pathanamthtta, Malapuram,

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The main hurdle for the progress of beekeeping in the country is deforestation and neonicotinoids. The depletion of bee forage in the forests results in the decreasing number of bee colonies and lowering honey production. In the agricultural plains vast areas exist without any shade for the beehives. Trees or large shrubs have to be planted to provide shelter to the bees. Indiscriminate use of insecticides on crops kills bees. Usually if only one crop is grown in a large area bees cannot get alternate sources and are forced to collect food from sprayed crops.

TOTAL FOREST COVER

The total forest cover of India is 6, 37, 293 sq kg which is 19.39% of the total area of the country out of which 40% of forest covers dense forest.

Sr. No	Name of States	Area in sq. Km
1	Andhra Pradesh	47112
2.	Arunachal Pradesh	68621
3.	Assam	24061
4.	Bihar	26561
5.	Goa	1250
6.	Gujarat	12320
7.	Himachal Pradesh	12500
8.	J & K	20433
9.	Karnataka	32382
10.	Kerala	10336
11.	Madhya Pradesh	135164
12.	Maharashtra	43843
13.	Manipur	17558
14.	Meghalaya	15714
15.	Mizoram	18576
16.	Nagaland	14291
17.	Orissa	47107
18	Punjab	1342
19	Rajasthan	13280
20	Sikkim	3127
21	Tamil Nadu	17766
22	Tripura	5538
23	U. P.	33986
24	West Bengal	8276
25	Andaman Nicobar	7615

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CHAPTER-7

Methods for Identification of Beneficiary, Honey Bee Assistant and Master beekeeper Trainer and Beekeeping Experts/ Scientist etc.

a) All the State / Divisional Directors / Incharge of SBEC of KVIC will invite applications from potential beneficiaries through press advertisements in local media, radio advertisements, hoardings mobilizing through organizations like NYKS, SC/ ST / Minority Finance & Development Corporation, MWCD, AWWA, Panchayat Raj Institutions, State Women & Child Development Corporation, State Designated Authorities of Agricultural and Horticultural Departments etc.
b) Dignitaries for District Level Awareness Camps would be State Director / Asst. Director of S.O/ D.O.s of KVIC, Representative of District Industries Center (DIC) / Representative of Khadi Board, Lead District Manager (LDM), Representative of NABARD, Sarpanch/ representative of Gram Panchayat and Representative of National Bank of local branch.
c) Application form for the training will be filled, called and screening of the applicants for imparting training on "Beginners Beekeeping and Entrepreneur Development Program" will be finalized on the same day at the end of the Awareness camp with the help of the Dignitaries present in the respective Awareness Camps.
d) Short listed applicants will be deployed for training and list of selected candidates will be displayed at the respective Awareness Camps and also on the notice board at SO/ DO/ SBECs of KVIC.

TRAINING: Beekeeping Training is more of integrating beekeeping science with skill development. The skills and the knowledge of beekeeper and their timely application those trained management practices are more important. The training is of developing patience and aptitude to adopt the efficient use of modern frame hives. After successful completion of 5 days training, candidates will be formed into beekeeping groups.

List of Honeybee Assistants/ trainers: Each state will identify local beekeeping trainers and train them under master /trainers training program at CBRTI / SBEC. The honey Assistants will act as trainer and care taker for the colonies for two seasons. The amount paid to the trainer is @ Rs. 150/- per day per person of 5 days training program. i.e. for a batch of 25 candidates, an amount of Rs. 18, 750/- for 5 days. It shall be paid in two installments. 50% on the day of completion of training and distribution / supply of bee colonies and remaining 50% on the day of completion of handholding for two seasons. After two seasons, if the beneficiary desires to have the services of Honeybee Assistant, @Rs.100/- per hive will be charged to beneficiary by the Honeybee Assistant / trainer. He / she will also collect data of the beneficiary, colonies inspection reports and submit to respective state / Divisional offices of KVIC and the State Office.

TOOL SUPPLY and QUEEN REARING PROGRAM:Trained candidates would be provided 10 bee hives supported with two years of handholding for two seasons to set up Apiary Units through Honeybee Assistants / Master Trainer and SBEC/ CBRTI. Once the given 10 bee hives multiply into 18 – 20 by each beneficiary, the production of honey would be 1800 MT to 2000 MT. the trained

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entrepreneurs will be routed to local bee nurseries for procuring Bee Colonies, who have been trained under SBECs under Queen Rearing Program and other skill Up-gradation programs for producing additional colonies by the local beekeepers. These beekeepers shall be identified and trained accordingly in mass multiplication of bee colonies. This will develop linkages between the existing commercial beekeepers and new beekeeping entrepreneurs/ beekeeping groups and establish as local honeybee nurseries. A list of this suppliers shall be maintained by the each state and upload in KVIC website.

Stock multiplication is the key activity for beekeeping for doubling the honey production. It is expected that there will be vast improvement in beekeeping by way of supply of improved bee breed. Queen rearing by selection and grafting method to be followed strictly while undertaking the program. In the program, select best few colonies from the available colonies as breeder colonies. The main criteria followed are brood development, disease / pest/ mite free, longevity of bees, hygienist, mild temper, etc. Therefore, a "Queen Rearing Training Program" may be conducted for beekeepers by each State Beekeeping Extension Center by collecting fees. With Queen rearing Program, commercial beekeepers can multiply colonies to three times of his / her basic stock. In the training commercial beekeeper will be trained in queen rearing, who owns minimum of 100 bee colonies and motivated to follow commercial queen rearing practices by dividing his basic stock in to batches. i.e. 50 colonies for honey production and 50 colonies for multiplication under queen rearing program.

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CHAPTER – 8

A) STATEWISE AND SCHEMEWISE BUDGET AND ACTION PLAN UNDER MAJOR HONEY MISSION

Potential State and respective Districts are in place with the report, any further addition of places may be supported with study of flora and fauna. District wise floral calendar is available for publishing by CBRTI. Keeping in view of the potentiality and KVIC's beekeeping network in India, state wise allocation of targets have been worked out in consultation of Hon'ble Chairman, KVIC and Dy. CEO (Honey Mission).

A National Level Beekeepers meet shall be called to announce the package of KVIC- Honey Mission followed with workshops and presentation and various relevant issues.

About 10, 200 persons / farmers/ beekeepers/unemployed youth are targeted and these beneficiaries shall be supplied 10 bee hives with bee colonies each. Tool kits and other necessary bee equipments will be provided as per action plan. Beekeeping is practiced with native bees in various part of the country using indigenous technology, which is low cost and suited to poor villagers. It is adaptable to different climatic conditions. Bee species has given a scope for continuing practice of beekeeping with domestic bees:

The Draft Mission Plan and implementation guidelines are enclosed along with State wise proposed Activities and Action Plan:

1..1. State wise Physical and Financial allocation for distribution of Bee Hives (Boxes) with bee colonies under Honey Mission Program for SC /ST candidates (establishing 10 bee colony apiary) for **NON NEZ– Annexure-I.**

1..2. State wise Physical and Financial allocation for distribution of Bee Hives (Boxes) with bee colonies under Honey Mission Program for **NEZ** State(s)' candidates (establishing 10 bee colony apiary)– **Annexure-II**

1..3. State wise allocation of S.S. Honey Extractors, Hive tools, cost of handholding, backward / forward linkages - **Annexure-III**

1..4. The State wise details of backward and forward linkages- **Annexure-IV. (The cost of backward & forward of Rs. 986.02 details given in annexure-IV has also included in Annexure-IV).**

B) EXPECTED OUTCOME :

in view of the infrastructure and manpower available as on date with KVIC under Beekeeping, the following outcome under Major Honey Mission is expected:

1. **Employment Generation :**

About **11000 employment** will generate out of which **10,200** direct employment and 800 indirect employment will provided under this project.

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2. Estimated Production of honey and other bee hive products from **1,02, 000** bee colonies (**73000 Apis mellifera and 29000 *Apis cerana***) and its estimated value is given below :

Sr. No	Name of the product	Production (In Tons)	Value (In Cro.)
1	Honey	2625	28.88
2	Wax	15.30	0.46
3	Pollen	18.00	0.54
4	Royal Jelly	3.60	3.60
5	Bee Vanom	0.0008	0.08
	TOTAL		33.56 Cr.

After implementation of Major Honey Mission Program the Honey production will be expected to increase about 10500 Metric Tons (M.T.) with in three years.

C) CONVERGENCE: -

1. Sustainable investments are being made for strengthening beekeeping activity in the point of view of ecological sustainability and pollination and livelihood for poor & landless laborers, tribes. In order to optimize the efforts and maximize impact & sustainability, it is imperative to ensure convergence and bring in synergies between different private initiatives and government schemes in terms of planning, process and implementation.
2. Private sector participation: The mission shall encourage participation of private sector retailers with proven track of record and established retail network and specialized in beekeeping commercially. Either specialized in Marketing of the honey & hive products or producing the honey & hive products.
3. Corporate Social Responsibility: The corporate of public and private sectors can participate in Mission by way of providing additional financial support and professional operations & management support to the Mission as part of their contribution.
4. Participate by Private Equity (PE) Impact Funds: To leverage the increasing trend of financial institutions floating funds to support Mission, that are in nature of social investments, such funds will be encouraged to participate in the SPVs, / SHG.
5. Other Schemes of State and Central Govt.: IA(s) shall be encouraged to dovetail funds from other various states and central govt. schemes over and above the funds sanctioned for Mission, provided there is no duplication of a specific project component being funded from one source.
6. Funds from Development Banks (MDB(s)): It is envisaged that the funding from the scheme will leverage to secure additional financial assistance to ensure sustainability and competitiveness of the cluster, where and when required.
7. The participation of stakeholders as illustrated above, any such participation or support needs to be detailed out in the Agreement and subject to approval of the Zonal Dy. CEO.

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CHAPTER- 9

A. ROLE & RESPONSIBILITIES FOR IMPLEMENTATION

1. ROLE OF CENTRAL BEE RESEARCH & TRAINING INSTITUTE, PUNE

- One of the main objective of Mission Mode is that the area of beekeeping program is to be widened by standardizing collection, handling and processing methods with its physical and chemical analysis and its parameters, quality control, preservation, commercial production and packaging of new bee hive products viz. Pollen, Royal Jelly, Propolis, Bee Venom, Bee Wax, etc. and also by giving special attention on honey and other bee hive mixed products in terms of increasing food value and medicinal value, thereby increasing the earnings of beekeepers. CBRTI should pay full attention on these areas and also give consultation to the needy people on various technical issues and managerial aspects of beekeeping.
- In the entire Honey Mission technical supported will be provided by CBRTI, KVIC, Pune and their infrastructure / manpower will be utilized.
- CBRTI, KVIC, Pune will collect colonies inspection reports from field / honeybee Assistants and guide them in maintaining healthy colonies. The data collected will compile and validate by CBRTI.
- CBRTI will supply floral colanders and migratory routes for facilitating beekeepers for migrating their colonies.
- CBRTI will Collects honey samples from each state and test in the laboratory of CBRTI for ensuring the quality of honey produced under KVIC-Honey Mission.
- CBRTI will prepare professional short films on beekeeping for utilizing in awareness / training / workshops and to disseminate beekeeping technologies to field through Honey Mission.
- CBRTI should restructure the training schedule under beekeeping program on real needs of the filed requirement in the changing scenario.
- Providing Technical Assistance to the needy State Beekeeping Extension Centers in respect of Queen Rearing, bee breeding, quality control of honey, Pollen collection & other Bee Hive Products and bee disease managements etc.
- Fallow up with Honeybee Assistants/ Trainer / SBECs for collecting honey samples for quality check and provide feedback and suggestive measures on samples checked / tested on need basis.
- Preparation of Training Module
- Providing technical inputs to identified bee breeders
- Dissemination of technology in bee-management through Beekeeping Extension Centers/Honeybee Assistants/ Trainer
- Coordinating and participating Conducting workshop cum training in advance technology
- Arranging training for bee hunters / wild honey collectors through NGO's in consultation with respective state KVIB(s)
- Arranging workshop and demonstrating on bee pollination
- Endeavoring for convergence with like-minded agencies.
- Preparation of short films on all the beekeeping training programs and all other hive products technologies through professionals.
- Maintain complete beekeeping database at CBRTI.
- Any other as per the advice of the National Advisory Committee for Honey Mission.

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3. ROLE OF STATE AND REGIONAL DIRECTORS

- Forming state level beekeeping mission teams / state monitoring committee and conducting state level and district level awareness programs.
- Beekeeping potential pockets should be identified as per the tentative list, so that the visibility of the impact of the mission can be seen and the beneficiary will reap the fruits of the program.
- Giving necessary advertisements and local press meets with the due consent of Dy. CEO (respective zones) to popularize the mission program.
- To prepare month wise and activity wise action plan for implementation for placing in committees for approval of Dy. CEO (Respective Zones)
- Selection of Honeybee Assistants/ Master Trainer / Beekeeping NGO.
- Procuring bee hives and bee colonies as per GFR
- Identification of entrepreneurs and master trainers for arranging training through State Beekeeping Extension Centers
- Identifying and notifying the bee equipment and bee colonies suppliers in the state.
- Linkage with financial institutions/ banks for facilitating trainees to avail finance under PMEGP.
- To collect data on honey produced by the bee colonies supplied with names of the persons in two
- Registration and issuance of identity card to the Master Trainers / Honeybee Assistants.
- Networking with local or nearest Honey Processors (HPP)/ Beekeeping Clusters to collect the honey, processing and packing.
- Arranging leading Beekeepers meets in potential Districts
- Supporting & linking stakeholders and coordinating
- Any other work assigned by the authority from the Central Office.
- To set monthly, quarterly and annual targets to state team.
- To ensure quality training, Aadhaar seeding and social security schemes etc. across all beekeeping development programmes being implemented under honeybee mission.
- Ensure to upload photos with appropriate captions and reports on the various events like training, field demonstrations, distribution of beehives, bee colonies and equipment, places, where the hives are located and name of the person responsible for the hives and handholding, collection and sale of honey, etc. under the State jurisdiction.
- Maintain a detailed record of the number of boxes and colonies distributed. A **unique id number** for each of the bee hive, which is tamper proof should also be placed in the beehive, so that these beehives can be verified and located whenever required.
- Fortnight reports should be sent to the Directorate of Forest Based Industry for placing before the Monitoring Committee
- To prepare and validate the annual training calendar.
- Coordinate and converge with local beekeeping NGOs, Master Trainers and Beekeepers in order to align objectives outlined in the Honey Mission's Action Plan.
- Any other work assigned by Central Steering Committee.
- Most importantly, focus on two verticals & credible Quality Assurance framework with **Good Beekeeping Practices (GBP)** and **Fair Trade Practices** to align the outcome and increase.

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3. ROLE OF STATE BEEKEEPING EXTENSION CENTERS/ KVK/ Beekeeping NGO

1. Coordinating with State / Divisional Offices.
2. Submitting weekly reports to State / Divisional Offices.
3. Conducting Awareness Camps / advertisements for inviting prospects from SHGs / forming beekeeping SHGs and individuals.
4. Imparting 5 Days Beginners Beekeeping Training programs through Honeybee Assistants / Master Trainers and make payment @ Rs. 100/- per person / day in two installments. 50% on the day of completion of training and 50% on the day of completion of hand holding
5. Assisting beekeepers in preparation of beekeeping model projects and forwarding to Banks through State / Divisional Offices for PMEGP.
6. Helping beekeeping entrepreneurs to set up the apiary units and maintaining beekeepers and their respective bee colonies database and record.
7. Timely submission of Expenditure Statements through State / Divisional Offices.
8. Collection of data in respect of new floral sources, honey in terms quantity and number of colonies in the state
9. Conducting exposure visits to potential beekeepers.
10. Informing beekeepers in preventing methods for controlling bee diseases in the state.
11. Maintaining 50 bee colonies for the purpose of training and a bee nursery with its breeding objectives.
12. Promoting pollination services with farmers through beekeepers.
13. Ensuring supply of CF Sheets and other tools to beekeepers
14. Imparting training on other bee hive products for its commercial production to beekeepers.
15. Encouraging beekeepers to form a self-help-groups in order to take more advantage of KVIC schemes like SFURTI/PMEGP in setting up of Honey Processing Plant and CFC.
16. Develop linkages with NHB, NGOs, Agri. Universities / Collages and other like-minded agencies for convergence.
17. Attending and submitting the information to State Monitoring Committee.
18. To collect data on honey produced by the bee colonies supplied.
19. Any other work assigned by the authority time to time.

4. ROLE OF MASTER TRAINERS / HONEYBEE ASSITANTS

1. To impart 5 days beginners beekeeping training to new entrants as per the syllabus of CBRTI.
2. Handholding the trainees for one year / two seasons in order to teach and demonstrate;
   a) Extraction of honey and
   b) Multiplication of bee colonies by collecting @ Rs. 25/- per colony from the trainee.
3. Reporting to SBEC regularly and submitting the reports and data and assist SBEC.
4. Obtain certificate /letter of completion of handholding from the beneficiary with dates and cash receipts from the beneficiary for collecting remaining 50% of his / her
5. To collect / maintain data on name of the persons, no. of colonies given, no. of colonies generated and amount of honey & wax produced by the bee colonies supplied in excel sheet.
6. Attend awareness and exposure visit programs time to time.

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5. ROLE OF EQUIPMENT & BEE COLONIES SUPPIER

a) Supply equipment and honeybee colonies as per the standard specification and terms fixed by the SBEC & State / Divisional Directors.
b) Providing service / replacing the defect hives and colonies, if any, in time.

6. ROLE OF DIRECTORATE OF FOREST BASED INDUSTRY:

1. Monitoring CBRTI, State Beekeeping Extension Centers and Mission program and coordinate the teams and committees.
2. Coordinating and providing policy support
3. Providing Budget support in time to time
4. Providing feedback and reporting to Commission time to time.
5. Conducting Orientation Programs to staff posted SBECs and CBRTI, Pune for effective implementation of Mission Program
6. Compile the data and upload in KVIC website
7. Reporting to Commission.

7. Need of National Level Advisory Committee: -

National Level Task Advisory Committee for KVIC-Honey Mission constituted with following members in order to have the suggestions, guidance, while formulating & executing the Honey Mission Program in the country. The Committee will evaluate the performance of the program and suggest line of action for effective implementation of the KVIC-Honey Mission program in State(s):

Sr. No.	Name & designation	
1.	Ms. Preeta Verma, CEO, KVIC, Mumbai. Email id: ceocell.kvic@gov.in Contact No. 022- 26711577	Chairperson
2.	Shri. Ashok Bhagat, Member (RD), KVIC. Email id: vikasbharati1983@hotmail.com Contact No. +91 9431118213 +91 9334381508	Expert Advisor
3.	Dr. R.C. Mishra, Ex. Director, ICAR. Email: rameshwarmishraroda@gmail.com Contact: +919816011253	Expert Advisor
4.	Dy. CEO (Honey Mission), KVIC, Mumbai. Email id: brmtkr@yahoo.co.in Contact No. +91 9923441062	Member
5.	Dr. Padma Sudarshan, No. 23, Sankalp Chaitanya, Double Road, Kuvempu Nagar, Mysore – 570023 Karnataka, Mobile: 09731862533; Emailed: padma.sudarshan@gmail.com	Member
6.	Shri. B.P. Singh, Ex. Dy. Director (Beekeeping- FBI) Email id: bpsdd25@gmail.com; Contact No. +917526029829	Member
7.	Ms. Chayya Nanjappa, Nectar Fresh Mysore Email id: md@nectarfreshfoods.com Contact No. +919880055606	Member

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8.	Shri. Jonty Randhwa, Big Bee Agro. GT Road, Village- Doraha, Ludhiana, Punjab – 141 421.Email id: bigbassociation@yahoo.com Cell: +91 7508600052	Member
9.	In-charge CBRTI/ Representative of CBRTI Not less than AD-II (Beekeeping), KVIC, Pune Tel. No. 020- 25655351 (Fax)	Member
10.	Dy. Director I/C, Forest Based Industry, KVIC, 3, Irla Road, Vile Parle (W), Mumbai- 56; Email id: fbi@kvic.gov.in Fax: 022 – 26708064	Member Convener

Note: There may be special invitees' provision for the committee with the permission of the Chair.

Terms of References for the Committee

4. The National Level Advisory Committee (NLAC) for KVIC-Honey Mission will meet in every quarter and submit their reports to the competent authority about ongoing performance of the honey mission.

5. The Committee will be responsible for supervising and implementation of prestigious honey mission program of KVIC and give the feedback from the field solving the difficulties, if any that are being faced by the KVIC/Beekeepers/ Farmers/ Honey processing Units/ Honeybee Entrepreneurs, etc. in the implementation of Honey Mission.

6. All the members of the Committee for Honey Mission including the special invitee will be given honorarium @ Rs.2, 000/- (Rupees Two Thousands Only) for one sitting and T.A. & D.A. admissible as per the Group "A" Officers of KVIC.

The committee will remain valid for two years unless until renewed with the due approval from competent authority.

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CHAPTER 10

AWARENESS ON ENEMIES OF HONEYBEES AND THEIR MANAGEMENT

Acarian mite

It is endo-parasitic mite and is present in almost countries. It parasitizes both *A. mellifera* and *A. cerana.* The mite enters the thoracic trachea of bees and development from egg to adult takes place there.

1) Many bees are found crawling in front of the hive.
2) Abdomen becomes distended & is dysenteric. Yellow spots of shit can be seen on the walls, alighting board etc.
3) K-winged condition due to non-coupling of two wings, unable to fly.
4) Bees become lethargic and paralytic; for scattered small-clusters and unable to cover and feed the brood.
5) On dissection the tracheae are seen brittle with brown color.
6) Heavy infestation interferes with normal respiration.

Prevention & Control

1. Remove the hives, infested with mite to prevent spread.
2. Remove dead and dying bees and burry them.
3. Give Sulphur fumigation to infested colonies.
4. Put methyl-salicylate in a vial with a loose cotton wick. Place it in the hive; repeat as per need.
5. Use menthol strips (paper strip impregnated with 300 ml. of menthol) for fumigation.
6. Formic acid fumigation; 5 ml of 85% formic acid, in a vial with loose cotton wick is placed on the bottom board is replaced every day for 15-20 days in the evening. OR Dimit (PK) chlorbenzitate (Folbex) fumigation is effective too.

Tropilaelaps clareae

It is ectoparasitic mite; each brood cell may have 1-15 mites. Mites suck blood.

1) Patchy brood is the result of infestation because worker bees remove heavily infested brood.
2) Small perforations on the capping of infested brood.
3) In case of low infestation, the adult bees may emerge but with incomplete legs, wings etc.
4) Bees with affected legs and wings are incapable of movement and flight and are found crawling.
5) Mites can be seen running on the comb and sticking to brood if suspected cells are opened and brood examined.

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Tropilaelaps clareae mite

Prevention & Control

1) Sulphur (200 mg per brood frame) dusting on top bars on on bottom board, near the entrance is most effective; repeat after 21-30 days during active brood rearing season.
2) Formic acid fumigation (as in acarine) for 15-20 days.
3) Apistan and mavrik TM have also been found effective.
4) Making the colony queen-less and consequently brood-less for 15-20 days can be used. This allows bees to clean infested brood and mites do not find brood for feeding and breeding.

Varroa jacobsoni

It is reported from both the hive species but has never been serious. Adult mites can be seen on body and other symptoms are spotty brood, dead brood malformed bees with deformed legs and wings, dead prepupae with raised heads.

Varroa jacobsoni

Prevention & Control

Apistan (fluvalinate) strips are most effective. Fumigation with bromopropylate strips and chlorodimeform hydrochloride and Amitraz spray are equally effective.

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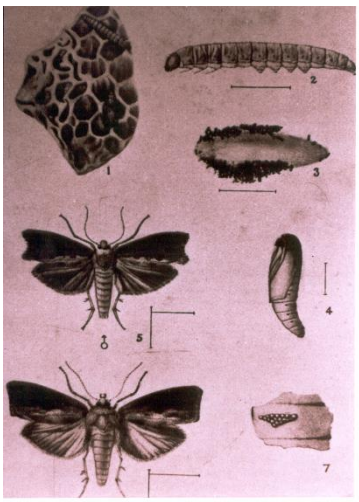
Wax mothGalleria melonella

It is very serious in A. cerana, A. dorsata and A. florea. A. mellifera mixes some propolis in combs and hence moth attack is very less.



Wax mothGalleria melonella

1) Larvae of eax moth after emerging from eggs tunnel the combs and feed on pollen, wax and exuvae.
2) Tunnels are filled with frass and exereta.
3) In case of severity the combs are damaged and rendered unfit for reuse.

Comb damaged by wax moth

Prevention & Control

1) Wax moth is a problem for a careless beekeeper.
2) Store extra combs carefully; staking the frames in brood chambers, one over the other and sealing the space in between the chambers with mud & dung.
3) Fumigate the spare combs by sulphur smouldering.
4) Acetic acid and formaline fumigation kills the younger larvae but not the older ones.
5) Larvae of moth can be killed by low temperature treatment (-7^{0}C for 4.5 hrs; -12^{0}C for 3 hrs)
6) Phostoxin (phosphine) is very effective for fumigation of combs.
7) Repeat fumigation at 25-30 days interval from June to October.

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Predatory wasps (Vespa spp.)

The species vary in different areas. Attack is serious in some areas (especially hilly) from June to October. The wasps catch the bees at /or near the entrance and suck the juices of the body by cutting the head. Each wasp kill large number of bees and the colony strength and brood rearing is reduced. Colonies may abscond.

Predatory wasps

Prevention & Control

1.Killing of fecundated females in spring means destroying a future nest.
2 Destroy wasp nests in the vicinity of the apiary.
3. Mix insecticide (without offensive smell) in attractants like meat, fish or rotting fruits and place in the apiary. Some of the wasp spp. are sufficiently attracted to these baits and are killed.
4. Kill by flapping in the apiary.

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Predatory birds
***Merops* spp are common besides many other spp.**

Birds are very serious predators of bees during summer and again in winter when they don't find other prey (insects) in the fields. The birds sit on electric-, telephone- wires and on tree branches with less of leaf foliage. They catch the flying bees in the apiary or in the field.

Prevention & Control

1. Scare the birds in the apiary. Attack is very serious in unattended apiaries.
2. Place the hive under a thick canopy of trees like poplar and mulberry. The thick canopy obstructs the birds from taking flight for catching bees in the apiary.
3. Killing of these birds is prohibited due to ecological reasons.

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CHAPTER-11

A)List OF BEEKEEPING CLUSTERS DEVELOPMENT- Common Facilitates Centers (CFC)

KVIC created beekeeping infrastructure facilities with NGO through different schemes of UNDP/KRDP/ SFURTI for the benefit of the beekeepers in the cluster approach. These 26 Honey Processing Plants and laboratories may suffice the purpose of collection, processing, packing & bottling and marketing

Name of the State	Address of the NGO	Infrastructure and Equipmentavailable
JAMMU&KASHMIR 1.	Shri Gandhi Seva Sadan, H.O., Gandhi Bhavwan, JAMMU-TAWI, J&K Ph - 547291	➢ Honey Processing Plant 300 kg capacity/ 8 hours ➢ Bottling unit ➢ SS Tank for honey storage ➢ Quality control lab ➢ Generator
2.	Khadi Gramodyog Sewa Sansthan, 268, Sarwal Mohalla, Jammu, Sec- 09419185559, rajeshbakshi1234@yahoo.in	➢ Honey processing plant 300 Kg with automatic moisture reduction unit ➢ stainless steel 304 food grade, Automatic Honey Bottling machine, ➢ Bee hive tools, Honey extractors, Digital Moisture meter, Royale Jelly Extractor, Wax melting unit, Comb foundation unit. Honey trays, Digital weighing machine, Generator set
HIMACHAL PRADESH	Himachal Khadi Mandal, Akhara Bazar, Kullu, H.P.	➢ Honey Processing Plant 300 kg capacity Bottling unit ➢ SS Tank for honey storage ➢ Quality control lab ➢ CF mill
UTTAR PRADESH	Apis Gramodyog Sansthan, Chueti Gara, Delhi Road, Vill Nainkhera P.O., SAHARANPUR, U.P.	➢ Moisture reduction unit for Honey Processing Plant 300 kg capacity ➢ Bottling unit ➢ SS Tank for honey storage ➢ Quality control lab ➢ CF mill
Uttarkhand 1	Beekeeping Extension Centre, MDTC, KVIC, HALDWANI, U.A. **DEPARTMENTAL**	➢ Honey Processing Plant 300 kg capacity Bottling unit ➢ SS Tank for honey storage ➢ Quality control lab ➢ CF mill
2	Kshatriya Shree Gandhi Ashram, Gochar Badrenath Road, Chamoli – pin – 246401, Uttarkhand ph: 09410301011	➢ Honey processing plant 300 Kg capacity ➢ bottling plant ➢ bottle dryer

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BIHAR **1**	Muzaffarpur Zilla Khadi Gramodyog sangh, SARVODAYAGRAM Muzaffarpur – 842 002 Bihar Ph- 243562	➢ Honey Processing Plant 300 kg capacity Bottling unit ➢ SS Tank for honey storage ➢ Quality control lab ➢ CF mill ➢ Generator
2	Tirhut Dugdh Utpadak Sahakari Sangh Ltd.Kolhua Dist. Muzaffarpur, 843 108 (Bihar) PH: 0621-2263549, 2264030/ 09431238834www.sudhahoney.com	➢ Honey Processing Plant 1000 Kg ➢ Storage Tank (S.S.) ➢ Sealing & Feeding Gum machines
JHARKHAND	Singhbhum Gramodyog Vikas Sansthan, Nimdih,Chaibasa 833201 (Jharkhand). Mo. Sec -9431210645, G.M -9931102346, 06582-255093/06582-256215, www.jharkhandhoney.com	➢ Honey Processing Plants, ➢ Honey carry canes, ➢ Honey tank 5 M.T.
WEST BENGAL **1**	24, Parganas Beekeepers Coop. Society, Vill. Shasan, Post Baruipur – 743 302, Dist. 24 Parganas (South), W.B.	➢ Honey Processing Plant 300 kg capacity Bottling unit ➢ SS Tank for honey storage ➢ Quality control lab ➢ Computer ➢ CF mill
2	West Bengal Bee-Keepers' Association, 21, Ma- Sarada Road, Napara, P.O.- Barasat, Dt.- North 24 Pgs. Kolkata- 7000124 Phone/Fax, e-mail: 033-25424237,25241846, 033-25241846; wbbabarasat@gmail.com	➢ Honey Processing Plants with moisture reducing unit, ROPP Capping Machine ➢ Twin Head Volumetric Honey Filling Machine, Bottle Label, Gumming & Pasting Machine ➢ Voltage Stabilizer for HPP, Comb Foundation Mill (*A.Melifera*) ➢ FSS Liquid Filling & Sealing Machine, Specto- -photometre
3.	Vivekananda Institute of Biotechnology, Sri Ramkrishna Ashra, Post - Nnipith Ashram, South 24 Paraganas (Sunderbans) Pin: 743 338 West Bengal, India Ph:	➢ Honey processing Plan (HPP) ➢ Lab equipment ➢ Bottling unit ➢ Sealing machine ➢ Honey storage containers (SS 300 Kg Capacity) ➢ Honey storage containers (SS 1000 Kg Capacity)

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MADHYA PRADESH	Mahatma Gandhi Seva Ashram, Joura, Distt- Morena – 476221 M.P. Ph-55027-Joura,23013-Morena, Fax-326756	➢ Honey Processing Plant 100 kg capacity Bottling unit ➢ SS Tank for honey storage ➢ Quality control lab ➢ Generator
MAHARASHTRA 1.	Pragati Bahuuddeshiya Sanstha, Weekly Market, Pulgaon 442 302 M.S. Ph- 07158-283461 melghathoney@yahoo.co.in	➢ Honey Processing Plant 100 kg capacity Bottling unit ➢ SS Tank for honey storage ➢ Quality control lab ➢ Generator ➢ Honey Pouch packing Machine ➢ Honey Bristol packing, & cutting machine
2.	CBRTI, KVIC, Pune	➢ Honey Processing Plant 100 kg capacity ➢ Bottling unit ➢ SS Tank for honey storage ➢ Quality control lab ➢ Generator
KARNATAKA 1	The South Kanara Bee-Keepers Cooperative Society Ltd., L.386, P.O., Puttur-574 201, D.K. Dist, Karnataka Ph-220524, 224524 Fax- 08251-222080	➢ Honey Processing Plant 300 kg capacity Bottling unit ➢ SS Tank for honey storage ➢ Quality control lab ➢ Solar water heater & CF mill
2	The Coorg Progressive Beekeepers Co-Operative Society, Ltd., Bhagamandala. Coorg district, Karnataka-571 247 Ph: 243224,243442 paneer.06@gmail.com	➢ Honey Processing Plant, ➢ Storage tank (5000x2) ➢ Bottling unit
3.	Mysore (PMEGP) Ms. Chaya nanzappa	➢ Honey Processing Plant, ➢ Storage tank ➢ Bottling unit
TAMIL NADU	Kanyakumari District Sarvodaya Sangh, 22-23, Vagayadi South Car Street, Kottar, Nagercoil – 629 002, Kanyakumari Dist., T.N. Ph . 04651 280022	➢ Honey Processing Plant 300 kg capacity Bottling unit ➢ SS Tank for honey storage ➢ Quality control lab ➢ CF mill
KERALA 1	Kozhikode Sarvodaya Sangham, Khadigram, S MS Street, Kozhikode, Kerala. Ph: 04952720049 kozhikodesarvodayasangh@gmail.com	➢ Honey processing plant 300 kg ➢ Bottling plant ➢ Bottle dryer

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2	Khadi & V.I. Association, Avinissery, P.O. Ollur, Trissure, Kerala- 680 313	➢ Honey Processing Plant with Moisture reduction unit. (300- kg Capacity 8 hour shift) ➢ Lab. Equipments ➢ Semi-automatic Honey Bottling unit ➢ Sealing Machine ➢ 04 Honey Storage stainless Steel containers (300 kg capacity) ➢ 04 Honey Storage Stainless Steel containers with a cap. of 1000 lit., ➢ Generator
ORISSA **1.**	Sarvodaya Samiti, Gandhinagar, Koraput, Orissa Ph- Fax –91-6852-251417	Honey Processing Plant 100 kg capacity Bottling unit SS Tank for honey storage Quality control lab
2.	Human Resource Centre, NGO, A-1, Ambagadia, Block: Betanoti, Mayurbhanj, Orissa	Honey Processing Plant 100 kg capacity Bottling unit SS Tank for honey storage
3.	Balasore Beekeeping Industrial Cooperative Society, Balasore**.**	➢ Honey processing Plant (HPP) 300 kg capacity ➢ 10 Raw honey SS storage containers 100 Kg Capacity ➢ 03 SS processed honey storage containers 1000 kg capacity ➢ Sealing machine ➢ 5 Honeybee Nurseries and carpentry unit ➢ 20 Bee venom kits ➢ Honey testing Laboratory ➢ Generator
TRIPURA	Tripura Khadi & V.I. Board, Colonel Chowmuhan, Agartala, Tripura (W)PH; 0381-2323386	Honey Processing Plant, Twin head volumetric Honey filling machine, Semi-Automatic capping machine, UV Spectro Photometer, Single Pan Analytical Balance, Vacuum Oven
SIKKIM	State Institute of Rural Development, State Institute of Rural Development (An Autonomous Institute of Rural Mngt. & Dev. Deptt. Govt. of Sikkim) Karfectar, Jorethang, South Sikkim -737121 Ph: 03595 - 257521, 257251; 03595 – 257290; sirdsikkim@yahoo.co.in	Honey Processing Machine, Bottling Machine Comb Foundation Machine

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B) LIST OF BEE COLONIES SUPPLIERS

Sr. No.	Address	Telephone No.
	1. Uttar Pradesh	
1	The Chairman Jyoti Gramodyog Sansthan, Gango (P.O)Saharanpur Dist. U.P	9759424652
2	Om Madhu Kendra Vil- Dakrawar Kala Post- Rampur Maniharan Dist- Saharanpur	9675430101
3	Shiv Gramodyog Sansthan P.O Beerakheri, Saharanpur (U.P) 247 340	01331236107
4	Jyoti Apiaries Nanauta Road, Gangoh Dist- Saharanpur U.P	09412130552
5	Lucky Bee farm Main Mandoli Road Krishna Vihar, Dist-Gaziabad.	09350627350
6	Shiv Maounpalan Kendra Maukhas, Meerut.	09719739363
7	Archna Maunpalan Kendra Vil- Sisauli, post- Syana, Dist- Buland Shahar	09412568746
8	Rekha Mounpalan Kendra Vil- Behta, poat Syana, Dist-Buland Shahar	09412568746
9	Snehi Gramodyog Sansthan, VPO, Banat Dist- Shamli.	09412112118
10	Shri Bee Farm VPO-Buklana, Syana Dist- Buland Shahar	09675150198
	2. Uttarkhand	
1	Chaitanya Maounpalan & Krishi Seva Samiti, Durgapuram Colony, Devalchoud, Haldwani Prp. Sanjay Joshi	09412134920
2	Uttam Singh Rawat, Lachampur Goalapur, Haldwani	09411161942
3	Surendra Singh Rawat, Shivalal Pur Pandy, Ramnagar, Nainital	09927126181
4	Aprit Mehraotra, Ramsons apiary, Ramnagar,	09412410919
5	Prakash Sati, Gr. Patli, Po- Amgadhi Nagar, Ramnagar	09457696534
6	Aditya Saraswat Shri Ram apiary , Shivlalpur Near Parvatiya Plywood, Ramnagar,	09837095372
7	Prakash kalakoti, E.W.S 103/3 Awas Vikas colony Haldwani	09412994243
8	Puran Chandra Joshi, Uhnchapul, Haldwani	09411596275
9	Navin Chandra Pandy, Jyolikot, Nainital	09927860929
10	Sanjivkumar Saini	09412956487
	3. Andhra Pradesh	
1	K. Siva Rama Krishna Vijayrai	9493088714
2	D. Ramesh Chand, Papavinasanam (PO)	9492524957
3	Sk.Jani, Ponnur, Guntur District	8985294675
4	K Anjaneyulu, Dandamudi, Guntur dist	9492708132
5	K Prakasa Rao, Vijayrai	8790075701
6	G Ramu, Vidyanagar, Guntur	9391668777
7	P.R Naresh Chaudhary, Gudivada, Guntur District.	9010011041
8	K Ramesh, Ponnur, Guntur District.	8985109469
9	M Banu Prakash, Yellamanda, Guntur Dist.	9640710940
10	M.S R Krishnaiah, Vijaywada, Krishna	9440025544

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	4. Bihar	
1	Muzaffarpur Zilla Khadi Gramodyog Sangh, Sarvodaygram, Khadibhandar Chowk, Kanhauli, Muzaffarpur.	0621- 2228562
2	Rajeev Wooden Box, Khamaipatti, Meenapur, Muzaffarpur. Pro Shri Shankar Prasad.	9955658639
3	Tirhut Madumakhipalan Sah Kalyan Santha, Khemaipatti, P.O Meemapur	9905366081
4	Dev Narayan Sharma, Sharma Italian Madumaki Box & furniture hous, Mazaffarpur.	9939448797
5	Shri Prabhu Sharma, Italian Madumaki Box & furniture house, Prahladpur	07654567545
6	Shri Shambhu Sharma Vishwakarma Madumakhi Box Udyog, prahladpur	09931968330
7	Shri Rajesh Sahni, Samastipur	09939454002
8	Shri Dayanand Singh, M/s Mushan Madhubati Mithanpura, Muzaffarpur	09570554321
9	Vaishali Madhu Utpadak Samiti, Katarmala	09546701522
10	Shiva Madhu utpadan Swablambi Sahkari Samiti , Katarmala, Vaishali Dist	08809585385.
	Assam	
1.	Shri. Arun Mitra, Oujari, Khetri, Dist- Kamrup	8752950353
2.	Shri. Lila Charan Datta, Beekeeper, Bahana, Dist. Jorhat	
5.	**Maharashtra**	
1.	Shri Sagar Patil	9860179549
2.	Shri Dhanraj Koche	9404050212
3.	Shri Donald Piase	9422003586
4.	Dr. Thomas, Pune	9423505891
5.	Shri Johnson, Mumbai	9619799261
6.	Dr. Nikam T B, Nasik	9420226557
7.	Shri Patil (mahabaleshwar)	9423862919
9.	Shri Santosh Kulkarni, Pune	9403186878
10.	Shri Vidyanand Shire, Jalgaon	9067101381
11.	Shri Vivek Khalokar, Amaravati	9561133311
12.	Shri Subba Rao, Pune	8329710501
13.	Dr. B.S Rahile, Napgur	9890426422
14.	Prof. Ram Gavande, Nagpur	9970468436
15.	Dr. Vijay Lurkar, Nagpur	9422831053
16.	Dr. V K Biradar, Nagpur	9422826153
17.	Dr Neharkar, Nagpur	9405195778
18.	Purushottam Gedam	9823649454
19.	Dayvan Patil, Kolhapur	9096385712
20.	Amit Godse, Pune	9920698778

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C) LIST OF MASTER TRAINERS / Beekeeping Experts / Honeybee Assistants

Sr. No.	Address	Telephone No.
	1. Uttar Pradesh	
1	Shri. Sanjay sani, Jyoti Gramodyog Sansthan, Rambagh colony, Gangoh Dist-Saharanpur	9759424652
2	Shri Ompal Singh, Om Madhu Kendra, Dakrawar Kala, Post Rampur, Saharanpur	09675430101
3	Shri Ajay kr Saini Jyoti Apiaries Nanauta Road, Gangoh Dist- Saharanpur U.P	09412130552
4	Sh Vijay Kasana,Lucky Bee farm Main Mandoli Road Krishna Vihar, Dist- Gaziabad.	09350627350
5	Shri Ranvir Singh Tomar, Shiv Maounpalan Kendra Maukhas, Meerut.	09719739363
6	Shri Sanjay Tyagi 81 Mohalla, Patti Dahar, Syana, Dist- Bulandshahar	09758112220
7	Shri Rajendra Singh Tyagi Syana, Dist-Bulandshahar	09412568746
8	Sh Narash Chand, Snehi Gramodyog Sansthan	09412112118
9	Shri Sardar Singh, Sree Bee Farm, Buklana	09675150198
10	Sh Krishna Kant Shandiya	09627122905
11	Shri Vinay Panwar, Rampur Saharanpur	09411080822
12	Sh Kuldeep Panwar, Rampur	09719301827
13	Shri Sadhu Ram Sharma, Saharanpur	09760785427
	2. M.P	
1	Shri Prafulla Kr Shrivastav	9425126460
2	Shri Dinesh kr Tyagi	9584694152
3	Shri Ramnaresh Agrawal	7047070252
4	Shri Ram Awtar Tyagi	9179330687
5	Shri Hari om Agrawal	9165731990
6	Shri Sheetal Jain	9993475400
7	Shri Balaram Batham	9179556585
	3. Uttarkhand.	
1	Prop. Sanjay Joshi, M/s Chaitanya Maounpalan & Krishi Seva Samiti, Durgapuram Colony, Devalchoud, Haldwani	09412134920
2	Shri Aditya Saraswat Shri Ram apiary , Shivlalpur Near Parvatiya Plywood, Ramnagar,	09837095372
3	Shri M.S Mittal Ex D.O KVIC, Haldwani	9837222257
4	Shri I. D Dumka, Ishwarjeet Mahila Vikas Sansthan, Near Vikas Bhavan Gorakhpur	9458964112
5	Shri Manohar Singh Rawat, Shivlalpur Pandey	9927823488
6	Shri Bhuwan Chandra Pandey, Jyolikoy	9536246801
7	Shri Prakash Sati, Amgadhu Ramnagar	9457696534
8	Shri Prakash kalakoti, Haldwani	9412994243
9	Shri Umesh Chandra Bhatt	9756947238
10	Shri Girish Chnadra Pandey	9927368399

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	4. Andhra Pradesh	
1	Shri K Sambha Shiva Rao, President AP beekeepers Association, Tenali Guntur	9440259698
2	Shri A.S.S Chalapathi Rao, Dandamudi, Ponnuru Mandal, Guntur Dist.	9440066910
3	Shri D.B Raghvendra, tenali	9441412272
4	Shri T. Narasimha Rao, Iticumapadu.	9573602618
5	Dr Y.V.V Prasad, Vijayawada	9849370896
6	Ch Venkata Ramana, Narasipatnam	9989782984
7	Shri G Vaidya Dhara Rao, kaviti, Srikulam	7036506845
8	Shri B Ashok Vardhan, Vijayawada, Krishna	9948045679
9	Shri P Sobhan Babu Alias Samson, Varahapuram, vemuru, Guntur Dist	8187808593
10	Shri P Ravendra Kumar, Hyderabad	9393978111
	5. Maharashtra	
1.	Shri Sagar Patil	9860179549
2.	Shri Dhanraj Koche	9404050212
3.	Shri Donald Piase	9422003586
4.	Dr. Thomas, Pune	9423505891
5.	Shri Johnson, Mumbai	9619799261
6.	Dr. Nikam T B, Nasik	9420226557
7.	Shri Patil (mahabaleshwar)	9423862919
9.	Shri Santosh Kulkarni, Pune	9403186878
10.	Shri Vidyanand Shire, Jalgaon	9067101381
11.	Shri Vivek Khalokar, Amaravati	9561133311
12.	Shri Subba Rao, Pune	8329710501
13.	Dr. B.S Rahile, Napgur	9890426422
14.	Prof. Ram Gavande, Nagpur	9970468436
15.	Dr. Vijay Lurkar, Nagpur	9422831053
16.	Dr. V K Biradar, Nagpur	9422826153
17.	Dr Neharkar, Nagpur	9405195778
18.	Purushottam Gedam	9823649454
19.	Dayvan Patil, Kolhapur	9096385712
20.	Amit Godse, Pune	9920698778

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D) NAME & ADDRESS OF THE DIRECTLY AIDED BEEKEEPING INSTITUTIONS OF KVIC

NORTH ZONE

SO JAMMU (J&K)	
1	Gandhi Seva Sadan, Gandhi Bhavan, Jammu
2	Khadi Gram Mandal, Jammu 94-A Gandhi Nagar, Jammu
SO, AMBALA (HARYANA)	
3	Sanjay Gramodyog Samiti, Tirath Nagar, Near Bharati Hospital, Yamunanagar (Haryana)
SO SHIMLA (H.P.)	
4	Himachal Khadi Mandal, Akhara Bazar, Kullu (H.P)
5	Khadi Gramodyog Sansthan P.ONagrota, Tel & Dist-Kangra
6	Pragatisheel Khadi Gramodyog Samiti ,Gadagusaini, Mandi ,Dist:Mandi
SO, CHANDIGARH (Punjab)	
7	Punjab Khadi Mandal, Admapur, Doaba, Dist-Jalandhar, (Punjab)
8	Mani Gramodyog Samiti, Vill-Ferozpur, Post-Bassipathana, Dist- Pathiala
9	Kshetriya Shree Gandhi Ashram, Queens Road,Amritsar

CENTRAL ZONE

RO, MEERUT (Uttar Pradesh)	
10	Apis Gramodyog Sanstha , Nainkhera, P.O-Pahansu, Saharanpur Dist-Dehradun
RO, VARANASI (Uttar Pradesh)	
11	Kambal Garha Udyog, Devabhairanpur, P.O-Devaria, Dist-Gazipur
12	Kshetriya Shri Gandhi Asharm,Maghar, Sant Kabir Nagar
13	Kshetriya Shri Gandhi Asharm,Varanasi
DEHRADUN (Uttaranchal)	
14	Parvatiya Gram Swarajya Mandal, Kunj Jayanti, Dist -Moradabad
15	Kshetriya Shri Gandhi Ashram, Kalawati Colony, Haldwani (Nainital)
16	Kshetriya Shri Gandhi Ashram Chanoda Dist- Almora
CHATTISGARH	
17	Sarvodaya Samiti , Sarguja, Ambikapur Chhatisgarh

EASTERN ZONE

SO, PATNA (Bihar)	
18	Vaishali Zilla Khadi Gramodyog Sangh. Gasndhi Ashram, Najipur, Vaishali (Bihar)
19	Muzzaffarpur Zilla Khadi Gramodyog Sangh, Sarvodaya Gram, Muzaffarpur-842002
20	Madhubani Zilla Khadi Gramodyog Sangh, P.O, Madhubani (Bihar)
21	Sitamadhi Zilla Khadi Gramodyog Sangh, Sitamadhi (Bihar)
22	Bhagalpur Zilla Khadi Gramodyog Sangh, Laxmi Narayan Bhawan, Bhagalpur-812002
23	Gram Swarajya Sangh,P.O-Bariyapur Dist- Munger (Bihar)
24	Khagria Zilla Khadi Gramodyog Sangh, P.O-Gogari, Khagriya (Bihar)
25	Saharas zilla Khadi Gramodyog Sangh D.V.Road,Saharasa
26	Gram Bherti Sarvodaya Ashram, P.O Samutalla, Dist-Jamni Bihar
27	Paschim Champaran Zilla Khadi Gramodyog Sangh, Bettia, Post-Paschim Champaran
28	Samastipur Anumandaliya Gramodyog, Samiti Pussa, P.O Waini Dist-Samastipur
29	Gram Swarajya Sangh At/Po- Bariyapur , Dist- Munger -811 211

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JHARKHAND	
30	Chhotanagapur Khadi Gramodyog Sansthan, Post -Tiril , Block Ratu, Teh & Dist-Ranchi- 834004 (Jharkhand). Tel. No. 0651- 440375
31	Santhal Paragana Gramodyog Samiti, Near Tower Chowk, Post - B. Deoghar , Block / Teh /Dist- Deoghar, -814 112 , (Jharkhand) Tel.No. 06432 - 22225 .
32	Adimjati Samagra Vikas Parishad , At Post/ Block - Anagara Dist- Ranchi - 835 103 (Jharkhand) Tel. No. 0651 - 306210 .
33	Adivasi Smagra Vikas Parisad, Palkot Gumla
34	Ranchi Zilla Banbasi Khadi Gramodyog Sansthan, Aryapuri Ratu Road , Ranchi - 840 001 (Jharkhand) Tel. No. 0651- 309102
35	Khadi Gramodyog Sangh , Ravindra Path Hazaribag- 825 301, Jharkhand
SO, CALCUTTA (West Bengal)	
36	24 parganas Beekeepers Co-Operative Society Ltd, Village-Shasan,Post Baruipur, Dist-24 Paraganas(South)
37	Chandrakanta Lalitmaohan Resham Khadi Samity,Po- Khagra, Dist-Murshidabad
38	Abhoy Asharam Khadi & V.I.Activities, Po-Birati Kolkata-51
39	Silk Khadi Seva Mandal,Raghunathsyer, Po-Bishnu, Dist-Bankura-722122
40	Midnapore Beekeepers Khadi & V.I.Co-operative Society Ltd, Po- Pratappur, Dist-Midnapore
41	Balarampur Sarvodaya Gram Swarajya Sangh,Vill/Po-Balarampur, DistMidnapore-721301
SO BHUBANESHWAR (Orissa)	
42	Sarvodaya Samiti Koraput (Orissa)
43	Boipariguda Kshetra Samity Koraput (Orissa)
44	Sampradaya Seva Samity,Dighapandi Tahasil Colony,Ganjam (Orissa)

NORTH EASTERN ZONE

SO, GUWAHATI (Assam)	
45	Gram Loa Seva Sangh, P.O Niz Dhamdhama, Dist-Nalbari, Pin-781349
46	Barkhetri Unnayan Samiti, At.P.O Mukalmua, Dist-Nalbari, Pin-781126
47	Balijana Anchlik Jana Seva Samiti P.O-Agia,Dist-Golapare (Assam)
48	Tamalpur Anchlik Gramdan Sangh, Kumrikata,Nalbari-781360
49	Tazpur Anchlik Gram Bikas Sangh, Vill-Dekargoan, P.O Dekargoan, Dist-Donitpur
50	Gram Swarajya Parishad Rangia, PO Rangia,Dist-Kamruk (Assam)
51	Kasturba Seva Mandir,Texpur, Dist-Sonitpur (Assam)
MEGHLAYA	
52	**Paham Khadi Gramodyog Sangh,Village-Paham,Po-Paham,Block-Selsela, Dist-Tura-994 104(Meghalaya)**
SO, IMPHAL, (Manipur)	
53	Manipur Khadi Production & Sales Co.op society Ltd. Roop Mahal Tank, B-T-Raod, Imphal
54	Dorcas Society, Old Lambulane, Imphal, Manipur

WESTERN ZONE

SO, MUMBAI (Maharashtra)	
55	Pragathi Bahuudeshiya Sanstha, Weekly Market, Pulgaon, 442 302, Maharashtra

SOUTH ZONE

SO, CHENNAI (Tamil Nadu)	
56	Chidambaram Sarvodaya Sangh, 48 South Car Street,Post Chidambaram District Cuddalore-608 001
57	Tirupur Sarvodaya Sangh ,Murugampalayam,Veerapandi, Post-Iduvampalayam, Dist-Coimbatore-641 687
58	Udamalpet Sarvodaya Sangh,4B Nehru Street,Udamalpet District-Coimbatore-642 126
59	Pollachi Sarvodaya Sangh, 36 Venkatramana Street,Post-Pollachi,Dist-Coimbatore-642 001

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60	Khadi Gramodyog Sangh,844,Anna Salai,Chennai-600002
61	Arni Sarvoadaya Sangh,36 Mettu Street,Post Arni, Diastrict-Tiruvannamlai-632301
62	Tirupathur Sarvodaya Sangh
63	Avarampalayam Sarvodaya Sangh,129 Appusamy Layout,Red Fields, Coimbatore-641 045
64	Annur Sarvodaya Sangh,7/34 Nehruji Street,Post Annur, Dist. Cimbatore-641653
65	Nambiyur Sarvodaya Sangh,AT/Po Nambiyur, Erode-638 458
66	Coimbatore Central Sarvodaya Sangh,Muthonampalayam, Post Pollikalipalayam District-Coimbatore-641 665
67	Coimbatore South Sarvodaya Sangh,33 New Beemar Street,P.B.No 11,Post Dharapuram,Dist Erode-638 656
68	Sathyamangalam Sarvodaya Sangh, 9/467 Main Road, Satyamangalam Dist Erode-638 401
69	Padiyur Sarvodaya Sangh Post Pdiyur,Via Kangayam-638 701,District-Erode
70	Tiruchirapalli Sarvodaya Sangh,9 Jp Nagar,Dindigul Road, Tiruchirapalli-620 001
71	Mulanar Sarvodaya Sangh,65 Vadugapatti Road,Post Mulanur Dist-Erode-638 106
72	Karur Sarvodaya Sangh,Village -Vaiyapurinagar,Post/District-Karur-639 001
73	Gandhi Ashram,Nallipalayam,Post Gandhi Ashram, District Namakal-637 201
74	Erode Sarvodaya Sangh,Chennimalai Road,Post-Kasipalayam, Dist-Erode-638 009
75	Thanjavur Sarvodaya Sangh
76	North Arcot Sarvodaya sangh,10-11,New Sitting Bazar post /District - Vellore-632 513
77	Tiruchirapalli Northh sarvodaya Sangh, no 123 Double mall Street,Po-Teppakulam, Dist Tiruchirapalli-620008
78	Thanjavur West Srvodaya Sangh,,28 Giri Road ,Srinivaspuram Post/District-Thanjavur-613 009
79	Salem Dist Sarvodaya Sangh,9.Gandhi Nagar Post Attur District Salem-636 102
80	Cuddalore Sarvodaya Sangh,Parvithipuram,Sarvodaya Nagar,Post Vadalur ,Distirict Cuddalore-607 303
81	Chigleput District Sarvoadaya Sangh,40 Amudhupadim Street, Kancheepuram-631 503
82	Madras Sarvodaya Sangh,199 Linghi Chetty Street Chennai-600 001
83	Gandhipuram Sarvodaya Sangh,Maruthamalai Road,Vadavalli Post-Vadavalli, District-Coimbatore-641 041
84	Pondicherry Sarvodaya Sangh
85	Coimbatore North Sarvodaya Sangh, 255, Nawab Hakeem Road, Coimbatore-641001
DO MADURAI (Tamil Nadu)	
86	Ambasamudram Sarvodya Sangh, Gandhi Nagar, Viravanlur - 627 426
87	Aruppukottai Sarvodya Sangh , Sathiyamoorti Bazar, Aruppukottai -626 102
88	Gandhi Nikatan Ashram, T. Kallupatty 626 702, Dist- Madurai
89	Gandhigram Khadi & V.I. Public Charitable Trust , Gandhigram – 624302 Dist- Dindigul
90	Kanyakumari Dist. Sarvodaya Sangh, 22-23 Vagayadi South Car Street , Kottar, Nagarcoil -629 002
91	Karaikudi Sarvodaya Sangh, 2- 2 /87 Devakottar Road , Karaikudi
92	Madurai Dist. Sarvodya Sangh 26 Town Hall Road Madurai 625 001
93	Madurai East Sarodaya Sangh, 256 Kamrajar Salai Madurai - 625 009
94	Madurai West Sarvodya Sangh, Sastripuram , Tirumagalam -625 706, Dist-Madurai

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95	Madurai North Sarvodaya Sangh, Kasthuribha Nagar Sinthalabadampatty Palani
96	Naguneri Sarvodaya Sangh 28, Siva Nagar, Panagudi - 627 109Dist- Tirunelveli.
97	Puliyangudi Sarvodaya Sangh, 28 Karpaga Street Puliyngudi 627 858 Dist- Tirunveli , Katta Pomman
98	Periyakulam Sarvodaya Sangh, 17-A, Cumbum Road, Periyakulam 623 601
99	Ramnathapuram Dist. Sarvodaya Sangh, 45 East Car Street Srivilliputhur - 626 125, Dist. Virudhunagar
100	Ramnathpuram Central Sarvodaya Sangh, 6/774,Arumugam Colony, Satsiyapuram, Sivakashi (W).
101	Ramnathpuram East Sarvodaya Sangh ,Paramkudi - 623 707
102	Sankarankoil Sarvodya Sangh North Car Street Sankarankoil - 627 756, Dist- Tirunelveli
103	Tiruchendur Sarvodaya Sangh West Car Street Tiruchendur- 628 125
104	Tirunelveli Sarvodya Sangh, 59 South Car street , Tirunelveli- 627 006
105	Tuticorin Sarvodya Sangh, KVK Nagar, Tuticorin 628 008, Dist- Tuticorin
106	Virudhunagar Sarvodaya Sangh, 329 Rail way Feeder Road, Virudhunagar-626001
107	Tamilnadu Gandhi Smarak Nidhi, Madurai
108	Eranil Sarvodaya Sangh, 28/92, Muttom Road, Eranial, Post- Neyyoor - 629 802, Dist- Kanyakumari
109	Gram Rajya Nirman Sangh, Dindigul
DO VISHAKAPATNAM (Andhra Pradesh)	
110	Sitanagaram Khadi & V.I. Development Sanstha, Sitanagram Via Rajhmundry, Dist. East Godavari
SO, BANGALORE (Karnataka)	
111	The South Kanara Beekeepers Co-op Society Ltd. Puttur -574 201, Dist- South Kanar
112	The Beekeepers Co-op Society LTd. At/Po- Sakleshpur, Dist- Hassan -573 134
113	Karnataka Khadi Gramodyog Samyukta Sangh (Fedration) Benegari-Hubli-580 023
SO, THIRUVANANTHAPURAM (Kerala)	
114	Kerala Sarvodaya Sangh, Gandhi Ashram, Civil Sattion, Post-Calicut-673020
115	Alleppy Sarvodya Sangh, Pallarimangalam-P.O Mavelikkara-690107
116	Kerala Khadi & V.I Federation, 48/497 c Padivattam, Eddappily-P.O Cochin-24
117	Kerala Khadi & V.I.Association, Avanissery, Trichur-680313
118	Kozhikode Sarvoday Sangh,S.M.Street, Khadi Gram, Kozhikode- 673 001
119	Trivendrum Sarvodaya Sangh, Gramodya, P.B No-89 M.G.Road, Trivendrum-1
120	Cannanore Sarvodaya Sangh, Chettenkoonu, Telicherry- 1, Dist-Cannanore
121	Changancherry Social service society, Arch Bishop's House, Changancherry. Dist- Kottayam (Kerala)
122	Kerala Gandhi Smarak Nidhi, Gandhi Bhavan, Trivendrum-695001
123	Palghat Sarvodaya Sangh

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DATE: 12.01.2018

Annexure-I

Honeybee Mission for SC and ST for non NE
Khadi & Village Industries Commission
State wise allocation of Bee Boxes (hives) with Physical Targets and Financial Outlay (Allocation of 10 Bee Boxes (hives) to each person)

Sr. No	Name of the State	Name of SO/DO/MDTC/SBEC	SC : ST as per Census 2011	No. of persosn to be selected			No. of hives			Rate per bee box (hive) with colony (in Rs.)	Total cost of boxes (hives) with live colonies (Rs. In Lakhs)			contribution (Rs. In Lakhs)		KVIC Contribution		Total KVIC's Contribution for SC /ST (Rs. In Lakhs)	Remarks
				Total	SC	ST	Total	SC	ST		Total	SC	ST	SC 20%	ST 20%	SC (80%)	ST (80%)		
1	2	3		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	Jammu & Kashmir	S.O. Jammu	00.62:1.00	600	230	370	6000	2300	3700	4500	270.00	103.50	166.50	20.70	33.30	82.80	133.20	216.00	
2	Haryana	S.O. Ambala	01.00:0.00	200	200	0	2000	2000	0	4500	90.00	90.00	0.00	18.00	0.00	72.00	0.00	72.00	
3	Punjab	S.O. Chandigarh	01.00:0.00	400	400	0	4000	4000	0	4500	180.00	180.00	0.00	36.00	0.00	144.00	0.00	144.00	
4	H.P.	S.O. Shimla	4.41:1.00	400	325	75	4000	3250	750	4500	180.00	146.25	33.75	29.25	6.75	117.00	27.00	144.00	
5	Uttar Pradesh	S.O. Lucknow	36.00:1.00	200	195	5	2000	1950	50	4500	90.00	87.75	2.25	17.55	0.45	70.20	1.80	72.00	
6	do	DO Meerut		200	195	5	2000	1950	50	4500	90.00	87.75	2.25	17.55	0.45	70.20	1.80	72.00	
7	do	DO Gorakhpur		200	195	5	2000	1950	50	4500	90.00	87.75	2.25	17.55	0.45	70.20	1.80	72.00	
8	do	DO Varanasi		200	195	5	2000	1950	50	4500	90.00	87.75	2.25	17.55	0.45	70.20	1.80	72.00	
9	Uttara Khand	S.O., Dehradun	6.48:1.00	700	600	100	7000	6000	1000	4500	315.00	270.00	45.00	54.00	9.00	216.00	36.00	252.00	
10	Bihar	S.O., Patna	12.30:1.00	700	648	52	7000	6480	520	4500	315.00	291.60	23.40	58.32	4.68	233.28	18.72	252.00	
11	Jharkhand	S.O. Ranchi	0.46:1.00	400	126	274	4000	1260	2740	4500	180.00	56.70	123.30	11.34	24.66	45.36	98.64	144.00	
12	West Bengal	S.O. West Bengal	4.00:1.00	300	240	60	3000	2400	600	4500	135.00	108.00	27.00	21.60	5.40	86.40	21.60	108.00	
13	Orissa	S.O., Bhubaneshwar	0.75:1.00	400	170	230	4000	1700	2300	3500	140.00	59.50	80.50	11.90	16.10	47.60	64.40	112.00	
14	Andhra Pradesh	SO And. Pradesh	2.35:1.00	200	140	60	2000	1400	600	4500	90.00	63.00	27.00	12.60	5.40	50.40	21.60	72.00	
15	do	DO Vizak.	2.35:1.00	150	105	45	1500	1050	450	4500	67.50	47.25	20.25	9.45	4.05	37.80	16.20	54.00	
16	Telangana	S.O. Telangana	2.35:1.00	150	105	45	1500	1050	450	4500	67.50	47.25	20.25	9.45	4.05	37.80	16.20	54.00	
17	Kerala	S.O. Trivandrum	6.27:1.00	400	345	55	4000	3450	550	3500	140.00	120.75	19.25	24.15	3.85	96.60	15.40	112.00	
18	Karnataka	S.O., Bangalore	2.46:1.00	400	285	115	4000	2850	1150	3500	140.00	99.75	40.25	19.95	8.05	79.80	32.20	112.00	
19	Tamilnadu	S O Chennai	6.27:1.00	150	130	20	1500	1300	200	3500	52.50	45.50	7.00	9.10	1.40	36.40	5.60	42.00	
20	do	DO, Madurai	6.27:1.00	50	43	7	500	430	70	3500	17.50	15.05	2.45	3.01	0.49	12.04	1.96	14.00	
21	Gujarat	S.O. Ah'bad	0.46:1.00	600	190	410	6000	1900	4100	4500	270.00	85.50	184.50	17.10	36.90	68.40	147.60	216.00	
22	Maharashtra	SO Mumbai	1.26:1.00	200	110	90	2000	1100	900	4500	90.00	49.50	40.50	9.90	8.10	39.60	32.40	72.00	
23	do	D.O. Nagpur	1.26:1.00	200	110	90	2000	1100	900	4500	90.00	49.50	40.50	9.90	8.10	39.60	32.40	72.00	
24	do	CBRTI, Pune	1.26:1.00	100	60	40	1000	600	400	4500	45.00	27.00	18.00	5.40	3.60	21.60	14.40	36.00	
25	Chhattisgarh	S.O. Raipur	0.42:1.00	300	90	210	3000	900	2100	4500	135.00	40.50	94.50	8.10	18.90	32.40	75.60	108.00	
26	Madhya Pradesh	S.O. Bhopal	0.74:1.00	200	85	115	2000	850	1150	4500	90.00	38.25	51.75	7.65	10.35	30.60	41.40	72.00	
27	Rajasthan	S.O. Jaipur	1.3:1.00	150	105	45	1500	1050	450	4500	67.50	47.25	20.25	9.45	4.05	37.80	16.20	54.00	
28	Goa	S.O., Goa	0.17:1.00	100	15	85	1000	150	850	4500	45.00	6.75	38.25	1.35	7.65	5.40	30.60	36.00	
	Sub Total			**8250**	**5637**	**2613**	**82500**	**56370**	**26130**		**3572.5**	**2439.35**	**1133.15**	**487.87**	226.63	**1951.48**	906.52	**2858.00**	
29	C. O. Mumbai	C.O. Mumbai		450	225	225	4500	2250	2250	4500	202.50	101.25	101.25	20.25	20.25	81.00	81.00	162.00	
		Grand Total		**8700**	**5862**	**2838**	**87000**	**58620**	**28380**		**3775.00**	**2540.60**	**1234.40**	**508.12**	246.88	**2032.48**	987.52	**3020.00**	

Note 1: The allocation under SC and ST category is made based on the population with respective category and and beekeeping potential in the state concerned

Note 2: 20% own contribution should be collected from SC & ST candidates in Non NE States.

DATE: 12.01.2018

Annexure-II

Honeybee Mission for NE ZONE
Khadi & Village Industries Commission
State wise allocation of Bee Boxes (hives) with Physical Targets and Financial Outlay (Allocation of 10 Bee Boxes (hives) to each person)

Sr. No	Name of the State	Name of SO/DO/MDTC/SBEC	No. of persosn to be selected				No. of hives				rate in Rs.	Total cost of boxes (hives) with live colonies (Rs. In Lakhs)				beneficiary's contribution (Rs. In Lakhs)			KVIC contribution			Total KVIC Contribution for SC /ST (Rs. In Lakhs)	Remarks
			Total	Gen.	SC	ST	Total	Gen	SC	ST		Total	Gen.	SC	ST	Gen. 10%	SC	ST	Gen. (90%)	SC (100%)	ST (100%)		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	NE Zone																						
1	Assam	S.O.Guwahati	300	242	21	37	3000	2420	210	370	3500	105.00	84.70	7.35	12.95	8.47	0.00	0.00	76.23	7.35	12.95	96.53	
2	Arun.Pradesh	S.O. Itanaga	200	65	0	135	2000	650	0	1350	3500	70.00	22.75	0.00	47.25	2.28	0.00	0.00	20.48	0.00	47.25	67.73	
3	Sikkim	S.O.Gangtok	200	116	10	74	2000	1160	100	740	3500	70.00	40.60	3.50	25.90	4.06	0.00	0.00	36.54	3.50	25.90	65.94	
4	Mizoram	S.O. Aizwal	200	10	0	190	2000	100	0	1900	3500	70.00	3.50	0.00	66.50	0.35	0.00	0.00	3.15	0.00	66.50	69.65	
5	Meghalaya	S.O. Shillong	300	37	2	261	3000	370	20	2610	3500	105.00	12.95	0.70	91.35	1.30	0.00	0.00	11.66	0.70	91.35	103.71	
6	Manipur	S.O., Imphal	100	60	2	38	1000	600	20	380	3500	35.00	21.00	0.70	13.30	2.10	0.00	0.00	18.90	0.70	13.30	32.90	
7	Nagaland	S.O., Dhimapur	150	20	0	130	1500	200	0	1300	3500	52.50	7.00	0.00	45.50	0.70	0.00	0.00	6.30	0.00	45.50	51.80	
8	Tripura	S.O., Agartala	50	25	10	15	500	250	100	150	3500	17.50	8.75	3.50	5.25	0.88	0.00	0.00	7.88	3.50	5.25	16.63	
	SuTotal		**1500**	**575**	**45**	**880**	**15000**	**5750**	**450**	**8800**		**525.00**	**201.25**	**15.75**	**308.00**	**20.13**	**0.00**	**0.00**	**181.13**	**15.75**	**308.00**	**504.88**	

Note 1: 10% contribuition should be collected from Gen. candidates in NE States and SC & ST Nil

DATE: 12.01.2018

Annexure-III

Honeybee Mission
Khadi & Village Industries Commission

State wise allocation of Bee Boxes (hives) with Physical Targets with cost of backward/ farword linkages, honey extractors, hive tools and training & handholding
Allocation of two extractor shall be shared by 5 person; smoker, bee veil, hive tool to each persons and Block provision

(Rs. In Lakhs)

S.No.	Name of the State	Name of SO/DO/MDTC/SBEC	No. of persosn	Total No. of bee boxes (hives)	cost Honey extractors	hive kit / person	Total cost of tools (col. 6+7)	Cost of training	Backward /farword linkgaes Monitoring	Total amount	SC	ST	Gen.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Jammu & Kashmir	S.O. Jammu	600	6000	14.40	4.50	18.90	8.40	45.00	72.30	29.89	48.09	0.00
2	Haryana	S.O. Ambala	200	2000	4.80	1.50	6.30	2.80	20.00	29.10	25.99	0.00	0.00
3	Punjab	S.O. Chandigarh	400	4000	9.60	3.00	12.60	5.60	33.00	51.20	51.99	0.00	0.00
4	H.P.	S.O. Shimla	400	4000	9.60	3.00	12.60	5.60	33.00	51.20	42.24	9.75	0.00
5	Uttar Pradesh	S.O. Lucknow	200	2000	4.80	1.50	6.30	2.80	20.00	29.10	25.34	0.65	0.00
6	do	DO Meerut	200	2000	4.80	1.50	6.30	2.80	20.00	29.10	25.34	0.65	0.00
7	do	DO Gorakhpur	200	2000	4.80	1.50	6.30	2.80	20.00	29.10	25.34	0.65	0.00
8	do	DO Varanasi	200	2000	4.80	1.50	6.30	2.80	20.00	29.10	25.34	0.65	0.00
9	Uttara Khand	S.O., Dehradun	700	7000	16.80	5.25	22.05	9.80	52.00	83.85	77.98	13.00	0.00
10	Bihar	S.O., Patna	700	7000	16.80	5.25	22.05	9.80	51.50	83.35	84.22	6.76	0.00
11	Jharkhand	S.O. Ranchi	400	4000	9.60	3.00	12.60	5.60	32.50	50.70	16.38	35.61	0.00
12	West Bengal	S.O. West Bengal	300	3000	7.20	2.25	9.45	4.20	26.50	40.15	31.19	7.80	0.00
13	Orissa	S.O., Bhubaneshwar	400	4000	9.60	3.00	12.60	5.60	33.00	51.20	22.09	29.89	0.00
14	Andhra Pradesh	SO And. Pradesh	200	2000	4.80	1.50	6.30	2.80	20.00	29.10	18.19	7.80	0.00
15	do	DO Vizak.	150	1500	3.60	1.13	4.73	2.10	17.25	24.08	13.65	5.85	0.00
16	Telangana	S.O. Telangana	150	1500	3.60	1.13	4.73	2.10	17.25	24.08	13.65	5.85	0.00
17	Kerala	S.O. Trivandrum	400	4000	9.60	3.00	12.60	5.60	33.00	51.20	44.84	7.15	0.00
18	Karnataka	S.O., Bangalore	400	4000	9.60	3.00	12.60	5.60	33.00	51.20	37.04	14.95	0.00
19	Tamilnadu	S O Chennai	150	1500	3.60	1.13	4.73	2.10	17.25	24.08	16.90	2.60	0.00
20	do	DO, Madurai	50	500	1.20	0.38	1.58	0.70	11.75	14.03	5.59	0.91	0.00
21	Gujarat	S.O. Ah'bad	600	6000	14.40	4.50	18.90	8.40	45.00	72.30	24.69	53.29	0.00
22	Maharashtra	SO Mumbai	200	2000	4.80	1.50	6.30	2.80	20.00	29.10	14.30	11.70	0.00
23	do	D.O. Nagpur	200	2000	4.80	1.50	6.30	2.80	20.00	29.10	14.30	11.70	0.00
24	do	CBRTI, Pune	100	1000	2.40	0.75	3.15	1.40	14.50	19.05	7.80	5.20	0.00
25	Chhattisgarh	S.O. Raipur	300	3000	7.20	2.25	9.45	4.20	26.50	40.15	11.70	27.29	0.00
26	Madhya Pradesh	S.O. Bhopal	200	2000	4.80	1.50	6.30	2.80	20.00	29.10	11.05	14.95	0.00
27	Rajasthan	S.O. Jaipur	150	1500	3.60	1.13	4.73	2.10	17.25	24.08	13.65	5.85	0.00
28	Goa	S.O., Goa	100	1000	2.40	0.75	3.15	1.40	14.50	19.05	1.95	11.05	0.00
	Sub Total		**8250**	**82500**	**198**	**61.88**	**259.88**	**115.5**	**733.75**	**1109.13**	**732.61**	**339.60**	**0.00**
30	Assam	S.O.Guwahati	300	3000	7.20	2.25	9.45	4.80	26.50	40.75	2.73	4.81	31.45
31	Arun.Pradesh	S.O. Itanaga	200	2000	4.80	1.50	6.30	3.20	21.00	30.50	0.00	17.55	8.45
32	Sikkim	S.O.Gangtok	200	2000	4.80	1.50	6.30	3.20	21.00	30.50	1.30	9.62	15.08
33	Mizoram	S.O. Aizwal	200	2000	4.80	1.50	6.30	3.20	21.00	30.50	0.00	24.69	1.30
34	Meghalaya	S.O. Shillong	300	3000	7.20	2.25	9.45	4.80	26.50	40.75	0.26	33.92	4.81
35	Manipur	S.O., Imphal	100	1000	2.40	0.75	3.15	1.60	15.50	20.25	0.26	4.94	7.80
36	Nagaland	S.O., Dhimapur	150	1500	3.60	1.13	4.73	2.40	18.25	25.38	0.00	16.90	2.60
37	Tripura	S.O., Agartala	50	500	1.20	0.38	1.58	0.80	12.75	15.13	1.30	1.95	3.25
	Sub Total		**1500**	**15000**	**36.00**	**11.25**	**47.25**	**24.00**	**162.50**	**233.75**	**5.85**	**114.37**	**74.73**
38	C. O. Mumbai	C.O. Mumbai	450	4500	10.80	3.38	14.18	6.30	89.77	110.25	29.24	29.24	0.00
	Block provision	**Grand Total**	**10200**	**102000**	**244.80**	**76.50**	**321.30**	**145.80**	**986.02**	**1453.12**	**767.70**	**483.21**	**74.73**

Note:

1 2 SS Honey Extractors (4 frame shallow super) per 100 hives @ Rs. 12, 000/- per estractor, shall be provided to groups only.
2 hive tools (ss knife; one hive tool, smoker and bee viel) @ 750/- per kit, shall be gives to each benificiary at the time of training
3 Cost of training @ Rs. 35,000/- per bactch of 25 candidates in Non NE States and Rs. 40, 000/- for NE States
4 The Details of Backward and Forward linkages please see Annexure-IV

DATE: 12.01.2018

Annexure-IV

Khadi & Village Industires Commission
Directorate of Forest Based Industry
Irla Road, Vile Parle (West) Mumbai- 400056

State wise, program wise detailed allocation Physical and financial of Backward and forward linkages under Honey Mission

S.No.	Name of the State	Name of SO/DO/MDTC/ SBEC	No. of persosn to be selected	Total No. of bee boxes (hives)	12 Awraenss Programs	4 beekeeprs meets	beekeeping in 5 schools /jails	C/F sheets	Monitoring ,Conveyance & TA & DA for visiting apiaries	cost of hand holding for two seasons	Monitoring at C.o & Exp for NLTACM*	Misc.	Total
1	2	3	4	5	6	7	8	9	10	11		12	13
1	Jammu & Kashmir	S.O. Jammu	600	6000	3.00	2.00	1.50	30.00	5.00	3.00		0.50	45.00
2	Haryana	S.O. Ambala	200	2000	3.00	2.00	1.50	10.00	2.00	1.00		0.50	20.00
3	Punjab	S.O. Chandigarh	400	4000	3.00	2.00	1.50	20.00	4.00	2.00		0.50	33.00
4	H.P.	S.O. Shimla	400	4000	3.00	2.00	1.50	20.00	4.00	2.00		0.50	33.00
5	Uttar Pradesh	S.O. Lucknow	200	2000	3.00	2.00	1.50	10.00	2.00	1.00		0.50	20.00
6	do	DO Meerut	200	2000	3.00	2.00	1.50	10.00	2.00	1.00		0.50	20.00
7	do	DO Gorakhpur	200	2000	3.00	2.00	1.50	10.00	2.00	1.00		0.50	20.00
8	do	DO Varanasi	200	2000	3.00	2.00	1.50	10.00	2.00	1.00		0.50	20.00
9	Uttara Khand	S.O., Dehradun	700	7000	3.00	2.00	1.50	35.00	6.50	3.50		0.50	52.00
10	Bihar	S.O., Patna	700	7000	3.00	2.00	1.50	35.00	6.00	3.50		0.50	51.50
11	Jharkhand	S.O. Ranchi	400	4000	3.00	2.00	1.50	20.00	3.50	2.00		0.50	32.50
12	West Bengal	S.O. West Bengal	300	3000	3.00	2.00	1.50	15.00	3.00	1.50		0.50	26.50
13	Orissa	S.O., Bhubaneshwa	400	4000	3.00	2.00	1.50	20.00	4.00	2.00		0.50	33.00
14	Andhra Pradesh	SO And. Pradesh	200	2000	3.00	2.00	1.50	10.00	2.00	1.00		0.50	20.00
15	do	DO Vizak.	150	1500	3.00	2.00	1.50	7.50	2.00	0.75		0.50	17.25
16	Telangana	S.O. Telangana	150	1500	3.00	2.00	1.50	7.50	2.00	0.75		0.50	17.25
17	Kerala	S.O. Trivandrum	400	4000	3.00	2.00	1.50	20.00	4.00	2.00		0.50	33.00
18	Karnataka	S.O., Bangalore	400	4000	3.00	2.00	1.50	20.00	4.00	2.00		0.50	33.00
19	Tamilnadu	S O Chennai	150	1500	3.00	2.00	1.50	7.50	2.00	0.75		0.50	17.25
20	do	DO, Madurai	50	500	3.00	2.00	1.50	2.50	2.00	0.25		0.50	11.75
21	Gujarat	S.O. Ah'bad	600	6000	3.00	2.00	1.50	30.00	5.00	3.00		0.50	45.00
22	Maharashtra	SO Mumbai	200	2000	3.00	2.00	1.50	10.00	2.00	1.00		0.50	20.00
23	do	D.O. Nagpur	200	2000	3.00	2.00	1.50	10.00	2.00	1.00		0.50	20.00
24	do	CBRTI, Pune	100	1000	3.00	2.00	1.50	5.00	2.00	0.50		0.50	14.50
25	Chhattisgarh	S.O. Raipur	300	3000	3.00	2.00	1.50	15.00	3.00	1.50		0.50	26.50
26	Madhya Pradesh	S.O. Bhopal	200	2000	3.00	2.00	1.50	10.00	2.00	1.00		0.50	20.00
27	Rajasthan	S.O. Jaipur	150	1500	3.00	2.00	1.50	7.50	2.00	0.75		0.50	17.25
28	Goa	S.O., Goa	100	1000	3.00	2.00	1.50	5.00	2.00	0.50		0.50	14.50
	Sub Total		**8250**	**82500**	**84.00**	**56.00**	**42.00**	**412.5**	**84.00**	**41.25**	**0**	**14.00**	**733.75**
30	Assam	S.O.Guwahati	300	3000	3.00	2.00	1.50	15.00	3.00	1.50		0.50	26.50
31	Arun.Pradesh	S.O. Itanaga	200	2000	3.00	2.00	1.50	10.00	3.00	1.00		0.50	21.00
32	Sikkim	S.O.Gangtok	200	2000	3.00	2.00	1.50	10.00	3.00	1.00		0.50	21.00
33	Mizoram	S.O. Aizwal	200	2000	3.00	2.00	1.50	10.00	3.00	1.00		0.50	21.00
34	Meghalaya	S.O. Shillong	300	3000	3.00	2.00	1.50	15.00	3.00	1.50		0.50	26.50
35	Manipur	S.O., Imphal	100	1000	3.00	2.00	1.50	5.00	3.00	0.50		0.50	15.50
36	Nagaland	S.O., Dhimapur	150	1500	3.00	2.00	1.50	7.50	3.00	0.75		0.50	18.25
37	Tripura	S.O., Agartala	50	500	3.00	2.00	1.50	2.50	3.00	0.25		0.50	12.75
	Sub Total		**1500**	**15000**	**24.00**	**16.00**	**12.00**	**75.00**	**24.00**	**7.50**		**4.00**	**162.50**
	C. O. Mumbai	C.O. Mumbai	532	5320	3.00	0.00	1.50	26.60	0.00	2.66	55.51	0.50	89.77
	Block provision	**Grand Total**	**10282**	**102820.00**	**111.00**	**72.00**	**55.50**	**514.10**	**108.00**	**51.41**	**55.51**	**18.50**	**986.02**

Note:

1 Awarness Programs: 12 Awarness programs, workshops and oneday training programs @Rs. 25, 000/- per program for list of benificiaries, tech. dissemination, trg.
2 4 commercial beekeeper's meets per state @ Rs. 50, 000/- per meet for organizing bee colonies for the program
3 5 beekeeping in schools per state @ Rs. 30, 000/- per school, to involve school childred to promote beekeeping
4 10 comb foundation sheets (SF Sheet) per hive @Rs. 50/- per sheet
5 Block provision of Rs. 55.51 Lakhs for Monitoring at Central office level & National Level Task Advisory Committee Meetings (NLTACM), etc.

6 **The amounts of Rs. 986.02 Lakhs earmarked for backward Forward linkages in annexureIV has been included in Annexure-III at colum NO-10.**