

## Beekeeping: Additional Income Source for Farmers

(\* R. N. Sharma<sup>1</sup>, Subash Bajjiya<sup>2</sup> and P. K. Kumawat<sup>3</sup>)

<sup>1</sup>Rajasthan Agricultural Research Institute, Durgapura, SKNAU, Jobner, Jaipur

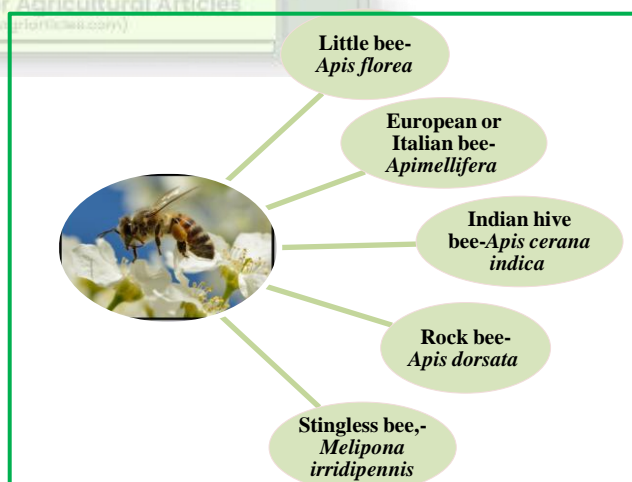
<sup>2</sup>SRF at Directorate of Extension Education- AU Jodhpur

<sup>3</sup>Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu

\*Corresponding Author's email: [sramnarayan75@gmail.com](mailto:sramnarayan75@gmail.com)

Beekeeping or apiculture was a very successful industry in India in 1960, The PAU, Ludhiana successfully introduced the European bee hive. In recent years beekeeping is a low input, high output industry.

Beekeeping is one of the excellent business opportunities for small and marginal farmers where they can invest in and bring the green business revolution, which is mainly driven by the demand of consumers who are interested in purchasing goods that incorporate eco-friendly manufacturing processes and saving natural resources. It involves the rearing of honeybees for the benefit of human being and also has the capabilities of building up any nation. Apart from honey and other byproducts, bees contributed to sustaining as well as enhancing crop production through their pollination services. In our country, about sixteen lakh people are involved in beekeeping and allied activities directly or indirectly. In India, honey and beekeeping have a long history, and also honey was the first sweet food tasted by our forefathers inhabiting rock shelters and forests. They hunted bee hives for this gift of God. Now honey and bee products find use in several industries such as pharmaceuticals, bees wax industries, bee venom, royal jelly, bee nurseries, bee equipment, and hives etc. Beekeeping is quite profitable in areas with good floral pasturage. According to recent statistics, about 50 million hectares of land is under the cultivation of oilseeds, pulses, orchards, and other crops which is useful to bees and benefitted by bee pollination. In addition, there is about 60 million hectares of forest area with beekeeping potential. This vast area of agriculture Beekeeping in India has the potential to keep about 120 million bee colonies that can provide self employment to over 6 million rural and 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 collection of forest honey and beeswax using improved methods can result in additional production of at least 120,000 tons of honey and 10,000 tons of beeswax. The major honey producing states include Punjab, Haryana, Uttar Pradesh, Bihar, and West Bengal. Govt. of India has approved a new Central Sector Scheme entitled "National Beekeeping & Honey Mission (NBHM)" for two years for overall



promotion and development of scientific beekeeping in mission mode to achieve the goal of “Sweet Revolution” in the country by giving thrust on capacity building & training, specific focus on women, input support for promotion & production, setting up of Integrated Beekeeping Development Centres (IBDCs), other infrastructures, digitization /online registration, processing, value addition, market support, etc. In Uttar Pradesh, the beekeeping program is being operated in various 15 districts of the state by the Department of Horticulture and food processing, with the motive to promote beekeeping for the business purpose among the farmers of the state.

**Types of Honeybees:** Five important species of honey bees are as follows.

<p><b>European or Italian bee (<i>Apis mellifera</i>):</b></p> <ul style="list-style-type: none"> <li>◆ It is introduced species of bees from Italy by Dr. A. S. Atwal in 1960 (Punjab).</li> <li>◆ It is highly domesticated in nature.</li> <li>◆ They construct multiple parallel combs.</li> <li>◆ It yields highest honey. It produces 45-180 kg. honey/hive/year.</li> </ul>	<p><b>Little bee (<i>Apis florea</i>):</b></p> <ul style="list-style-type: none"> <li>◆ Smallest honey bee’s species.</li> <li>◆ They build single vertical combs.</li> <li>◆ The bees are very prone to swarming.</li> <li>◆ Poor honey yielder (0.5Kg/comb/year).</li> </ul>
<p><b>Indian bee (<i>Apis cerana indica</i>):</b></p> <ul style="list-style-type: none"> <li>◆ They are the domesticated species, construct multiple parallel combs.</li> <li>◆ They are native of India/Asia.</li> <li>◆ They are more prone to swarming and absconding.</li> <li>◆ Low honey yielder (5-10 Kg of honey/comb/year).</li> </ul>	<p><b>Indian Black Honey bee (<i>Apis karinjodian</i>):</b></p> <ul style="list-style-type: none"> <li>◆ <i>Apis karinjodian</i> has evolved from <i>Apis cerana indica</i>.</li> <li>◆ It is new honey bee species discovered in India.</li> <li>◆ They are native of India (Central Western and Southern Western).</li> <li>◆ They are the domesticated species, construct multiple parallel combs.</li> </ul>
<p><b>Rock bee (<i>Apis dorsata</i>):</b></p> <ul style="list-style-type: none"> <li>◆ They are giant bees.</li> <li>◆ Found all over India in sub-mountainous regions.</li> <li>◆ They construct single vertical comb.</li> <li>◆ Often, they shift the place of the colony.</li> <li>◆ Ferocious and difficult to rear.</li> <li>◆ It produces upto 37 kg. honey/hive/year.</li> </ul>	

**Requirements and Market Potential for Beekeeping** 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 the development of beekeeping. About 500 flowering plant species, both wild and cultivated, are useful as major or minor sources of nectar and pollen. A rich diversity of bee flora and fauna is available in Uttar Pradesh that can be utilized for the development of the honey industry in the country. Beehives 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 occupation. In the domestic market, very little amount of honey is used for personal consumption, while the pharmaceutical and confectionary industry utilizes the majority. With changing lifestyles and increasing health consciousness, the consumption of honey is increasing as health food.

**Low budget Investment:** Bee Farming is not a manufacturing activity, as such costly machines and tools are not required. There is nothing like production capacity as well. Only small wooden frames with boxes are needed. Their sizes are also standardized. To begin with, around 15 such sets/boxes can be purchased or assembled at a rate of Rs.1500.00 per box that

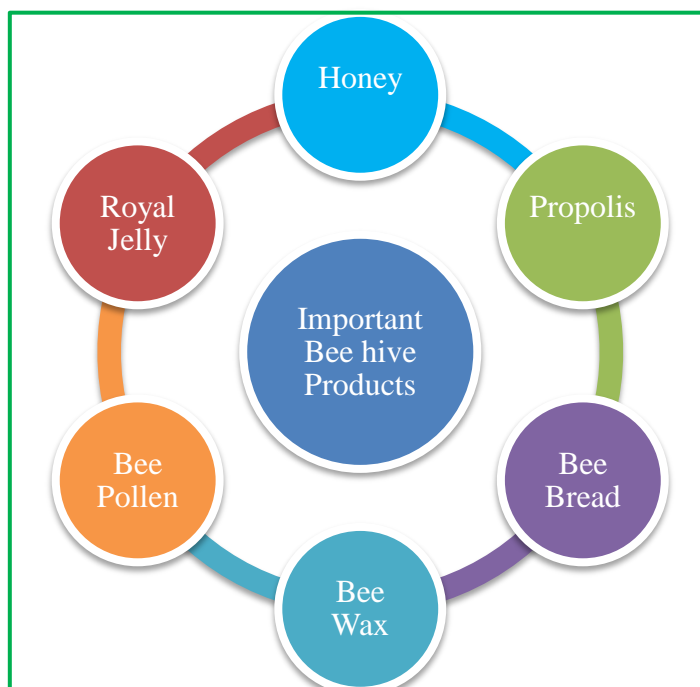
would cost Rs.22 500/- for 15 Boxes. Honey extractors would cost to the tune of Rs.5 000/- each with filtration facilities. For other miscellaneous expenditures, including training and consultancy services, a sum of Rs.5000.00 can be earmarked. That means a total of Rs.32 000.00 would be required to start Bee Farming with 15 Boxes which is equivalent to or less than the cost of cultivation of one acre of paddy field.

Value addition in Byproducts of Beekeeping By and large, at present, beekeeping in our country is practiced mainly for honey production. To make this trade more fascinating and higher income generation, more focus should be given to diversify beekeeping to get other valuable bee products- bee wax, bee venom, royal jelly, propolis, and pollen, and using beekeeping for commercial pollination services.

**Honey-** Flowers nectar is a solution of sugars and other minor constituents that bees collect and concentrate into honey. It is a sweet, viscous fluid, produced by honeybees. It is collected as nectar from nectarines at the base of flowers. Also collected from nectar secreted by plant parts other than flowers known as extrafloral nectaries. It is collected also from fruit juice, cane juice, etc.

Honey is a best health food, which is considered a wonderful creation. It is very useful in weight management, throat and cough irritation, allergies etc. When we compare to sugar, it contains vitamins, minerals, antioxidants, and lesser calories.

**Beeswax-** Beeswax is the material that bees use to build their nests. It is produced by young honeybees that secrete it as a liquid from special wax glands. Worker bees secrete wax when they are 14 to 18 days old. In contact with air, the wax hardens and forms scales, which appear as small flakes of wax on the underside of the bee. About one million wax scales make 1 kg of wax. Bees use the wax to build the well-known hexagonal cells that make up their comb, a very strong and efficient structure. Bees use the comb cells to store honey and pollen; the queen lays her eggs in them, and young bees develop in them. Beeswax is produced by all species of honeybees, although the waxes produced by different species have slightly different chemical and physical properties. Best grade wax is obtained from cappings where the recovery percent is higher. In India, a major proportion of wax is from combs of *Apis dorsata*.



**Pollen** - Bee Pollen is known as the most natural & complete food. Bee Pollen has been found to contain a wide spectrum of trace nutrients and includes - Complex Vitamins, & Vitamins B, C, D, E, K & Beta Carotene (Vitamin A), Vitamin B6 (Methionine) plus numerous minerals, enzymes & coenzymes, plant source fatty acids, carbohydrates, proteins, & amino acids. In India, Bee Pollen Caps @ 500 mg (250 Capsules) are available at the cost of Rs. 2,100.00/-(approx.)



**Propolis** - Propolis gathered by bees from resinous exudes of the tree. In the bee colony, propolis is used for stacking frames, sealing cracks, and crevices but it is a contaminant of comb wax. Propolis is obtained by scrapping it from the frames.

Used in preparing ointments for treating cuts, wounds and abscesses in cattle. Mixed with vasallne to soother burns.

**Royal jelly** - Royal jelly is secreted by the gland of nurse bees of the age of 6 to 12 days when the glands are fully active. It is a very nutritious food and is fed to the young worker larvae and the queen larva and adult. Royal jelly is milky or light pale in color.

Use: Responsible for queen determination. Very nutritious food for human beings.

**Bee Venom** - The sting of a worker bee is attached to a poison sac where venom is stored. A newly emerged bee is unable to sting because she cannot insert the sting which is not fully criticized. Also, little amount of venom is stored in the venom sac. A bee, when two weeks old has maximum venom in her poison sac.

**Bee pollination-** It is collected by pollen trap from ingoing pollen foragers. Pollen is a rich protein source for the human diet.

**Uses of the honey bee:-** In addition to providing man with very valuable materials as honey and beeswax, the honey bees are also useful to him in aiding in the pollination of many of his crops. In fact, it has been claimed that the value of bees in the pollination of crops is ten to twenty times the value of honey and wax they produce. Certain crops like apples, alfalfa, and clover almost entirely depend upon bees for their pollination. Even among some regularly self-pollinated crops, the yield is considerably increased after the visit of bees.

## Conclusion

Beekeeping provides an excellent source of employment for the rural unemployed, enhances the income of farmers and the landless beekeepers. It enhances the productivity levels of agricultural, horticultural, and fodder crops through pollination services. A number of small scale industries depend upon bees and bee products. It provides them valuable nutrition in the form of honey, protein-rich pollen and brood. Production of honey has been the major aim of the industry. Modern beekeeping also includes the production of beeswax, bee collected pollen, bee venom, royal jelly, and propolis. It is vital to make the beekeeping industry more vibrant, to contribute to the national goal for reducing poverty, improving community livelihoods, and maintaining sustainable natural resources under the Green Business Revolution.