

Beekeeping and Livelihood

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Introduction:

People have been collecting honey from forests for a very long time, even though honey bee cultivation has only recently become profitable in India. Honey is produced by honey bees and stored in their hives from flower nectar. The market's growing need for honey indicates that beekeeping in India has the potential to flourish at this time. Let's talk about the products that beekeeping produces in India. Honey and honey wax are two significant goods made from it. Any farmer wishing to augment their income is welcome to participate in this agro-based enterprise. Honey production is an old-fashioned endeavour. After experiencing continuous losses in farming, several farmers have switched to the beekeeping industry. By starting this business, farmers are generating income, and pollination increases agricultural yield. Conventional or traditional agriculture has been practiced in large part in our country, India. After experiencing continuous losses in farming, several farmers have switched to the beekeeping industry.

Furthermore, beekeeping is a vital component of raising agricultural output.

Brief History

- Earlier, the Primitive man used to Rob the colonies of bees, he used to find that hives in cavities of hollow trees, rocks & mud houses of traditional.
- This method is still followed by some tribes nowadays.
- Beekeeping was started properly when humans started protecting the hives of bees.
- This strategy to keep bees came from fallen trees in which bees use to nest.
- Modern beekeeping was started somewhere around 1500 and 1851, it was the time many attempts were made to domesticate bees in different type of hives but it failed because the problem was bees built combs in such a way that made it hard to get honey without damaging the combs.
- The Principle of bee space was discovered by L. L. Langstroth which resulted in invention of Movable frame

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hive. It was for *Apis mellifera* with bee space 9.5mm.

- This discovery of movable frame hive created many things like smoker, extractor, and comb foundation mill.
- In **India** the first attempt to keep bees in movable hives was made on 1882 in Bengal, later 1883-84 in Punjab.

Beekeeping

Beekeeping, also known as **Apiculture**, is the practice of maintaining colonies of honeybees, usually in hives, by humans.

Beekeepers, known as apiarists, manage colonies to produce various products such as honey, beeswax, pollen, royal jelly, and to facilitate pollination of crops.

Tasks such as hive inspection, pest management, honey extraction, and colony management are involved in beekeeping to ensure the health and productivity of the bees. It is both a hobby and a commercial activity, playing a crucial role in agriculture and

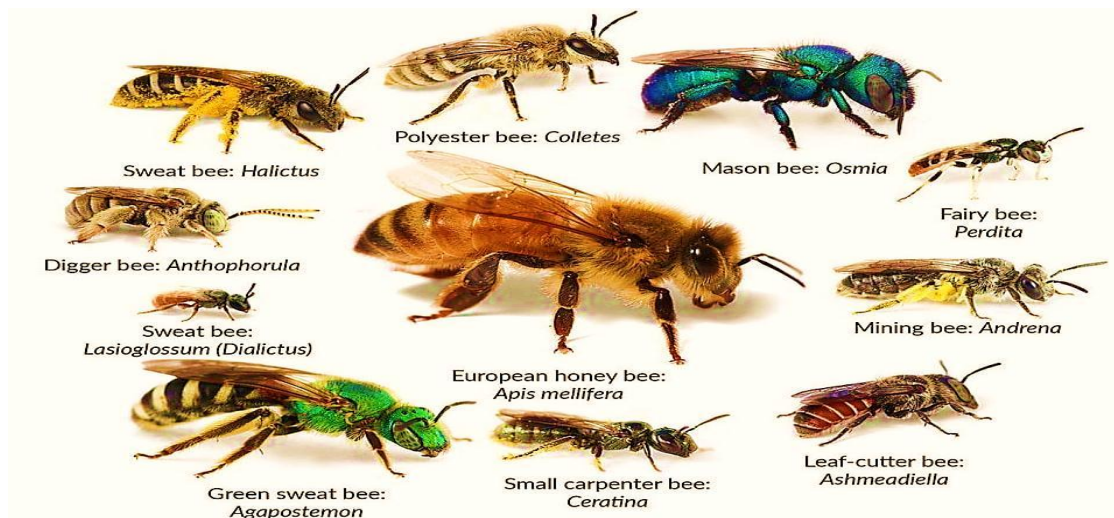
ecosystem sustainability through pollination services.

Significance of Beekeeping

- High value product of honey bees is Honey, which is also used as medicine.
- Other than honey there are many more products like Beeswax, pollen, Royal Jelly and venom of bee, produced by honey bees.
- Bees' plays significant role in Pollination of plants while collection of food from flowers in form of pollen & nectar.
- Ecological balance is maintained by insects, in which bees have a pivotal role.
- It has a major role in Sustainable agriculture.

Types of Honey Bee:

A beehive typically has a queen, hundreds of drones, and thousands of worker bees; hence, a colony may have three species



or more. In this, the queen bee is a female bee with the ability to reproduce. Additionally, worker bees are sterile bees unable to reproduce, whereas drone bees are male. Some prominent bee species include the ones listed below.

- ❖ **Indian Hive Bees** (*Apis cerana Indica*)
- ❖ **Rock Bees** (*Apis dorsata*)
- ❖ **Little Bees** (*Apis florea*)
- ❖ **European and Italian Bees** (*Apis mellifera*)
- ❖ **Dammer Bee or Stingless Bee** (*Tetragonula iridipennis*)

Rearing honey bees:

It involves several steps, here's a step-by-step guide to rearing honey bees:

- 1. Select a Suitable Location:** Select a location for your hive that has convenience to sunlight, is protected from strong winds, and should have a water source nearby location. Make sure that your selected location has suitable surrounding environment.
- 2. Purchase Beekeeping Equipment:** Purchase or acquire the necessary beekeeping equipment, including components of Beekeeping equipment (hive bodies, frames, bottom board, inner cover, and outer cover), protective gear (bee suit or jacket, veil, gloves), hive tools, smoker, and feeder.

- 3. Set up the Hive:** Prepare and assemble your beehive according to the manufacturer's instructions provided. Hive components have to be placed in the selected location, ensuring that the hive is level and stable. Frames with foundation wax or starter strips are installed in the hive bodies
- 4. Obtain Bees:** Acquire bees for your hive through one of several methods, such as purchasing package bees, nucleus colonies or established colonies, or by capturing a swarm. Make sure that bees are healthy & Disease free.

- 5. Install Bees in the Hive:** This may involve shaking package bees into the hive, transferring frames from a nucleus colony, or introducing bees from an established colony.

- 6. Feed the Bees (if necessary):** Provide supplemental feeding to your bees if there is limited forage available, especially during the starting stages of establishing the colony. You have to feed sugar syrup to bees for carbohydrate supplement.

- 7. Monitor Hive Health:** Regular inspection needs to be done to make sure the bees are free from disease & pest.

8. Hive Components Management:

Management of hive components is essential, including overseeing supers, frames, and honey stores as required. Hive boxes (supers) should be added as the colony expands to accommodate bee growth and honey storage

9. **Prevention of swarm:** Implement swarm prevention techniques, such as providing ample space within the hive, ensuring the colony has a young and vigorous queen, and performing colony manipulations to prevent overcrowding and swarming.

10. **Harvest Honey (if desired):** Harvesting needs to be done before Honey flow period or on Honey flow period.

11. **Maintenance and Learning:** Beekeeping is a ongoing and continuous process, monitor, maintain the bees to learn more about it.

Starting beekeeping can be done in several ways:

- ✓ You can buy Packaged bees,
- ✓ Purchasing Nucleus colonies,
- ✓ Buying Established colonies,
- ✓ Collection of Swarm
- ✓ Tree and/or wall cavities, you can collect the bees from them.

It is suggested that Amateur begin with either a package or nucleus colonies.

However, be cautious when purchasing nucleus colonies and established colonies because other beekeepers' concerns such as disease or non-standard equipment might be inherited. Collecting swarms and transferring bees is remarked as more difficult and is not recommended for Amateurs without the assistance of a more experienced beekeeper.

The recommended time best for starting with bees is in the spring or early summer.

Beekeeping Equipment

Bee Hive- L.L. Langstroth discovered the bee space's principle in 1851.

This was a big discovery for modern beekeeping as it was based on bee space principle. The space provides free passage for the worker bees & small & congested for deposition of bee glue. 9.52mm bee space is provided for *A. mellifera* and this was modified for *A. cecropia* around 7 to 9mm.

Stand: Bottom board is supported by stand.

Bottom board: Has entrance for bees, acts as floor .Supports the brood chamber.

Brood chamber: Rearing of Brood is done in this chamber. Frames are placed in this chamber on which combs are raised by bees. The dimensions and number of frames differ with the type of hive. A wooden dummy board is used to limit the size of the brood chamber and is placed at the end of brood frames.

Frame: Each frame consists of a top bar, two sides and a bottom bar. The inner aspect of the top bar has a groove for fixing the comb foundation sheet. For wiring the sidebar has 4 holes. The frame holds a comb.

Super: Dimensions resemble as that of the brood chamber or half of it (depending on the type of bee hive). Surplus honey is stored in this chamber.

Inner cover: A board which acts as a division between the brood/super chamber and the roof. **Top cover:** A type of lid/seal acts as roof placed over inner cover.

OTHER EQUIPMENT

Nucleus hive: 4-6 frames provided for keeping small bees. These are utilized for reproduction of queens and colonies division.

Observation hive: Small hive with glass sides to observe the movements and behavior of bees.

foundation sheet for *A. mellifera* and *A. cecropia*.

Bee veil: Prevents bee stings on the face and neck.

Smoker: Calms down the bees.

Uncapping knife: Uncap the frames before honey extraction; it is a large sized knife.

Hive tool: Cleans and opens the hive tool.

Queen Cell protector: Used for protecting queen cells, spring-like structure

Queen Cage: Used to facilitate a queen to a new colony. Transport the queen.

Bee brush: To brush the bees from frames.

Feeders: Various types of feeders are used for feeding sugar syrup to the bee colonies. These can be (i) slow feeders (friction top pail feeders) in which holes are



Comb foundation mill: Used to print the natural cell size of the desired comb

made in the lid and the feeder is placed inverted inside the hive (ii) fast feeders

(division board feeders) which are the size of a regular frame and the trough contains a wooden float inside the cavity.

Swarm basket: Bee swarm is catch by this basket.

Queen excluder: Zinc sheets-perforated or round wires arranged in such a way that worker can pass through them and queen can't enter (perforation size is 4.20mm for *A. mellifera* whereas worker thorax size varies from 3.33 to 3.50mm). It is used especially while honey flow season to stop the movement of queen to brood chamber and thereby preventing egg laying in the super. It is also used in maintaining multiple queen system in a colony.

Honey extractor: Honey is centrifuged out from uncapped frames.

Wax melter: Double-walled chamber for melting of beeswax, makes comb foundation sheets

Pollen trap: the pollen attached to corbicula is trapped here. (*A. mellifera* pollen trapping screen has holes of 4.7 to 5mm. and for *A. cecropia* 3.5 to 3.7mm.)

Bee escape: Provides one way passage to bees

Beekeeping Livelihood

- ✓ 70000 metric tons of honey annually from all the four species of honey bees In India.
- India ranks 8th and 9th globally in honey production and exportation, respectively.

✓ In the fiscal year 2021-22, India exported 74,413 metric tons (MT) of honey valued at Rs. 1221.17 Crores.

✓ During April-February 2022-23, honey exports amounted to 190.06 million US dollars. India's honey exports reach approximately 83 countries, with key markets including the USA, Saudi Arabia, UAE, Bangladesh, and Canada.

✓ In 2022, major destinations for Indian honey exports included the United States (\$208M), United Arab Emirates (\$10M), Saudi Arabia (\$3.42M), Canada (\$2.43M), and Morocco (\$1.91M)

The livelihood of beekeeping refers to the exercise of beekeeping as a means of producing income and supporting livelihoods.

1. Production of Honey: One of the

primary sources of income from beekeeping is the production and sale of honey. Honey is a valuable product with a high demand in both local and global markets. Beekeepers can extract honey from their hives and sell it to consumers, retailers, or wholesalers for profit.

2. Pollination Services: Beekeepers can offer pollination services to agricultural producers by renting out their beehives to pollinate crops. Many crops, including fruits, vegetables, and nuts, depend on insect pollination for

successful yield. Beekeepers can earn income by providing pollination services to farmers, helping to increase crop yields and quality.

3. **Production of Beeswax:** In addition to honey, beeswax can be harvested from their hives. Beeswax has various utility, includes candle making, cosmetics, pharmaceuticals, and woodworking. Beekeepers can sell beeswax as a raw material or use it to produce value-added products for additional income.
4. **Bee Products:** Apart from honey and beeswax, beekeeping can also yield other bee products with economic value, such as royal jelly, bee pollen, and propolis. These products are significant for their capable health benefits and are used in different industries, including health supplements, cosmetics, and food products.
5. **Sustainable Livelihoods:** Beekeeping can provide opportunities for generation of income and reducing income inequality, especially in rural areas where alternative livelihood options may be lacking. Beekeeping requires low capital investment and can be practiced on a small scale, making it accessible to smallholder farmers and marginalized farmers.

6. **Environmental Benefits:** Beekeeping enhances sustainability of environment by supporting population of pollinator and conservation of biodiversity. Healthy bee population's plays pivotal role to ecosystem services such as pollination, which are essential for maintaining agricultural ecosystem health & productivity.