



A Great Social Relation of Honey Bees with Organic Farming

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ABSTRACT

Agriculture plays a key role in Indian Economy and it contributes about 20% in total GDP. Approximately 70% of the rural people depends on agriculture for their livelihood. It reduces the unemployment. When compared conventional agriculture, the organic farming protects the ecological balance, reduce the soil erosion and produce healthy foods. The productivity rate of the agriculture is mainly depending on the environmental conditions and cross pollinators. There are several biotic (animals and insects) and abiotic (wind and water) agents involved in cross pollination. Of these honey bees plays a crucial role. Honey bees not only involved in higher yield; they also improve the quality of products. At the same time, they produce honey, having high nutritional value. Sri Akepati Varaprasada Reddy, innovative organic farmer, rearing honey bees along with agricultural crops for cross pollination and getting honey.

Keywords: Agriculture, Cross pollination, Honey bees and Higher yield.

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INTRODUCTION

Agriculture plays an important role in Indian economy, as it contributes about 18.3% to the total GDP in the year 2022-23(21). India got second place in the population around the world. This huge population, requires large amount of food. Therefore, there is a need for agriculture. The rural people mainly depends on agriculture for their livelihood(13). It also provides employment to over 60% of the population. The most important contribution of agriculture is to provide sufficient food to the increasing population (35). Indian climate is mostly characterized by wet and dry seasons (9). Most part of the India has tropical climate, but the northern part has humid tropical climate and along the western coast lies wet tropical areas. These areas have a great diversity of ecosystems (7). The farmers of India cultivate different varieties of crops like paddy, wheat, pulses, fruits, vegetables, sugarcane, jute, cotton, tobacco and oil seeds like rapeseeds, soya bean, groundnut and sunflower etc, in three seasons. Horticulture is one of the important sector in Indian agriculture (8). India got top position in the production of Mango, Banana, Coconut and the second in Tea, Coffee, Cashew, Spices and are exported into other countries. In the year 2022, India produced 35.8 million metric tons of banana (22) and 21 million metric tons mangoes (23). The productivity rate of the agriculture is mainly depends on the environmental conditions and cross pollinators (18). There are several biotic (animals and insects) and abiotic (wind and water) agents (27) involved in cross pollination (29). Of these honey bees plays a key role (37). They improve the productivity rate (11). These are part of the biodiversity (24). They provide high-quality food—honey, royal jelly and pollen — and other products such as beeswax, propolis and honey bee venom (25). *Apis dorsata* (Rock bee), *Apis cerana indica* (Indian hive bee), *Apis florea* (little bee) and *Apis mellifera* (Western/European bee) are the different species of honey bees. According to IPBES, the western honey bee is the most widespread managed pollinator globally, and more than 80 million hives produce an estimated 1.6 million tons of honey annually. This honey bee is commonly used for commercial purpose by beekeepers(2). *Apis cerana indica* present extensively in Indian environment (28). It's maintenance is very easy. Hence Farmers choose these bees for cross pollination (19). According to bee experts at the Food and Agriculture Organization (FAO) of the United Nations, a third of the world's food production depends on bees. Beekeeping also provides some financial support to the rural people (12). In agriculture sector the crop production need fertilization of plant gametes. It is facilitated by pollination. Honey bees are best natural pollinators (31), belongs to class Insecta of phylum Arthropoda. These are good friends of farmers. The main food of bees is nectar and pollen grains of plant flowers (1). So they regularly visit the plants for getting food. Nectar has high sugar and pollen contain high proteins (15). During this visit the bees transfer the pollen grain from one plant to the another plant of the same species. This is called cross

pollination. Disappearance of bees from the environment leads the decrease of agricultural products. It affects the human life (10). According to University of Pennsylvania reports 1/3 of all crops require pollination from bees — either directly or indirectly. Primarily, bees are essential for pollinating fruits, nuts, and vegetables. Avocados, blueberries, apples, cucumbers, grapefruit, and almonds are just a few foods that would be missing from store shelves if bees didn't exist. Now a day's, the biodiversity and ecosystems are get unbalance by rapid utilization of pesticides and other chemicals(38). It decrease the honey bee number. Some enemies also cause threat to the bees (17). If it is prolonged, the upcoming generation did not get the sufficient fruits and vegetables. Hence organic farming is more need in the production of agricultural products (20). The main theme of organic farming is to supply healthy food to the public at low cost (5). It cannot harm to the bees. So the bee number is increased and enhances the cross pollination and productivity rate. At present time some of the organic farmers rearing the bees along with agriculture. This is called integrated farming. They used biological fertilizers such as cow/buffalo dung, compost manure, green manure, vermicomposting and neem powder (3). When Compared with conventional agriculture, organic farming reduce the soil erosion, decreases nitrate leaching into groundwater and surface water (34). The challenge for future organic agriculture will be to maintain its environmental benefits, increase yields, reduce pollution and wastage (33). The idea of organic agriculture was developed in the early 1900s by Sir Albert Howard, F.H. King, Rudolf Steiner. Organic food sales increased gradually from the late 20th century. The cost of organic product is generally higher than that of conventionally grown food. Organic products have special taste and spoiled early (4). Organic farmers must be certified for their products to be labeled as 'Organic'.

SELF EMPLOYABILITY PRACTICES OF HONEY

Self-employment opportunities within the honey industry hold great promise for today's young entrepreneurs. The honey production sector, along with its related activities, offers a sustainable and potentially profitable path for youth to explore (36). Here are some key elements of self-employability practices within the honey sector:

1. Beekeeping Skills: Young individuals can hone their expertise in beekeeping, mastering the art of managing beehives, understanding bee behavior, and ensuring the well-being of their bee colonies (36). These skills serve as the cornerstone of successful honey production.

2. Honey Harvesting: Learning the techniques for efficient honey extraction from combs is crucial. Young entrepreneurs can adopt modern methods while prioritizing the welfare of their bees (6).

3. Product Diversification: Beyond honey itself, young entrepreneurs can diversify their product offerings. They might venture into creating value-added items such as beeswax candles, honey-based skincare products, or even mead (honey wine) (32). These innovative ventures can attract a broader customer base and increase profitability.

4. Marketing and Branding: Building effective marketing strategies and a strong brand presence is essential. Utilizing social media, e-commerce platforms, and local markets can help youth showcase their products and engage with customers effectively (16).

5. Sustainability and Conservation: Embracing sustainable beekeeping practices, including organic methods, contributes to pollinator conservation and environmental protection (26). Young entrepreneurs can take pride in their role in ecological well-being.

6. Entrepreneurship Training: Aspiring honey entrepreneurs can benefit from entrepreneurship training programs, workshops, and mentorship opportunities to sharpen their business acumen and management skills (30).

7. Local and Global Markets: The honey industry offers access to both local and international markets. Youth can tap into the growing global demand for high-quality honey and bee-related products (14).

8. Community Engagement: Active involvement in local beekeeping associations or cooperatives fosters collaboration, knowledge sharing, and access to valuable resources within the community (38).

9. Technology Integration: Incorporating technology can streamline beekeeping operations. Young entrepreneurs can leverage data analytics, sensors, and mobile apps to monitor hive conditions, enhance productivity, and stay competitive (32).

10. Environmental Impact: Highlighting the positive influence of beekeeping on biodiversity and crop pollination can resonate with environmentally conscious consumers and strengthen brand appeal (24).

In summary, self-employability practices in the honey industry empower young individuals to become stewards of nature, successful entrepreneurs, and contributors to their local economies. By combining traditional beekeeping knowledge with modern business strategies, young entrepreneurs can create thriving and sustainable ventures in the delightful world of honey.

SCOPE OF STUDY

I had taken up a case study to known the relationship between the honeybees and organic farming in the year 2022. I have chosen Sri Akepati. Varaprasada Reddy, farmer belongs to Hasthavaram village,

Rajampeta Mandal of Annamayya Dt. His age is 56. He has 6 acres Red soil land. He was started agriculture in the year 1987. He is mainly farming banana, papaya, guava turmeric and rice. In addition to these he is growing vegetables as intercrops. He started Organic farming in the year 2003. Through this, he is rearing many varieties of green leaves, vegetables, fruits like banana, guava, papaya and turmeric also. For this he is used cow dung, vermicompost, caster powder, besan flour, neem cake, sheep manure and green manure. In 2007 he is used both liquid and solid Jeevamrutham. He prepared these by using 15kg cow dung, 20ltrs cow urine, 2kg jaggery, 20kg besan flour and 1kg putta mannu. He mix up all the materials two times per day. After 1 week he is used it. He added decomposed bacteria i.e pseudomonas to the jeevamrutham. He is using neem juice for the removal of pest insects. It is prepared by using 5kg neem powder, 5kg cow dung, 5kg cow urine and 100ltrs of water. He also used waste decompose. It is prepared by mixing up of 2kg jaggery, 1kg waste decompose in 200 litres of water. It is spraying to the soil. He spent minimum amount (fifty thousands) for the preparation of jeevamrutham as the buying of chemical fertilizers (3 lakhs). He received M.S. Swaminathan National Fellowship in the year 2008 at New Delhi. He got Innovative Organic farmer Award from Indian Agricultural Research Institute, at New Delhi, in the year March'2020. It is presented by Narendra sing Tomar, Agricultural minister, Indian Govt. He started Apiculture in the year March' 2021, by the initiation of Dr. Shilpakala garu, Scientist, Krishi Vignana Kendram, Utukuru, Kadapa. He started apiculture with 4 Boxes (Bee hives). He bought bee hives from Coimbatore. He is mainly rearing *Apis cerena indica* species. At present he is rearing honey bees in 5 boxes. He is rearing honey bees mainly for the purpose of cross pollination. After rearing honey bees, he got huge money from the agriculture. Additionally he got pure honey. Many higher officials and students regularly visited this farm to gain more knowledge on organic farming, importance of bees in the environment and rearing of bees. Along with our college U.G Zoology students, we visited the apiaries at hasthavaramu, maintained by Varapasada Reddy garu. From his we got huge information about the importance and products of honey bees in the nature. He explained the structure of artificial bee hive (Fig-1 & 2), Kinds of bees (Fig-3), Crop yielding (Fig- 4&5), Harvesting of honey (Fig- 6,7,8&9), testing of honey to the students.

VARIOUS ACTIVITES OBSERVED BY ME AND MY STUDENTS, AS A PART OF RESEARCH WORK:



Fig - 1

Examining the configuration of bee hive

Fig -2



Fig -3- Studying bees



Fig -4 & 5 Keeping an eye on crops



Fig - 6



Fig - 7



Fig - 8



Fig - 9

Fig - 6,7,8 & 9 . Observe the Process of Honey harvesting

CONCLUSION

India is mainly agriculturally based country. But majority of the farmers using chemical fertilizers. These chemical products spoil the human health. Hence the Indian Govt. focused on organic farming. The Govt. motivate the many farmers. Now, some farmers using organic fertilizers. These products improves the human health. But the productivity rate is low. Hence they depend on cross pollinators. For this they choose honey bees. These are best pollinators. Hence they are called best friends of farmers. Through these farmers get high crop yielding. In addition, they get high nutritional, medicated pure honey. If honey bees dies, our life is succumb.

AUTHORS CONTRIBUTION

N. Chandra Mohan : Case study, Collection of literature and Preparation of Manuscript. B. Purushotham : Reviewing and Editing of the Manuscript.

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