

Stable Honeybee Management in Pranggang Village, Kediri Regency, East Java

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ABSTRACT

Since pollen and nectar are the primary food sources for bees, beekeeping is typically carried out in Kediri during the flowering season. However, the reliance on the flowering season makes beekeepers' income insignificant and unstable. The Community Service Program (PKM) aims to assist partner organizations in enhancing research and development to produce bee forage plant varieties that bloom continuously and exhibit greater resistance to pests and diseases. The program also offers training on modern and efficient beekeeping techniques and pest and disease management and assists beekeepers in gaining market access and increasing the value of honey products. The program's focus on increasing the value of honey products creates optimism about the economic growth potential, while promoting forest conservation and environmental sustainability. Additionally, the program provides financial assistance and supporting infrastructure for beekeepers. The implementation of this Community Service Program (PKM) introduces innovative solutions through partnerships between beekeepers and honey processing factories. In this collaboration, honey factories supply supplementary feed for the bees, allowing year-round beekeeping without dependence on the flowering season. As a result, the productivity of the beekeepers has increased, and their income has become more stable and significant each month. This innovation not only improves the welfare of the beekeepers but also creates a sustainable beekeeping model that supports the development of the honey industry in Kediri.

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INTRODUCTION

The potential for honeybee farming in Indonesia is still very large. This is based on the fact that Indonesia has vast natural forests, covering approximately 200 million hectares, with a wide variety of plants that bloom alternately throughout the year (Saepudin 2016). These plants are an ideal food source for honeybee farming. Currently, beekeeping is the most dominant activity among beekeepers in Indonesia (Abdurrahman 2018). Sustainability in beekeeping is a complex concept underwritten by social, ecological and economic opportunities and constraints. Inconsistencies in the literature and strong, polar opinions on the ground have created a diversity of opinion and practice, and misunderstanding within the beekeeping community and among policymakers can be high (Phillips 2014) (Andrews 2023). This has led to calls for reduction of managed honeybee colony numbers on farms (Garibaldi et al. 2014) and management of honeybee stocking densities in protected areas (Henry and Rodet 2020).

Indonesia's honey production is only around 2,000 tons per year, with per capita honey consumption still low, ranging from 10 to 15 grams per person per year, which is equivalent to just one tablespoon per person per year. In comparison, honey consumption in developed countries such as Japan and Australia has reached between 1,200 and 1,500 grams per person per year (Novandra, 2013). Honeybee farming can provide direct benefits by utilizing products generated by honeybees, such as honey, royal jelly, bee pollen, wax, propolis, and bee venom. Furthermore, honeybee farming has unintended benefits like the preservation of forest resources and increased crop yield because of the mutually beneficial relationship between bees and plants, in which the latter help with pollination while the former forages for food (Fatmariza, Inayati, and Rohmi 2017).

In the Kediri region, particularly in Pranggang Village, beekeeping has become a common livelihood for the local community. This focuses on the development priorities of the Klaten Regency, which aim to raise local potential and improve welfare for the community (Sutaryono et al. 2020). This task is typically completed during the blooming season when pollen and nectar, the primary food sources for bees, are abundantly available. The bees naturally collect nectar from flowers to produce honey, making honey production dependent on specific seasons when flowers are in bloom. However, this seasonal dependency poses several challenges for beekeepers, especially in terms of income. Beekeeping only yields small profits because it can only be done in specific seasons of the year. Income fluctuations remain one of the biggest challenges faced by beekeepers in Kediri. This situation began to change when Universitas Airlangga, through its Community Service Program (PKM), provided assistance to help beekeepers improve their productivity and income. The program aims to solve the issue of beekeepers' dependency on the flowering season by offering solutions that enable year-round beekeeping. One of the breakthroughs introduced through this program is the establishment of partnerships between beekeepers and honey processing factories. In this collaboration, honey factories not only act as marketing partners but also make significant contributions by providing supplemental feed for the bees. This feed serves as a substitute for natural food sources such as nectar and pollen, which are typically available only during the flowering season.

With the availability of supplemental feed, bees can remain active in producing honey throughout the year, without having to rely on specific seasons. This innovation has had a significant impact on the well-being of beekeepers in Kediri. Beekeepers, who previously depended solely on the flowering season, can now operate their beekeeping activities year-round. As a result, honey production has become more stable and sustainable, and the beekeepers' monthly income has increased significantly. This not only provides financial benefits to the beekeepers but also creates opportunities for the development of the honey industry in the region (Fatmariza, Inayati, and Rohmi 2017). This Community Service Program (PKM) demonstrates how innovation and cooperation can overcome challenges faced by the beekeeping sector. The partnership model between beekeepers and honey factories serves as an example of how strategic collaboration can support business sustainability while creating a positive impact on the local economy. If this program is

successful, it should increase beekeeping in Pranggang Village, Kediri, and serve as a model for other communities hoping to raise beekeepers' standard of living and productivity.

METHOD

1. Time and Place Implementation

The implementation of this community service activity will take place over five days, from September 16 to September 20, 2024. The event is scheduled to take place in Kediri, East Java's Pranggang Village.

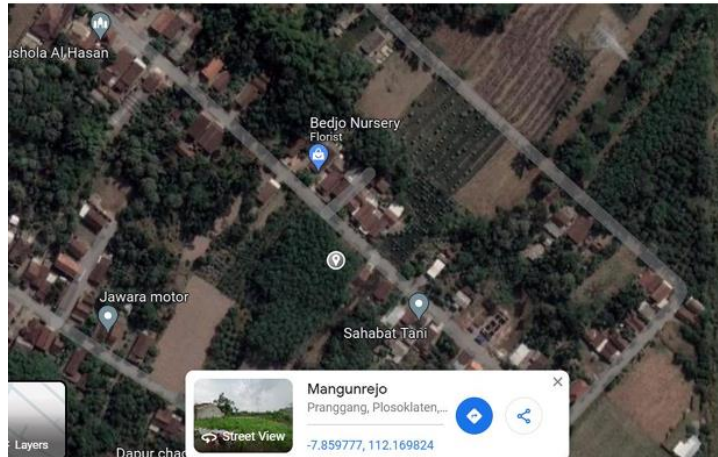


FIGURE 1. Pranggang Village, Kediri, East Java

2. Implementation of Activities

The activities for implementing assistance to bee cultivation groups consist of several stages as shown in Figure 2.

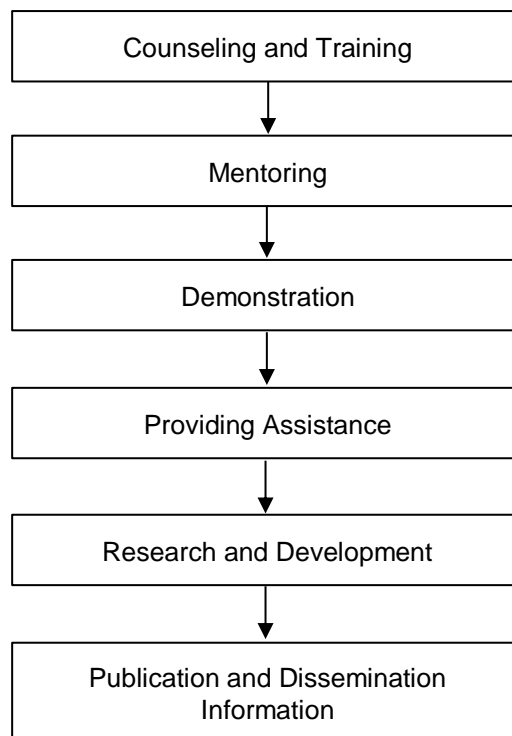


FIGURE 2. Implementation of Activities

- **Counseling and Training**

Public education regarding the advantages of beekeeping, contemporary and effective techniques for beekeeping, and the potential economic benefits of beekeeping are all part of extension efforts. Then, the community was trained on honey bee cultivation techniques, starting from making bee boxes, choosing a location, planting bee food plants, managing bee colonies, harvesting honey, to processing and marketing honey.
- **Mentoring**

Assistance is carried out by providing assistance to the community in the process of cultivating honey bees, starting from preparation, implementation, to evaluation. Technical guidance to the community on how to overcome obstacles and problems faced in honey bee cultivation.
- **Demonstration**

Demonstration by showing directly to the public modern and efficient honey bee cultivation techniques. Providing opportunities for the community to practice honey bee cultivation techniques directly in the field.
- **Providing Assistance**

supplying the community with tools for honey bee cultivation, bee boxes, business capital, and seeds for bee food plants. As well as helping the community in getting access to medicines for bees.
- **Research and Development**

Carrying out research to develop honey bee cultivation technology that is more modern, efficient and environmentally friendly. Attempting to make plants more bee-friendly by making them more resistant to pests and diseases and by ensuring that they bloom throughout the year. Conduct research to find ways to control bee pests and diseases that are more effective and environmentally friendly.
- **Publication and Dissemination of Information**

Publish research results and information about honey bee cultivation to the public. Organizing seminars, workshops and other information dissemination activities about honey bee cultivation. Create information media such as brochures, leaflets and websites about honey bee cultivation.

RESULT AND DISCUSSION

Indonesian honey farming has a lot of room to grow. A tropical climate that is perfect for honey bee growth, a high level of biodiversity, and rising market demand all support this. Despite various challenges, the prospects for the development of honey farming in Indonesia remain positive. The government, breeders, researchers and academics need to work together to overcome existing problems and increase the effectiveness of honey farming in Indonesia. Honey bee cultivation in Pranggang Village is carried out every spring. Limited bee food means that beekeepers cannot harvest honey all the time. Erratic climate changes can also cause nectar scarcity. The availability of food sources affects the quantity of honey produced by bees (Suparyana et al. 2022). The availability of land for bee food plants is decreasing. Pesticides used on flowering plants that have the potential to kill bees. Through this PKM program, farmers can help gain market access and increase the selling value of honey products. Beekeepers in this area can only optimize their livestock when flowers bloom because bees need pollen and nectar as their main food source. This causes breeders' income to tend to be unstable and insignificant because they can only raise livestock for a certain period of time each year (Hattab, Syahrudin. 2022).

After the Community Partnership Program (PKM) initiated by Airlangga University, innovative solutions emerged to overcome these limitations. Providing bees with special food that can replace nectar is one way to implement a partnership and keep bees productive all year round. Breeders purchase this feed, which bee factories sell for IDR 10,000 per unit, to substitute the food for their bees. With the availability of this

artificial feed, breeders no longer depend on the flower season alone, and the honey production process can continue throughout the year. With a stable food supply, beekeeping is no longer limited to the flowering season. Bees can remain active all year round, allowing farmers to breed without having to wait for flowering season. Bee honey products are made using the traditional harvest method, and it seems that the honey bee products do not contain vitamins because they are cooked according to the suggestion that they contain polys. Meanwhile, the harvest method using technology via a spinner machine produces clear honey and increases product yields as shown in Fig.3.



FIGURE 3. Spinner Machine

In addition to providing feed, honey factories also serve as the primary buyers of beekeepers' products, particularly honey syrup (Setiawan, Sulaeman, and Arlita 2017). These factories purchase honey syrup from Rp30,000 to Rp45,000 per kilos. With a clear market and stable pricing, beekeepers can now sell their products in large quantities, around 3,000 to 5,000 bottles of honey syrup per harvest. This volume of sales significantly impacts the economy, as beekeepers receive consistent income and experience improved financial stability for their families. As a result of this partnership, the productivity of beekeepers has increased significantly. They now earn a more stable and higher monthly income than before. This innovation enhances the economic well-being of beekeepers in Kediri and creates a more sustainable and efficient beekeeping model while preserving bee populations, which are vital to the ecosystem. One of the training sessions conducted during this community service activity involved the introduction of bee box innovations (Sihombing, 1997).

Bee Box Innovation

The Universitas Airlangga team introduced innovations in bee boxes. Beekeepers should know the basic properties of wood, especially its composition (extractive substances). According to research by (Hadiani, 2002), wood containing certain extractive substances with distinct odors and aromas that bees dislike can create an unfavorable environment inside the box, discouraging bees from being active within it.



FIGURE 4. bee box innovations

The development of modern bee boxes with ergonomic and easy-to-clean designs helps beekeepers maintain and harvest honey more efficiently. The use of durable and environmentally friendly materials, such as recycled plastic or locally sourced wood, for the bee boxes further supports sustainability. Additionally, integrating systems for monitoring bee health and temperature control into the bee boxes improves the management of bee colonies. Beekeepers also make use of land near forests, home gardens, or yards to plant bee forage crops. Forests play a crucial role as a nectar source for bees, so maintaining forest sustainability through reforestation and preventing illegal logging is essential (Hamzari, Hapid, and Hamka 2021).

CONCLUSION

Beekeeping in Indonesia has significant potential for growth, supported by a tropical climate and increasing market demand. However, challenges such as dependence on flowering seasons, climate change, pesticide use, and limited foraging land hinder honey production stability. The Community Service Program (PKM) from Airlangga University offers innovative solutions by providing alternative feed for bees and training in the use of modern honey harvesting technology. Collaboration with honey processing factories, which provide affordable feed and competitively purchase honey syrup from farmers, enables year-round honey production. This has a substantial impact on increasing farmers' income and economic stability. Additionally, innovations in ergonomic and easy-to-clean beehive designs, as well as land use for bee forage plants, play a crucial role in supporting the sustainability of the beekeeping industry. Overall, strategic partnerships among the government, academia, and industry stakeholders, along with innovations in technology and bee management, can enhance the effectiveness and well-being of beekeepers in Indonesia, making it a more sustainable and competitive sector.

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