BALI HONEY BEE CULTIVATION COMMUNITY PARTNERSHIP PROGRAM KELE AGROWING ETHNO BALI IN BAHA VILLAGE

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ABSTRACT

Balinese Etno Bee Agrotourism is located in Baha village which is engaged in cultivating honey bees. Kele is a partner in PKM activities. The aim of this PKM is (1) to overcome pests that attack kele honey bees in an effort to increase production yields, (2) to increase sales of honey produced by kele honey bee cultivation. Solutions to overcome attacks from bee enemies: (1) To prevent ants from entering the bee house, the legs supporting the bee house are smeared with oil or placed in a bowl filled with water. To prevent night moths, this is done by keeping the bee house clean, making the door smaller so that the butterflies cannot enter, strengthening the colony and setting traps at night. (2) Increasing marketing is carried out through online and off-line marketing promotions. To reach a wider range of consumers, the honey packaging is varied with varying volumes, namely 250 ml and 500 ml with attractive labels attached to the packaging bottles. Offline marketing is assisted by inviting consumers directly to the location to show that the honey is truly pure cultivated honey. Online marketing is assisted by promotions through digital media. The results of PKM are an increase in bee cultivation, increased skills in cultivating kele honey bees and an increase in sales income from honey production.
Keywords: agrotourism, cultivation, kele bees, marketing

1. INTRODUCTION

Baha Village is in Mengwi District, Badung Regency, which is an area with a land height of 250 meters above sea level, with relatively low rainfall, suitable for honey cultivation. Kele bees are honey bees that do not have stings, so these bees produce propolis as a means of self-defense. Kele bee honey is pure and original honey produced by the kele bee propolis type (Badung Regency Central Statistics Agency, 2020). This is what makes trigona honey have high quality and the price is more varied because production is limited (Dewantari, M., Sumardani, N. L. G., & Suranjaya, I. G., 2020). The Baha village area is very suitable as a location for developing kele honey bee cultivation because its location is on the outskirts of gardens with potential natural resources for honey bees in the form of the availability of garden vegetation flowers and coffee flowers which are a source of bee food.

Factors that are very influential in the development of bees are the availability of food and environmental factors such as air temperature, air humidity, rainfall and altitude which are very influential (Sardiana, IK., NLR Purnawan., 2016). Cleanliness and safety of stups (honeycombs for kele honey bees), the use of modern stups, the application of good bee cultivation techniques, as well as controlling bee pests and diseases are closely related to efforts to increase production, both quality and quantity (Surata, I.K. 2017). By increasing honey

production, it is hoped that it will ultimately increase the income of the honey bee group in particular and the Baha village community in general.

According to Surata (2017), honey bees are relatively docile and do not sting so they do not harm tourists. Besides that, maintenance does not require a large area of land. Before and after training, a pretest and post-test are given and the results can be seen together. The demonstration activity was carried out by assisting target partners on the box system stup design and colony transfer techniques (Ginting, G., Tariningsih, D., & Lestari, P., 2020). During this demonstration, a discussion took place between members of the bee group and experts regarding making stups of various sizes, maintaining the stups and how to move the bee colony (queen).

According to data from the Department of Forestry of the Republic of Indonesia (2009), currently hundreds of local bees have been developed, both managed on a large scale and small scale as a side business (Surata, I.K. 2017). Honey bees are often attacked by various pests and diseases. Some of them are mild and can be controlled even after they have spread. Hence they will not threaten the survival of the colony. It is important that all beekeepers must have established good pest and disease control strategies, which may differ significantly between countries, legal frameworks, personal philosophies, means of production, product target markets (Baiquni, M. 1999).

Beekeepers must know about pests and diseases in bees. By knowing more about these things, beekeepers will be able to overcome or at least avoid pest and disease attacks (Sihombing, D.T.H., 2005). The animals that are often enemies of bees are ants, mites and night moths. Meanwhile, the diseases that often attack bees are larval rot and poisoning. That's why to face all attacks from bee enemies, beekeepers must look for and know the prevention. The problems that need to be addressed are: (1) Weaver ants are very dangerous because they disturb the colony by destroying food supplies (pollen, honey) and killing bee chicks. (2) Mites. There are two types of mites that attack bees, namely Varroa jacoboni mites and Tropilaelaps clarae mites. Varroa mites are reddish brown in color and larger in body. Meanwhile, Tropilaelaps mites are gray-brown in color. These mites attack bees from larval to adult levels by sucking the bees' body fluids. As a result, bees' growth is stunted and they even die before they are born. 3) Night Moths, butterfly insects that are active at night, often lay their eggs at the top of the nest in the bee house. After the eggs hatch into caterpillars, they will eat the beehive wax, so that the nest combs become damaged, night moths can attack old nests and newly formed nests. In severe attacks, it can cause the bee colony to move/abandon (Nurrahmi, M., Saepudin, R., & Zain, B., 2019).

When determining the location, it is necessary to consider the availability of food, data collection on the types of nectar and pollen producing plants, plant age, plant density and fertility. The condition of the apiary location is closely related to the placement of the number of maintenance stops per unit area (Chambers, R., 1987). The harvest period for kele honey is between 3 and 6 months. Harvesting can be done for years as long as the catfish do not move from their nests. The taste of kele honey is very natural which can help maintain body vitality or maintain health. To ensure the authenticity of kele honey, buyers can come directly and buy at each breeder's house. This is important in order to really get real honey which is produced from Kele bees.

Kele honey has high osmolality so it is difficult for bacteria to live. Honey has hygroscopic properties, that is, it attracts water from the surrounding environment.

Kele bees are known as bees that produce more propolis than honey. Based on the results of observations and interviews, there are 2 (two) most basic problems that need immediate solutions. The partner's priority problems that will be assisted are as follows: (1) Pest problems in kele honey bee cultivation, and (2) Marketing problems.

2. RESEARCH METODOLOGY

The methods used to help Balinese Ethno Bee Agrotourism are detailed counseling, training, mentoring and dissemination. The methods applied to empower this target partner group are as follows: (1) Socialization and coordination with the target partner group. Brief counseling and training on how to cultivate kele honey bees and (2) Periodic and continuous assistance to the target group so that it can be implemented independently.

Meanwhile, the implementation of practical activities for kele honey bee cultivation includes: (1) Participatory coordination and communication with target groups to formulate programs starting from planning, operations and evaluation; (2) Extension of honey bee cultivation techniques and honey bee group management training; (3) Colony transfer training, box system setup design and assistance in kele honey bee cultivation and (4) Monitoring and Evaluation.

Figure 1. Phase I Workshop and Training Activities

Partner Participation in Program Implementation

To ensure the smooth running of the activities to be carried out, partners also help by providing contributions from both the Chair and members who involve students as described as follows:

3. RELATED RESEARCH/LITERATUR REVIEW

Evaluation of Program Implementation and Sustainability

To determine the level of success of mentoring, before and after the mentoring activities a pre-test and post-test will be carried out. From these results, it will be possible to measure the group's level of understanding in understanding the material presented, whether the material provided can be understood or not, and whether there is a need for further deepening of the material that has been provided. In assessing the skill level of the group in the training carried out, an assessment is carried out in the process of implementing these skills which is seen from the stages that must be carried out in cultivating kele honey bees. In the group kele honey bee cultivation business and the final results of the training. Apart from that, the increase in productivity of kele honey bee cultivation will also be a comparison before and after this activity to see the results of honey production.

Table 1. Participation in the Implementation of the PKM Program

No	Parties Involved	Participation or Contribution
1	Chairman	- Coordinate with the implementation team and group members in each activity carried out - Prepare a place for socialization and training - Help prepare food during activities
2	Member	- Follow every activity carried out - Willing to be assessed during activities - Conducting Kele Honey Bee Cultivation training at Bali Ethno Agrotourism - Provide mutual motivation for the success of activities and sustainability of activities - Create PKM reports
3	Student	- Assisting with activities requested by the lecturer of the Kele Honey Bee Cultivation Service Team in Bali Ethno Agrotourism - Help search for data, record data and document PKM activities


Figure 2. Phase I Assistance

4. RESULTS AND DISCUSSION

The process of introducing cultivation was explained to the participants by a service team from PGRI Mahadewa Indonesia University (UPMI) lecturers formed by 3 students. The final product that will be produced through the bee cultivation process is natural honey bees produced by local bees of the Apis cerana type through the cultivation (farmed) process. The natural honey produced comes from nectar sucked by bees from plant flowers. When searching for nectar, bees are actually helping the process of pollinating plant flowers, which is an important process in plant reproduction. The sweet taste of honey is obtained from a biological process that produces monosaccharides, fructose and glucose in honey. The nectar that worker bees obtain from plant flowers will be taken back to the nest. After the nectar is collected, the bee returns to the nest and then another worker bee (usually younger) sucks the nectar from the stomach of the worker bee who has just returned using the proboscis. Young worker bees in the nest then

convert the nectar into honey. This is done by adding various enzymes from the mouths of worker bees to the nectar to then turn it into raw honey. This process takes approximately 20 minutes. The raw honey produced is then stored in the honeycomb. At this stage honey still has a high water content. Raw honey will then gradually reduce its water content. The flapping of bees' wings in the hive is one way for bees to reduce the water content in raw honey. Honey is considered mature if the water content has dropped to a certain level. Ripe honey will be protected and stored with the help of wax produced by a kind of sheet under the bee's stomach. After this process, the honey is ready to be used by the honey bee colony or harvested by humans (Sebayar et al., 2017).

The solution to dealing with all attacks from bee enemies, beekeepers must look for and know the prevention.

1) Ants. Prevention: to prevent ants from entering the bee house, the legs supporting the bee house are smeared with oil or placed in a bowl filled with water. Nests that have been damaged are immediately destroyed by burning.
2) Mites. Prevention: spraying with an acaricide type drug (dose 1 cc / 1 liter of water) three times, with a spray interval of 4 days. Spraying activities are carried out in the morning or afternoon.
3) Night Moth. Prevention to prevent night moths can be done by keeping the bee house clean, making the door smaller so that the butterflies cannot enter, strengthening the colony and setting traps at night. If eggs, caterpillars and moths are found in the nest, they must be immediately removed and destroyed.
4) Bee Larvae. Prevention of this disease can be done in several ways, including: Strengthens bee colonies so they can kill bacteria that attack larvae. Take the infected comb, then destroy it by burning it. Provides sugar stimulation mixed with terramycin.

For marketing, there needs to be marketing promotions both online and off-line. Improving production quality, maintaining the quality of honey sold to consumers, making bottle packaging as attractive as possible and filling with special labels to protect the name of the producer.

To carry out service to a nationally competitive community with this Community Partnership Program (PKM) Scheme, the Implementation Team from the Mathematics Education, Physical Education, Health, Recreation and Biology Education Study Programs at PGRI Mahadewa Indonesia University will be able to complete it well, because it is supported by qualified human resources in the field of service to people who have previously won PKM grants. The team has experience in honey bee cultivation capabilities.

Balinese Ethno Bee Agrotourism PKM activities include: Extension activities, training and mentoring in the field of application of kele honey bee cultivation. Dissemination takes the form of:

1) Pest problems in kele honey bee cultivation
   Pests like Star Ping that appear every prolonged rainy season. If just one colony is affected by the Bintang Keping pest, if it is too late to treat it, it will spread to other colonies very quickly. Ants are the pests that most often appear in every colony. Likewise, Cicak and Toke pests always eat bees. Balinese Ethno Bee Agrotourism has difficulty dealing with kele honey bee

pests, because it must avoid the use of pesticides and otar which contain poison.

2) Marketing problems. The processing of kele honey is still traditional, convincing consumers that the honey sold is genuine honey, packaging the honey in bottles to attract consumers, and the price of kele honey is more expensive than forest honey.

The solution to dealing with all attacks from bee enemies, beekeepers must look for and know the prevention.

1) To prevent ants from entering the bee house, the legs supporting the bee house are smeared with oil or placed in a bowl filled with water. Nests that have been damaged are immediately destroyed by burning them, to prevent mites by spraying with an acaricide (dose of 1 cc / 1 liter of water) three times, with a spray interval of 4 days. Spraying activities are carried out in the morning or afternoon. To prevent night moths, you can do this by keeping the bee house clean, making the door smaller so that the butterflies cannot enter, strengthening the colony and setting traps at night. If eggs, caterpillars and moths are found in the nest, they must be immediately removed and destroyed. Strengthens bee colonies so they can kill bacteria that attack larvae. Take the infected comb, then destroy it by burning it. Likewise, dealing with lizard and toke attacks requires traps.

2) For marketing, there needs to be online and off-line marketing promotions. The group continues to improve production quality, maintains the quality of honey sold to consumers, makes bottle packaging as attractive as possible and contains special labels to maintain the good name of the producer.

Figure 3. Photo on the left of the initial condition of the honey packaging bottle with the correct size large and without labels and the right side of the packaging bottle is filled with labels

Cultivating kele honey bees is not difficult. Cultivators do not need to provide food because the kele bees usually find their own food. Cultivators only need to adjust the kele bee house close to the flowering plants. This is because kele bees eat flower and fruit juice as a basic ingredient for honey.

The Balinese Ethno Bee Agrotourism Group received input in the form of knowledge and skills from the dissemination provided. So the expected output is to achieve an increase in production results from cultivating Kele honey bees, increasing skills in cultivating Kele honey, and increasing knowledge in marketing the production.

5. CONCLUSION

Based on the results of the service implementation in the Balinese Ethno Agro-tourism honey bee farmer group, Mengwi District, Badung Regency, it can be concluded: (1) There was an increase in the scores from the initial test (before socialization took place) to the final test (after socialization took place) in the partner farmer group. This means that understanding increases skills about how to handle pests in kele bees, honey yields from cultivation increase, (2) Knowledge in selling honey increases. Increasing the quality of output targets such as: 100% increase in handling of Kele honey bee pests, 100% increase. Honey production results, 100% increase in economic income in kele honey bee cultivation. In general, bee farming groups understand modern bee cultivation. The Balinese Ethno Bee Agrotourism Group received input in the form of knowledge and skills from the dissemination provided. So that the expected output is an increase in the production of kele honey bee cultivation, increasing skills in kele honey cultivation and increasing knowledge in marketing the production results. The outcome of the activities at the Bali Ethno Bee Agrotourism is to increase the productivity of kele honey bee cultivation, improve the group's skills in managing kele honey bees and increase sales of kele honey.

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