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Development of Kelulut (Trigona sp) Cultivation Business

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Abstract

Tumbang Nusa Village, Jabiren District, Pulang Pisau Regency, Central Kalimantan community groups have been formed into the Nusa Sehati Peat Ecosystem Protection Control Working Team (TKPPEG). They serve as partners in managing peat ecosystem protection. Alongside peat ecosystem conservation, improving the community's economy is essential. One initiative is the cultivation of kelulut bees (Trigona Sp), which has not been optimally implemented, particularly in technical beekeeping and honey marketing. Thus, the kelulut cultivation business was developed through the Community Empowerment Lecturer Program (PDPPM) at the University of Palangka Raya. The program's objectives include increasing kelulut honey production, enhancing online marketing, and creating product branding. The implementation involved training, field practice, and mentoring. As a result, lulus bees cultivated with a two-week harvest cycle produced approximately 14.5 liters of honey. Branding efforts allowed Kelulut Honey to compete better in the market, and marketing was conducted via WhatsApp, Instagram, and Facebook. In conclusion, community partners succeeded in cultivating kelulut honeybees, created branding, and adopted online marketing techniques. Their beekeeping skills improved, and they learned the importance of logos, packaging, and product narratives. This extended their market reach, increased sales, and allowed access to non-local consumers.

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INTRODUCTION

Beekeeping is significant in rural economic development strategies and the sustainable agricultural sector. Beekeeping activities increase the production of high-quality food products that enhance nutrition and income for rural communities. Honeybees provide numerous benefits, including acting as antioxidants, antibacterial, and antimicrobial agents, wound care enhancers, immune system boosters, and allergy symptom reducers (Cahyadi et al., 2019; Delima & Partiwi, 2019; Handayani et al., 2022; Khumaidi et al., 2022; Putri, 2021; Umam et al., 2019;).

Kelulut bees, specifically, offer additional benefits for beauty care by moisturizing and nourishing the skin, preventing premature aging, and reducing scars and dark spots (Erlianti et al., 2023; Sofyanita et al., 2023; Suwarno et al., 2024; Wardaniati et al., 2018). Honeybees also play a significant role in enhancing plant biodiversity through the endogamy process.

Honeybee cultivation is a business activity that does not require large tracts of land, ensuring it does not compete with conventional agricultural practices. Furthermore, beekeeping optimizes natural resources by utilizing nectar and pollen—two plant byproducts that would otherwise go to waste—as feed for honeybees.

Kelulut bees, known scientifically as Trigona sp., are among the species most suitable for community development. Tropical rainforests host numerous Trigona sp. species, with four main types: T. apicalis, T. biroi, T. iridipennis, and T. thoracica. Among these, T. laeviceps is widely cultivated due to its adaptability to environmental changes, flexible nesting habits, stable honey production, and resistance to insect diseases and predators. This species can thrive in both forested and urban environments.

Kelulut honey differs in taste from the honey produced by Apis mellifera, as it depends on the type of feed, such as nectar and pollen from surrounding plants and flowers. Kelulut honey has a sweet-sour taste due to amino acids, enzymes, and compounds collected from flowers, along with fermentation processes within the bee nest. These factors contribute to its unique characteristics.

Kelulut honey is nutritionally rich, containing vitamin C, minerals, amino acids, enzymes, and bioactive compounds (Karnia et al., 2020; Anugerah et al., 2022). Its properties include antimicrobial, antioxidant, anti-inflammatory activity, immune system enhancement, and cholesterol regulation in the blood (Rahma et al., 2014).

The community group in Tumbang Nusa village was formed into the Nusa Sehati Peatland Ecosystem Control and Protection Task Force (TKPPEG) by the Ministry of Environment and Forestry (KLHK) through the Independent Village for Peatland Care Program (DMPG). The aim is to enhance the productive economic vitality of village communities living in peatland ecosystems. Among the programs offered to TKPPEG, the chosen one is kelulut honeybee farming due to the abundant feed availability for kelulut honeybees derived from plants and agricultural resources in Tumbang Nusa village.

Kelulut honeybee farming has been carried out since 2022, with 50 kelulut beehives. However, the TKPPEG group faces challenges with low honey production, yielding only about 5–7 liters per harvest. Ideally, one kelulut beehive should produce ½ liter of honey per harvest. With 50 hives, TKPPEG should be able to produce 25 liters of honey per harvest. The group has extended the harvest period to 2–3 months to increase production, but this approach limits their ability to meet market demand.

From a marketing perspective, kelulut honey has not established branding for its bottled packaging. Additionally, the TKPPEG Nusa Sehati community group has never received training on technical aspects of kelulut honeybee farming or marketing from government or private institutions.

Based on observations and interviews conducted by the UPR team, the TKPPEG Nusa Sehati group expressed a strong desire for training and mentorship in honeybee farming. The objectives of the proposed activities are: 1). To enhance the technical knowledge of kelulut honeybee farming, including nest creation, maintenance, and honey harvesting; 2). To improve production skills; 3). To promote local economic empowerment; 4) To develop community-based entrepreneurship; and 5). To establish marketing networks and improve environmental sustainability. Given these needs, the UPR team implemented a community service program to address these issues through the Community Empowerment Mentorship Program for Lecturers (PDPPM) for the TKPPEG Nusa Sehati community group.

METHODS

The community service program was conducted from September 3 to December 3, 2023, in Tumbang Nusa Village, Jabirean Sub-district, Pulang Pisau Regency, Central Kalimantan Province. The activities were attended by 15 TKPPEG Nusa Sehati community group members, who served as program partners.

The implementation method included the following steps:

Observation:

Conducted over 2 days, coordinating with the village government and TKPPEG administrators. The goal was identifying specific needs, preparing materials, and arranging a schedule.

Training:

Conducted over 4 days, covering the following topics:

1) Day 1: Basic introduction to kelulut bees, their ecosystem, and the importance of sustainable beekeeping.
2) Day 2: Practical techniques for kelulut bee farming, including nest construction, maintenance, and honey harvesting methods.
3) Day 3: Post-harvest techniques, maintaining product quality, and kelulut honey packaging.
4) Day 4: Marketing strategies, market network development, and product branding.
5) Participants engaged in hands-on practice for 3–4 hours after each material session.

Mentorship:

Conducted over 3 months with the following approach:

1) Regular field visits: Mentors visited the kelulut bee farming locations every 2–4 weeks. During these visits, they provided direct guidance to address technical or managerial issues faced by the community group.
2) Remote assistance: Mentorship was also provided via phone, text messages, or video calls for urgent consultations or immediate assistance as needed by the community group.
3) Group discussions and Q&A sessions: Each session included time for group discussions, experience sharing, and Q&A to help participants better understand the material.

Evaluation:

Conducted in the final phase of the program, lasting 1 day. The evaluation was carried out by the UPR team and the Tumbang Nusa village government to assess the understanding of kelulut bee farming and improvements in honey production and marketing.

The evaluation utilized an observational instrument with a scale of 1–5, which was converted into the following score categories: 0–20: Very poor, >20–40: Poor, >40–60: Fair, >60-80: Good and >80-100: Excellent.

RESULTS AND DISCUSSION

The training delivered by the UPR team was well-received and implemented by the community partners. Before the activity, the UPR team coordinated with the partners and the village government to ensure the activities were recognized and supported by relevant stakeholders. Based on the coordination results, the community partners agreed to and supported the development of kelulut bee farming in their group. Similarly, the village government supported and assisted in implementing the activities. An example of coordination with the partners is shown in Figure 1.

Figure 1 Coordination activities

The purpose of involving the community in coordination activities was to build collective capacity among stakeholders, fostering a shared vision for the implementation process (Koem et al., 2019). The success indicators of the community service activities were based on the evaluation results. The evaluation, conducted by the UPR team and the Tumbang Nusa village government, assessed the partners' performance. The results are shown in Table 1.

Table 1 Evaluation results

Aspect	Score
Location	80
Feed	95
Maintenance	80
Harvesting	85
Marketing	90
Average Score	86
Classification	Excellent

Interpretation of Evaluation Results: Location (80): The score indicates that the beekeeping location meets good standards. The suitable result bee farming site criteria include being pollution-free, having a stable climate and temperature, sufficient water availability, no standing water, and well-maintained beehives (Payung et al., 2024). Feed (95): This high score demonstrates that the community group provides excellent feed, supporting the health and productivity of the bee colonies. The partners identified the types of feed required by kelulut bees, ensuring year-round availability. Observations in the field identified several plant species as feed sources, including jambu air (Syzygium aqueum), sunflower (Helianthus annuus L.), oil palm flowers (Elaeis guineensis Jacq.), kaliandra (Caliandra sp.), air mata pengantin (Antigonon leptopus), and galam wood flowers (Melaleuca leucadendron). Additionally, flowers from peat forest trees such as ramin (Gonystylus bancanus), belangeran (Shorea belangeran), and meranti (Shorea spp.) attract bees due to their abundant nectar production. These trees provide nectar and help maintain ecosystem balance by strengthening soil structure, preserving water levels, and supporting biodiversity (Rosawanti et al., 2022; Sanjaya et al., 2019).

Maintenance (80): This score indicates that the beekeepers successfully perform the necessary maintenance activities. Maintenance includes colony care, providing supplemental feed, hive cleaning, and pest and disease control (e.g., controlling mites and fungal infections). The kelulut mite (Varroa jacobsoni), a parasite that significantly harms kelulut bee colonies, was addressed through preventive measures such as using hot smoke or essential oils with repellent effects. Additional activities included colony health monitoring, hive regulation, queen replacement, and environmental management (Miftahul, 2024). Harvesting (85): This score reflects effective and sustainable harvesting techniques. The partners demonstrated the ability to harvest kelulut honey

appropriately and according to standards. The method of kelulut honey harvesting is illustrated in Figure 2.

Figure 2 Kelulut honey harvesting

The evaluation highlights the successful implementation of the kelulut bee farming program, with an overall score of 86, classified as "Very Good." The partners can now harvest kelulut honey using mechanical suction tools instead of manual methods. With intensive maintenance and mechanical suction tools, honey production has significantly increased (Wijaya et al., 2023). The initial honey yield of 3–5 liters has risen to 14.5 liters per harvest, with harvests occurring every two weeks. This improvement allows the group to meet market demands and increases their income. Marketing (90): The high marketing score reflects the community group's success in selling kelulut honey, supported by effective strategies, including online and offline distribution networks. Online marketing has been implemented using WhatsApp, Instagram, and Facebook platforms. These platforms allow the group to promote and sell their products directly to followers. The objectives of online sales include increasing market access, enhancing product visibility, expanding market opportunities, improving shopping convenience, driving business growth, enhancing customer engagement, and boosting profits (Armansyah et al., 2023; Mila et al., 2024; Subianto et al., 2023).

Previously, the group's honey was sold at Rp. 40,000 per bottle. After improving the packaging and creating a product brand, the price increased to Rp. 70,000 per bottle. The assistance provided to the partners by the UPR team was also featured in the local media Kalteng Pos on October 16, 2023. The media coverage is shown in Figure 3.

SOCIETY

KALTENG POS • Senin, 16 Oktober 2023 | 4

Prodi Kehutanan UPR Laksanakan Pendampingan Budi Daya Lebah Kelulut

PALANGKA RAYA - Program Studi (Prodi) Kehutanan Fakultas Pertanian (Faperta) Universitas Palangka Raya (UPR) telah melaksanakan kegiatan pengabdian kepada masyarakat melalui Program Dosen Pendamping Pemberdayaan Masyarakat (PDPPM) dengan fokus pada Pendampingan Pengembangan Usaha Budi Daya Lebah Kelulut pada Sabtu (7/10) lalu.

Kegiatan pengabdian masyarakat ini dilaksakan di Desa Tumbang Nusa, Kabupaten Pulang Pisau. Giat tersebut dipimpin oleh Ir. Nuwa MP bersama dengan anggota tim, Dr. Ir. Johanna Maria Rotinsulu MP dan Dr. Hendra Tosi SHut MP. Mereka juga didukung oleh dua mahasiswa dari jurusan kehutanan Faperta UPR.

"Tujuan utama dari kegiatan ini memberikan pendampingan dan bimbingan kepada kelompok masyarakat Nusa Sehati di Desa Tumbang Nusa, dalam upaya mengembangkan usaha budi daya Lebah Kelulut," ujar Ketua Jurusan Kehutanan, Dr. Ir. Johanna Maria Rotinsulu MP, yang juga merupakan anggota tim pengabdian kepada masyarakat.

Diharapkan juga melalui pendampingan ini bisa meningkatkan hasil panen madu kelulut dan memberikan tambahan penghasilan masyarakat setempat. "Kegiatan pemberdayaan masyarakat di Desa Tumbang Nusa, merupakan implementasi Tri Dharma Perguruan Tinggi dalam bidang pengabdian pada masyarakat. Ini juga mendukung program Merdeka Belajar Kampus Merdeka (MBKM) serta mencapai Indikator Kinerja Utama (IKU) Rektor UPR," katanya.

Kegiatan ini juga bertujuan untuk memberikan pengetahuan kepada mitra dalam hal budi daya Lebah Kelulut. Mereka diajarkan untuk melakukan panen madu secara optimal, yaitu dua kali dalam sebulan, membersihkan lokasi budi daya, menanam tanaman penambah sumber pakan lebah, dan membuat label produk madu. Tim juga memberikan bantuan dalam proses pemasaran.

"Melalui giat ini diharapkan memperkuat ikatan antara universitas dan masyarakat serta menjaga warisan budaya dan alam di daerah tersebut," pung-

BUDI DAYA: Tim Dosen Pendamping Pemberdayaan Masyarakat Lembaga Penelitian dan Pengabdian Kepada Masyarakat UPR, saat di lokasi budi daya lebah Kelulut "Nusa Sehati" di Desa Tumbang Nusa, Kabupaten Pulang Pisau, Sabtu (7/10).

Figure 3 Local media coverage

Average Score (86): The average score 86 indicates that the community group's implementation of kelulut bee farming is classified as "Very Good." This reflects consistent practices and success in various aspects of beekeeping. Classification (Very Good): The "Very Good" classification demonstrates that the TKPPEG Nusa Sehati

group has successfully implemented kelulut bee farming. This positive indicator provides a foundation for further development, including increasing production and enhancing product development.

CONCLUSION

Based on the stages of activities, the TKPPEG Nusa Sehati community group has successfully increased kelulut honey production, significantly impacting their income. Additionally, they can now market their honey online using WhatsApp, Instagram, and Facebook.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTIONS STATEMENT

The author's contribution to the research article is conceptualizing the article produced by N and JMR. HT designed the methodology. N, JMR, and HT collected data in the field. RJ carried out data analysis and prepared the original draft.

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