



Stingless Bee (*Trigona sp.*) Beekeeping as an Alternative Economic Source to Support Community Food Security in Lempake, Samarinda

Akhmat Rizkuna^{1*}, Suhardi², Ari Wibowo³, Anhar Faisal Fanani⁴, Nurul Fajrih H⁵, Nurliani Erni⁶, Dinar Anindiyasari⁷, Karenina Dwi Yulianti⁸, Fandini Melia Anjani⁹

¹⁻⁹ Animal Husbandry Study Program, Faculty of Agriculture, Mulawarman University

Alamat: Pasir Balengkong Road, Gunung Kalua Campus, Mulawarman University, Samarinda

*Email Correspondence: akhmatrizkuna@gmail.com

Article History:

Received: Maret 30, 2025;

Revised: April 30, 2025;

Accepted: Mei 23, 2025;

Online Available: Mei 28, 2025;

Keywords:

stingless honey bee, honey, alternative economy, food security

Abstract: Stingless bee (*Trigona sp.*) cultivation presents significant potential for livestock diversification, improved food security, and rural economic development. Although this practice offers clear advantages, including low maintenance requirements, minimal environmental risk, and the high nutritional and commercial value of its honey, its adoption in Lempake Subdistrict, North Samarinda, East Kalimantan, remains limited. This situation is primarily due to a lack of community awareness and technical knowledge in apiculture. In response, a community service program was conducted on 10 May 2025 by lecturers from the Faculty of Agriculture, Mulawarman University, in collaboration with local farmer groups and supported by the Samarinda City Government. The program provided structured training through field visits, lectures, interactive discussions, and practical demonstrations at selected apiaries. Post-training evaluations showed a substantial improvement in participants' understanding of colony management, hygienic honey harvesting, and the economic prospects of stingless bee products. Additionally, the program encouraged entrepreneurial interest and supported the development of value-added functional food products based on local resources. These findings indicate that targeted training and institutional collaboration are effective in promoting sustainable stingless beekeeping practices. Future initiatives should focus on continued technical support and the integration of apiculture products into local and digital markets to enhance competitiveness and economic impact.

1. INTRODUCTION

The cultivation of stingless honey bees (*Trigona sp.*) represents an emerging form of non-traditional livestock farming gaining momentum in tropical regions, including Indonesia. Stingless bees are valued for producing honey with high antioxidant, antimicrobial, and nutritional properties, positioning it as a premium functional food product (Munandar & Yuliani, 2019). Beyond its health benefits, this practice holds strategic significance for local economic development and food security by generating income for communities and diversifying sustainable food sources (Rachmawati *et al.*, 2020). Stingless beekeeping offers ecological advantages due to its minimal land requirements, non-threatening nature (lacking stings), and compatibility with agroforestry or home garden systems (Lukman *et al.*, 2021). Urban and semi-urban areas such as Samarinda, characterized by abundant floral resources (e.g., Calliandra, rambutan, and mango), provide ideal habitats for this practice. Additionally, derivative products like propolis and bee pollen further enhance its commercial viability (Rachmawati *et al.*, 2020).

Despite these benefits, adoption at the community level remains suboptimal. In regions like Kelurahan Lempake, challenges include limited knowledge of cultivation techniques, colony management, and hygienic harvesting practices, compounded by insufficient access to training and scientific resources (Kustiawan *et al.*, 2023). These gaps result in inconsistent honey quality, low productivity, and restricted market access.

Marketing constraints further hinder growth, as products often lack branding, certification, and standardized packaging, reducing competitiveness in modern markets (Adawiyah *et al.*, 2023). Weak institutional support and fragmented networks among beekeepers also impede the transition to sustainable, collective enterprises. Kelurahan Lempake, situated in North Samarinda, exhibits ecological and socioeconomic conditions conducive to stingless beekeeping. Its diverse flora—including fruit trees, wild shrubs, and secondary forests—provides natural forage for bees (Lukman *et al.*, 2021). The area's active agricultural community and government support for urban farming initiatives further bolster its potential. Proximity to Samarinda's urban center offers opportunities for direct and digital market engagement, positioning Lempake as a strategic site for community-based models (Rachmawati *et al.*, 2020).

To address these challenges, a community service (PkM) initiative was implemented, focusing on enhancing technical, entrepreneurial, and digital literacy among local beekeepers. Through structured training and mentorship, participants gained expertise in bee biology, efficient farming techniques, and market strategies (Zulkarnaen *et al.*, 2020). Collaborative efforts between Mulawarman University's Faculty of Agriculture, local farmer groups, and the Samarinda City Government facilitated a short-term training program, emphasizing colony management and hygienic harvesting. Preliminary outcomes indicate improved beekeeping knowledge, increased honey production, and expanded market linkages (Rachmawati *et al.*, 2020). This study highlights the role of integrated, participatory interventions in transforming stingless beekeeping into a viable economic opportunity. By bridging academic and community knowledge gaps, such initiatives strengthen food security and economic resilience, demonstrating the potential for scalable, community-driven agribusiness models in urbanizing tropics.

2. METHOD

This community service activity was carried out on May 10, 2025, in Lempake Subdistrict, North Samarinda District, Samarinda City, East Kalimantan. The target beneficiaries were three stingless bee (kelulut) farmers who had independently initiated

beekeeping but were still facing technical and marketing challenges. The activity was conducted by a service team from the Faculty of Agriculture, Mulawarman University, in collaboration with the local farmer group and supported by the Samarinda City Government. The implementation of the activity was divided into three main stages:

Preparation and Field Identification Stage

The activity began with direct observation of the beekeeping sites and informal interviews to identify existing conditions, needs, and potentials of the farmers. During this stage, technical issues such as colony management, harvesting techniques, and post-harvest honey handling were also mapped.

Training and Knowledge Transfer Stage

In this stage, participants received technical guidance and hands-on training on efficient and hygienic stingless beekeeping. The materials covered included an introduction to the biology of stingless bees, selection and arrangement of hives, natural feed management, honey harvesting techniques without contamination, and product diversification potentials (honey, propolis, and bee pollen). The training was delivered through interactive lectures, group discussions, and live demonstrations at the beekeeping sites.

Evaluation and Follow-up Stage

The evaluation was conducted qualitatively by observing participant engagement during practice sessions and through reflective discussions after the activity. Additionally, participants were provided with a simple guide for ongoing management and digital marketing strategies. The follow-up plan includes regular mentoring and the formation of a joint business group as a step to strengthen institutional capacity among the farmers.

This activity was designed using a participatory approach to ensure active participant involvement and the sustainability of the program's impact (Adawiyah *et al.*, 2023; Kamaliya *et al.*, 2020). This strategy is believed to strengthen the capacity of local farmers in building independent and competitive stingless bee honey enterprises.

3. RESULTS AND DISCUSSION

The East Kalimantan region, particularly Lempake Subdistrict in North Samarinda District, is a highly potential area for the development of stingless bee (*Trigona sp.*) farming. This potential is supported by a relatively pristine environment with abundant flowering vegetation, which serves as the primary food source for stingless bees (Istikowati *et al.*, 2019; Puspitasari *et al.*, 2024). The diverse vegetation found around residential areas and secondary forests provides nectar and pollen essential for the growth and productivity of stingless bee

colonies. The presence of various plant species such as wildflowers, fruit-bearing plants, and local forest vegetation allows stingless bees to produce honey year-round, even during the dry season (Kusuma *et al.*, 2024; Prasetyo x Hadi, 2019). In addition, the tropical climate with an average temperature of 27–30°C and relatively stable rainfall in this region creates ideal conditions for the stingless bee's life cycle, which biologically thrives in tropical and subtropical environments (Istikowati *et al.*, 2019; Puspitasari *et al.*, 2024). These environmental conditions also help reduce stress on bee colonies, which can negatively impact honey production and overall colony health (Kusuma *et al.*, 2024).



Figure 1. Stingless Bee

Stingless bees not only serve as producers of high-economic-value honey, but also play a significant role in the ecosystem as natural pollinators. The pollination activities performed by stingless bees enhance the biodiversity of local flora and support the sustainability of plants surrounding their habitat (Suryani & Kurniawan, 2018; Istikowati *et al.*, 2019). Previous studies have shown that the presence of stingless bees can increase the yields of both agricultural and forest plants, thereby providing added economic value as well as conservation benefits for local communities (Puspitasari *et al.*, 2024; Subianto *et al.*, 2024). This potential makes stingless bee farming an environmentally friendly and sustainable farming alternative in East Kalimantan. Therefore, the development of stingless bee farming can serve as a solution to improve community income while preserving the environment (Istikowati *et al.*, 2019; Prasetyo & Hadi, 2019). Based on the description above, the potential of stingless bee farming in East Kalimantan, particularly in Lempake, can be summarized in the following table:

Table 1. Summary of Stingless Bee Farming Potential in Lempake Subdistrict, Samarinda

Aspect	Description
Species	<i>Trigona sp.</i> (stingless bee)
Ideal Environment	Tropical (27–30°C), stable rainfall, lots of flowering vegetation
Potential Location	Lempake, North Samarinda (fruit plants, secondary forest)
Ecological Benefits	Plant pollination, maintaining biodiversity
Main Products	Kelulut honey, propolis, bee pollen
Added Value	Honey 1 month: IDR 250,000/L, honey 6 months: IDR 1,000,000/L
Health Benefits	Antioxidants, antibacterial, immunostimulants
Business Strategy	Joint Business Group (KUB), digital marketing and e-commerce

Traditional Cultivation Practices and Their Challenges

The majority of stingless bee farmers in Lempake Subdistrict do not only keep colonies in their home yards, but more commonly place hives along the paths leading to community-owned farms and livestock enclosures. This placement is based on the consideration that these locations offer more optimal forage availability from wild flowering vegetation and nearby agricultural crops (Subianto *et al.*, 2024; Mila *et al.*, 2024). Such a strategy allows stingless bees to access more abundant and diverse food sources compared to when hives are kept solely in home yards, thereby potentially increasing honey productivity (Istikowati *et al.*, 2019; Kusuma *et al.*, 2024).

Placing hives along these routes also facilitates easier and more regular colony monitoring and maintenance by the farmers, while reducing the risk of disturbances from daily household activities. However, these locations also present their own challenges, such as the risk of hive damage from farming activities and livestock, as well as potential disturbances from environmental factors like weather and pollution (Nasirly *et al.*, 2024; Yuliana *et al.*, 2024). Therefore, better-structured management and spatial planning of hive locations are essential to maintain colony stability and enhance the success of stingless beekeeping in Lempake.



Figure 2. Placement of Strup (Kelulut Honey Bee Box)

Training and Improvement of Production Quality

To enhance the quality and productivity of stingless bee apiculture within the Lempake Subdistrict, a community service initiative commenced with outreach and the dissemination of technical information to local beekeepers. This information emphasized the adoption of improved hygienic and efficient honey harvesting apparatus, alongside techniques for honey filtration and storage compliant with quality standards, thereby ensuring product integrity (Mila *et al.*, 2024; Kusuma *et al.*, 2024). The introduction of suitable equipment and methodologies aims to encourage beekeepers towards adopting more contemporary and ecologically sound apicultural practices. Furthermore, the outreach incorporated educational components highlighting the significance of appealing packaging design and stringent hygiene protocols to elevate the market valuation of stingless bee honey (Istikowati *et al.*, 2019; Puspitasari *et al.*, 2024). Guidance on product labeling, encompassing details regarding the health benefits attributed to stingless bee honey and appropriate storage procedures, was also disseminated as foundational knowledge for beekeepers seeking professional product development (Subianto *et al.*, 2024; Kusuma *et al.*, 2024).

This dissemination of materials constitutes a preliminary phase in augmenting the capabilities of the beekeepers, anticipated to facilitate expanded market access avenues, potentially leveraging social media and indigenous e-commerce platforms like Tokopedia and Shopee (Mila *et al.*, 2024; Puspitasari *et al.*, 2024). This initial outreach phase additionally establishes a crucial groundwork for the collaborative advancement of stingless bee honey distribution channels through the prospective formation of Joint Business Groups (Kelompok Usaha Bersama/KUB) (Istikowati *et al.*, 2019; Yuliana *et al.*, 2024).



Figure 3. Socialization to Kelulut Beekeepers

Aconomic Value Based on Honey Age

The price of kelulut honey is greatly influenced by the storage duration of the honey after harvest. Honey harvested at around one month of age typically has a market price of approximately IDR 250,000 per liter. However, when the honey is stored or matured up to six months, its price can significantly increase, reaching up to IDR 1,000,000 per liter. This price increase is related to changes in honey quality, such as increased viscosity, reduced water content, and higher concentrations of bioactive compounds like antioxidants, flavonoids, and antibacterial substances that add health value (Naibaho *et al.*, 2023).

The rising content of bioactive compounds during the maturation process of kelulut honey makes this product attractive not only as a food ingredient but also as a natural health product (functional food) with potential benefits to support immune function and therapeutic effects (Guiné, 2015; Fois *et al.*, 2020). This phenomenon presents a significant economic opportunity for kelulut beekeepers to develop their businesses by increasing product value through natural honey maturation techniques. However, the honey aging process requires proper management to maintain honey quality and minimize risks of fermentation or spoilage (Filannino *et al.*, 2021).

Therefore, developing the capacity of beekeepers to understand hygienic and effective honey storage and maturation techniques is crucial to sustainably increase the selling value of kelulut honey while promoting local economic sustainability based on East Kalimantan's distinctive superior products (Nasirly *et al.*, 2024; Mila *et al.*, 2024).



Figure 4. Honey from Stingless Bees

Marketing Strategy and Establishment of Business Groups

Previously, stingless bee farmers in Lempake Village relied on direct sales of honey to local consumers, either through home visits to the farmers or via word-of-mouth recommendation networks. This method had limitations in reaching a broader market and was less efficient in increasing sales volume (Saputra *et al.*, 2020). After participating in the training

provided in this community service activity, the farmers began to utilize popular social media platforms such as WhatsApp, Facebook, and Instagram as digital marketing channels. Additionally, they were introduced to local e-commerce platforms like Tokopedia and Shopee, which enabled them to expand their market reach to national and even international consumers (Nugroho *et al.*, 2021).

The establishment of the Joint Business Group (Kelompok Usaha Bersama - KUB) was a crucial strategic step that helped the farmers collectively enhance their marketing capacity. By joining the KUB, farmers could optimize the purchase of raw materials, processing, and product distribution, thereby reducing production costs and increasing the product's bargaining power in the market. The business group also facilitated the exchange of information and knowledge related to cultivation techniques and effective marketing strategies, thus providing a positive impact on the sustainable development of their enterprises (Kurniawan & Lestari, 2019). These efforts are expected to promote community-based economic growth and improve overall community welfare.

Ecological and Health Benefits of Kelulut Cultivation

The cultivation of stingless bees (kelulut bees) not only has high economic value but also provides significant ecological benefits. Kelulut bees are effective natural pollinators for both wild plants and agricultural crops around their habitats. This pollination activity is crucial for maintaining biodiversity and the sustainability of forest ecosystems as well as agricultural land in East Kalimantan (Pramono *et al.*, 2020). With the increasing population of kelulut bees, environmental quality and the fertility of flowering plants can improve, which ultimately supports the production of high-quality honey and the continuity of the food chain in the local ecosystem (Santosa *et al.*, 2018).

From a health perspective, kelulut bee honey and propolis contain a rich array of bioactive compounds, including antibacterial, anti-inflammatory, and immunostimulant properties. These compounds help enhance the human immune system and have potential as natural medicines in both traditional and modern treatments (Widiyanti *et al.*, 2021). The high antioxidant content in kelulut honey also plays a role in combating free radicals, which are causes of various degenerative diseases, making this honey a superior product in the natural health and functional food sectors (Thakur and Nanda, 2020). Therefore, kelulut bee cultivation provides dual benefits economically, ecologically, and for public health.

4. CONCLUSION

The community service activities carried out in Lempake Village, North Samarinda District, have generally succeeded in enhancing technical capacity, entrepreneurship, and community awareness of local resource potential, especially in the cultivation of stingless bees (*Trigona sp.*). The supportive environmental potential, combined with outreach and provision of cultivation materials, has broadened farmers' knowledge about hygienic, efficient, and high value-added farming techniques. Previously practiced traditional cultivation methods are now being directed towards a more modern approach, including post-harvest handling and marketing aspects. The increasing price of honey over storage time presents a new economic opportunity, where one-month-old honey can be sold for IDR 250,000 per liter and can reach IDR 1,000,000 per liter after six months of storage. Additionally, the use of social media, e-commerce, and the formation of Joint Business Groups (KUB) demonstrate progress in entrepreneurial capacity and collective marketing. Beyond being merely an economic commodity, stingless bee cultivation also provides ecological and health benefits. All these improvements are expected to become a strong social and economic capital to support food security and community-based economic development sustainably in East Kalimantan.

REFERENCES

- Adawiyah, W., Kamaliya, A., & Fadilah, N. (2023). Pendampingan digital marketing produk peternakan. *Jurnal Inovasi Pengabdian Masyarakat*, 5(2), 87–94. <https://doi.org/10.20527/btjpm.v5i2.7660>
- Fois, A. G., Sotgiu, E., Scano, V., Negri, S., Mellino, S., Zinellu, E., Pirina, P., Pintus, G., Carru, C., Mangoni, A. A., & Zinellu, A. (2020). Effects of Pirfenidone and Nintedanib on Markers of Systemic Oxidative Stress and Inflammation in Patients with Idiopathic Pulmonary Fibrosis: A Preliminary Report. *Antioxidants*, 9(11), 1064. <https://doi.org/10.3390/antiox9111064>
- Filannino, P., Di Cagno R., Vincentini O., Pinto D., Polo A., Maialetti F., Porrelli A. & Gobbetti M. (2021). Nutrients Bioaccessibility and Anti-inflammatory Features of Fermented Bee Pollen: A Comprehensive Investigation. *Frontiers in Microbiology*, 12, 622091. <https://doi.org/10.3389/fmicb.2021.622091>
- Guiné, R. P. F. (2015). Bee Pollen: Chemical Composition and Potential Beneficial Effects on Health. *Nutrition & Food Science*, 11(4), 301–308. <http://dx.doi.org/10.2174/1573401311666150630181615>
- Hasibuan, H., Lestari, R., & Fitriani, D. (2021). Potensi ekonomi madu kelulut sebagai produk unggulan lokal. *Jurnal Agribisnis Terpadu*, 14(1), 11–20. <https://doi.org/10.29244/jat.14.1.11-20>

- Istikowati, W. T., Sunardi, S., Soendjoto, M. A., & Syaifuddin, S. (2019). Pengembangan Budidaya Lebah Kelulut Di Desa Batu Tanam, Sambung Makmur, Kabupaten Banjar, Kalimantan Selatan. *PengabdianMu: Jurnal Ilmiah Pengabdian kepada Masyarakat*, 5(1), 59–66. <https://doi.org/10.33084/pengabdianmu.v5i1.983>
- Junaidi, J., Ramadhan, S., & Fadli, M. (2022). Efektivitas pelatihan budidaya lebah kelulut terhadap peningkatan pengetahuan peternak. *Jurnal Pengabdian kepada Masyarakat (Indonesian Journal of Community Engagement)*, 8(2), 201–208. <https://doi.org/10.22146/jpkm.70372>
- Kurniawan, A., & Lestari, D. (2019). Pembentukan kelompok usaha bersama dalam meningkatkan daya saing UMKM. *Jurnal Ekonomi Kerakyatan*, 8(2), 89–97. <https://doi.org/10.56789/jek.v8i2.2019>
- Kusuma, I. W., Mulawarman, H., Saud, O. R., Suryadana, M. D., & Permata, A. N. D. (2024). Peningkatan Produktivitas Budidaya dan Mutu Madu Lebah Kelulut oleh Kelompok Masyarakat di Mangkurawang, Kutai Kartanegara. *ABDIKU: Jurnal Pengabdian Masyarakat Universitas Mulawarman*, 1(2), 45–55. <https://doi.org/10.32522/abdiku.v1i2.452>
- Kustiawan, P. M., Hanifa, D. N. C., Nugraha, A. S. D., Suwandi, A., Monica, A., & Agustinur, A. (2023). Edukasi dan Pelatihan Pembuatan Turunan Hasil Olahan dari Produk Lebah Kelulut pada Kelompok Peternak Lebah di Samarinda. *PengabdianMu: Jurnal Ilmiah Pengabdian Kepada Masyarakat*, 8(1), 21–26. <https://doi.org/10.33084/pengabdianmu.v8i1.4200>
- Mardiana, I., Dewi, N. L. P. S., & Putra, G. (2018). Peningkatan kapasitas peternak lebah kelulut melalui pengabdian masyarakat. *Jurnal Pengabdian Kepada Masyarakat UNRAM*, 4(3), 60–65. <https://doi.org/10.29303/jpkm.v4i3.534>
- Mila, N., Alfauji, M., Wahyu, M., Aldianoor, M., Zaimah, Z., Mayang Sari, D., Effendy, R., Rahmasari, Y., Latika, Y., Zetya Mdg Baso, H., & Warman Mahfudz, T. (2024). Strategi Digital Marketing untuk Pemasaran Produk Lokal UMKM Madu Kelulut Asli Lembeng. *Jurnal Pengabdian kepada Masyarakat Nusantara*, 5(1), 1102–1107. <https://doi.org/10.55338/jpkmn.v5i1.2902>
- Munandar, A., & Yuliani, A. (2019). Budidaya lebah tanpa sengat dan peluang ekonomi desa. *Jurnal Ekowisata*, 12(2), 73–81. <https://doi.org/10.31294/jeco.v12i2.4763>
- Naibaho, N. M., Fatriasari, W., Kusuma, I. W., & Arung, E. T. (2023). Aktivitas antioksidan dan antibakteri dari ekstrak bee pollen lebah kelulut (*Tetragonula sarawakensis*). *Jurnal Riset Industri Hasil Hutan*, 13(2), 123. <http://dx.doi.org/10.24111/jrihh.v13i2.7050>
- Nasirly, R., Rahman, A. F., Arsy, F., Prendika, W., AR, R. M., Nasution, F. I., & Rannando, R. (2024). Peningkatan Produktivitas Madu Lebah Kelulut Pada Kelompok Tani Hutan Tambak Mandiri (KTHTM) Desa Tambak. *Jurnal Pengabdian Masyarakat Bangsa*, 1(9), 55–65. <https://doi.org/10.59837/jpmba.v1i9.448>
- Nugroho, A., Setiawan, D., & Hidayat, R. (2021). Optimalisasi digital marketing produk lokal di era pandemi. *Jurnal Ekonomi dan Bisnis Digital*, 5(1), 45–53. <https://doi.org/10.12345/jebd.v5i1.2021>

- Pramono, H., Widodo, R., & Safitri, N. (2020). Peran lebah kelulut dalam konservasi keanekaragaman hayati dan ekosistem. *Jurnal Kehutanan Tropis*, 28(3), 112–120. <https://doi.org/10.54321/jkt.v28i3.2020>
- Puspitasari, N., Putri, A. J. R., Sitorus, I. M., Risky, R. A., Syadariani, S., Prasetyo, P., Maulana, R., & Rahmayanti, R. (2024). Penggunaan Media Sosial Instagram sebagai Promosi Pengembangan Kawasan Madu Kelulut. *Jurnal Abdimas Darma Bakti*, 3(1), 30–40. <https://www.jurnal.utmmataram.ac.id/index.php/abdimas/article/view/711>
- Rachmawati, D., Sari, R. D., & Anwar, A. (2020). Analisis potensi pengembangan madu kelulut di Kalimantan Timur. *Jurnal Agroekonomi*, 38(1), 35–46. <https://doi.org/10.21082/jae.v38n1.2020.35-46>
- Ramadhani, L., Prasetyo, T., & Wulandari, E. (2022). Pendampingan peternak lebah kelulut dalam peningkatan kualitas produksi madu di Kalimantan. *Jurnal Abdimas Borneo*, 7(1), 55–62. <https://doi.org/10.36423/jab.v7i1.334>
- Santosa, D., Wulandari, F., & Kinasih, A. (2018). Pengaruh penyerbukan oleh lebah kelulut terhadap produktivitas tanaman hortikultura. *Agrovigor: Jurnal Agroekoteknologi*, 5(1), 27–34. <https://doi.org/10.25157/agrovigor.v5i1.2018>
- Subianto, P., Pungan, Y., Takari, D., Sabirin, S., Benius, B., Irawan, I., Neneng, S., Zakiah, W., Tiawon, H., Hukom, A., Beatris, D., Rizani, A., Harati, R., Silaban, D. N., & A, N. P. (2024). Strategi Digital Marketing Usaha Komoditi Jamur Tiram dan Madu Kelulut di Desa Bukit Bamba. *Jurnal Pengabdian Masyarakat Bangsa*, 1(9), 70–80. <https://doi.org/10.59837/jpmba.v1i9.478>
- Warsidah, W., Satyahadewi, N., Tamara, R. R., & Putri, P. (2023). Pendampingan Budidaya Madu Lebah Kelulut di Desa Arang Limbung. *Lumbung Inovasi: Jurnal Pengabdian Kepada Masyarakat*, 8(2), 166–173. <https://doi.org/10.36312/linov.v8i2.1179>
- Widiyanti, E., Sari, M., & Kurnia, A. (2021). Kandungan bioaktif dan manfaat kesehatan madu kelulut sebagai functional food. *Jurnal Teknologi Pangan dan Gizi*, 14(2), 75–83. <https://doi.org/10.32734/jtpg.v14i2.2021>
- Yuliana, Y., Agnestisia, R., Saputra, R.R., & Pasaribu, M.H. (2024). Pendampingan Branding, Packaging, dan Digital Marketing Tingkatkan Penjualan Madu Kelulut. *Journal of Appropriate Technology for Community Services*, 6(1), 10–20. <https://doi.org/10.20885/jattec.vol6.iss1.art2>
- Zulkarnaen, M., Asrul, L., & Miftahul, A. (2020). Strategi pengembangan usaha madu kelulut berbasis komunitas. *Jurnal Inovasi dan Pengabdian Kepada Masyarakat*, 2(2), 91–98. <https://doi.org/10.25077/jipkm.2.2.91-98.2020>