ISSN: 2338-1345 e ISSN 2808-8948 – Vol. 13(2) 55-60 https://ojs.bakrie.ac.id/index.php/APJSAFE/about

Asia Pacific Journal of Sustainable Agriculture Food and Energy (APJSAFE)

Meliponitourism in the Philippines: Integrating stingless bee keeping and sustainable tourism for community development and biodiversity conservation

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Received: 1st Sep 2025 | Revised: 1st Oct 2025 | Accepted: 20th Oct 2025

Abstract—Meliponitourism, the integration of stingless beekeeping with sustainable tourism, is an emerging niche within ecotourism that combines biodiversity conservation, cultural heritage, and community livelihood enhancement. While countries such as Brazil, Malaysia, Indonesia, and Australia have developed established models, the concept remains relatively new in the Philippines. This study employs a case-based approach to examine Philippine meliponitourism initiatives, focusing on their ecological foundations, socio-economic contributions, and development challenges. Data were gathered from peer-reviewed literature, institutional reports, and indigenous knowledge systems, with triangulation ensuring reliability and breadth of perspectives. Findings show that stingless bees (*Tetragonula* spp.) support both agricultural productivity and unique tourism offerings through high-value products such as pot-honey, pot-pollen, and propolis. Philippine case examples—including research-led projects by CBSUA and UPLB, community ventures such as Balay Buhay sa Uma Bee Farm, and indigenous practices of the Ibaloi, Aeta-Tabangnon, and Higaonon--demonstrate pathways by which meliponitourism can advance income diversification, women and youth empowerment, and pollinator-friendly conservation. However, challenges remain, particularly regarding product certification, policy integration, and technical capacity. Comparative insights from global models underscore the importance of institutional support, diversified product development, and participation in international networks. The study concludes that with enabling policies, inclusive community participation, and research-driven innovation, meliponitourism in the Philippines can evolve into a triple-win strategy that advances biodiversity conservation, strengthens rural livelihoods, and fosters sustainable tourism innovation.

Keywords: **stingless bees, meliponitourism, sustainable tourism, biodiversity conservation, community livelihoods, Philippines**

INTRODUCTION

Tourism is increasingly shifting toward more authentic, educational, and environmentally responsible forms of travel. Within this context, ecotourism has become a key model for promoting biodiversity conservation and sustainable community development (UNWTO, 2023). A novel niche within this framework is meliponitourism--the integration of stingless beekeeping (meliponiculture) with tourism activities that blend recreation, education, and conservation (Nicolas *et al*., 2022).

Globally, stingless bees (tribe Meliponini) are recognized not only as efficient pollinators but also as producers of unique hive products such as pot-honey, propolis, and pot-pollen (Vit *et al*., 2018). Their gentle, non-stinging nature makes them highly suitable for public engagement, particularly in family-oriented and educational tourism (Heard, 2016) (Fig.1). Countries such as Brazil and Australia have long-established meliponitourism industries, but significant momentum is now emerging in Southeast Asia. In Malaysia, stingless bee farms are integrated with fruit orchards and eco-parks, supported by national standards for *kelulut* honey that ensure quality and export readiness (Eltz *et al*., 2021). In Indonesia, community-led meliponiculture in Bali has become part of agro-ecotourism packages that combine bee education, honey tasting, and farm visits, creating new livelihood streams for rural households (Nicolas *et al*., 2022). Thailand has likewise expanded meliponiculture-based tourism through university-led research, commercial honey fairs, and community training initiatives, positioning stingless bee honey as both a cultural and commercial product (Warrit *et al*., 2023). These regional experiences demonstrate how meliponitourism can serve as a livelihood diversification strategy, a driver of conservation awareness, and a platform for rural innovation.

In the Philippines, meliponitourism is still in its formative stage. Stingless bees, locally known as *kiwot* (*Tetragonula biroi* Friese), are native pollinators with ecological, cultural, and economic significance but remain underutilized compared to *Apis* honey bees (Asis *et al*., 2018). Emerging initiatives from universities, community

https://doi.org/10.36782/apjsafe.v13i2.538

farms, and indigenous groups reveal promising avenues for meliponitourism as a rural enterprise model. Yet, systematic documentation of its opportunities, challenges, and enabling conditions remains limited in academic and policy discourse.

Figure 1. A four-year-old grandchild of a beekeeper in Albay, Bicol, Philippines, confidently standing beside a *T. biroi* hive and pointing to the bees and hive entrance while engaging visitors.

To address this gap, this study asks: How can meliponitourism in the Philippines be systematically documented and developed as a sustainable strategy for biodiversity conservation, rural livelihood, and tourism innovation? Specifically, it (i) documents the biological and socio-cultural foundations of stingless beekeeping, (ii) analyzes Philippine initiatives and their socio-economic and environmental impacts, and (iii) draws lessons from global experiences to identify enabling conditions for scaling up.

MATERIALS AND METHODS

A. Design

This study employed a case study approach to examine meliponitourism as an emerging niche within the Philippine ecotourism sector, recognizing its potential to integrate biodiversity conservation with rural livelihoods (Hidalgo *et al*., 2022).

B. Case Selection and Data Sources

Cases were selected based on three criteria: (i) representation of different meliponitourism models (research-led, community-based, indigenous), (ii) availability of documented outputs or ongoing initiatives, and (iii) geographic distribution across Luzon, Visayas, and Mindanao. Data collection drew from three main sources. First, a review of peer-reviewed articles, conference proceedings, and technical reports was conducted to synthesize current knowledge on stingless bee biology, meliponiculture, and meliponitourism, including comparative global experiences in Brazil, Malaysia, Indonesia, and Australia (Cortopassi-Laurino & Nogueira-Neto, 2016; Eltz *et al*., 2021; Heard, 2016). Second, institutional and community documentation was analyzed, particularly reports and project outputs from CBSUA (2023, 2025), UPLB (2020), and case experiences from community-based initiatives such as Balay Buhay sa Uma Bee Farm in Sorsogon (Mongabay, 2022). Third, cultural accounts of stingless bee use among indigenous groups, including the Ibaloi in Benguet, the Higaonon in Mindanao, and the Aeta-Tabangnon in Bicol, were reviewed to capture the socio-cultural and ethnobiological dimensions of meliponiculture (Guibu *et al*., 2020).

C. Data Validation and Analysis

Data validation was achieved through triangulation of academic, institutional, and community sources. The analysis was guided by a three-dimensional framework: (i) ecological and biological basis of stingless bees and their products (Michener, 2013; Vit *et al*., 2018), (ii) socio-economic and cultural impacts of meliponitourism enterprises (Nicolas *et al*., 2022), and (iii) institutional and policy support, with attention to lessons drawn from established international models and sustainability guidelines (ASEAN, 2018; UNESCO, 2021). This framework provided an integrative lens to assess how meliponitourism operates in the Philippines while situating its development within broader global practices.

RESULTS AND DISCUSSIONS

Biological and Cultural Foundations

Stingless bees (tribe Meliponini) are widely distributed across the Philippines, with at least ten documented species, including *Tetragonula biroi*, *Heterotrigona itama*, and *Lepidotrigona terminata* (Asis *et al*., 2018; Michener, 2013). These bees are efficient pollinators of tropical crops such as coconut (*Cocos nucifera*), mango (*Mangifera indica*), avocado (*Persea americana*), and wax apple (*Syzygium samarangense*), as well as native forest species (Heard, 1999; Nieves *et al*., 2022). Their hive products, particularly pot-honey, pot-pollen, and propolis, are distinguished by their high antioxidant, antimicrobial, and nutritional properties, commanding premium prices in both local and international markets (Vit *et al*., 2018; Camiña *et al*., 2016).

Culturally, stingless bee honey has long been valued for medicinal use. Among the Ibaloi in Benguet, feral colonies are preserved near households due to beliefs that bees bring good fortune (Guibu *et al*., 2020) (Fig. 2). In Mindanao, the Higaonon tribe integrates stingless beekeeping with

https://doi.org/10.36782/apjsafe.v13i2.538

agroforestry (ATI, 2021), while the Aeta-Tabangnon in Bicol use honey for food and traditional healing (Guibu *et al*., 2020). These practices provide a rich cultural narrative that enhances the appeal of meliponitourism by combining biological significance with heritage values.

Philippine Meliponitourism Initiatives

Research-led initiatives. The UPLB Bee Program has advanced meliponiculture research, product development, and training programs. Conferences such as the 2020 International Meliponine Conference highlighted the potential of meliponitourism as a tool for conservation and livelihood diversification (UPLB, 2020). The CBSUA has also played a leading role, hosting the 2025 International Symposium on Stingless Bees (ISSB 2025) (CBSUA, 2025) (Fig. 3). Its demonstration farms showcase innovations in hive management, "meliponiscaping" (pollinator-friendly landscaping), and product diversification (CBSUA, 2023) (Table 1).

Community-based enterprises. The Balay Buhay sa Uma (BBU) Bee Farm in Sorsogon demonstrates the dual ecological and economic potential of meliponitourism (Fig.4). By maintaining *T. biroi* colonies, the farm reported

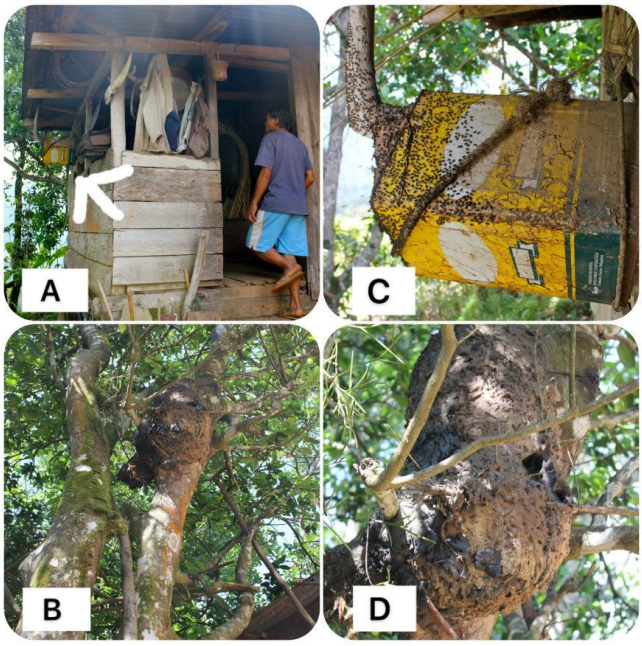

Figure 2. Feral colonies of *Tetragonula* found in and around houses of the Ibaloi tribe in Atok, Benguet, Philippines. These colonies are left undisturbed because they are believed to bring good luck: (a) a stingless bee colony nesting inside an empty cooking oil container hanging outside a house window; (b) a colony nesting on a tree trunk near a house; (c) close-up view of the colony in (a); (d) close-up view of the colony in (b).

coconut yield increases of 50–80% (Mongabay, 2022). Women-led cooperatives manage honey tasting tours, artisanal packaging, and bee education programs, positioning meliponitourism as both a livelihood strategy and a conservation practice.

Indigenous partnerships. Training and partnerships with the Higaonon tribe in Northern Mindanao have facilitated colony propagation and buy-back systems, ensuring income generation while preserving traditional knowledge (ATI, 2021). In Benguet, the Ibaloi community's conservation of feral colonies provides opportunities for cultural tourism that emphasize respect for indigenous ecological knowledge (Guibu *et al*., 2020).

Socio-Economic and Environmental Impacts

Philippine meliponitourism has demonstrated potential for income diversification, with pilot sites reporting additional annual earnings of ₱40,000–₱60,000 from combined honey sales, farm visits, and workshops (Nicolas *et al*., 2022). Beyond direct revenues, tourism exposure enhances branding, allowing bee products to be marketed as premium, artisanal, and conservation-linked (Eltz *et al*., 2021).

Community empowerment is another key impact. Women have taken leading roles in product development and visitor engagement, while youth contribute through digital promotion and creative content (Hidalgo *et al*., 2022). This inclusivity fosters stronger community ownership of meliponitourism ventures.

Figure 3. A photo taken with the local and international guests and participants during the Opening Ceremony of the ISSB 2025 held at Villa Caceres Hotel in Naga City, Bicol, Philippines.

Table 1. Key initiatives advancing meliponitourism in the Philippines.

Initiative Type	Examples	Key Impacts
Research-led	UPLB Bee Program; CBSUA demo farms and symposia	Product innovation; research-based tourism models
Community-based	Balay Buhay sa Uma Bee Farm (Sorsogon)	Coconut yield ↑ 50–80%; women-led honey tasting & packaging

https://doi.org/10.36782/apjsafe.v13i2.538

Initiative Type	Examples	Key Impacts
Indigenous partnerships	Ibaloi (Benguet), Higaonon (Mindanao), Aeta-Tabangnon (Bicol)	Cultural conservation; income via colony propagation
Policy/Networking	RUTA-MELI global network; ATI training programs	Knowledge exchange; capacity-building

Environmentally, meliponitourism encourages pollinator-friendly landscapes through the planting of native flora, reduction of pesticide use, and conservation of

Figure 4. The Philippine Meliponitourism Team from CBSUA with their international research partners from Singapore visited the BBU Bee Farm in Sorsogon, Bicol, Philippines, collaborating on stingless bee honey characterization and testing and supporting meliponitourism efforts.

mangrove and forest habitats (Nieves *et al*., 2022; ASEAN, 2018). As a result, it not only sustains stingless bee colonies but also enhances biodiversity and ecosystem services.

Lessons from Global Models

International experiences provide insights for scaling up Philippine meliponitourism.

Brazil. Government-backed certification and marketing programs have built visitor trust and allowed beekeepers to access niche markets (Cortopassi-Laurino & Nogueira-Neto, 2016).

Malaysia. The integration of stingless bee farms with fruit orchards and eco-parks diversifies visitor experiences, while national honey standards ensure quality control and export readiness (Eltz *et al*., 2021; Food Compliance International, 2017).

Australia. Urban meliponitourism demonstrates that stingless bee education and tourism can thrive in non-rural settings, expanding awareness and market reach (Heard, 2016).

For the Philippines, these lessons underscore the importance of certification schemes, research-driven branding, and institutional partnerships to strengthen credibility and competitiveness.

Challenges and Opportunities

Despite its promise, Philippine meliponitourism faces significant challenges that must be critically weighed against its opportunities. One major constraint is the absence of quality standards and certification for stingless bee honey and related products, which undermines consumer confidence and limits access to both domestic and export markets (Food Compliance International, 2017). In addition, meliponitourism is not yet formally recognized within national tourism and agricultural development frameworks, leaving smallholder initiatives without clear policy backing or institutional support (ASEAN, 2018). Technical limitations such as colony management skills, product processing, and marketing knowledge, further restrict the ability of rural communities to fully capitalize on meliponitourism's potential (Hidalgo *et al*., 2022). Finally, the sector is vulnerable to ecological pressures, including habitat loss, pesticide use, and climate variability, which can directly threaten stingless bee populations and the sustainability of related enterprises.

In contrast, the opportunities presented by meliponitourism are substantial and provide pathways to overcoming these challenges. Pilot sites have demonstrated that meliponitourism can generate additional income ranging from ₱40,000–₱60,000 annually, with women and youth taking active roles in product development, visitor engagement, and digital promotion (Nicolas *et al*., 2022; Hidalgo *et al*., 2022). Branding bee products as artisanal, conservation-linked goods also positions communities to access niche markets and eco-conscious consumers. Moreover, meliponitourism promotes biodiversity conservation by encouraging pollinator-friendly landscapes, native plant restoration, and reduced pesticide use (Nieves *et al*., 2022). At a broader scale, global networks such as RUTA-MELI (Fig. 5) and the Asian Pollinator Initiatives Alliance (APIA) offer opportunities for knowledge exchange, capacity building, and international visibility (Warrit *et al*., 2023).

Taken together, the comparison highlights that while opportunities in livelihood diversification, empowerment, and conservation are strong, they cannot be fully realized without addressing the structural challenges of certification, policy integration, and ecological vulnerability. This balance underscores the urgent need for coordinated action--combining institutional support, research-driven innovation, and inclusive community participation--to ensure that meliponitourism in the Philippines develops into a sustainable and competitive sector.

https://doi.org/10.36782/apjsafe.v13i2.538

Figure 5. Screenshot of the RUTA-MELI website depicting a stingless bee colony being presented to tourists as part of meliponitourism activities.

CONCLUSIONS

Meliponitourism in the Philippines demonstrates strong potential as a model for sustainable tourism, rural development, and biodiversity conservation. Current initiatives--spanning research institutions, community-based enterprises, and indigenous practices--illustrate diverse pathways through which stingless bees are integrated into tourism. These initiatives highlight multiple benefits: generating additional livelihood opportunities, fostering women and youth participation, promoting pollinator-friendly landscapes, and preserving cultural heritage.

Nonetheless, realizing this potential requires addressing existing challenges. The absence of standardized certification for stingless bee products, limited policy recognition within national tourism and agricultural frameworks, and technical capacity constraints among smallholders remain barriers to growth. Comparative lessons from countries such as Brazil, Malaysia, and Australia show that certification systems, institutional support, and diversified product development are essential in strengthening credibility and competitiveness.

Looking ahead, strategic investments in research (e.g., honey authentication, colony health, product innovation), training programs for communities, and stronger participation in regional and global networks such as RUTA-MELI and APIA will be crucial. With enabling policies, scientific evidence, and inclusive community engagement, the Philippines can advance meliponitourism as a triple-win strategy--enhancing biodiversity conservation, supporting resilient rural livelihoods, and promoting sustainable tourism innovation.

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