RESEARCH ARTICLE

MEDIA KONSERVASI
SCIENTIFIC JOURNAL IN CONSERVATION OF NATURAL RESOURCES AND ENVIRONMENT

Unraveling The Threads of Tradition: The Transformation of *Kepayang* (*Pangium edule* Reinw.) Ethnobotanical Knowledge in Sarolangun, Central Sumatra

Bambang Hariyadi[a,b], Andi Lahmuddin[b], Muhammad Harun Alrasyid[a], Bisma Sindi Tira[a], Mahya Ihsan[a], Upik Yelianti[b] and Eko Waskito[c]

[a] Study Program of Biology, Faculty of Science and Technology, University of Jambi, Mendalo Indah, Jambi 36361, Indonesia

[b] Study Program of Biology Education, Faculty of Education, University of Jambi, Mendalo Indah, Jambi 36361, Indonesia

[c] Gerakan Cinta Desa (Movement for Loving Village), Kenali Asam Bawah, Kota Baru, Jambi 36128, Indonesia

Article Info:
Received 11 April 2024
Revised 16 October 2024
Accepted 21 October 2024

Corresponding Author:
Bambang Hariyadi
Study Program of Biology, Faculty of Science and Technology
University of Jambi
E-mail: bambang_h@unja.ac.id

Abstract

For centuries, the Sarolangun community in Central Sumatra has depended on *kepayang* for its essential roles in nutrition, medicine, environmental conservation, and cultural practices. However, modernization now threatens the preservation of indigenous knowledge and traditions related to *kepayang*. This study investigates the shifts in ethnobotanical knowledge concerning *kepayang* in six villages across three sub-districts of Sarolangun Regency, Jambi Province, encompassing urban, peri-urban, and rural landscapes representative of the region's main *kepayang* production areas. Using a descriptive-analytical approach, data were collected from 68 participants through in-depth interviews and participatory observations utilizing snowball sampling. Findings reveal the plant's diverse uses and evolving application patterns, with a broader range of uses in rural areas compared to urban ones. Despite these shifts, *kepayang* retains its culinary significance throughout the community, symbolizing cultural continuity. Additionally, its role in oral traditions continues to impart moral values to younger generations, supporting collective wisdom essential for conservation. This research advocates for a balanced conservation strategy that integrates ecological preservation with cultural heritage and sustainable development, adapting to local knowledge's evolution while exploring *kepayang's* potential for economic benefits within the community.

Keywords: conservation, ethnobotany, Jambi, oral tradition, *Pangium edule*

1. Introduction

The *kepayang* (*Pangium edule* Reinw.) is a revered tree species from the Achariaceae family, celebrated for its distinctive round-to-oval fruit. These impressive trees can soar to 40 meters, boasting trunks reaching around 100 centimeters in diameter [1]. *Kepayang* thrives in various types of land, from dense natural forests to cultivated fields, shrublands, and even local communities' gardens. *Kepayang* frequently adorns the riverbanks, enhancing its ecological significance and natural allure.

Kepayang has gained notoriety due to its toxic compound, cyanide acid, found in nearly every part of the plant. However, traditional societies across different regions in Indonesia have long recognized the potential benefits of harnessing the poison of *kepayang* for various purposes, including medicinal applications and food preservation [2]. Recent research has unveiled the promising potential of *kepayang* in treating major diseases such as HIV [3] and SARS [4]. Interestingly, despite the poisonous nature, local communities commonly utilize *kepayang* seeds as a food source. Traditional communities in Indonesia and Southeast Asia have developed diverse techniques and technologies to process *kepayang* seeds [5–7].

Due to its extensive root system, *kepayang* is crucial in conserving water and soil resources, effectively preventing erosion. It is commonly grown along riverbanks because of its remarkable ability to stabilize the soil in those areas. *Kepayang* is also planted on steep slopes, emphasizing its significance in combating erosion and preserving the integrity of the surrounding land [8].

The lush canopy of the *kepayang* tree, adorned with vibrant leaves, not only produces oxygen but also provides a sanctuary for humans and wildlife, particularly birds. Its role in the socio-cultural fabric of communities is of utmost importance. Traditionally, *kepayang* trees were planted along the periphery of gardens, near the boundaries, as they offered dual benefits. They allowed people to derive advantages from the tree while maintaining its expansive canopy to shield the main crops at the garden's core. Locals firmly believed that the poisonous nature of *kepayang* acted as a formidable defense, deterring various pests from infiltrating the garden. The unique characteristics of *kepayang*, particularly its poisonous content, have become deeply embedded in local cultural values, sayings, and other oral traditions, further accentuating its significance within the community.

Due to ongoing changes and dynamics, local communities have neglected their extensive knowledge of *kepayang*. This knowledge, primarily preserved in elders' memories, is slowly disappearing, with only a small portion being passed down to the younger generation. However, there is hope in the younger generation, who increasingly recognize this knowledge's importance and take steps to preserve it. On a global scale, modernization and market integration are the primary factors contributing to the loss of this Indigenous knowledge [9]. These external forces have pressured traditional practices and eroded the cultural significance and understanding of *kepayang* within communities. This decline in local knowledge poses significant challenges to the sustainable use and preservation of *kepayang*'s benefits for future generations.

In a village in Sarolangun, local knowledge about *kepayang* has expanded, especially regarding using *kepayang* oil. This valuable oil, derived from *kepayang*, is used for cooking, as an ingredient in pharmaceuticals, and across various industries [10]. Additionally, *kepayang* has the potential to be an alternative energy source that can replace fossil fuels [11]. Biodiesel oil derived from *kepayang* offers several advantages over other biodiesels [12]. This biodiesel can operate at sub-zero temperatures, making it suitable for sub-tropical regions. The increasing recognition of *kepayang* oil as a versatile resource opens new opportunities for its use, benefiting various fields such as culinary practices, pharmaceuticals, and sustainable energy production.

The Sarolangun District, located in the Jambi Province, is a central region for *kepayang* production. Over time, the area has experienced various socio-economic and cultural changes. Transportation infrastructure development has made it easier to distribute goods, impacting the community's traditional uses and the perceived value of *kepayang*. The changes have marginalized the traditional values and customs associated with *kepayang*. Given these circumstances, this study aims to investigate the changes occurring in the Sarolangun community regarding the ethnobotany of *kepayang*.

2. Materials and Methods

We conducted fieldwork in six strategically selected villages across three sub-districts in Sarolangun. The villages were chosen based on the prevalence of *kepayang* cultivation and use. The villages included Lubuk Kepayang, Semurung, and Lubuk Jering in the Air Hitam Sub-district; Sungai Bemban and Muara Cuban in the Batang Asai Sub-district; and Ladang Panjang in the Sarolangun Sub-district (Figure 1). It is worth noting that the Sarolangun Sub-district shares its name with the encompassing district. We conducted field visits between 2018 and 2020, systematically visiting each sub-district to ensure comprehensive data collection.

Data collection involved conducting in-depth interviews using an interview guide to comprehensively understand *kepayang's* role within the community. The data captured information regarding its prevalence, applications, preservation techniques, and cultural and traditional significance. Each interview began by gathering demographic and background information about the respondent, followed by more focused questions about their experiences and views on *kepayang*.

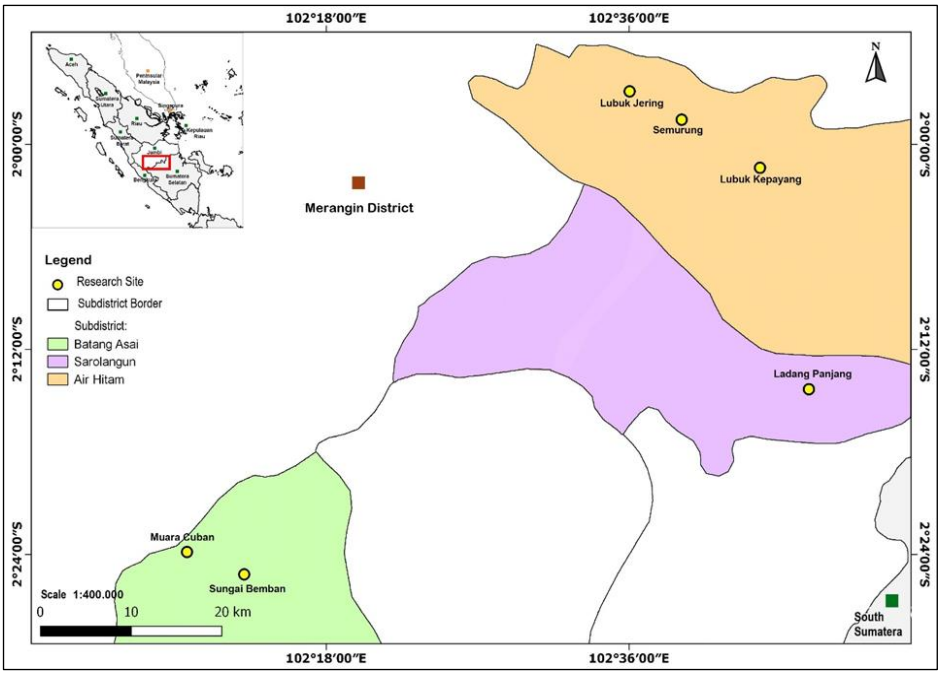

Figure 1. The research site is located in Sarolangun District, Jambi Province.

We employed a snowball sampling method, starting with the village head as the primary contact. This approach helped mitigate selection bias by incorporating referrals from a broad network of respondents, reducing the risk of homogeneity (homophily). We aimed to capture a more diverse and representative community sample by selecting initial contacts from different sub-districts. This method helped us gather a diverse sample of 69 respondents, 32 males, and 37 females, across the three sub-districts. Although snowball sampling can introduce dependence on the honesty of initial respondents, we minimized this by ensuring clear, consistent communication regarding the study's goals and confidentiality. While randomization was impossible, the varied referral chains ensured diversity in the collected perspectives. Furthermore, careful attention to ethical guidelines and privacy concerns was maintained throughout the process. Ultimately, this sampling strategy allowed us to gather a comprehensive and nuanced view of the significance of *kepayang* within the Sarolangun community despite the inherent challenges of snowball sampling.

The researchers conducted in-depth interviews and participated in community activities related to *kepayang*. This hands-on approach involved harvesting and processing *kepayang* seeds, offering a practical understanding of the plant's role in daily life. Informal dialogues during these observations further enriched the data pool.

The data analysis process followed the framework proposed by Miles et al. [13]. First, we reduced the raw data to highlight important points. Then, we visually organized the data to identify patterns. We drew initial conclusions and continuously verified the data for accuracy. Concurrently, we recorded our reflections to aid the interpretative process. We grouped the data into broader themes through pattern coding as discernible patterns emerged. Finally, we conducted a thematic analysis to synthesize the data into a coherent narrative that depicted the community's relationship with *kepayang*. This rigorous methodology ensured that the insights derived were comprehensive and grounded in the lived experiences of the Sarolangun community.

3. Results and Discussion

3.1. Results

The close relationship between the Sarolangun people and the *kepayang* tree has deep roots in centuries-old traditions. The relationship represents a rich combination of traditional

knowledge about plants, cultural significance, and effective conservation methods. As modernization continues to change the social and ecological landscape, the community faces various challenges and opportunities that reshape how they interact with the *kepayang*. Our analysis begins by thoroughly exploring the community's ethnobotanical knowledge. We focus on examining the practical use of *kepayang* as a source of cooking oil and how the availability of other economically viable options has affected its traditional role within the community. Our discussion then shifts to *kepayang's* symbolic significance, providing essential insights into its cultural importance and symbolism. We also highlight the community's dedicated conservation efforts and the crucial role of *kepayang* in the environmental framework.

3.1.1. Ethnobotanical knowledge

The *kepayang* tree is an integral part of the landscape in Sarolangun Regency, with many trees found growing naturally or intentionally planted across the region. These ancient trees bear fruit after 15 years, with each mature tree capable of yielding up to 200 kilograms of fruit annually (Figure 2). Despite containing toxic cyanide, the local community has ingeniously developed methods to utilize the tree's various parts for beneficial purposes, demonstrating adaptability and innovation in food preservation, medicine, pest control, and fishing practices.

Figure 2. Removing *kepayang* seeds from the fruit before processing them into oil

The uses of *kepayang* can be classified into several key categories, as shown in Table 1: foodstuffs, ingredients and preservatives, *kepayang* oil, medicinal uses, and other miscellaneous applications. These varied applications highlight the plant's remarkable versatility and importance in the community. Moreover, the multiple uses of *kepayang* emphasize its role as a valuable economic resource that significantly supports the livelihoods of local communities.

Transitioning to its use as a food source, *kepayang* is a dietary staple in rural and urban areas alike. The seeds are creatively prepared into spicy sambal, fermented *belacan* sauce, and sweets like *dodol* and *kue*. One notable dish, *cangkuk* or *kepayang* curry, is especially popular during the fruiting season. Although *cangkuk* is primarily a household delicacy and not commercialized, its preparation involves intricate methods: mature seeds are fermented for about two weeks in a jar with minimal water and salt to reduce cyanide content. Fermentation imparts a tangy flavor balanced with rice-washing water. Once stored, the dish remains consumable for up to two months, and it is often cooked into traditional curries served alongside local river fish.

Table 1. Current use of *kepayang* in Sarolangun, Air Hitam, and Batang Asai Sub-districts

Category	Utilization	Air Hitam	Saro Langun	Batang Asai
Food	Cangkuk (*kepayang* curry)	●●●●●	●●●●●	●●●●●
	Sambal (*kepayang* spicy sauce)	●●●●○	NA	NA
	Belacan (fermented *kepayang* sauce)	NA	●○○○○	NA
	Dodol (*kepayang* cake)	NA	●●○○○	●●●●○
	Kue (*kepayang* pie)	●●○○○	NA	NA
	Cooking oil	○○○○○	●○○○○	●●●●●
Food preservative	Fish Kasam	●●●○○	●●○○○	●●●●●
	Beef Kasam	●●●○○	●○○○○	●●●●○
	Fermented durian	●●●○○	NA	NA
Medicines	*Kuro* Fever	NA	●●○○○	●●●●○
	Toothache	NA	NA	●●●●●
	Wound	●●●○○	●○○○○	●●●●●
	Itch	NA	NA	●●●●●
	Scabies	NA	NA	●●●●●
	Massage	●○○○○	●●○○○	●●●●●
Poison	Fish catching	●●●○○	●○○○○	●●●●○
	Head lice control	●●●●○	●○○○○	●●●●○
	Golden snail control	NA	NA	●●●●○
Other Uses	Wooden board	●●●○○	●●●○○	○○○○○
	Wood beam	NA	●●●○○	NA
	Machete handle	NA	NA	○○○○○
	Gold mining tool	NA	NA	○○○○○
	Crop fertilizer	NA	NA	●●●●●
	Snail trap	●●●●○	NA	●●●●○
	Food wrapper	NA	NA	●●●○○

Note:
○○○○○ No longer practiced
●○○○○ Very rarely (once in ≥ 4 years)
●●○○○ Rarely (once in 2–4 years)
●●●○○ Sometimes (once in 1–2 years)
●●●●○ Often (once a year)
●●●●● Very often (> 1 in a year)

Transitioning to its use as a food source, *kepayang* is a dietary staple in rural and urban areas alike. The seeds are creatively prepared into dishes such as spicy sambal, fermented *belacan* sauce, and sweets like *dodol* and *kue*. One notable dish, *cangkuk* or *kepayang* curry, is especially popular during the fruiting season. Although *cangkuk* is primarily a household delicacy and not commercialized, its preparation involves intricate methods: mature seeds are fermented for about two weeks in a jar with minimal water and salt to reduce cyanide content. Fermentation imparts a tangy flavor balanced with rice-washing water. Once stored, the dish remains consumable for up to two months, and it is often cooked into traditional curries served alongside local river fish.

Beyond direct consumption, *kepayang* also functions as a food preservative, particularly for fermenting fish (fish *kasam*) and preserving beef (beef *kasam*). This method, though less common than culinary uses, highlights the plant's role in traditional food preservation practices. Local adaptations are evident, as in Batang Asai Sub-district, where *kepayang* leaves are used instead of seeds for wrapping grilled fish, enhancing flavor with their unique aroma. A key informant shared, "The combination of the fish's charred flavors and the fragrant undertones of the *kepayang* leaf creates a wonderful taste experience, offering a harmonious interplay of flavors for the discerning palate."

Shifting to its production of oil, *kepayang* seeds are processed into a distinctive oil highly valued in the community for cooking and medicinal purposes. The labor-intensive extraction process begins with naturally ripened fruit, whose seeds are fermented, cleaned, boiled, and minced before pressing (Figure 3). Although *kepayang* oil once held critical economic importance, improved infrastructure and the availability of alternatives like palm oil have reduced its prominence. Urbanization has further contributed to a decline in *kepayang*

populations as lands are repurposed. However, in rural areas such as Batang Asai Sub-district, initiatives supported by local organizations aim to preserve and enhance *kepayang* oil production, capitalizing on its high market value.

Figure 3. Extracting the kernel from *kepayang* seeds: a step-by-step process

In addition to its culinary and economic roles, *kepayang* is deeply ingrained in traditional medicine. For example, *kepayang* oil is commonly used to treat skin ailments such as wounds and scabies, while its bark is applied to livestock. Though modern healthcare reduces reliance on such traditional remedies in urbanized areas, niche practices like using *kepayang* oil in massages persist, emphasizing its therapeutic value.

Lastly, the community has found innovative uses for the toxic pulp of the *kepayang* fruit, employing it as a biopesticide and a method for catching fish. Additionally, the high-quality wood of the *kepayang* tree is used in construction and furniture-making, while its roots and buttresses are fashioned into tools for gold panning. By-products from oil extraction, such as the shell and pulp, serve as fertilizers for rice cultivation, and the liquid waste acts as both a biopesticide and a fish-stunning agent in local rivers.

The potential of *kepayang* as an economic resource remains significant, as its fruit commands a price of 1,000–5,000 rupiahs per kilogram during the fruiting season. With a mature tree yielding up to 300 fruits annually, the income from selling *kepayang* fruit alone surpasses the monthly living cost in the region, while processed oil offers even greater profitability. These findings highlight the enduring cultural and economic value of *kepayang* in the face of modernization and market evolution.

3.1.2. The cultural significance of *kepayang*

The community of Sarolangun purposefully uses the symbolic characteristics of the *kepayang* to impart virtuous values to their youth. This practice is evident through the various *selokos*, or sayings, prevalent within the Jambi Province. *Selokos* are valuable oral traditions rich in moral and ethical principles that act as guiding principles in everyday life [14]. These concise yet profound phrases encapsulate the cultural wisdom of the community, offering deep insights into society's prevalent values and beliefs. These *selokos* are expected to be recited at almost all community gatherings, including weddings and traditional events, effectively serving as a verbal tapestry that tightly binds the community's cultural identity and moral fabric.

The term *kepayang* holds significant cultural and symbolic meaning in both Sarolangun and Indonesia as a whole, often associated with its toxic nature. In *seloko*, it highlights this

characteristic, sometimes with emphasis or exaggeration. For example, the *seloko "Sayang buah kepayang, dimakan mabuk dibuang sayang"* metaphorically captures the dilemma of weighing potential harm against potential benefit, reflecting the environmental ethos of many indigenous communities and their respect for nature's power.

Similarly, the *kepayang* fruit has inspired the widely known Indonesian proverb *mabuk kepayang*, which describes an overpowering and volatile love, likened to the intoxicating effects of the fruit. This vivid metaphor illustrates the intense emotions often associated with youthful love. While *kepayang* is commonly used in metaphorical contexts, its literal meaning, tied to its toxicity and cultural relevance, remains lesser-known to many.

The abundant presence of *kepayang* trees along the riverbanks significantly impacts the nearby aquatic ecosystems. The local communities recognize and emphasize this ecological interdependence through the Indigenous wisdom enshrined in the saying *nutuh kepayang, nubo tepian*. This expression reflects the potential introduction of toxins into the river when they prune or mismanage the *kepayang*, as most trees contain hydrocyanic acid.

A closer look at the *seloko's* symbolic meanings unveils valuable lessons about environmental stewardship. It metaphorically emphasizes that mismanaging essential resources, vital for livelihood, can have harmful consequences on different aspects of life. Even though *kepayang* is not the residents' primary income source, the *seloko* implicitly encourages individuals to protect and secure essential communal resources.

3.1.3. Cultural wisdom and conservation challenges of *kepayang*

The *kepayang* tree is significant ecologically, socio-culturally, and economically. Empirical observations have shown that its extensive root system helps to prevent soil erosion, especially in areas prone to land degradation. Local reports indicate that regions with a high density of *kepayang* trees have improved soil stability, reducing the risk of landslides. Furthermore, the tree's dense canopy provides a habitat for diverse wildlife, contributing to the preservation of regional biodiversity.

In the Sarolangun Sub-district, the traditional cultivation of *kepayang* begins with selecting seeds from ripe fruits, easily identified by their reddish-brown color. Various harvesting methods are employed, including climbing the trees, using poles equipped with knives, or allowing the fruits to fall naturally when fully ripe. These techniques reflect the community's resourcefulness in adapting to the unique characteristics of the *kepayang* tree.

However, in the Batang Asai Sub-district, it is preferred to let the fruits fall naturally to ensure they are completely ripe. Since *kepayang* trees in this area can grow to around 15 meters in height, climbing them is quite challenging. The impact of indigenous beliefs on *kepayang* cultivation is significant, as they dictate that harvesting immature *kepayang* seeds can affect the future fruiting of the tree. This belief underscores the cultural significance of the traditional practices.

The *kepayang* tree holds a special place in the local community, as reflected in the *seloko: Durian dipanjat, petai ditutuh, tepian ditubo, dan kepayang dijuluk*. This proverb emphasizes the traditional prohibition against harvesting *kepayang* fruits by climbing trees or harvesting poles. The rule applies not only to *kepayang* fruits but also to other critical local fruits. It emphasizes that *kepayang* fruits should be allowed to mature and fall from the tree naturally. This approach benefits both humans and other living creatures.

The fallen fruits contribute to new tree growth, ensuring the species' continuity. This traditional harvesting principle embodies local wisdom and promotes the conservation of fruit-bearing species like the *kepayang* tree. While rural communities, particularly those in Batang Asai Sub-district, still adhere to this rule, its observance is decreasing in urbanized areas, contributing to a decline in the *kepayang* population.

The relationship between human communities and *kepayang* trees is complex and influenced by geographical, cultural, and economic factors. In urban areas like the Sarolangun Sub-district, there is a lower population of *kepayang* trees, possibly due to reduced reliance on them and a shift to other resources. In contrast, rural regions like Batang Asai Sub-district, characterized by intimate human-*kepayang* interactions, display a more robust tree population attributed to the tree's multifunctional utility in daily life.

Conservation efforts provide hope. Grassroots initiatives, mainly led by the older generation, aim to establish *kepayang* nurseries to increase its presence in areas where it has declined. External interventions, carried out by NGOs in collaboration with local authorities, focus on reforestation and educating the community about the ecological importance of *kepayang*. These organizations offer technical guidance and rewards to individuals who reach specific *kepayang* planting goals. These combined efforts, focused on conservation and awareness, have been met with positive community feedback and have provided significant encouragement.

3.2. Discussion

The ethnobotanical relationship between the Sarolangun community and the *kepayang* tree (*Pangium edule* Reinw.) reflects a long history of interaction between human societies and their surrounding ecosystems, demonstrating a deep understanding of natural resources. This relationship has evolved over centuries, highlighting sustainable living practices, resilience, and adaptability within the community [15]. The *kepayang* tree plays multifaceted roles, particularly in culinary, medicinal, construction, and ecological domains. Its seeds are commonly used in cooking, while other parts, such as the leaves and bark, are employed in traditional medicine. These applications underscore the resourcefulness of the Sarolangun community, which is consistent with findings from other indigenous communities that also rely on multifunctional plant resources to fulfill diverse needs, contributing to cultural continuity, particularly in rituals and ceremonies [16,17].

However, the use of *kepayang* has shifted with modernization and increased market accessibility. The availability of more affordable products has reduced the demand for certain *kepayang*-based items, though some derivatives with unique qualities, such as the fermented seeds, retain market value. This shift is a common phenomenon observed in other ethnobotanical contexts where unique properties of traditional resources allow them to continue to be relevant despite economic pressures [18]. The adaptability and resilience of the Sarolangun community in maintaining these practices amid modernization raise questions about the long-term sustainability of these traditions, especially as new, cheaper alternatives become more accessible.

Geographic factors also influence the use of *kepayang*, with variations across sub-districts in Sarolangun. In areas like Batang Asai, which are characterized by agricultural and forested landscapes, *kepayang* is innovatively used for pest management, illustrating the community's capacity to adapt its traditional practices to specific environmental conditions. This localized application parallels findings in other ethnobotanical studies, emphasizing the role of geographic context in shaping the diversity of plant uses [19]. Such regional variation highlights the importance of understanding the full range of ethnobotanical knowledge within a community, considering the influence of local environmental factors.

The gastronomic significance of *kepayang* continues to bridge rural and urban traditions, underscoring its resilience in the face of modern culinary influences. Despite the influx of modern foods, the persistence of *kepayang* in traditional dishes suggests potential for the plant to be marketed as a heritage food. This could offer both conservation and economic benefits, as its unique traditional flavors may attract broader interest contexts [20]. The community's ability to manage the inherent toxicity of *kepayang* through fermentation techniques exemplifies local knowledge and innovation, transforming its toxic pulp into an edible form. Such methods could inform the development of affordable processed foods and functional ingredients, contributing to food security and sustainability [21].

The medicinal applications of *kepayang* further demonstrate its potential for integration into modern healthcare. Traditional remedies derived from the plant could be validated through scientific research, offering opportunities for bridging traditional knowledge with contemporary medicine. Studies have highlighted the potential of such remedies in modern healthcare, suggesting that *kepayang*-based treatments could add value both culturally and medically [22].

Beyond its direct uses, *kepayang* also plays a significant role in local livelihoods. Its toxic properties have been harnessed for biopesticides and fishing aids, demonstrating a sustainable use of natural toxins. These applications align with global trends in sustainable

agriculture and environmental management, where biopesticides derived from local plant resources are increasingly recognized for their ecological and economic benefits. The integration of such natural pesticides into Integrated Pest Management (IPM) strategies can reduce dependence on synthetic chemicals, benefiting both the environment and human health [23–25].

The wood of the *kepayang* tree is also valuable to the Sarolangun community, used for house construction and furniture making. Its moderate weight and bonding qualities make it an ideal material for furniture, with medium durability. These uses highlight the community's respect for local resources and their sustainable management, balancing utility with ecological stewardship. The diverse roles of *kepayang* within the Sarolangun community underscore its cultural, ritualistic, and practical importance. It serves as a symbol of local heritage, particularly evident in its use in *seloko*, an oral tradition that conveys cultural narratives and values across generations. This finding aligns with broader observations in indigenous communities worldwide, where plants like *kepayang* are integral to cultural identity and continuity, fostering a deep sense of belonging and connection to ancestral practices [26].

The continued ceremonial use of *kepayang* in the face of modern influences demonstrates the community's active efforts to preserve its cultural heritage while adapting to evolving socio-cultural environments. However, cultural traditions, including the use of *kepayang*, may evolve over time, influenced by factors such as age, education, and globalization. Understanding these shifts is essential for preserving cultural heritage and ensuring the sustainable management of natural resources in a rapidly changing world. The integration of *kepayang* into the local language and traditions, especially through *seloko*, illustrates the intricate relationship between cultural practices and the natural environment. *Seloko*, as part of the local language, holds critical knowledge about ecosystems, plant life, and ecological processes, making it vital for biodiversity conservation [27].

Research has shown that linguistic diversity is positively correlated with biodiversity, emphasizing the importance of preserving indigenous languages like seloko, which contain valuable ecological knowledge. This perspective underscores the need for a holistic approach to conservation that integrates both linguistic and biodiversity preservation. Such an approach can foster greater awareness of the symbiotic relationship between human communities and their natural environments [28].

Ecologically, *kepayang* plays an important role in local ecosystems, contributing to soil stabilization, habitat provision, and biodiversity maintenance. Its connection to the community reflects a dynamic interplay between ecological knowledge and cultural practices, offering insights into innovative conservation strategies. For instance, the community's reliance on natural seed dispersal methods and the avoidance of cutting young trees demonstrates respect for natural processes while adhering to cultural beliefs. These practices provide valuable examples of how traditional knowledge can inform modern conservation efforts [29–31].

Integrating traditional ecological knowledge with modern conservation methods offers opportunities to address urbanization threats and promote sustainable development. Such integration ensures the preservation of both cultural and ecological integrity while fostering the sustainable management of resources. Efforts to document and revitalize traditional practices related to *kepayang* are crucial for intergenerational knowledge transfer, ensuring the long-term sustainability of these practices [31,32].

The modernization of *kepayang*-derived products presents promising opportunities to preserve local knowledge while enhancing economic benefits for the community. Innovations like *kepayang*-based food products, alongside developments in culinary tourism, make these cultural practices more relevant in today's market. Furthermore, promoting *kepayang* within the context of culinary tourism strengthens its cultural significance and supports local economies. Recent research has highlighted new applications for *kepayang* including its antioxidant properties and the potential for byproduct innovations like biochar production, which could offer both economic and environmental benefits [33–35].

However, urbanization and modernization pose significant challenges to the transmission of traditional knowledge, as evidenced by the decline in knowledge about *kepayang* oil production among urban populations in Sarolangun. This highlights the importance of balancing tradition with innovation to maintain cultural relevance while addressing modern needs. Collaborative efforts to document, adapt, and promote traditional practices, supported by both local engagement and external resources, are essential for preserving the ecological, cultural, and economic significance of *kepayang* [36].

4. Conclusions

The *kepayang* tree is a significant part of the Sarolangun community, representing a combination of culture, economy, and culinary tradition preserved across generations. Although there has been a decline in knowledge about the tree in urban areas due to modernization, its continued use in cooking highlights its lasting importance. This finding shows how to preserve and bring back the tree's significance despite modern challenges. The enduring connection between the community and the *kepayang* tree demonstrates a harmonious balance between tradition and innovation, sustainability, and adaptability, showing the community's solid and respectful relationship with its natural environment. The cultural and ecological importance of the *kepayang* is deeply rooted in the community's identity and environmental values, calling for active conservation efforts to maintain its cultural relevance in a changing society. Collaborative conservation methods that combine traditional knowledge with external expertise are crucial to protecting the biodiversity of the *kepayang* tree and the rich cultural and ecological heritage it represents. The relationship between the Sarolangun community and the *kepayang* tree presents a resilient model of environmental stewardship, reflecting global efforts toward sustainable conservation in indigenous communities and emphasizing the essential role of cultural values and traditional practices in maintaining ecological balance and preserving biodiversity.

Author Contributions

BH: Conceptualization, Methodology, Investigation, Writing - Review & Editing; **AL**: Investigation, Review & Editing; **MHA**: Investigation, Review & Editing; **BST**: Investigation, Review & Editing; **MI**: Writing - Review & Editing, **UY**: Writing - Review & Editing; **EW**: Investigation, Review & Editing.

Conflicts of Interest

There are no conflicts to declare.

References

1. Sangat-Roemantyo, H. Plant Resources of South-East Asia No 12(2): Medicinal and Poisonous Plants 2; van Valkenburg, J.L.C.H., Bunyapraphatsara, N., Eds.; PROSEA Foundation: Bogor, Indonesia, 2001.
2. Iskandar, B.S.; Iskandar, J.; Partasasmita, R. Strategy of the Outer Baduy Community of South Banten (Indonesia) to Sustain Their Swidden Farming Traditions by Temporary Migration to Non-Baduy Areas. *Biodiversitas* **2018**, *19*, 453–464, doi:10.13057/biodiv/d190212.
3. Tumilaar, S.G.; Fatimawali, F.; Niode, N.J.; Effendi, Y.; Idroes, R.; Adam, A.A.; Rakib, A.; Emran, T.B.; Tallei, T.E. The Potential of Leaf Extract of Pangium Edule Reinw as HIV-1 Protease Inhibitor: A Computational Biology Approach. *J. Appl. Pharm. Sci.* **2021**, *11*, 101–110.
4. Sailah, I.; Tumilaar, S.G.; Lombogia, L.T.; Celik, I.; Tallei, T.E. Molecular Docking and Dynamics Simulations Study of Selected Phytoconstituents of "Pangi" (*Pangium edule* Reinw) Leaf as Anti-SARS-CoV-2. *Philipp. J. Sci.* **2021**, *150*, 925–937.
5. Prastowo, I.; Nurusman, A.A.; Moro, H.K.E.P.; Rizkianti; Dewi, C. Diversity of Indonesian Offal-Based Dishes. *J. Ethn. Foods* **2023**, *10*, 1–19, doi:10.1186/s42779-023-00181-8.

6. Fauzi, S.Z.S.; Ahmad, S.N. Nyonya Food, Culinary Capital and Women's Empowerment in Stella Kon's Emily of Emerald Hill and Selina Siak's The Woman Who Breathed Two Worlds. *3L Southeast Asian J. English Lang. Stud.* **2022**, *28*, 110–123, doi:10.17576/3L-2022-2804-08.
7. Saupi, N.; Saidin, A.A.; Zakaria, M.H.; Sarbini, S.R.; Yusli, N.A. An Ethnobotanical Study of Indigenous Leafy Vegetables among Local Communities in Bintulu, Sarawak, Malaysia. *Borneo J. Resour. Sci. Technol.* **2020**, *10*, 155–165.
8. Heriyanto, N.M.; Subiandono, E. Ekologi Pohon Kluwak/Pakem (*Pangium edule* Reinw.) Di Taman Nasional Meru Betiri, Jawa Timur. *Bul. Plasma Nutfah Vol* **2008**, *14*, 33–42.
9. Aswani, S.; Lemahieu, A.; Sauer, W.H.H. Global Trends of Local Ecological Knowledge and Future Implications. *PLoS One* **2018**, *13*, 1–19, doi:10.1371/journal.pone.0195440.
10. Purwayantie, S. Plant Diversity and Nutrient Substances of Native Edible Plant: Case Study in Suka Maju and Tamao Villages, Kapuas Hulu District, West Kalimantan, Indonesia. *Biodiversitas J. Biol. Divers.* **2020**, *21*, 842–852, doi:10.13057/biodiv/d210252.
11. Rizal, T.A.; Khairil; Mahidin; Husin, H.; Ahmadi; Nasution, F.; Umar, H. The Experimental Study of Pangium Edule Biodiesel in a High-Speed Diesel Generator for Biopower Electricity. *Energies* **2022**, *15*, 1–15, doi: 10.3390/en15155405.
12. Atabani, A.E.; Badruddin, I.A.; Masjuki, H.H.; Chong, W.T.; Lee, K.T. *Pangium edule* Reinw: A Promising Non-Edible Oil Feedstock for Biodiesel Production. *Arab. J. Sci. Eng.* **2015**, *40*, 583–594.
13. Miles, M.B.; Huberman, A.M.; Saldaña, J. *Qualitative Data Analysis: A Methods Sourcebook*; Sage Publications: Thousand Oaks, California, USA, 2018; ISBN 1506353061.
14. Armansyah, Y. Kontribusi Seloko Adat Jambi Dalam Penguatan Demokrasi Lokal. *Sos. Budaya* **2017**, *14*, 1–13.
15. Filho, W.L.; Barbir, J.; Gwenzi, J.; Ayal, D.; Simpson, N.P.; Adeleke, L.; Tilahun, B.; Chirisa, I.; Gbedemah, S.F.; Nzengya, D.M. The Role of Indigenous Knowledge in Climate Change Adaptation in Africa. *Environ. Sci. Policy* **2022**, *136*, 250–260.
16. Syaiful, S.; Irawan, B. Kajian Ekologi Kepayang (*Pangium edule*) Pada Kebun Campuran Di Desa Raden Anom Kacamatan Batang Asai Kabupaten Sarolangun Provinsi Jambi. *J. Pembang. Berkelanjutan* **2020**, *3*, 20–28.
17. Jupri, A.; Milenia, E.W.; Jannah, W.; Husain, P. Ethnobotany of Food Plants Used by Local Communities at Joben Resort Mount Rinjani National Park, East Lombok. *J. Biol. Trop.* **2022**, *22*, 1025–1032.
18. Grace, O.M. Succulent Plant Diversity as Natural Capital. *Plants, People, Planet* **2019**, *1*, 336–345.
19. Manoppo, J.S.S. Potential Extracts of *Pangium edule* Reinw and *Derris elliptica* Wallich as Botanical Molluscicides for Management of Golden Apple Snail *Pomacea canaliculata* Lamarck. *Agrotech Journal. Univ. Sembilan Belas Nop. Kolaka* **2017**, *2*, 14–20.
20. Pieroni, A.; Hovsepyan, R.; Manduzai, A.K.; Sõukand, R. Wild Food Plants Traditionally Gathered in Central Armenia: Archaic Ingredients or Future Sustainable Foods? *Environ. Dev. Sustain.* **2021**, *23*, 2358–2381.
21. Sabater, C.; Ruiz, L.; Delgado, S.; Ruas-Madiedo, P.; Margolles, A. Valorization of Vegetable Food Waste and By-Products through Fermentation Processes. *Front. Microbiol.* **2020**, *11*, 1–11, doi: 10.3389/fmicb.2020.581997.
22. Kang, X.; Jin, D.; Jiang, L.; Zhang, Y.; Zhang, Y.; An, X.; Duan, L.; Yang, C.; Zhou, R.; Duan, Y. Efficacy and Mechanisms of Traditional Chinese Medicine for COVID-19: A Systematic Review. *Chin. Med.* **2022**, *17*, 1–13, doi: 10.1186/s13020-022-00587-7.
23. Kharissova, O.V.; Kharisov, B.I.; Oliva González, C.M.; Méndez, Y.P.; López, I. Greener Synthesis of Chemical Compounds and Materials. *R. Soc. open Sci.* **2019**, *6*, 1–41, doi:10.1098/rsos.191378.
24. Mishra, J.; Dutta, V.; Arora, N.K. Biopesticides in India: Technology and Sustainability Linkages. *3 Biotech* **2020**, *10*, 1–12, doi:10.1007/s13205-020-02192-7.
25. Koulougliotis, D.; Antonoglou, L.; Salta, K. Probing Greek Secondary School Students' Awareness of Green Chemistry Principles Infused in Context-Based Projects Related to Socio-Scientific Issues. *Int. J. Sci. Educ.* **2021**, *43*, 298–313.
26. Turner, N.J.; Cuerrier, A.; Joseph, L. Well Grounded: Indigenous Peoples' Knowledge, Ethnobiology and Sustainability. *People Nat.* **2022**, *4*, 627–651.
27. Zhang, X.; Bu, Z.; Ju, H.; Jing, Y. Investigation on the Relationship between Biodiversity and Linguistic Diversity in China and Its Formation Mechanism. *Int. J. Environ. Res. Public Health* **2022**, *19*, 1–19.

28. Inglis, D.; Pascual, U. On the Links between Nature's Values and Language. *People Nat.* **2023**, *5*, 326–342.

29. Shao, H.; Yang, J.; Xue, D. Applications of Wa Traditional Culture in Biodiversity Conservation. *Biodivers. Sci.* **2021**, *29*, 1120–1127, doi:10.17520/biods.2020480.

30. Tews, J.; Brose, U.; Grimm, V.; Tielbörger, K.; Wichmann, M.C.; Schwager, M.; Jeltsch, F. Animal Species Diversity Driven by Habitat Heterogeneity/Diversity: The Importance of Keystone Structures. *J. Biogeogr.* **2004**, *31*, 79–92.

31. Berkes, F. *Sacred Ecology*; Routledge: Oxfordshire, England, UK, 2017; ISBN 131511464X.

32. Sillitoe, P. *Investigating Local Knowledge: New Directions, New Approaches*; Routledge: Oxfordshire, England, UK,2019; ISBN 0429583141.

33. Munandar, A.; Indaryanto, F.R.; Prestisia, H.N.; Muhdani, N. Potensi Ekstrak Daun Picung (*Pangium edule*) Sebagai Bahan Pemingsan Ikan Nila (*Oreochromis niloticus*) Pada Transportasi Sistem Kering. *J. Fishtech* **2017**, *6*, 107–114.

34. Mapanawang, A.L.; Elim, H.I. Pangi Leaf (*Pangium edule* Reinw) Herbal Medicine: A Marvelous Candidate for the Prominent Hiv Herbal Medicine. *Sci. Nat.* **2019**, *2*, 97–104.

35. Chye, F.Y.; Sim, K.Y. Antioxidative and Antibacterial Activities of *Pangium edule* Seed Extracts. *International Journal of Pharmacology* **2009**, *5*, 285–297.

36. Salma, I.; Masrom, A.M.; Raziah, M.L. Diversity and Use of Traditional Fruit Species in Selected Home Gardens or Fruit Orchards in Malaysia. *J. Trop. Agric. Food Sci.* **2006**, *34*.