Neglected but Not Forgotten: How Sundanese Culture Sustains Indigenous Plant Diversity

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ABSTRACT

The Sundanese people of West Java, Indonesia, have long sustained indigenous plant diversity through deeply rooted cultural practices, offering critical insights into the preservation of neglected and underutilized plant species (NUS). This study examines how traditional Sundanese agricultural methods—such as intercropping, organic farming, and community-based seed saving—have safeguarded plants like kecipir (winged bean, *Psophocarpus tetragonolobus*), kenikir (*Cosmos caudatus*), and leunca (*Solanum nigrum*). These species thrive within biodiverse agroecosystems, providing nutritional, medicinal, and ecological benefits. Culturally embedded practices, including culinary traditions and ethnobotanical knowledge, ensure their continued relevance, with plants serving dual roles as food and medicine. However, modernization, monoculture expansion, and generational knowledge erosion threaten their survival. Conversely, global movements toward sustainable agriculture and local food systems present opportunities to revitalize these species. By integrating Sundanese traditional knowledge with contemporary organic farming and market initiatives, neglected plants can enhance food security, biodiversity, and climate resilience. This review underscores the importance of preserving indigenous agricultural heritage as a model for global sustainability, advocating for policies that support agroecological diversity and community-led conservation efforts. The findings highlight the urgency of bridging traditional wisdom and modern practices to address pressing challenges in food security and ecological health.

Keywords: Sundanese culture, neglected and underutilized species (NUS), traditional ecological knowledge, agroecology, biodiversity conservation.

INTRODUCTION

Modern agriculture and global food systems have long overlooked neglected and underutilized plant species (NUS), despite their immense potential to contribute to food security, sustainable farming, and biodiversity. Though not widely cultivated commercially, these plants have historically been crucial in local communities' diets and traditional practices (Farooq & Siddique, 2023). Among the Sundanese people of West Java, Indonesia, a rich heritage of plant knowledge and agricultural practices has ensured the survival of numerous neglected plants, maintaining their relevance in both cultural traditions and ecological systems (Kristianti *et al*., 2024). These plants, such as *kecipir* (*Psophocarpus tetragonolobus*), *kenikir* or *ulam raja* (*Cosmos caudatus*), and *leunca* (*Solanum nigrum*), offer both nutritional benefits and resilience to changing environmental conditions, positioning them as key contributors to local food systems.

The Sundanese have long demonstrated a deep understanding of their natural environment, relying on traditional ecological knowledge passed down through generations to sustain their agricultural practices (Putra *et al*., 2018).

Neglected plants like *kecipir*, *kenikir*, and *leunca* have been cultivated for their nutritional value and ability to thrive in diverse and often marginal environments. For example, *kecipir* (winged bean) is celebrated for its high protein content and unique characteristic of being entirely edible—from pods and leaves to roots and seeds (Lepcha *et al*., 2017). Similarly, *kenikir* (ulam raja) is known for its medicinal properties and is frequently used in traditional Sundanese herbal remedies (Moshawih *et al*., 2017). At the same time, *leunca* has been a staple in local cuisine, especially in vegetable-based dishes like *oseng-oseng* (stir-fried vegetables) (Mulyanto *et al*., 2018). These plants represent a reservoir of agricultural biodiversity, contributing to local food security while embodying the resilience and resourcefulness of Sundanese farming systems.

Preserving these plants is not accidental but the result of deliberate cultural practices emphasizing biodiversity and sustainable living. Traditional Sundanese agriculture integrates mixed cropping systems, intercropping, and polycultures, creating a conducive environment for neglected plants to thrive alongside staple crops (Cita & Hasibuan, 2019; Putra *et al*., 2018). These practices conserve soil fertility and promote ecological balance and resilience against pests and diseases (Cita & Hasibuan, 2019). Moreover, the Sundanese tradition of seed saving ensures that plant varieties like *kecipir*, *kenikir*, and *leunca* are passed down across generations, safeguarding genetic diversity. In addition, these plants are central to the Sundanese culinary tradition, which emphasizes fresh, locally sourced ingredients that align with the cultural preference for simple yet nutritious meals. This culinary integration serves as another form of preservation, embedding these plants into the fabric of daily life.

However, the survival of these plants faces increasing challenges from modernization and the dominance of high-yield commercial crops. Rapid urbanization, shifting agricultural priorities, and the homogenization of food systems threaten these neglected plants' biodiversity. Nevertheless, growing opportunities exist to revitalize interest in plants like *kecipir*, *kenikir*, and *leunca*. The global trend towards organic farming, sustainable agriculture, and a renewed focus on indigenous food systems offers a chance to reintegrate these plants into modern diets and markets. The unique nutritional profiles of these plants, coupled with their adaptability to diverse environments, present them as valuable assets in the face of climate change and food insecurity. This review, therefore, aims to explore how Sundanese traditional knowledge has preserved these neglected plants and what lessons can be learned to ensure their continued survival and relevance in both local and global food systems.

LITERATURE REVIEW

Neglected Plants in Sundanese Culture

Neglected plants are an integral part of Sundanese culture, deeply embedded in local diets, agricultural practices, and medicinal traditions. These plants, often overlooked by mainstream agriculture, have been cultivated and utilized by Sundanese communities for generations due to their resilience, nutritional value, and medicinal properties. In Sundanese life, *kecipir* (winged bean, *Psophocarpus tetragonolobus*), *kenikir* or *ulam raja* (*Cosmos caudatus*), and leunca (*Solanum nigrum*) are prime examples of such species that continue to play a vital role despite external pressures and modernization. Their enduring presence reflects the Sundanese people's commitment to preserving biodiversity and traditional knowledge. *Kecipir* (winged bean, *Psophocarpus tetragonolobus*) is one of the most versatile crops in the Sundanese tradition. Every part of the plant, from the leaves to the seeds and roots, is edible, making it a valuable resource in regions prone to food scarcity. Its high protein content positions *kecipir* as a potential solution to malnutrition, yet it remains largely neglected by global agricultural initiatives (Padulosi *et al*., 2013). In Sundanese cuisine, *kecipir* is commonly used in salads, stir-fries, and soups, showcasing its culinary versatility. Beyond its nutritional benefits, the plant is also valued for its nitrogen-fixing properties, which enhance soil fertility and support sustainable farming practices (National Research Council, 1981). This dual role as a food source and environmental enhancer underscores its significance in Sundanese agricultural systems.

Kenikir (*ulam raja*, *Cosmos caudatus*) is another plant deeply revered in Sundanese culture for both its culinary and medicinal uses. Traditionally consumed as a fresh herb or incorporated into vegetable dishes, *kenikir* is celebrated for its antioxidant properties and its potential to promote cardiovascular health (Mediani *et al.*, 2013).

In Sundanese households, the plant is often included in herbal remedies aimed at improving digestion and overall well-being. Despite its clear advantages, *kenikir* is considered an underutilized crop, as modern agriculture tends to favor more commercially viable plants. However, its preservation within Sundanese communities is ensured by its dual role in traditional medicine and its popularity in home-cooked meals, highlighting its cultural and practical importance.

Leunca (*Solanum nigrum*), a small berry-producing plant, holds a special place in Sundanese cuisine, particularly in dishes like *oseng leunca,* a simple stir-fry. While its bitter taste may not appeal to everyone, it is cherished for its health benefits, including anti-inflammatory properties (Gürbüz *et al*., 2003). Traditionally, *leunca* has also been used to treat ailments such as fever and digestive issues, further solidifying its role in Sundanese medicinal practices. The plant is typically grown in home gardens or found in local markets, reflecting its integration into the daily diets of Sundanese people. Despite its widespread availability in rural areas, *leunca* is rarely cultivated on a large scale, making it another neglected yet culturally significant plant in Sundanese tradition.

Kecipir (Psophocarpus tetragonolobus)

Kenikir (Cosmos caudatus)

Leunca (Solanum nigrum)

Figure 1. Neglected plants connected with Sundanese culture

Together, these plants exemplify the resilience and richness of Sundanese culture, where biodiversity is not only preserved but celebrated. Each plant has its place within the local ecosystem and the community's way of life, embodying the Sundanese philosophy of living harmoniously with nature. They serve as sources of food, medicine, environmental protection, and cultural symbolism, reflecting a holistic approach to sustainability. The continued use of *kecipir*, *kenikir*, and l*eunca* underscores the importance of traditional knowledge in maintaining agricultural diversity and highlights the unique cultural identity of the Sundanese people. By valuing these neglected plants, the Sundanese community demonstrates how traditional practices can contribute to global efforts in biodiversity conservation and sustainable living.

Sundanese Agricultural Practices for Plant Preservation

Sundanese agricultural practices are deeply rooted in a long-standing tradition of biodiversity conservation and sustainable farming methods. These practices, passed down through generations, emphasize harmony between humans and the environment, ensuring that neglected plants like *kecipir* (*Psophocarpus tetragonolobus*), *kenikir (Cosmos caudatus*), and leunca (*Solanum nigrum*) continue to thrive alongside more commercial crops. Through integrated farming systems, intercropping, and organic approaches, the Sundanese have successfully preserved the genetic diversity of their native plants, ensuring food security and ecological resilience in the face of external agricultural pressures. These methods reflect a profound understanding of the interconnectedness of agriculture, culture, and the environment.

One of the key agricultural practices among the Sundanese is intercropping, a method that involves growing multiple crops together in the same field. By integrating *kecipir*, *kenikir*, and *leunca* with staple crops such as rice or maize, farmers maximize land use efficiency while enhancing soil health and minimizing the risk of crop failure. Intercropping encourages biodiversity by allowing different plants to interact synergistically. For example, *kecipir* is a nitrogen-fixing plant, meaning it can absorb nitrogen from the air and replenish soil

nutrients, which benefits neighboring crops (National Research Council, 1981). This practice reduces the need for chemical fertilizers and promotes sustainable farming, helping to preserve the health of the soil for future generations. Such methods highlight the Sundanese people's ability to work with nature rather than against it, fostering a balanced and resilient agricultural system.

In addition to intercropping, traditional seed-saving practices are central to preserving the genetic diversity of neglected plants. Sundanese farmers often save seeds from *kecipir, kenikir,* and *leunca* at the end of each growing season, selecting seeds from the healthiest and most productive plants. These seeds are then stored and used in the following planting cycle. This method ensures that the most resilient and adaptable varieties are perpetuated, maintaining genetic diversity and allowing the plants to adapt to changing environmental conditions (Altieri, 2018). Unlike commercial seeds, which may be bred for uniformity, local Sundanese seeds retain their diversity, which enhances their ability to withstand pests, diseases, and climate variability. This practice underscores the importance of traditional knowledge in safeguarding agricultural biodiversity.

The use of traditional organic farming methods also plays a significant role in the preservation of these plants. Many Sundanese farmers rely on organic compost, animal manure, and natural pest control methods rather than synthetic fertilizers and pesticides. This organic approach aligns with the philosophy of living in harmony with nature, as it avoids the disruption of local ecosystems. The practice of using organic inputs has helped sustain the productivity of plants like *kenikir* and *leunca*, which are often cultivated in home gardens or small-scale farms (Gliessman, 2022). By avoiding chemical interventions, the Sundanese have fostered a more sustainable agricultural system that benefits both the plants and the environment. This approach not only preserves the health of the soil but also ensures the long-term viability of neglected plant species.

Finally, community-based knowledge sharing is vital for the continued preservation of these neglected plants. Traditional farming knowledge, including the best methods for cultivating and utilizing *kecipir, kenikir,* and *leunca*, is shared among generations and within communities. This informal education system ensures that younger farmers inherit the skills and understanding necessary to maintain diverse and productive farms. Additionally, local communities often hold events such as agricultural festivals and seed exchanges, where farmers can share seeds, knowledge, and best practices (Brookfield & Padoch, 1994). These community activities foster a sense of collective responsibility for preserving biodiversity, ensuring that the agricultural wisdom surrounding these neglected plants is not lost in the face of modern agricultural practices.

In essence, Sundanese agricultural practices, through their emphasis on biodiversity, organic farming, and community knowledge-sharing, have been instrumental in preserving neglected plant species. These methods not only contribute to the conservation of *kecipir*, *kenikir*, and *leunca*, but they also promote a resilient, sustainable, and culturally rich agricultural system. The enduring success of these traditional practices offers valuable lessons for broader efforts to preserve agricultural biodiversity in a rapidly modernizing world. By valuing and integrating such practices, global agricultural systems can move toward greater sustainability and resilience, ensuring food security and ecological health for future generations.

Culinary and Medicinal Uses of Neglected Plants in Tradition

In Sundanese culture, food and medicine are often closely intertwined, with many plants serving dual purposes in daily life. Neglected plants like *kecipir* (*Psophocarpus tetragonolobus*), *kenikir* (*Cosmos caudatus*), and *leunca* (*Solanum nigrum*) hold important roles not only as food sources but also as traditional remedies. This dual significance reflects the deep-rooted ethnobotanical knowledge of the Sundanese people, who have long valued the nutritional and healing properties of local flora. The culinary and medicinal uses of these plants not only enhance their cultural relevance but also contribute to their ongoing preservation, ensuring that they remain integral to Sundanese life despite the pressures of modernization.

Kecipir (winged bean, *Psophocarpus tetragonolobus*) is a highly versatile plant in Sundanese cuisine. Often referred to as a "superfood" because of its rich protein content, *kecipir* is used in a variety of dishes, including salads, stir-fries, and soups. The young pods are commonly boiled or steamed and served with chili paste (*sambal*), a staple accompaniment in Sundanese meals. Beyond its culinary uses, *kecipir* has been traditionally

valued for its ability to nourish and strengthen the body. The plant's seeds are particularly high in essential amino acids, making it an important source of nutrition in rural communities where protein sources might be scarce (National Research Council, 1981). Its leaves and pods are also consumed to promote general well-being, reflecting the Sundanese understanding of food as both sustenance and medicine. This dual role highlights the plant's significance in maintaining health and nutrition within the community.

Kenikir (ulam raja, *Cosmos caudatus*), commonly eaten raw as a salad herb or lightly blanched as part of traditional dishes, is another important plant in Sundanese cuisine. The fresh, peppery flavor of *kenikir* makes it a popular ingredient in vegetable salads known as *lalapan*, often paired with rice and grilled fish or tempeh. In addition to its culinary role, *kenikir* is revered for its medicinal properties. It is rich in antioxidants and is believed to have anti-inflammatory and antibacterial effects, making it a common home remedy for various ailments such as digestive disorders and fever (Mediani *et al*., 2013). Sundanese families often prepare herbal drinks or tonics from *kenikir*, which are believed to enhance vitality and cleanse the body, illustrating the plant's integral role in both daily nutrition and traditional healing practices. This combination of culinary and medicinal uses ensures its continued relevance in Sundanese households.

Leunca (*Solanum nigrum*), a small berry-bearing plant, holds a special place in Sundanese cuisine and medicine. The berries are typically stir-fried with chili and garlic, known locally as *oseng leunca*, or incorporated into vegetable curries and soups. Despite its bitter taste, *leunca* is prized for its distinct flavor and is believed to stimulate the appetite. Medicinally, *leunca* has been used in traditional Sundanese herbal treatments for its anti-inflammatory and analgesic properties (Gürbüz *et al*., 2003). It is often applied topically in the form of poultices or consumed to alleviate symptoms of fever, joint pain, and skin conditions. The plant's widespread use in traditional medicine underscores its importance as a source of both food and healing, demonstrating the Sundanese reliance on local flora for holistic health. This dual functionality reinforces its cultural and practical value within the community.

Tumis Teri Leunca (Stir-fried Leunca with anchovies)

Lalaban (Fresh vegetable with sambal)

Figure 2. Traditional daily meals in Sundanese culture

The incorporation of these neglected plants into both daily meals and traditional medicine has allowed them to maintain their relevance in Sundanese society. While modern diets and commercialized medicine have made significant inroads into rural areas, the cultural value of these plants continues to support their preservation. Sundanese food culture, which emphasizes fresh, locally sourced ingredients, provides a strong foundation for the continued use of *kecipir*, *kenikir*, and *leunca* in everyday life. Moreover, the enduring use of these plants in traditional healing practices speaks to the community's reliance on natural remedies and the cultural transmission of ethnobotanical knowledge (Brookfield & Padoch, 1994). These practices ensure that the knowledge and use of these plants are passed down through generations, safeguarding their place in Sundanese culture.

Challenges and Opportunities for the Preservation of Neglected Plants

The preservation of neglected plants such as *kecipir* (*Psophocarpus tetragonolobus*), *kenikir* (*Cosmos caudatus*), and *leunca* (*Solanum nigrum*) within Sundanese traditions faces significant challenges in the modern era. As Indonesia undergoes rapid urbanization and agricultural commercialization, traditional knowledge and practices that have safeguarded these plants for centuries are increasingly under threat (Maffi, 2005). However, alongside these challenges, there are growing opportunities to reintegrate and elevate the status of these plants, driven by global movements advocating for biodiversity, sustainable agriculture, and the revival of indigenous food systems (Altieri & Toledo, 2011).

One of the primary challenges is agricultural modernization and the shift towards monoculture. Modern farming practices in Indonesia, like in many parts of the world, have increasingly favored high-yield, commercially profitable crops such as rice, maize, and palm oil, often at the expense of agricultural diversity (Khoury *et al*., 2014). The Sundanese community in West Java has a rich tradition of utilizing local plants for both food and medicinal purposes. This practice not only preserves biodiversity but also offers solutions to contemporary challenges in food security and healthcare. A study conducted in rural West Java documented the use of various underutilized food plants (UFPs) that play a crucial role in the traditional diet of the Sundanese people. These plants have been found to contribute significantly to nutritional intake, providing essential vitamins and minerals that can help address micronutrient deficiencies in the region (Rahayu *et al.,* 2024). Furthermore, another study revealed that the Sundanese community extensively uses medicinal plants in traditional healthcare practices, with 117 plant species identified for their therapeutic benefits. However, only 44.4% of the documented plant-disease pairings align with existing scientific literature, indicating a wealth of local knowledge that requires further pharmacological exploration (Roosita *et al*., 2008). Unfortunately, agricultural modernization and the shift toward monoculture in Indonesia have led to a significant decline in agricultural genetic diversity, with reports indicating a loss of up to 75%, posing a threat to both ecological sustainability and local cultural heritage (Santili, 2012). Therefore, integrating indigenous plants into modern agricultural systems is a crucial step in balancing productivity, food security, cultural preservation, and biodiversity conservation. Consequently, further research into the nutritional and pharmacological potential of these plants is essential to support broader applications in food security and public health. This shift has resulted in the marginalization of traditional crops, including *kecipir, kenikir,* and *leunca,* as they are considered less economically viable in large-scale agricultural production. Farmers may abandon these plants in favor of more profitable crops, leading to a decline in their cultivation and threatening the preservation of their genetic diversity (Padulosi *et al*., 2013). Additionally, the widespread use of chemical fertilizers and pesticides further diminishes the ecological environments that these neglected plants rely on to thrive (Gliessman, 2015).

Another challenge lies in the erosion of traditional knowledge due to changing lifestyles and urban migration. As younger generations move away from rural farming communities to pursue opportunities in cities, the transmission of ethnobotanical knowledge from elders to youth becomes increasingly fragmented (Brookfield & Padoch, 1994). The deep understanding of the uses, cultivation, and preservation of plants like *kecipir, kenikir,* and *leunca*—knowledge that has sustained these plants for generations—may be lost as agricultural practices modernize. This shift not only threatens the continuity of traditional farming practices but also diminishes the cultural significance of these plants in Sundanese identity (Toledo & Barrera-Bassols, 2008).

Despite these challenges, there are notable opportunities for the revitalization and preservation of neglected plants. The growing global interest in sustainable and organic agriculture presents a significant opportunity for plants like *kecipir*, *kenikir,* and *leunca* to gain wider recognition. As the world faces increasing concerns over food security, climate change, and biodiversity loss, there is renewed appreciation for the resilience and nutritional value of neglected species (Chivenge *et al*., 2015). These plants, known for their ability to grow in marginal environments and their nutritional richness, can play a critical role in diversifying food sources and promoting sustainability (Dawson *et al*., 2019). By integrating them into organic farming systems and promoting their benefits through local markets, these plants could gain wider use and commercial potential, thus encouraging their cultivation and preservation (Jacobsen *et al*., 2013).

Another opportunity is the promotion of local food movements and indigenous knowledge. There is a rising

trend in celebrating local cuisines and traditional food systems, particularly as people seek healthier, more sustainable alternatives to industrialized food production (Kuhnlein *et al*., 2009). In Indonesia, efforts to revive and promote traditional Sundanese cuisine provide a platform for highlighting the importance of *kecipir*, *kenikir*, and *leunca.* These plants can be reintroduced into modern diets through farm-to-table initiatives, local restaurants, and culinary festivals that emphasize the use of fresh, local ingredients (Frison *et al*., 2011). Additionally, there is growing interest in traditional medicine and natural remedies, which can further support the integration of these plants into modern wellness practices (Heinrich *et al*., 2003).

Lastly, community-driven initiatives that focus on seed saving, education, and sustainable farming practices can play a pivotal role in preserving these plants. By creating community seed banks and farmer cooperatives, local farmers can continue to cultivate and share seeds from *kecipir*, *kenikir*, and *leunca*, ensuring that their genetic diversity is maintained (Vernooy *et al*., 2015). Education programs that target younger generations, whether through schools or community centers, can help pass on traditional knowledge and raise awareness about the importance of agricultural biodiversity (Calvet-Mir *et al*., 2012). Such efforts will be crucial in safeguarding the future of these neglected plants while ensuring that Sundanese cultural heritage remains intact (Brush, 2004).

CONCLUSION

The preservation of neglected plants like *kecipir* (*Psophocarpus tetragonolobus*), *kenikir* (*Cosmos caudatus*), and *leunca* (*Solanum nigrum*) within Sundanese tradition offers profound insights into the resilience of indigenous agricultural practices and the deep interconnection between culture, food, and biodiversity. Despite the challenges posed by agricultural commercialization, urbanization, and the erosion of traditional knowledge, these plants continue to hold significant cultural, nutritional, and medicinal value for Sundanese communities.

Sundanese agricultural methods such as intercropping, seed saving, and organic farming provide effective means for maintaining biodiversity and ensuring the survival of these underutilized species. Additionally, the culinary and medicinal uses of *kecipir*, *kenikir*, and *leunca* reflect a cultural philosophy that views food as medicine, enhancing their cultural relevance and aiding in their preservation. Moreover, these plants embody the Sundanese community's approach to sustainable living, where traditional knowledge and ecological balance are at the core of farming and dietary practices.

In the face of modern pressures, there are promising opportunities to revitalize these plants through sustainable agriculture, local food movements, and community-driven initiatives. As the world grapples with issues like food security and climate change, the inherent resilience and adaptability of these plants position them as valuable resources for building more sustainable and diverse food systems. By reintroducing them into modern diets, promoting their health benefits, and integrating them into organic farming practices, these plants can contribute to the preservation of both Sundanese culture and global biodiversity.

Ultimately, the continued survival of neglected plants in Sundanese tradition depends on a collective effort to preserve cultural heritage, protect local ecosystems, and promote agricultural diversity. By recognizing the importance of these plants and the traditional knowledge that sustains them, both local communities and the global agricultural sector can play a role in ensuring their future

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