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Ethnobotany and traditional food plant knowledge among the Malay community of Kuantan Singingi District, Riau, Indonesia

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Abstract. *Hafizah N, Chikmawati T, Djuita NR, Purwanto Y. 2025. Ethnobotany and traditional food plant knowledge among the Malay community of Kuantan Singingi District, Riau, Indonesia. Asian J Ethnobiol 8: 271-290.* The Malay community in Kuantan Singingi District, Riau Province, Indonesia, is known for its unique culture and cuisine. However, their local knowledge and wisdom regarding the use of food plants have not been documented. This study aims to change that, documenting and analyzing diversity, identifying the local importance of species, and supporting sustainable biodiversity conservation. The research was conducted across five villages in Kuantan Singingi District, using open-ended, semi-structured, and structured interviews with 107 informants selected through purposive and snowball sampling methods. Data were analyzed to show Use Value (UV), Relative Frequency of Citation (RFC), Index of Cultural Significance (ICS), and Important Value Index (IVI). A total of 167 plant species belonging to 55 families were recorded, dominated by Fabaceae (13 species). Trees (40.12%) and herbs (33.53%) were the most common growth forms, with fruits (44.74%) and leaves (22.11%) as the main parts used. *Cocos nucifera* exhibited the highest UV, RFC, and ICS, reflecting its central cultural and culinary role. Knowledge was found to be influenced by gender, age, and occupation, with women and older generations serving as primary custodians. This study provides the first comprehensive documentation of food plant knowledge in Kuantan Singingi. It underscores the need for conservation strategies, intergenerational knowledge transfer, and integration of ethnobotanical knowledge into education to sustain both biodiversity and cultural heritage.

Keywords: Index of Cultural Significance, Malay food plant knowledge, Riau ethnobotany, Relative Frequency of Citation

INTRODUCTION

Interactions between local communities and the natural environment have been ongoing for a long time, especially since they began settling and cultivating plants to meet their food and medicinal needs (Santos et al. 2022). Food plants play an important role in daily lives, not only as a source of nutrition but also as a reflection of cultural identity. The unique processing of food plants is closely linked to cultural traditions passed down through generations (Nurainas et al. 2022), becoming an integral part of the cultural identity of an ethnic group in a particular region. In certain circumstances, such as food scarcity, local food plants become an integral part of traditional food systems, ensuring food security and self-sufficiency (Yangdon et al. 2022).

The Malay community that inhabits Kuantan Singingi District, Riau, Indonesia, is one example of a Malay community that has high food security and independence (BPS 2023). It is reflected in the largest rice productivity in Riau Province, a cultural icon of the Malay community in Indonesia, located in an area on the east coast of Sumatra (Yusri et al. 2022). In addition to excelling in rice productivity, the Malay community inhabiting Kuantan Singingi District has a unique culture that develops as an acculturation between Malay and Minangkabau cultures (Saputra 2007). This cultural identity is reflected in the processing of non-cultivated crops into traditional fermented foods (Maslami et al. 2024) and the cultivation of local rice cultivars (Marlina et al. 2023).

Currently, knowledge about local food plants is declining, particularly due to urbanization, which limits community access to local plants and shifts consumption patterns toward modern instant foods (Saupi et al. 2020; Nguanchoo et al. 2025). Additionally, habitat loss caused by land conversion for oil palm plantations continues to increase, especially in Riau Province. This situation threatens the survival of food crop species and diminishes local knowledge in the region. Therefore, an exploration of the relationship between community culture and the use of local food crops (Moteetee et al. 2019) needs to be carried out to ensure and maintain food security, one of which can be done by encouraging the diversity of food sources (Hidayati et al. 2015).

The Malay community's traditional knowledge of using plant diversity has only been passed down orally, raising concerns about its potential loss over time. Therefore, documenting this local wisdom through ethnobotanical research is essential. The most recent ethnobotanical studies on food plants within the Malay group in Riau remain limited. So far, only two studies have recorded how the Malay community in Riau uses plants. The Malay

community in Kampar Kiri Hulu uses 76 species of plants (Susandarini et al. 2021), and in Rokan Hulu uses 40 species (Wahyuni et al. 2021). However, ethnobotanical research on the food plants of the Malay community in Riau is still limited and poorly documented compared to other areas, such as in Belitung District (Chikmawati et al. 2023), and other border communities, such as the Minangkabau in West Sumatra (Nurainas et al. 2022; Syamsuardi et al. 2022; Agesti et al. 2023; Suwardi et al. 2023).

Therefore, the local wisdom of the Malay community in Kuantan Singingi and its food diversity require urgent documentation. This study is the first comprehensive ethnobotanical research of food conducted among the Malay community in Riau, particularly in Kuantan Singingi District. This study aims to (i) inventory and characterize food plant species utilized by the Malay community in Kuantan Singingi District; (ii) assess the local importance of these species, and (iii) analyze the management and sustainable development of food plants.

MATERIALS AND METHODS

Study area

This research was conducted from July 2024 to January 2025 in Kuantan Singingi District, Riau Province, Indonesia, which is located between 0°00 LU-1°00 LS and 101°02' East-101°55 East. Kuantan Singingi District has a tropical climate with annual rainfall ranging from 60.21 to 652.71 mm per month, and experiences 8 to 24 days of rain per month. The highest rainfall occurs in December, while the lowest rainfall occurs in September (BPS 2024). The research data were collected from five villages in different sub-districts, each with varying regional characteristics and traditions, ranging from lowland (Kinali, Pulau Kumpai, and Simpang Tiga) to flat-hilly areas (Koto Sentajo and Muara Lembu) (Figure 1).

Informant selection

A total of 107 informants (37 men and 70 women) aged 16 to 87 years were chosen. Community leaders and individuals with extensive knowledge of the diversity and utilization of food plants and landscape units were identified as key informants through purposive sampling (Neuman 2014). Meanwhile, members of the general public familiar with and utilizing food plants for various purposes in their daily lives were selected as general informants through snowball sampling (Naderifar et al. 2017).

Before conducting the research, official written permission was obtained from the local government of Kuantan Singingi District. Prior to starting data collection in each village, permission was secured from village officials and traditional elders. All interviews with informants were conducted directly between the researcher and the informant. The informants' willingness to participate was confirmed before each interview. The data collection process was halted once data saturation was reached, indicating that no new significant information was obtained when additional informants were included.

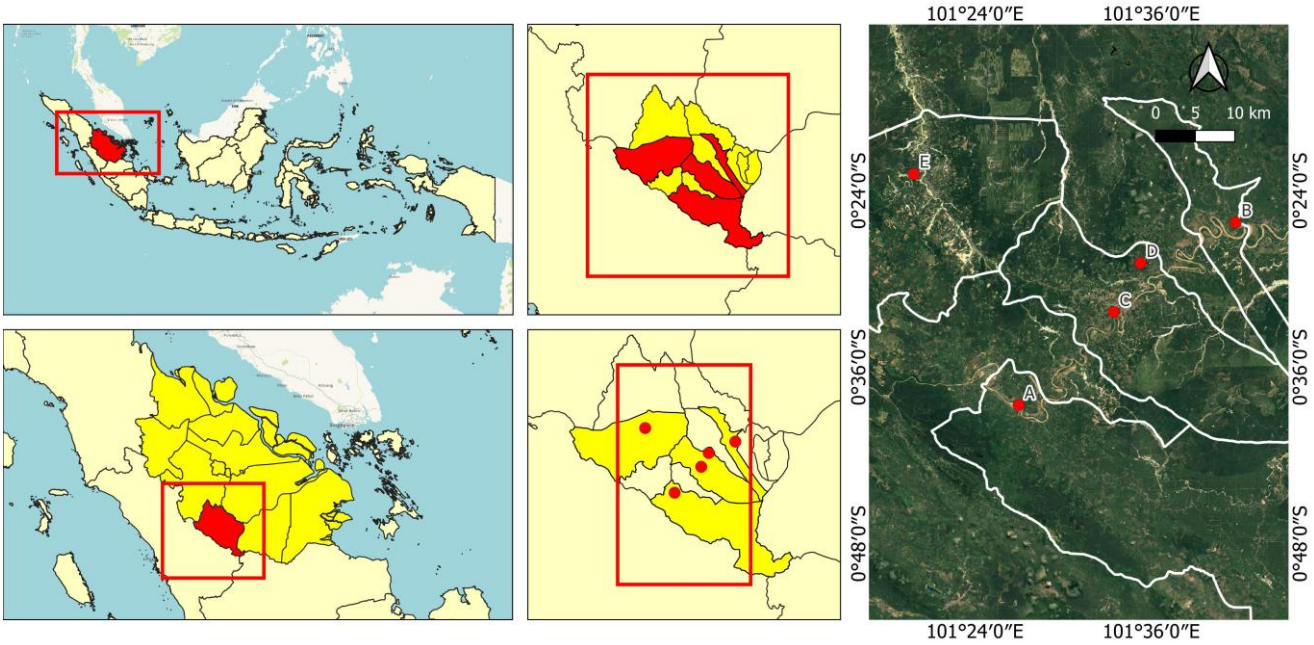

Figure 1. Map of research location in Kuantan Singingi District, Riau, Indonesia. A. Kinali, B. Pulau Kumpai, C. Simpang Tiga, D. Koto Sentajo, and E. Muara Lembu

Data collection

Ethnobotanical data, both qualitative and quantitative, were collected through open-ended, semi-structured, and structured interviews using questionnaires. The information collected included the diversity of food plant species, local names, parts used, processing methods, utilization methods, harvest locations, frequency of utilization, cultural value, and social value.

In addition to interviews, another method used was field observation with local informants in their natural habitat to identify plants directly. Plant species that could not be identified during field observations were collected for herbarium preparation using the standard method of Das (2020). Herbarium specimens were identified at the Botany Laboratory of the University of Riau by comparing them to plant identification books by matching the morphological characteristics of the specimens with two reference books, "Flora of Java" (Backer and Bakhuizen van den Brink 1968) and "Malesian Seed Plants: Spot-Characters" (Van Balgooy 1997). The scientific names were verified using online databases, including the Global Biodiversity Information Facility (GBIF) (https://www.gbif.org/), Plant of the World (https://powo.science.kew.org/), and World Plant Online (WFO) (https://wfoplantlist.org/plant-list).

Data analysis

Qualitative data were analyzed through species classification, categorized based on family, growth habits, use categories, plant parts used, and preparation methods. To improve the interpretability of the results, data were further visualized using pictures and graphs, while heat maps highlighted prominent growth habits and parts used patterns. Meanwhile, quantitative data were analyzed using indices such as Use Value (UV), Relative Frequency of Citation (RFC), Index of Cultural Significance (ICS), and Importance Value Index (IVI) (Table 1). The IVI data of a plant species is used to determine conservation strategy by comparing the IVI with the ICS value (Table 2). Quantitative analysis was performed using Excel, frequency analysis, and basic descriptive statistics to summarize and interpret the findings, with the results presented in tabular form.

RESULTS AND DISCUSSION

Food plants diversity

This study recorded a total of 167 plant species, belonging to 117 genera and 55 families, as food sources (Table S1). The most common plant family used is Fabaceae (13 species), followed by Rutaceae (9 species), Anacardiaceae, Cucurbitaceae, Myrtaceae, Poaceae, Solanaceae (8 species), Zingiberaceae (7 species), and other families (1-5 species) (Table 3). Food plants used by the Malay community in Kuantan Singingi District consist of both cultivated (100 species) and non-cultivated (67 species) plants.

Table 1. Summary of quantitative data index used in this study

Index	Formula	Purpose	Sources
Relative Frequency of Citation (RFC)	RFC = ΣFC / N	Indicated how often a species is mentioned by informants or its popularity among the community	Bano et al. (2014)
Use Value (UV)	UV = ΣU / N	Indicated the relative importance of each species based on the number of uses reported by the informant	Phillips et al. (1994)
Index of Cultural Significance (ICS)	ICS = q x i x e	Indicated the importance of a species in a cultural context, based on three aspects: quality of use, intensity of use, and the level of community preference for the plant.	Helida et al. (2015)
Importance Value Index (IVI)	IVI = RF + RD + RDo	Indicated species availability in a landscape	Ismail et al. (2017)

Note: FC: Number of informants who mentioned a species, N: Total number of informants, U: Number of uses mentioned by informants for a plant species, q: Quality value, representing the total use of a plant species, i: Intensity value, referring frequency of utilization, e: Exclusivity value, indicating the level of exclusivity of use, RF: Relative Frequency, RD: Relative Density, RDo: Relative Dominance

Table 2. Classification of conservation strategies based on IVI and ICS scores

Comparison category		Conservation
IVI	ICS	
Moderate/high	Moderate/high	Maintaining habitat and the availability of species
Low/moderate	High	Cultivating species
High	Low	Assessing and developing other potentials
Low	Low	Cultivating, studying, and developing another potential

Note: ICS: Index of Cultural Significance, IVI: Importance Value Index, Source: Dewi et al. (2016)

The number of food plant species found in this study was higher than in two previous studies in the Riau, namely 76 species in the Malay community in Kampar Kiri Hulu (Susandarini et al. 2021) and 40 species in Rokan Hulu (Wahyuni et al. 2021). However, this number is still lower than the findings in the Malay community in Belitung District, which reached 181 species (Chikmawati et al. 2023). The high proportion of cultivated species compared to non-cultivated species reflects agroforestry management strategies that ensure sustainable food supplies (Suwardi et al. 2025). Several non-cultivated plant species used by the Malay community in Kuantan Singingi as food are shown in Figure 2.

The Malay community in Kuantan Singingi District utilized the Fabaceae family for a variety of uses, including fruits, vegetables, side dishes, and spices. The Fabaceae family is the most widely used plant family as a food source globally, with around 640 species recorded (Ulian et al. 2020). This dominance is also reflected in Southeast Asia, including in Thailand (Phatlamphu et al. 2021; Nguanchoo et al. 2025), Myanmar (Shin et al. 2018), and Indonesia (Sujarwo et al. 2016; Agesti et al. 2023).

The number of food plant species used varies among villages. The highest plant species diversity was found in Koto Sentajo Village (136 species), which is located near a protected forest area, that still depends on local food plants. At the same time, people in Simpang Tiga use fewer plant species (108 species) than in the other villages. Simpang Tiga is located in an urban area that has been exposed to modern lifestyles. As a result, the residents do not rely on food plants because they can easily access animal-based and fast food. Additionally, the expansion of urban areas has led to a loss of access to food plants, especially non-cultivated ones (Phatlamphu et al. 2021).

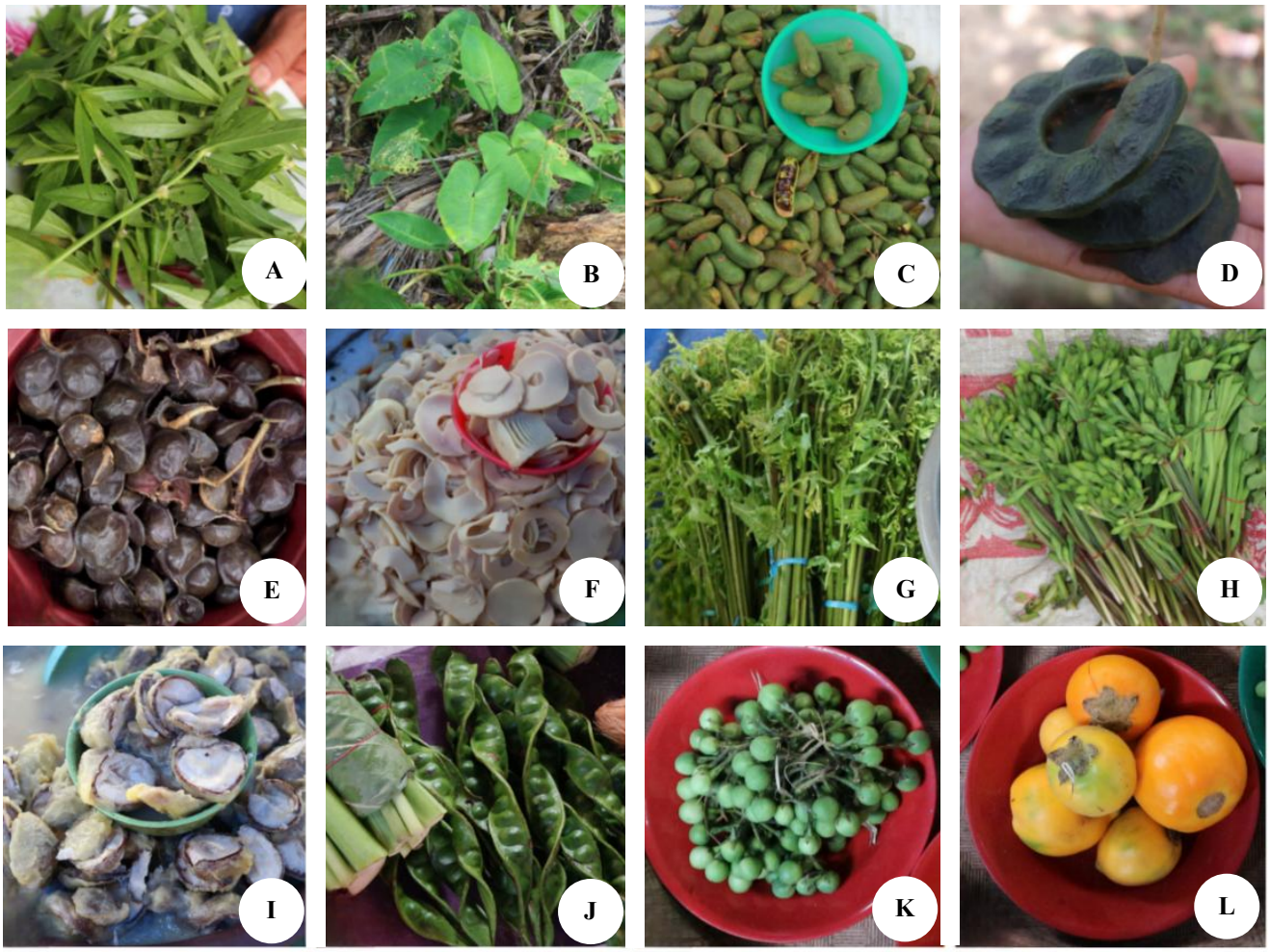

Figure 2. Non-cultivated food plant species used by the Malay community in Kuantan Singingi District, Riau, Indonesia. A. *Alternanthera sessilis* (L.) DC, B. *Apoballis mutata* (Scort. ex Hook.f.) S.Y.Wong & P.C.Boyce, C. *Archidendron bubalinum* (Jack) I.C. Nielsen, D. *Archidendron bigeminum* (L.) I.C.Nielsen, E. *Archidendron jiringa* (Jack) I.C. Nielsen, F. *Bambusa vulgaris* Schrad. ex J.C.Wendl., G. *Diplazium esculentum* (Retz.) Sw., H. *Limnocharis flava* (L.) Buchenau, I. *Pangium edule* Reinw., J. *Parkia speciosa* Hassk., K. *Solanum torvum* Sw., L. *Solanum virginianum* L

Table 3. Plant families utilized by the Malay community in Kuantan Singingi District, Riau, Indonesia

Family	Number of species
Fabaceae	13
Rutaceae	9
Anacardiaceae, Cucurbitaceae, Myrtaceae, Poaceae, Solanaceae	8
Zingiberaceae	7
Phyllanthaceae	6
Arecaceae, Sapindaceae	5
Amaranthaceae, Amaryllidaceae, Apiaceae, Araceae	4
Clusiaceae, Euphorbiaceae, Lamiaceae, Malvaceae, Meliaceae, Moraceae, Passifloraceae	3
Annonaceae, Asteraceae, Brassicaceae, Convolvulaceae, Fagaceae, Lauraceae, Melastomataceae, Musaceae, Oxalidaceae, Piperaceae, Rubiaceae	2
Achariaceae, Alismataceae, Apiaceae, Araliaceae, Asparagaceae, Athyriaceae, Blechnaceae, Bromeliaceae, Cactaceae, Caricaceae, Dioscoreaceae, Gnetaceae, Menispermaceae, Moringaceae, Muntingiaceae, Myristicaceae, Pandanaceae, Pontederiaceae, Sapotaceae, Schisandraceae, Theaceae, Vitaceae	1
Total number of families	55

Use categories

The food plants utilized by the Malay community in Kuantan Singingi District, Riau, Indonesia are categorized into two main categories, namely staple foods and supplementary foods. Staple foods are the main foods that are the primary source of energy for humans. These foods usually contain high amounts of carbohydrates and are consumed daily as the largest part of the diet. On the other hand, supplementary foods are food plants consumed as complements to staple foods to meet other nutritional needs, such as protein, vitamins, and minerals. The supplementary food plants utilized by the Malay community can be grouped into six categories, namely vegetables (69 species), fruits (59), spices (42), snacks (14), beverages (12), and side dishes (7) (Figure 3). The highest utilization category is vegetables, followed by fruits and spices. A similar result was reported on the Malay Community in Kampar Kiri Hulu by Susandarini et al. (2021).

Staple foods vary from one region to another depending on natural conditions, culture, and food availability. The Malay community in Kuantan Singingi District has the same staple food source, namely rice (*Oryza sativa* L.). Thirty-one local rice cultivars are still cultivated by the Malay community, which are classified into two main groups based on their texture. The first group is non-glutinous rice (*O. sativa*), locally known as *padi corai*, including *sokan*, *bujang merantau*, *bujang di rantau*, *kuniak*, *putiah*, *adam*, *ros*, *gondok*, *limbayang*, *katiok putiah*, *sirondah putiah*, *sarondah kuniang, sarondah merah, sarondah sira, singgaro merah*, *singgam putiah*, *singgam kuriak*, *batik lembayuang*, *batang piaman*, *lama*, *rondah sira, rondah putiah*, and *pandan wangi*. The second group is glutinous rice (*O. sativa* var. *glutinosa*), locally known as *padi puluik*, which includes *puluik bangkinang*, *puluik merah*, *puluik bungo belimbiang*, *puluik hitam*, *puluik solok*, *puluik benai*, *puluik kuning,* and *puluik karate*.

People traditionally distinguish local rice cultivars based on taste, color, texture, and grain shape. People in Kuantan Singingi District prefer a type of rice known as pera (fluffy rice), which is pure white and fragrant (Marlina et al. 2023). The Malay community in Kuantan Singingi District cultivates more local cultivars because they have a better taste, color, and texture. For example, the *putiah* is known as pure white rice, and the *pandan wangi* is famous for its fragrant pandan aroma. In addition, local rice cultivars are more adaptive to the environmental conditions in their village than modern cultivars. Kuantan Singingi District often experiences crop failures due to annual flooding and the expansion of oil palm plantations. Local cultivars can be used as an alternative crop to avoid crop failure. For example, the *sirondah putiah* and *sarondah merah* cultivars are resistant to drought stress, while the *ronda putiah* cultivar is able to adapt to fluctuations in water availability (Ezward et al. 2023).

Vegetables play a central role in Malay traditional cuisine. The Malay community has a diverse range of vegetable dishes and methods of preparation. Most of the vegetables used in traditional cuisine come from non-cultivated plants because people in the past had limited knowledge of agriculture. Several non-cultivated species commonly used as vegetables in traditional cuisine include *Apoballis mutata* (Scort. ex Hook.f.) S.Y.Wong & P.C.Boyce (*salimpek*), *Bambusa vulgaris* Schrad. ex J.C.Wendl. (*buluah*), *Diplazium esculentum* (Retz.) Sw. (*paku*), *Limnocharis flava* (L.) Buchenau (*kalayau*), and *Pangium edule* Reinw. (*samauang*).

The high utilization of fruit reflects their nutritional richness and economic value. Fruit is usually consumed directly when ripe, but its availability varies seasonally depending on the amount of fruit present in the environment. The Malay community in Kuantan Singingi prefers non-cultivated fruits, especially those with sour or sweet flavors, such as *Baccaurea motleyana* (Müll.Arg.) Müll.Arg. (*rambai*), *Baccaurea macrocarpa* (Miq.) Müll.Arg. (*tampui*), *Baccaurea polyneura* Hook.f. (*sijontiak*), *Mangifera caesia* Jack (*kemang*), *Mangifera odorata* Griff. (*kuini*), *Mangifera sumatrana* Miq. (*pauh*), *Mangifera laurina* Blume (*polam*), *Nephelium maingayi* Hiern (*pudung tunjuak*), and *Nephelium ramboutan-ake* (Labill.) Leenh. (*pelasan*). However, the fruits are becoming increasingly rare due to their reliance on natural habitats and lack of cultivation efforts. In particular, *M. caesia* was categorized as Near Threatened (NT) by the IUCN in 2021, with population declines attributed to habitat loss driven by plantation expansion and deforestation (Ganesan 2021).

Spices commonly used in various Malay traditional dishes are characterized by a combination of spicy, savory, and sour tastes. *Capsicum annuum* L. (*lado merah*) and *Capsicum frutescens* L. (*lado rawit*) are spice plants that provide a spicy taste. At the same time, *karambial* (*Cocos*

nucifera L.) adds savory flavors and thickens the texture of the dish. In addition, the Malay community in Kuantan Singingi District also utilizes the fruit of non-cultivated plants to impart a sour and fresh taste, such as *Averrhoa bilimbi* L. (*belimbing boreh*), *Garcinia xanthochymus* Hook.f. ex T.Anderson (*asam kandih*), *Garcinia atroviridis* Griff. ex T.Anderson (*asam galugua*), and *Solanum virginianum* L. (*torouang asam*). *Solanum virginianum* is commonly used in Malay dishes, such as *asam podeh* (a soupy dish with a sour and spicy taste). This knowledge is similar to that of the Malay community in Siak, Riau Province, Indonesia (Suprianti et al. 2017) and Sarawak, Malaysia (Jais 2016). Spices are also utilized by the Malay community to enhance aroma and eliminate unpleasant odors, particularly from meat or fish. *Polyscias scutellaria* (Burm.f.) Fosberg (*tapak leman*) leaves are used in goat curry, while *Ocimum tenuiflorum* L. (*ruku-ruku*) leaves are used in fish curry.

Snacks are supplementary foods consumed outside of main meal times, usually to stave off hunger. The Malay community of Kuantan Singingi District uses 14 species of plants as sources of snacks, which generally contain carbohydrates, as they serve as additional sources of energy. Two species of snack foods have potential as alternative foods during times of food scarcity, namely *Dioscorea hispida* Dennst. (*gadung*) and *Metroxylon sagu* Rottb (*rumbio*). Tubers of *D. hispida* contain 58.3-71.9% carbohydrates (Saleha et al. 2018). This species is used by the Bentong community in South Sulawesi as a source of carbohydrates during the dry season (Amboupe et al. 2019). Meanwhile, *M. sagu* has potential as an alternative local food source in Kuantan Singingi District, especially when rice crops fail due to flooding. This species is well-adapted to swampy and marginal lands, and it can thrive under flooded conditions, where other carbohydrate-producing crops struggle to grow (Azhar et al. 2022). Among all starch-producing plants worldwide, *M. sagu* has the highest starch productivity, ranging from 86.50 to 97.70%. This species has been a staple food for thousands of years in Southeast Asia and the Pacific, and it is still the main source of carbohydrates in Papua New Guinea (Duque et al. 2018).

Beverage plants include *C. nucifera* and *M. odorata,* commonly processed into a Malay traditional drink, known as *laksamana mengamuk*. This beverage is made from the fruit of *M. odorata* mixed with raw *C. nucifera* milk. The fruit of *M. odorata* has a soft, juicy pulp and a sweet taste (Juliantari et al. 2021). This beverage is only served during the *M. odorata* fruit season because any other fruit cannot replace the flavor and aroma of the fruit.

Side dishes are supplementary foods that serve to supplement staple foods as sources of protein, fat, and various complementary nutrients. The community uses seven plant species as sources of plant-based side dishes, which generally consist of protein-rich grains, including *Arachis hypogaea* L. (*kacang tanah*), *Archidendron bigeminum* (L.). I.C.Nielsen (*keliling*), *Archidendron jiringa* (Jack) I.C.Nielsen (*joriang*), *Archidendron bubalinum* (Jack) I.C.Nielsen (*kabau*), *Leucaena leucocephala* (Lam.) de Wit (*potai cino*), *Parkia speciosa* Hassk. (*potai*), and *P. edule* (*samauang*). The consumption of these plant-based side dishes is seasonal because their availability depends on the season and environmental conditions.

Growth habit, parts used, and habitat

Growth habit food plants utilized by the Malay community are trees (40.12%), herbs (33.53%), shrubs (13.17%), climbers (8.38%), creepers (3.59%), and lianas (1.20%) (Figure 4.A). The Malay community in Kuantan Singingi District most widely utilizes plants with a tree growth habit, due to high availability in various landscapes such as gardens, forests, and yards, and provides a variety of consumable parts, including fruits, leaves, seeds, flowers, and bark.

The Malay community in Kuantan Singingi utilizes nine plant parts, namely fruits (44.74%), leaves (22.11%), seeds (11.58%), flowers (7.89%), tubers (4.74%), stems, shoots (3.16% each), rhizomes (2.11%), and bark (0.53%) (Figure 4.B). The most utilized plant part is the fruit, followed by leaves. Fruits are widely used as sources of food, in the categories of fruits, vegetables, spices, and beverages. They are typically consumed fresh when ripe or used as vegetables when still young, for example, the young fruit of *Artocarpus heterophyllus* Lam. (*cubodak*), *Musa* x *paradisiaca* L. (*pisang*), and *Carica papaya* L. (*katelo*). Leaves are the second most commonly consumed plant part because of their year-round availability, as they are not dependent on specific seasons. Leaves are commonly consumed fresh by the Malay community as *ulam*, a type of traditional salad, typically served fresh or lightly cooked. This knowledge is similar to that of the Malay community in Malaysia (Awang-Kanak et al. 2018).

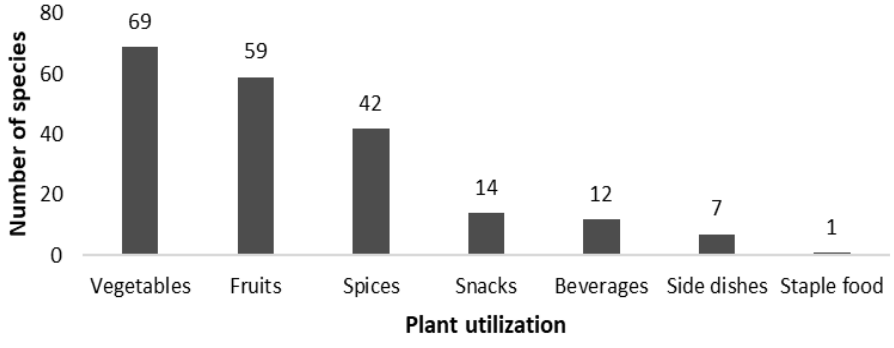

Figure 3. Categories of plant utilization by the Malay community in Kuantan Singingi, Riau, Indonesia

The heat map shows that the most utilized part of the tree habitus is the fruit (45 species), while in the herbaceous habitus, the most commonly used part is the leaves (23 species) (Figure 5). This pattern reflects the preference of the Malay community for harvesting plant parts that are easily accessible, non-destructive, and have high nutritional value. The Malay community generally harvests fruits and leaves manually without damaging the plant structure. A similar harvesting pattern is also found among the Minangkabau community in West Sumatra, who selectively harvest non-cultivated fruits to maintain sustainability (Suwardi et al. 2023).

Malay people utilize plants originating from 6 types of landscapes: yard (*laman*), *polak* (short rotation plantation), garden (*kobun*), agroforestry, rice field, and forest (*rimbo*) (Figure 6). Most people in Kuantan Singingi District found food plants in yards (115 species). Yards play an important role in meeting households' daily food needs and improving food security through plant diversification. Globally, yards are recognized as an important contributor to food security, household nutrition, and rural livelihoods (Ofosu-Bamfo et al. 2023).

Preparation methods

The food plants consumed by the Malay community in Kuantan Singingi District are processed using eight preparation methods, including cooked (47.42%), raw (38.03%), boiled (7.04%), roasted (2.82%), fermented (2.35%), soaked (1.41%), grated and burned (0.47% each) (Figure 7). These diverse methods are the result of accumulated knowledge, trials, and personal experiences that are passed down from one generation to the next.

Cooking is the most common preparation method among the Malay community, especially for vegetables and spices, to improve flavor and soften textures. The Malay community has unique cooking techniques that showcase their rich culinary traditions. For example, *Alternanthera sessilis* (L.) DC. (*karomak*) and *D. esculentum* are cooked into rendang, a traditional dish made with coconut milk and a blend of spices, cooked until thickened and reduced. This dish is served during traditional ceremonies, such as *makan basamo* (communal eating) held in the *rumah gadang* (traditional house), which occurs annually on the second day of Eid al-Fitr. This method of processing is similar to that of the Minangkabau community, which has the knowledge to process leaves from 40 plant species into a traditional dish called *rondang daun* (Agesti et al. 2023).

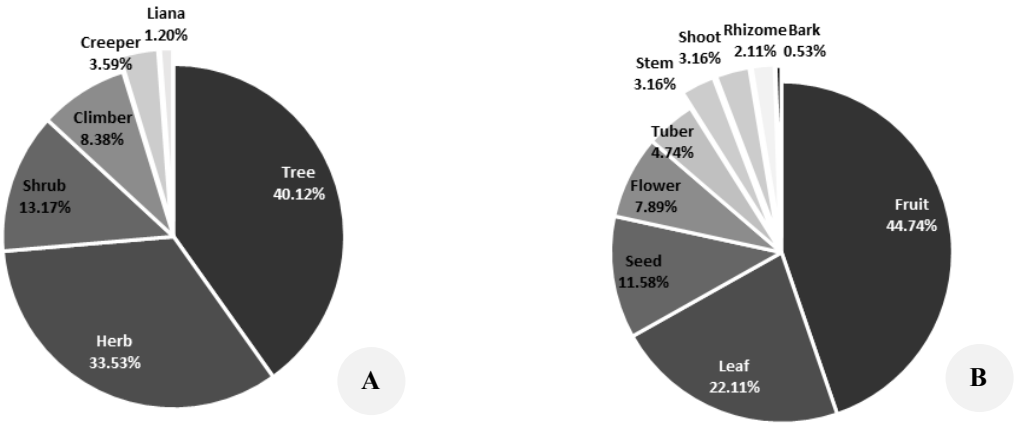

Figure 4. The percentage of growth habit (A) and Parts used of plant species used by the Malay community (B) in Kuantan Singingi District, Riau, Indonesia

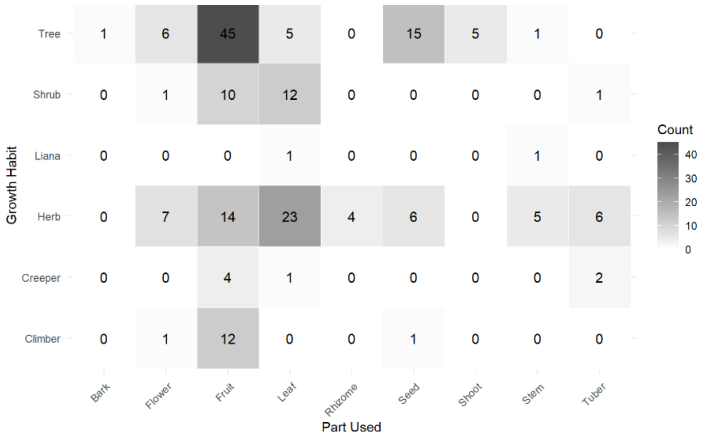

Figure 5. Heatmap of growth habit and parts used of plant species used by the Malay community in Kuantan Singingi District, Riau, Indonesia

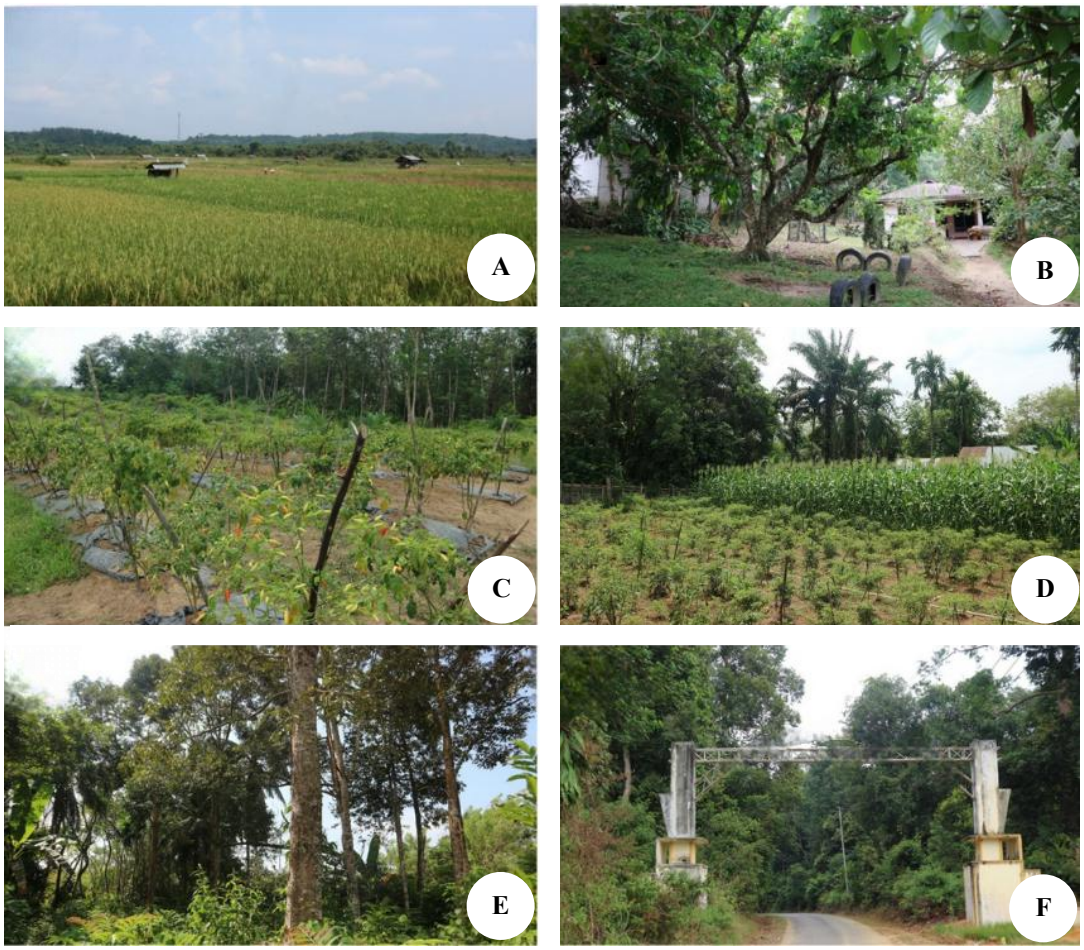

Figure 6. Landscape types of the Malay community in Kuanta Singingi District, Riau, Indonesia. A. Rice field, B. Yard, C. Agroforestry, D. Polak, E. Garden, F. Forest

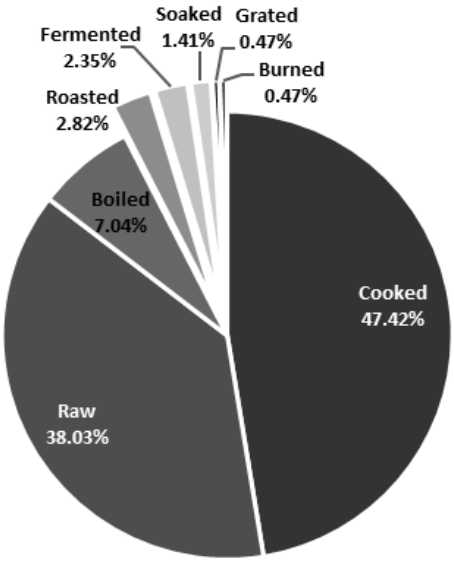

Figure 7. The percentage of preparation methods of plant species used by the Malay community in Kuantan Singingi District, Riau, Indonesia

Raw consumption in the Malay community is predominantly associated with fruits and vegetables. Fruits are often eaten fresh due to their palatable taste when ripe. In addition, vegetable plants are consumed raw by the Malay community as *ulam*. The most commonly used plant parts as *ulam* are leaves of *Anacardium occidentale* L. (*jambu monyet*), *Citrus medica* L. (*limau mentimun*), *Centella asiatica* (L.) Urb. (*pegago*), and *Melicope ptelefolia* (Champ. ex Benth.) T.G.Hartley (*tenggek burung*).

Boiling is a preferred method for snacks and vegetables to soften the texture and eliminate the bitter taste. Most snacks derived from tuberous plants require boiling before consumption, such as *D. hispida, Colocasia esculenta* (L.) Schott (*sipikul*), *Ipomoea batatas* (L.) Lam. (*ubi jala*), *Manihot esculenta* Crantz (*ubi kayu*), *Solanum tuberosum* L. (*kentang*), and *Xanthosoma sagittifolium* (L.) Schott (*taleh hitam*). Meanwhile, some snacks are roasted before consumption, such as *Castanopsis argentea* (Blume) A.DC. (*berangan*) and *Castanopsis megacarpa* Gamble (*karuntang*). The seeds of both species are traditionally dry-roasted using sand, which can distribute heat evenly and cook the seeds thoroughly.

Soaking is a preferred method to eliminate toxic compounds of plants, such as *D. hispida* and *P. edule*. Tuber of *D. hispida* possesses high levels of cyanogenic glycosides, making them toxic and unsafe for direct consumption (Widiyanti and Kumoro 2017). The Malay community in Kuantan Singingi District possesses traditional knowledge, which involves soaking tubers in running river water for 5-7 days. In contrast, the Bentong community in South Sulawesi uses a different detoxification method for this species, which involves burying the tubers in the ground for seven days to eliminate the toxins (Amboupe et al. 2019). Similarly, *P. edule* must be processed, as it contains high levels of cyanogenic compounds, rendering it toxic and unsafe for direct consumption (Sailah et al. 2021). The Malay community possesses traditional knowledge to detoxify the seeds by splitting them, extracting the endosperm, and soaking it in water for 7-10 days.

Fermenting reflects the local wisdom of the Malay community in utilizing non-cultivated plants from their surrounding environment. This method serves as a means of preserving food for long-term storage to ensure food availability over time. The young shoots of *B. vulgaris* are typically fermented traditionally into *cangkuak*, a preparation of fermented beef meat and bones using *B. vulgaris* shoots. Maslami et al. (2024) reported that *cangkuak* contains lactic acid bacteria from the genus *Lactobacillus*, which have been shown to inhibit the growth of *Staphylococcus aureus*, *Escherichia coli*, and *Salmonella* sp., indicating its potential as a natural antibacterial agent. In addition, the seeds of *P. edule*, after detoxification, are also used as natural meat preservatives. Mirdhayati et al. (2024) demonstrated that fermentation using *P. edule* can preserve meat without reducing its nutritional value.

Local importance of food plants

Cultivated species have higher UV values than non-cultivated species because they are used more frequently. Cultivated species with the highest UV score is *C. nucifera* (Table 4). This plant is widely used in various categories such as spices, vegetables, fruits, and beverages, demonstrating its multifunctionality. Additionally, nearly all parts of this species can be utilized. The leaves serve as food wrappers. The young fruit is used as a natural refreshing beverage, while the mature fruit functions as a spice and is a key ingredient in traditional Malay snacks and drinks. The young stems (*umbuik*) are used as vegetables, and even the male flowers are harvested to produce nira water, which can be drunk fresh or further processed into sugar.

Meanwhile, the non-cultivated species with the highest UV score is *A. bilimbi* (Table 4). This species has a wide range of uses as a fruit, spice, and vegetable. The Malay community often uses it in *gulai ikan* (fish curry) dishes as a spice to give a sour taste and to reduce the fishy odor in the dish. In fact, people often refer to this plant as *belimbing gulai* because it is commonly used in *gulai* dishes. This utilization is unique because the Malay community in other parts of Riau does not commonly use it.

A high RFC value indicates that a species is known by all respondents, reflecting the successful transmission of traditional knowledge in the community (Tounekti et al. 2019). There are 17 cultivated plant species known by all respondents, with an RFC value of 1.00 (Table 4). In general, cultivated plants with high RFC values are widely grown in yards and commonly consumed. These species include *A. heterophyllus*, *C. papaya*, *C. nucifera*, *Curcuma longa* (*kunik*), *Mangifera indica* (*mangga*), *M. esculenta*, *Musa* x *paradisiaca*, and *Nephelium lappaceum* (*rambutan*).

Among the non-cultivated plants, only five species have a high RFC values of 1.00 (Table 4), including *Lansium domesticum* Corrêa (*duku*), *B. vulgaris*, *P. speciosa*, *A. jiringa*, and *D. esculentum*. These plants grow naturally in the surrounding environment, making them more familiar than non-cultivated species that are difficult to find. This study shows that plant species that are rarely used tend to be unknown to the community. These findings emphasize the importance of passing on traditional knowledge through sustainable utilization practices in daily lives.

Cocos nucifera has the highest ICS score for cultivated species (Table 4). This species has a wide range of uses, a high frequency of utilization, and a strong cultural preference. *Cocos nucifera* is mainly used as a spice for daily cooking and has become an integral part of the culinary and cultural identity of the Malay community. For instance, *galamai* (a sweet, sticky snack made from glutinous rice flour, coconut milk, and palm sugar) and *lomang* (glutinous rice and coconut milk cooked in bamboo over an open fire). These two dishes are commonly served during Eid celebrations (an Islamic celebration) and used as souvenirs when visiting family homes. In addition, *C. nucifera* is also used in the Malay Kuantan Singingi dish *konji anak loba* (porridge shaped like a bee larva, served with coconut milk), which is served during community gatherings (*gotong royong*) as a symbol of togetherness. This study is similar to research conducted by Suwardi et al. (2025), which showed that *C. nucifera* is used as an ingredient in ritual offerings, symbolizes cultural identity, and serves as an expression of gratitude to ancestral spirits in the Malay community in Sintang, West Kalimantan.

The high category ICS score was recorded for two species of non-cultivated plants, *B. vulgaris* and *Arenga pinnata* (Wurmb) Merr. (Table 4). *Bambusa vulgaris* has the highest ICS score because it plays an important role in traditional Malay cuisine in Kuantan Singingi. The shoots of this plant are popular as a vegetable during wedding ceremonies (*baralek)* and the main ingredient in a traditional fermented food (*cangkuak).* In addition, the stems of *B. vulgaris* are used as containers for making traditional snacks (*lomang)*, which are made every year during the Eid al-Fitr celebrations. Another non-cultivated species with the high ICS score is *A. pinnata*. This plant has various uses, including as a source of fruit, a beverage, a natural sweetener, and a building material. The Malay community processes the flowers of this species into *gulo onau* (palm sugar), which is used in various traditional Malay snacks, such as *konji anak loba* and *galamai*.

Table 4. High RFC, UV, and ICS categories in cultivated and non-cultivated plants used by the Malay community in Kuantan Singingi District, Riau, Indonesia

Scientific name	Family	Local name	Parts used	Use category	Ethnobotanical indices			
					FC	RFC	UV	ICS
Cultivated plants								
Artocarpus heterophyllus Lam.	Moraceae	*Cubodak*	Fruit	Fruits, vegetables	107	1.00	1.98	-
Capsicum annuum L.	Solanaceae	*Lado merah*	Fruit	Spices	107	1.00	-	-
Carica papaya L.	Caricaceae	*Katelo*	Fruit, leaf, flower	Fruits, vegetables	107	1.00	1.93	-
Cocos nucifera L.	Arecaceae	*Karambial*	Fruit, shoot, flower	Fruits, beverages, vegetables, spices	107	1.00	4.08	137.20
Curcuma longa L.	Zingiberaceae	*Kunik*	Rhizome, leaf, flower	Spices, vegetables	107	1.00	1.61	98.60
Dimocarpus longan Lour.	Sapindaceae	*Lengkeng*	Fruit	Fruits	107	1.00	-	-
Durio zibethinus L.	Malvaceae	*Durian*	Fruit, seed, flower	Fruits, vegetables	107	1.00	1.54	-
Garcinia mangostana L.	Clusiaceae	*Manggi*	Fruit	Fruits	107	1.00	-	-
Manihot esculenta Crantz	Euphorbiaceae	*Ubi kayu*	Tuber, leaf	Vegetables, snacks	107	1.00	2.01	57.60
Mangifera indica L.	Anacardiaceae	*Mangga*	Fruit	Fruits	107	1.00	-	-
Musa x *paradisiaca* L.	Musaceae	*Pisang hibrid*	Fruit, flower	Fruits, vegetables	107	1.00	2.75	93.60
Musa acuminata	Musaceae	*Pisang*	Fruit, flower	Fruits, vegetables	107	1.00	2.25	81.60
Nephelium lappaceum L.	Sapindaceae	*Rambutan*	Fruit	Fruits	107	1.00	-	-
Oryza sativa L.	Poaceae	*Padi*	Seed	Staple food	107	1.00	1.06	85.80
Solanum melongena L.	Solanaceae	*Toruang*	Fruit	Vegetables	107	1.00	-	-
Vigna unguiculata (L.) Walp.	Fabaceae	*Kacang panjang*	Fruit	Vegetables	107	1.00	-	-
Zea mays L.	Poaceae	*Jagung*	Fruit, flower	Fruits, vegetables, snacks	107	1.00	2.44	-
Non-cultivated plants								
Archidendron jiringa (Jack) I.C.Nielsen	Fabaceae	*Joriang*	Seed	Vegetables, side dishes	107	1.00	1.04	-
Arenga pinnata (Wurmb) Merr.	Arecaceae	*Onau*	Fruit, flower	Fruits, beverages	-	-	1.41	61.20
Averrhoa bilimbi L.	Oxalidaceae	*Belimbiang boreh*	Fruit	Fruits, vegetables, spices	-	-	1.52	-
Bambusa vulgaris Schrad. ex J.C.Wendl.	Poaceae	*Buluah*	Shoot	Vegetables	107	1.00	1.09	65.60
Colocasia esculenta (L.) Schott	Araceae	*Sipikul*	Tuber, stem	Vegetables, snacks	-	-	1.41	-
Diplazium esculentum (Retz.) Sw.	Athyriaceae	*Paku*	Leaf	Vegetables	107	1.00	1.08	-
Lansium domesticum Corrêa	Meliaceae	*Duku*	Fruit	Fruits	107	1.00	-	-
Parkia speciosa Hassk.	Fabaceae	*Potai*	Seed	Vegetables, side dishes	107	1.00	1.04	-
Psidium guajava J.R.Forst. & G.Forst.	Myrtaceae	*Jambu awe*	Fruit	Fruits	-	-	1.06	-
Solanum virginianum L.	Solanaceae	*Toruang asam*	Fruit	Spices	-	-	1.35	-
Tamarindus indica L.	Fabaceae	*Asam jawa*	Fruit	Fruits, spices	-	-	1.34	-

Note: FC: Frequency of Citation, RFC: Relative Frequency of Citation, UV: Use Value, ICS: Index of Cultural Significance

Transmission of local knowledge

Knowledge about food plants in the Malay community of Kuantan Singingi is passed down orally from one generation to the next. However, this process is increasingly affected by both internal and external factors. Internal factors, including age, gender, education level, and occupation, significantly influence the number of food plant species known (Figure 8). Meanwhile, external

factors such as urbanization and modernization also affect the continuity of traditional plant knowledge.

The older generations (>55 years old) have more knowledge about food plants than the younger generation (≤25 years old) (Figure 8.A). Older generations have had more time to interact with the environment and accumulate experience, while younger generations are still learning and adapting to the local environment and culture. Previous studies have shown that age has a positive effect on the number of food plants known (Punchay et al. 2020; Saupi et al. 2020), and knowledge decreases as the older generation passes away (Agboola et al. 2015).

Women have more and richer knowledge of food plants than men (Figure 8.B). Women are more involved in activities related to food plants, such as cooking, processing, and planting plants in their surroundings. This study is similar to research conducted by Saupi et al. (2020), which indicated that most food plants are cultivated or gathered by women. Additionally, farmers possess greater knowledge about food plants (Figure 8.C) due to their increased interaction with the environment and their daily activities that involve processing and using food plants.

Malay people with an elementary school education have more knowledge than those with higher education (a Bachelor's degree) (Figure 8.D). Meanwhile, people with higher formal education generally work and live in urban areas, so their interaction with the natural environment is limited, and they are more dependent on modern food sources. A study conducted by Luo et al. (2024) also reported that people who pursue education or work outside their home regions tend to abandon traditional lifestyles and adopt modern lifestyles.

The Malay communities in rural areas that still practice traditions and rituals related to plant utilization have a higher level of knowledge about food plants. In contrast, the Malay community in urban areas has adopted a modern lifestyle and tends to abandon traditional practices. This study is similar to research conducted by Suwardi et al. (2025), which showed that the traditional knowledge of the younger generation of the Malay community in Sintang, West Kalimantan, has eroded due to reduced exposure to cultural practices, influenced by modernization and urbanization. Previous studies have also shown that as more of the younger generation adopt modern lifestyles, the transmission of local knowledge about food plants from the older generations is declining (Sutrisno et al. 2020; Blue et al. 2023).

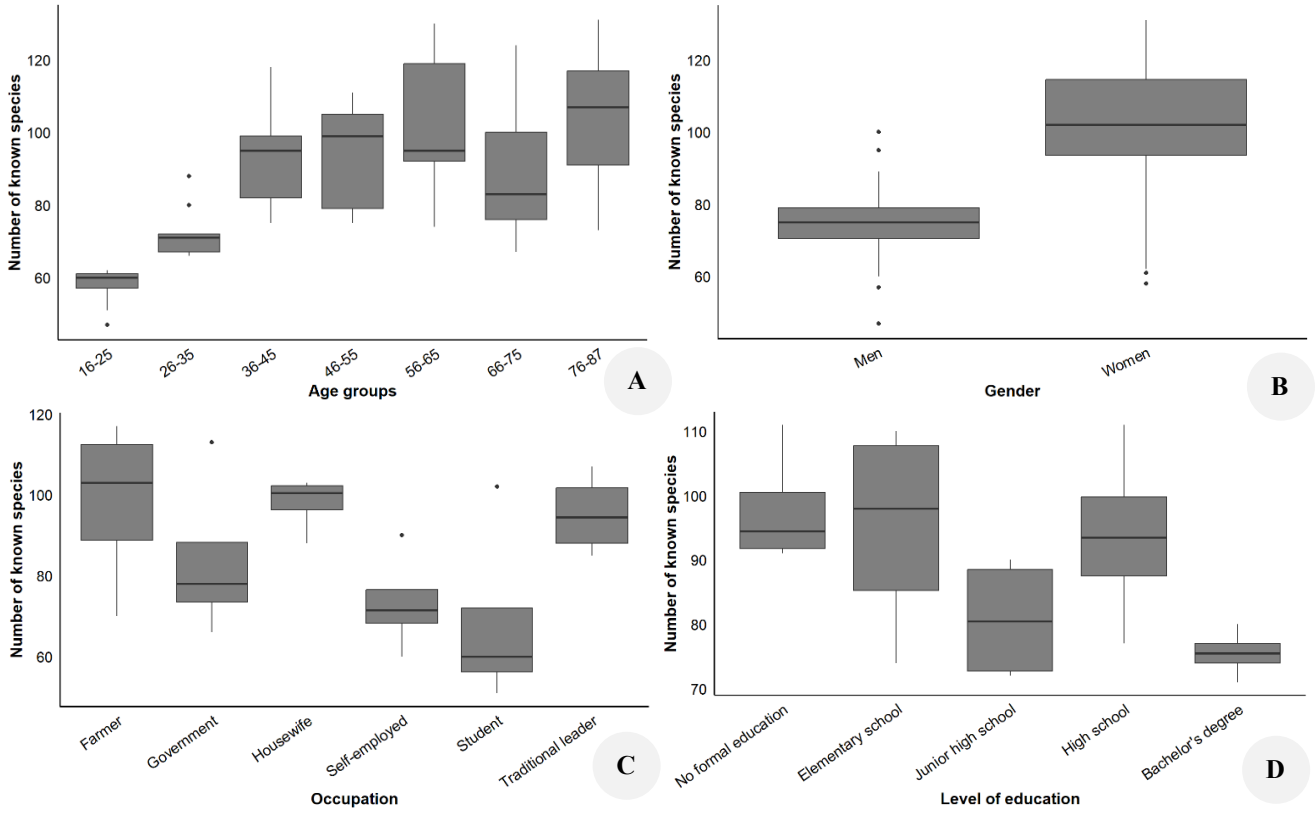

Figure 8. Food plant knowledge based on respondent characteristics. A. Age group, B. Gender, C. Occupation, D. Level of education

Table 5. Conservation strategies for non-cultivated food plants in Kuantan Singingi District, Riau, Indonesia

Conservation strategy/species	IVI value	ICS value	IVI category	ICS category
Maintaining habitat and the availability of species				
Archidendron jiringa (Jack) I.C.Nielsen (*joriang*)	93.02	28.80	Moderate	Moderate
Parkia speciosa Hassk. (*potai*)	73.87	32.00	Moderate	Moderate
Cultivating species				
Bambusa vulgaris Schrad. ex J.C.Wendl. (*buluah*)	62.48	65.60	Low	High
Arenga pinnata (Wurmb) Merr. (*onau*)	80.29	61.20	Moderate	High
Assessing and developing other potentials				
Lansium domesticum Corrêa (d*uku*)	193.31	14.40	High	Low
Cultivating, studying, and developing other potentials				
Archidendron bigeminum (L.) I.C.Nielsen (*keliling*)	8.06	5.60	Low	Low
Archidendron bubalinum (Jack) I.C.Nielsen (*kabau*)	17.72	14.40	Low	Low

Note: ICS: Index of Cultural Significance, IVI: Importance Value Index

In addition, urbanization has led to a decline in knowledge among the younger generation of the Malay community. Chikmawati et al. (2023) show that urbanization has increased the distance between residences and plant sources, resulting in limited access to non-cultivated plants. This situation has led to threats to biodiversity and local knowledge, showing signs of being forgotten and abandoned by the younger generation (Guo et al. 2022). Previous studies have also shown that local communities in Bintulu, Sarawak, Malaysia, have experienced a decline in the use of non-cultivated food plants among the younger generation, mainly due to limited access to non-cultivated plants as a result of urbanization (Saupi et al. 2020). Similarly, the Thai Song Dam community in Thailand has also experienced a decline in the use of local food plants, along with habitat loss and a shift in consumption patterns towards modern, instant food (Nguanchoo et al. 2025).

Conservation strategies of food plants

In general, our study found that knowledge about food plants among the Malay community increases with age. However, traditional knowledge is showing signs of being forgotten and abandoned by the younger generation due to environmental degradation of oil palm plantations, loss of access to food plants, and changes in modern lifestyles. The preservation of Malay traditions and customs in Kuantan Singingi must involve the younger generation to ensure the transfer of knowledge from older to younger generations. Additionally, integrating traditional knowledge about food plants into formal education—such as material on the ethnobotany of food in the *Muatan Lokal* curricula (Riau Malay culture subject) or documenting local wisdom—reduces reliance on passing knowledge down from older generations. This study also functions as a documentation effort that provides basic information on species inventory, usage patterns, processing methods, and cultural importance.

The Malay community in Kuantan Singingi District implements conservation practices based on local knowledge, one of which is through a mixed cropping system of various local rice cultivars in the same field. The community uses this strategy to reduce the risk of crop failure due to environmental changes or pest attacks. At the same time, it preserves the diversity of local varieties that have great potential as a source of germplasm. As a form of adaptation to environmental changes, the Malay community implements an agroforestry system by planting various species of food plants between young oil palms. Meanwhile, the Malay community still adheres to customary rules that prohibit tree felling in protected forest areas. Social sanctions in the form of customary ostracism have proven effective in helping to preserve the diversity of local fruit species sourced from the forest.

Conservation strategies based on the correlation between ICS and IVI (Table 5) are needed for sustainable use. Species with high or moderate ICS and IVI, such as *A. jiringa* and *P. speciosa*, should be conserved immediately through efforts to protect and maintain their natural habitats. Meanwhile, species with high ICS but low IVI, such as *B. vulgaris* and *A. pinnata,* need cultivation efforts to increase their availability. In addition, food plants with high IVI but low ICS, such as *L. domesticum*, need to explore other uses of these plants to increase their value. Plants that are considered less useful tend to be neglected and are at risk of being replaced by other species. Local species with low ICS and IVI, such as *A. bigeminum* and *A. bubalinum*, require all possible conservation strategies, including planting, exploring, and enhancing other potential values of these plants.

In conclusion, this study revealed that the Malay community in Kuantan Singingi District, Riau, Indonesia, utilizes 167 species of food plants, both cultivated and non-cultivated, obtained from six different landscape types. These plants serve various functions, including staple food, vegetables, fruits, spices, snacks, beverages, and side dishes. Key species, *C. nucifera*, has high cultural significance, as shown by its UV, RFC, and ICS values. Older generations and women play a central role in managing and passing on plant knowledge. However, erosion of knowledge among the younger generation, driven by land use change, reduced plant access, and socio-cultural shifts, poses a significant threat to biocultural heritage. Preservation of this knowledge should be supported through intergenerational transfer mechanisms, the revitalization of traditional Malay customs, and the integration of ethnobotanical education into formal curricula. The Malay community also holds valuable local

ecological knowledge that is key to biodiversity conservation. Based on the comparison of ICS and IVI values, this study recommends conservation strategies such as habitat protection for *A. jiringa* and *P. speciosa*, and cultivation-based strategies for *A. pinnata* and *B. vulgaris*. Further documentation of traditional knowledge through policy is urgently needed to support both food security and cultural identity preservation.

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Table S1. Diversity of food plants utilized by the Malay community in Kuantan Singingi District, Riau, Indonesia

Family	Scientific name	Local name	Growth habit	Cultivation status	Part used	Use category	Preparation method	Habitat
Fabaceae	*Arachis hypogaea* L.	*Kacang tanah*	Herb	Cultivated	Seed	Spices, side dishes, snacks	Cooked	Polak, Agroforestry
	Archidendron bigeminum (L.) I.C.Nielsen	*Keliling*	Tree	Non-cultivated	Seed	Vegetables, side dishes	Cooked, raw	Garden
	Archidendron jiringa (Jack) I.C.Nielsen	*Joriang*	Tree	Non-cultivated	Seed	Vegetables, side dishes	Cooked, raw	Yard, polak, garden forest, agroforestry
	Archidendron bubalinum (Jack) I.C.Nielsen	*Kabau*	Tree	Non-cultivated	Seed	Vegetables, side dishes	Cooked, raw	Garden, forest
	Clitoria ternatea L.	*Bunga telang*	Climber	Cultivated	Flower	Beverages	Boiled	Yard
	Dialium indum L.	*Keranji*	Tree	Non-cultivated	Fruit	Fruits	Raw	Forest
	Leucaena leucocephala (Lam.) de Wit	*Potai cino*	Tree	Non-cultivated	Seed	Vegetables, side dishes	Cooked, raw	Yard
	Psophocarpus tetragonolobus (L.) DC.	*Kacang belimbiang*	Climber	Cultivated	Fruit	Vegetables	Cooked	Yard, polak
	Parkia speciosa Hassk.	*Potai*	Tree	Non-cultivated	Seed	Vegetables, side dishes	Cooked, raw	Yard, polak, garden, forest
	Senna tora (L.) Roxb.	*Gelinggang*	Herb	Non-cultivated	Leaf	Vegetables	Cooked	Yard, agroforestry
	Tamarindus indica L.	*Asam jawa*	Tree	Non-cultivated	Fruit	Fruits, spices	Raw, cooked	Yard
	Vigna unguiculata (L.) Walp.	*Kacang panjang*	Climber	Cultivated	Fruit	Vegetables	Cooked	Polak, agroforestry
	Vigna radiata (L.) R.Wilczek	*Kacang hijau*	Herb	Cultivated	Seed	Snacks, vegetables	Boiled, cooked	Polak
Rutaceae	*Citrus* × *aurantium* L.	*Limau manih*	Shrub	Cultivated	Fruit	Fruits	Raw	Yard
	Citrus × *aurantiifolia* (Christm.) Swingle	*Limau kapeh*	Shrub	Cultivated	Fruit	Spices	Cooked, raw	Yard, polak
	Citrus × *aurantium f. aurantium*	*Limau peras*	Shrub	Cultivated	Fruit	Beverages	Raw	Yard, polak
	Citrus hystrix DC.	*Limau puruik*	Shrub	Cultivated	Leaf	Spices	Cooked	Yard
	Citrus × *limon* (L.) Osbeck	*Lemon*	Shrub	Cultivated	Fruit	Beverages	Raw	Yard, polak
	Citrus × *microcarpa* Bunge	*Limau kasturi*	Shrub	Cultivated	Fruit	Spices, beverages	Cooked, raw	Yard
	Citrus maxima (Burm.) Merr.	*Limau bali*	Shrub	Cultivated	Fruit	Fruits	Raw	Yard
	Citrus medica L.	*Limau mentimun*	Shrub	Non-cultivated	Leaf	Vegetables	Raw	Yard
	Melicope ptelefolia (Champ. ex Benth.) T.G.Hartley	*Tenggek burung*	Shrub	Non-cultivated	Leaf	Vegetables	Raw	Yard
Anacardiaceae	*Mangifera caesia* Jack	*Kemang*	Tree	Non-cultivated	Fruit	Fruits	Raw	Forest
	Mangifera foetida Lour.	*Ambacang*	Tree	Non-cultivated	Fruit	Fruits Spices	Raw	Yard
	Mangifera indica L.	*Mangga*	Tree	Cultivated	Fruit	Fruits	Raw	Yard, polak, agroforestry
	Mangifera laurina Blume	*Polam*	Tree	Non-cultivated	Fruit	Fruits Spices	Raw	Yard, polak, agroforestry
	Mangifera odorata Griff.	*Kuini*	Tree	Non-cultivated	Fruit	Fruits	Raw	Yard, garden

	Mangifera sumatrana Miq.	*Pauh*	Tree	Non-cultivated	Fruit	Fruits	Raw	Yard
	Anacardium occidentale L.	*Jambu monyet*	Tree	Non-cultivated	Fruit, leaf, seed	Fruits, vegetables	Raw, roasted	Yard
	Spondias dulcis Parkinson	*Kendondong*	Tree	Cultivated	Fruit	Fruits	Raw	Yard
Cucurbitaceae	*Benincasa hispida* (Thunb.) Cogn.	*Kundua*	Creeper	Cultivated	Fruit	Vegetables	Cooked	Yard, polak
	Citrullus lanatus (Thunb.) Matsum. & Nakai	*Semangka*	Creeper	Cultivated	Fruit	Fruits	Raw	Agroforestry
	Cucurbita moschata Duchesne	*Labu manih*	Creeper	Cultivated	Fruit, leaf	Snacks, vegetables	Cooked	Yard, agroforestry, polak
	Cucumis sativus L.	*Timun*	Climber	Cultivated	Fruit	Vegetables	Raw Cooked	Yard, agroforestry, polak
	Lagenaria siceraria (Molina) Standl.	*Labu aia*	Creeper	Cultivated	Fruit	Vegetables	Cooked	Yard, polak
	Luffa acutangula (L.) Roxb.	*Pitulo*	Climber	Cultivated	Fruit	Vegetables	Cooked	Yard, agroforestry, polak
	Momordica charantia L.	*Pario*	Climber	Cultivated	Fruit	Vegetables	Cooked	Yard, polak
	Momordica charantia subsp. charantia	*Pario katak*	Climber	Non-cultivated	Fruit	Vegetables	Cooked	Polak
	Sicyos edulis Jacq.	*Japan*	Climber	Cultivated	Fruit	Vegetables	Cooked	Local market
Myristicaceae	*Myristica fragrans* Houtt.	*Palo*	Tree	Cultivated	Seed	Spices	Cooked	Local market
Myrtaceae	*Psidium guajava* J.R.Forst. & G.Forst.	*Jambu awe*	Tree	Non-cultivated	Fruit	Fruits	Raw	Yard
	Rhodomyrtus tomentosa (Aiton) Hassk.	*Karamuntiang*	Shrub	Non-cultivated	Fruit	Fruits	Raw	Yard
	Syzygium aqueum (Burm.f.) Alston	*Jambu aia*	Tree	Cultivated	Fruit	Fruits	Raw	Yard, polak
	Syzygium aromaticum (L.) Merr. & L.M.Perry	*Cengkeh*	Tree	Cultivated	Flower	Spices	Cooked	Local market
	Syzygium malaccense (L.) Merr. & L.M.Perry	*Jambu jambak*	Tree	Cultivated	Fruit	Fruits	Raw	Yard, polak, garden
	Syzygium cumini (L.) Skeels	*Jambu koliang*	Tree	Non-cultivated	Fruit	Fruits	Raw	Yard
	Syzygium polyanthum (Wight) Walp.	*Salam*	Tree	Non-cultivated	Leaf	Spices	Cooked	Yard, polak
	Syzygium zeylanicum (L.) DC.	*Nasi-nasi*	Shrub	Cultivated	Leaf	Vegetables	Raw	Yard
Poaceae	*Bambusa vulgaris* Schrad. Ex J.C.Wendl.	*Buluah*	Tree	Non-cultivated	Shoot	Vegetables	Fermented, cooked	Yard, garden
	Cymbopogon citratus (DC.) Stapf	*Sorai*	Herb	Cultivated	Stem	Spices	Cooked	Yard, polak
	Dendrocalamus asper (Schult. & Schult.f.) Backer	*Botuang*	Tree	Non-cultivated	Shoot	Vegetables	Fermented, cooked	Garden
	Gigantochloa atroviolacea Widjaja	*Buluah*	Tree	Non-cultivated	Shoot	Vegetables	Fermented, cooked	Garden
	Saccharum officinarum L.	*Tobu*	Herb	Cultivated	Stem	Beverages	Raw	Yard, polak, garden
	Saccharum × edule Hassk.	*Tobu tolu*	Herb	Cultivated	Flower	Vegetables	Cooked	Yard
	Oryza sativa L.	*Padi*	Herb	Cultivated	Seed	Staple food	Cooked	Rice field
	Zea mays L.	*Jaguang*	Herb	Cultivated	Fruit, flower	Fruits, vegetables	Cooked, boiled	Polak, agroforestry
Solanaceae	*Capsicum annuum* L.	*Lado merah*	Herb	Cultivated	Fruit	Spices	Cooked	Yard, polak
	Capsicum frutescens L.	*Lado rawit*	Herb	Cultivated	Fruit	Spices	Cooked	Yard, polak, agroforestry
	Physalis angulata L.	*Lotuik-lotuik*	Herb	Non-cultivated	Fruit	Fruits	Raw	Yard, polak, agroforestry

	Solanum virginianum L.	*Toruang asam*	Herb	Non-cultivated	Fruit	Spices, vegetables	Cooked, raw	Yard, polak, agroforestry
	Solanum lycopersicum L.	*Tomat*	Herb	Cultivated	Fruit	Spices	Raw, cooked	Yard
	Solanum melongena L.	*Toruang*	Herb	Cultivated	Fruit	Vegetables	Cooked	Yard, polak, agroforestry
	Solanum torvum Sw.	*Rimbang*	Herb	Non-cultivated	Fruit	Vegetables	Raw, cooked	Yard, polak, agroforestry, garden, forest
	Solanum tuberosum L.	*Kentang*	Herb	Cultivated	Tuber	Vegetables, snacks	Boiled, cooked	Local market
Zingiberaceae	*Alpinia galanga* (L.) Willd.	*Lingkueh*	Herb	Cultivated	Rhizome	Spices	Cooked	Yard, polak
	Alpinia submutica K.Schum.	*Lome-lome*	Herb	Non-cultivated	Fruit	Fruits	Raw	Garden
	Curcuma longa L.	*Kunik*	Herb	Cultivated	Rhizome, leaf, flower	Spices, vegetables	Cooked	Yard, polak, garden
	Etlingera elatior (Jack) R.M.Sm.	*Kincung*	Herb	Non-cultivated	Flower	Spices, vegetables	Cooked	Yard, polak, garden
	Kaempferia galanga L.	*Ceku*	Herb	Cultivated	Rhizome	Spices	Cooked	Yard, polak
	Wurfbainia compacta (Sol. ex Maton) Škorničk. & A.D.Poulsen	*Sidamunggu*	Herb	Cultivated	Fruit	Spices	Cooked	Yard Polak
	Zingiber officinale Roscoe	*Sapodeh*	Herb	Cultivated	Rhizome	Spices	Cooked	Yard
Arecaceae	*Arenga pinnata* (Wurmb) Merr.	*Onau*	Tree	Non-cultivated	Fruit, flower	Fruits, beverages	Boiled	Yard, polak, garden
	Calamus sp.	*Otan*	Liana	Non-cultivated	Shoot	Vegetables	Cooked, burned	Forest
	Cocos nucifera L.	*Karambial*	Tree	Cultivated	Fruit, shoot, flower	Fruits, vegetables, spices, beverages	Raw, cooked, roasted	Yard, polak, garden
	Oncosperma tigillarium (Jack) Ridl.	*Nibung*	Tree	Non-cultivated	Shoot	Vegetables	Cooked	Forest
	Metroxylon sagu Rottb.	*Rumbio*	Tree	Non-cultivated	Stem	Snacks	Soaked, grated, cooked	Yard, forest
Phyllanthaceae	*Baccaurea motleyana* (Müll.Arg.) Müll.Arg.	*Rambai*	Tree	Non-cultivated	Fruit	Fruits	Raw	Yard, garden
	Baccaurea macrocarpa (Miq.) Müll.Arg.	*Tampui*	Tree	Non-cultivated	Fruit	Fruits	Raw	Forest
	Baccaurea polyneura Hook.f.	*Sijontiak*	Tree	Non-cultivated	Fruit	Fruits	Raw	Forest
	Baccaurea deflexa Müll.Arg.	*Tungau*	Tree	Non-cultivated	Fruit	Fruits	Raw	Forest
	Phyllanthus acidus (L.) Skeels	*Comai*	Tree	Non-cultivated	Fruit	Fruits	Raw	Yard
	Phyllanthus androgynus (L.) Chakrab. & N.P.Balakr.	*Ikuak*	Shrub	Cultivated	Leaf	Vegetables	Cooked	Yard, polak, garden, agroforestry
Sapindaceae	*Nephelium lappaceum* L.	*Rambutan*	Tree	Cultivated	Fruit	Fruits	Raw	Yard, garden, forest, polak
	Nephelium maingayi Hiern	*Pudung tunjuak*	Tree	Non-cultivated	Fruit	Fruits	Raw	Forest
	Nephelium ramboutan-ake (Labill.) Leenh.	*Pelasan*	Tree	Cultivated	Fruit	Fruits	Raw	Yard, forest
	Pometia pinnata J.R.Forst. & G.Forst.	*Matoa*	Tree	Cultivated	Fruit	Fruits	Raw	Yard, polak
	Dimocarpus longan Lour.	*Lengkeng*	Tree	Cultivated	Fruit	Fruits	Raw	Yard, polak

Amaranthaceae	*Alternanthera sessilis* (L.) DC.	*Karomak*	Herb	Non-cultivated	Leaf	Vegetables	Cooked	Agroforestry
	Amaranthus tricolor L.	*Bayam merah*	Herb	Cultivated	Leaf	Vegetables	Cooked	Polak
	Amaranthus viridis L.	*Bayam*	Herb	Cultivated	Leaf	Vegetables	Cooked	Polak, agroforestry
	Amaranthus spinosus L.	*Bayam potong*	Herb	Cultivated	Leaf	Vegetables	Cooked	Polak
Amaryllidaceae	*Allium cepa* L.	*Bawang merah*	Herb	Cultivated	Tuber	Spices	Cooked	Polak
	Allium fistulosum L.	*Daun bawang*	Herb	Cultivated	Leaf	Spices	Cooked	Yard
	Allium tuberosum Rottler ex Spreng.	*Kucai*	Herb	Cultivated	Leaf	Spices	Cooked	Yard
	Allium sativum L.	*Bawang putih*	Herb	Cultivated	Tuber	Spices	Cooked	Local market
Apiaceae	*Apium graveolens* L.	*Daun sop*	Herb	Cultivated	Leaf	Spices	Cooked	Yard
	Coriandrum sativum L.	*Ketumbar*	Herb	Cultivated	Seed	Spices	Cooked	Local market
	Foeniculum vulgare Mill.	*Adas manih*	Herb	Cultivated	Seed	Spices	Cooked	Local market
	Cuminum cyminum L.	*Jintan putih*	Herb	Cultivated	Seed	Spices	Cooked	Local market
Araceae	*Apoballis mutata* (Scort. ex Hook.f.) S.Y.Wong & P.C.Boyce	*Salimpek*	Herb	Non-cultivated	Stem	Vegetables	Cooked	Garden
	Colocasia esculenta (L.) Schott	*Sipikul*	Herb	Non-cultivated	Tuber, stem	Snacks, vegetables	Cooked, boiled	Yard, polak
	Leucocasia gigantea (Blume) Schott	*Kemumu*	Herb	Cultivated	Tuber, stem	Vegetables	Cooked, boiled	Yard, polak
	Xanthosoma sagittifolium (L.) Schott	*Taleh hitam*	Herb	Non-cultivated	Tuber	Snacks	Cooked, boiled	Yard, polak
Euphorbiaceae	*Aleurites moluccanus* (L.) Willd.	*Kemiri*	Tree	Cultivated	Seed	Spices	Cooked	Local market
	Cnidoscolus aconitifolius (Mill.) I.M.Johnst.	*Caya*	Shrub	Cultivated	Leaf	Vegetables	Cooked	Yard
	Manihot esculenta Crantz	*Ubi kayu*	Shrub	Cultivated	Tuber, leaf	Snacks, vegetables	Cooked, boiled	Yard, polak, garden, agroforestry
Meliaceae	*Sandoricum koetjape* (Burm.f.) Merr.	*Sontul*	Tree	Non-cultivated	Fruit	Fruits	Raw	Forest
	Lansium domesticum Corrêa	*Duku*	Tree	Non-cultivated	Fruit	Fruits	Raw	Yard, garden, forest
	Morus alba L.	*Bluberi*	Shrub	Non-cultivated	Fruit	Fruits	Raw	Yard
Moraceae	*Artocarpus camansi* Blanco	*Sukun*	Tree	Cultivated	Fruit	Snacks	Cooked	Yard
	Artocarpus integer (Thunb.) Merr.	*Cubodak hutan*	Tree	Non-cultivated	Fruit	Fruits	Raw	Forest, polak
	Artocarpus heterophyllus Lam.	*Cubodak*	Tree	Cultivated	Fruit	Fruits, vegetables	Raw	Yard, polak, garden, agroforestry
Clusiaceae	*Garcinia mangostana* L.	*Manggi*	Tree	Cultivated	Fruit	Fruits	Raw	Yard, garden, forest
	Garcinia xanthochymus Hook.f. ex T.Anderson	*Asam kandih*	Tree	Non-cultivated	Fruit	Spices	Cooked	Garden
	Garcinia atroviridis Griff. ex T.Anderson	*Asam galugua*	Tree	Non-cultivated	Fruit	Spices	Cooked	Local market
Lamiaceae	*Mentha × piperita* L.	*Mint*	Herb	Cultivated	Leaf	Beverages	Raw	Yard
	Ocimum basilicum L.	*Kemangi*	Herb	Cultivated	Leaf	Vegetables	Raw, cooked	Yard Polak
	Ocimum tenuiflorum L.	*Ruku-ruku*	Herb	Cultivated	Leaf	Vegetables	Cooked	Yard
Malvaceae	*Durio zibethinus* L.	*Durian*	Tree	Cultivated	Fruit, seed, flower	Fruits, spices, vegetables	Raw, cooked, fermented	Yard, polak, garden, forest
	Hibiscus sabdariffa L.	*Rosella*	Shrub	Cultivated	Leaf,	Vegetables,	Cooked, boiled	Agroforestry

					flower	beverages		
	Theobroma cacao L.	*Coklat*	Tree	Cultivated	Fruit, seed	Fruits	Raw, roasted	Yard, garden
Passifloraceae	*Passiflora quadrangularis* L.	*Balewa*	Climber	Non-cultivated	Fruit	Vegetables	Cooked	Forest
	Passiflora edulis Sims	*Markisa*	Climber	Cultivated	Fruit	Fruits	Raw	Yard
	Passiflora foetida L.	*Markisa hutan*	Climber	Non-cultivated	Fruit	Fruits	Raw	Yard, polak, agroforestry
Annonaceae	*Annona squamosa* L.	*Sarikayo*	Tree	Cultivated	Fruit	Fruits	Raw	Yard, polak
	Annona muricata L.	*Durian lauik*	Tree	Cultivated	Fruit	Fruits	Raw	Yard Polak
Asteraceae	*Cosmos pacificus* Melchert	*Kenikir*	Shrub	Cultivated	Leaf	Vegetables	Raw	Yard
	Lactuca sativa L.	*Selada*	Herb	Cultivated	Leaf	Vegetables	Raw Cooked	Yard
Brassicaceae	*Brassica oleracea* L.	*Kale*	Herb	Cultivated	Leaf	Vegetables	Cooked	Yard
	Brassica rapa L.	*Samhong*	Herb	Cultivated	Leaf	Vegetables	Cooked	Yard
Convolvulaceae	*Ipomoea aquatica* Forssk.	*Kacuke*	Herb	Cultivated	Leaf	Vegetables	Cooked	Yard, polak, rice field
	Ipomoea batatas (L.) Lam.	*Ubi jala*	Creeper	Cultivated	Tuber	Snacks	Cooked, boiled	Yard Polak
Fagaceae	*Castanopsis argentea* (Blume) A.DC.	*Berangan*	Tree	Non-cultivated	Seed	Snacks	Roasted	Forest
	Castanopsis megacarpa Gamble	*Karuntang*	Tree	Non-cultivated	Seed	Snacks	Roasted	Forest
Lauraceae	*Cinnamomum heyneanum* Nees	*Kulit manih*	Tree	Non-cultivated	Bark	Spices	Cooked	Forest
	Persea americana Mill.	*Pokat*	Tree	Cultivated	Fruit	Fruits	Raw	Yard, polak
Melastomataceae	*Melastoma malabathricum* L.	*Kaduduak*	Shrub	Non-cultivated	Fruit	Fruits	Raw	Yard, polak, garden, agroforestry, forest
	Miconia crenata (Vahl) Michelang.	*Kaduduak rimbo*	Shrub	Non-cultivated	Fruit	Fruits	Raw	Yard, polak, garden, forest
Musaceae	*Musa acuminata* Colla	*Pisang*	Herb	Cultivated	Fruit, flower	Fruits, vegetables	Raw, boiled, cooked	Yard, polak, garden, agroforestry
	Musa x *paradisiaca* L.	*Pisang*	Herb	Cultivated	Fruit, flower	Fruits Vegetables Snacks	Raw, boiled, cooked	Yard, polak, garden, agroforestry
Oxalidaceae	*Averrhoa bilimbi* L.	*Belimbiang boreh*	Tree	Non-cultivated	Fruit	Fruits, spices	Raw, cooked	Yard, polak
	Averrhoa carambola L.	*Belimbing bosi*	Tree	Cultivated	Fruit	Fruits	Raw	Yard
Piperaceae	*Peperomia pellucida* (L.) Kunth	*Sirih cina*	Herb	Non-cultivated	Leaf	Vegetables	Raw	Yard
	Piper indicum C.DC.	*Merica*	Climber	Cultivated	Seed	Spices	Cooked	Local market
Rubiaceae	*Morinda citrifolia* L.	*Mengkudu*	Tree	Non-cultivated	Fruit	Fruits	Cooked, raw	Yard, garden
	Coffea sp.	*Kopi*	Tree	Cultivated	Seed	Beverages	Roasted	Local market
Achariaceae	*Pangium edule* Reinw.	*Samauang*	Tree	Non-cultivated	Seed	Vegetables, side dishes	Fermented, soaked, cooked	Yard, garden, forest
Alismataceae	*Limnocharis flava* (L.) Buchenau	*Kalayau*	Herb	Non-cultivated	Leaf, fruit	Vegetables	Cooked	Rice field
Araliaceae	*Polyscias scutellaria* (Burm.f.) Fosberg	*Tapak leman*	Herb	Cultivated	Leaf	Spices, vegetables	Cooked	Yard, polak
Asparagaceae	*Dracaena angustifolia* (Medik.) Roxb.	*Suji*	Shrub	Cultivated	Leaf	Spices	Cooked	Yard
Blechnaceae	*Stenochlaena palustris* (Burm.f.) Bedd.	*Paku kalamidiang*	Herb	Non-cultivated	Leaf	Vegetables	Cooked	Garden
Athyriaceae	*Diplazium esculentum* (Retz.) Sw.	*Paku*	Herb	Non-cultivated	Leaf	Vegetables	Cooked	Yard, polak, garden,

								rice field
Bromeliaceae	*Ananas comosus* (L.) Merr.	*Naneh*	Herb	Cultivated	Fruit	Fruits, spices	Raw, cooked	Polak, yard
Caricaceae	*Carica papaya* L.	*Katelo*	Tree	Cultivated	Fruit, flower, leaf	Fruits, vegetables	Raw, cooked	Yard, polak, garden, agroforestry
Cactaceae	*Selenicereus monacanthus* (Lem.) D.R.Hunt	*Nago*	Climber	Cultivated	Fruit	Fruits	Raw	Yard
Dioscoreaceae	*Dioscorea hispida* Dennst.	*Gadung*	Creeper	Non-cultivated	Tuber	Snacks	Soaked, boiled	Forest
Gnetaceae	*Gnetum gnemon* L.	*Melinjo*	Tree	Cultivated	Seed, leaf	Vegetables	Cooked	Yard
Apiaceae	*Centella asiatica* (L.) Urb.	*Pegago*	Herb	Non-cultivated	Leaf	Vegetables	Raw	Yard
Menispermaceae	*Cyclea barbata* Miers	*Cincau*	Liana	Cultivated	Leaf	Beverages	Raw	Yard
Moringaceae	*Moringa oleifera* Lam.	*Kelor*	Tree	Cultivated	Leaf	Vegetables	Cooked	Yard, garden
Muntingiaceae	*Muntingia calabura* L.	*Seri*	Tree	Non-cultivated	Fruit	Fruits	Raw	Yard
Pandanaceae	*Pandanus amaryllifolius* Roxb. ex Lindl.	*Pandan*	Shrub	Cultivated	Leaf	Spices	Cooked	Yard, polak
Pontederiaceae	*Pontederia hastata* L.	*Kalayau sudu*	Herb	Non-cultivated	Leaf, flower	Vegetables	Cooked	Rice field
Sapotaceae	*Manilkara zapota* (L.) P.Royen	*Saos*	Tree	Cultivated	Fruit	Fruits	Raw	Yard, polak
Schisandraceae	*Illicium verum* Hook.f.	*Bungo lawang*	Tree	Cultivated	Flower	Spices	Cooked	Local market
Theaceae	*Camellia sinensis* (L.) Kuntze	*Teh*	Shrub	Cultivated	Leaf	Beverages	Boiled	Local market
Vitaceae	*Vitis vinifera* L.	*Anggur*	Climber	Cultivated	Fruit	Fruits	Raw	Yard