



Traditional Knowledge and Ethnobotanical Utilization of Edible Plants in the Repong Damar Agroforestry System, Ngaras Subdistrict, Pesisir Barat Regency, Lampung, Indonesia

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Abstract: Ethnobotanical practices provide new insights into local wisdom and the well-preserved ecosystems found in Ngaras Subdistrict, Pesisir Barat Regency, Lampung. This knowledge reflects the close relationship between humans and their surrounding environment. The purpose of this study is to identify the continuity of ethnopharmacological practices, inventory the plant species utilized, and document the edible plant species used by local communities. The research employs an ethnographic approach, using data collection methods such as in-depth interviews, participatory observation, and documentation involving local people who possess traditional knowledge of plant utilization within the *repong damar* system. Informants were selected using the snowball sampling technique to reach relevant sources such as *repong* managers, traditional leaders, and local residents directly involved in the use of biological resources. The findings reveal that the community utilizes various plant species as sources of food, including *Lansium domesticum* (duku), *Durio zibethinus* (durian), *Archidendron pauciflorum* (jengkol), *Parkia speciosa* (petai), *Garcinia mangostana* (mangosteen), *Gnetum gnemon* (melinjo), *Cocos nucifera* (kelapa), *Areca catechu* (pinang), *Etlingera elatior* (kecombrang), *Archidendron bubalinum* (jaling), *Syzygium aqueum* (jambu air), *Artocarpus integer* (cempedak), and *Rubus rosifolius* (arbei). Most of these species are used for personal consumption, while others serve as additional sources of income for the local community. The utilization practices remain rooted in local wisdom, emphasizing sustainability and ecological balance. This study particularly focuses on the food sector, aiming to understand and document how the community in Ngaras Subdistrict, Pesisir Barat Regency, utilizes the diversity of edible plants found within the *repong damar* ecosystem. Through the ethnographic approach, the research explores traditional knowledge related to edible plant species, methods of processing, and their roles in daily life. Overall, the study highlights that the diversity of edible plants in the *repong damar* plays a vital role in supporting food security and community welfare. Through documentation and ethnobotanical analysis, this research seeks to preserve traditional knowledge passed down through generations, serving as a foundation for future efforts in the sustainable management and conservation of biological resources.

Keywords: Ethnobotany, Repong Damar, Edible Plants, Traditional Knowledge, Ethnography, Biodiversity

1. INTRODUCTION

Indonesia is recognized as one of the countries with the highest levels of biodiversity globally. As a megadiverse nation, it harbors thousands of plant species distributed across various ecosystem types, including tropical rainforests, mountainous regions, and coastal areas. This botanical wealth serves not only essential ecological functions but also holds significant potential as a source of food, medicine, construction materials, and as a foundation for the social and cultural life of local communities. Nevertheless, much of this potential remains insufficiently explored and has not been fully utilized, particularly in the context of providing alternative food sources.

At the same time, the world is confronting serious challenges related to food security. Climate change, population growth, land degradation, and heavy reliance on a limited number of staple food commodities have rendered the global food system increasingly vulnerable, as highlighted in the study by Ramadhan et al. (2024) concerning environmental degradation. This situation underscores the need for food diversification efforts to strengthen food security at both global and local levels. The utilization of local biological resources constitutes a key strategy for reducing dependence on certain cultivated crops while optimizing the use of naturally available resources.

Research on the use of plants for food has been widely documented in various regions. Examples include studies in Lampung by Susanti et al. (2024) examining food plants in the repong damar agroforestry system in Pahmungan; in Sukabumi by Cita and Hasibuan (2019) investigating the utilization of food plants by the Sundanese ethnic group; and by Sholichah and Alfidhdhoh (2020), who analyzed wild plants that may serve as food sources in Mendirola Hamlet, Wonosalam District, Jombang. However, the present study will be conducted in an area where publications regarding the use of plants for food in daily life remain limited. These findings illustrate the importance of documenting traditional knowledge as a foundation for the sustainable management of biological resources.

To date, no research has specifically examined traditional knowledge and the ethnobotanical use of food plants within communities in Ngaras Subdistrict, West Pesisir Regency, despite the region being known for its distinctive agroforestry system, Repong Damar. Each local community possesses diverse knowledge and practices related to the management of biological resources, shaped by ecological conditions, cultural contexts, and collective experiences. Consequently, an in-depth investigation into the patterns of food plant utilization in Ngaras Subdistrict is urgently needed. The absence of similar studies reveals an unexplored research gap that warrants further scientific inquiry, thereby positioning this study as a strategic initial effort to document the utilization

of food plants within the Repong Damar agroforestry system in Ngaras.

This study is considered essential due to the importance of documenting biodiversity and traditional knowledge related to the utilization of food plants within the Repong Damar agroforestry system. The research is designed to analyze the biodiversity present in the Repong Damar area in Ngaras Subdistrict, identify various forms of biological resource utilization as food within local ethnobotanical practices, and describe the techniques of processing and preparing food materials derived from local biodiversity. The results are expected to make a significant contribution to the preservation of traditional knowledge, strengthen food diversification initiatives, and support the development of food security strategies grounded in local wisdom in West Pesisir Regency.

2. MATERIALS AND METHODS

2.1 Location and Time

This study was conducted from October to November 2025 in Ngaras District, Pesisir Barat Regency, Lampung Province. The area was selected because it represents a development zone of the Repong Damar agroforestry system, which is still traditionally managed by the local community and possesses ecological characteristics relevant to the research objectives. This area is considered representative for field observations, and the research location is shown in Figure 1.

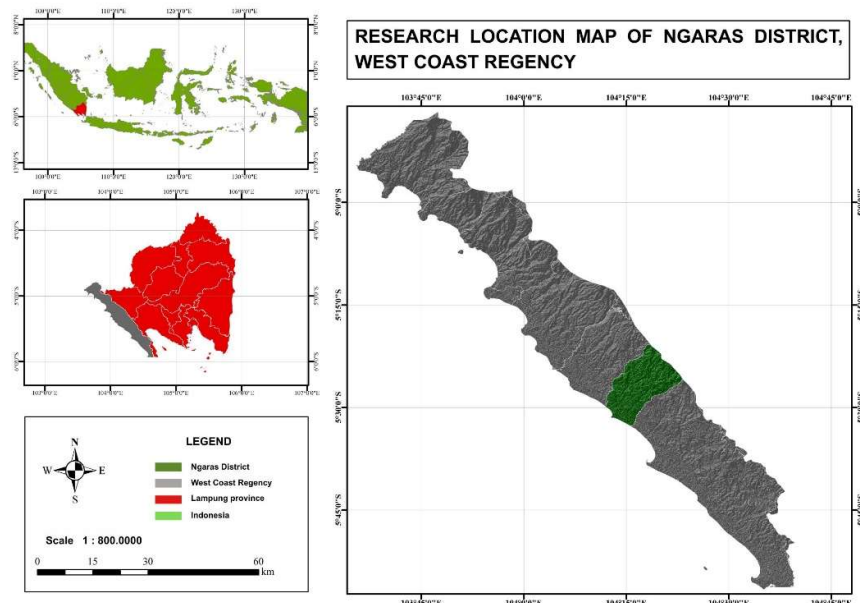


Figure 1. Location of the Repong Damar area in Ngaras District, West Coast Regency, Lampung

2.2. Sampling

This study comprised two main stages, namely vegetation analysis and an ethnobotanical assessment. In the vegetation analysis stage, a

stratified sampling technique was applied, which involves dividing the study area into several strata. The research was classified into two categories of Repong Damar management: repong located

outside conservation areas and repong situated within limited production forest zones. This method was selected because it improves data representativeness and enables sampling in areas with different types of vegetation. A total of 12 plots were randomly established, and each sample plot contained four subplots.

- 20 × 20 m for tree stage,
- 10 × 10 m for pole stage,
- 5 × 5 m for sapling stage, and
- 2 × 2 m for seedling stage.

In the ethnobotanical stage, an ethnographic approach was employed using the snowball sampling technique. This technique was chosen because knowledge related to the utilization of food plants is a form of local knowledge possessed by specific individuals, particularly traditional elders, Repong managers, or community members who continue to actively practice traditional food-processing customs. Through snowball sampling, the researchers were able to identify key informants progressively based on recommendations from previous informants, thereby obtaining in-depth, credible data that aligns with the sociocultural structure of the local community (Taherdoost, 2016).

2.3 Data Observed

Vegetation data included plant species, number of individuals, stem diameter, and tree height. Ethnobotanical data consisted of local plant names, plant parts used, processing techniques, and forms of utilization in daily community practices.

2.4. Research Implementation

Vegetation analysis began with the establishment of plots using the Stratified Sampling method, in which the study area was first divided into several strata based on specific environmental characteristics, followed by the random selection of plots within each stratum. All plant species encountered in each plot were identified using standard botanical identification keys, and the number of individuals per species was systematically recorded on tally sheets to maintain accuracy and consistency. Stem diameter (DBH) was measured at 1.3 meters above ground level using a measuring tape; for species with buttresses or pneumatophores, measurements were taken 20 cm above the highest buttress or aerial root to ensure representative DBH values. Tree height was measured using a hagameter from a predetermined observation distance to minimize measurement errors and ensure uniform procedures across all plots.

The ethnobotanical component of the study was conducted through semi-structured interviews to obtain in-depth information on local knowledge related to the identification, utilization, and preparation of food plants. These interviews allowed informants to describe plant parts used, processing steps, and traditional culinary practices. Participant

observation was carried out to complement the interviews by validating the information through direct observation of harvesting activities, processing stages, and daily plant-use practices. The combination of these methods enabled the researchers to capture practical techniques and culturally embedded practices that may not be fully conveyed through interviews alone. Collected data included local plant names, useful plant parts, processing techniques, modes of consumption, and cultural values associated with each species, thereby providing a comprehensive understanding of community-based food plant utilization.

2.5 Data Analysis

Vegetation data were analyzed by calculating species richness and the Importance Value Index (IVI) for each species. The IVI was used to evaluate and understand the significance of a species or a group of species within a plant community based on several measured parameters (Wijayani & Masrur, 2022). The IVI quantifies species dominance through relative density, relative frequency, and relative dominance. The formulas used are presented as follows.

$$IVI = RD + RF + RDo \quad (1)$$

where RD = relative density, RF = relative frequency, and RDo = relative dominance

Ethnobotanical data were analyzed using a descriptive-analytical approach by categorizing information according to plant species, the parts utilized, processing techniques, and forms of use. This approach enabled the interpretation of relationships between plant characteristics and cultural practices through the triangulation of interviews, observations, and field-based evidence. The analysis provided a comprehensive overview of biodiversity utilization patterns within the Repong Damar system.

3. Results and Discussions

3.1 Species Diversity of Vegetation in Repong Damar.

Based on vegetation analysis, there are 37 plant species in the Repong Damar area. Cat's Eye Damar (*Anthoshorea javanica*) showed the highest Importance Value Index (IVI) in the tree phase with a value of 108.72. In other phases, it is dominated by different species, indicating a layered vegetation structure. This strong dominance indicates its role as a keystone species that shapes forest structure and contributes to the ecological stability of the Repong Damar system. IVI values for each species across all growth strata are presented in Table 1.

Table 1. Importance Value Index (IVI) of Vegetation in the Repong Damar System of Krui Selatan

No	Local Name	Scientific Name	IVI			
			Growth Phase			
			Tree	Pole	Sapling	Seedling
1	Damar mata kucing	<i>Anthoshorea javanica</i>	108,72	44,65	32,19	-
2	Durian	<i>Durio zibethinus</i>	23,57	37,94	23,45	14,22
3	Petai	<i>Parkia speciosa</i>	35,87	66,28	29,03	12,75
4	Duku	<i>Lansium domesticum</i>	32,39	35,60	58,67	2,45
5	Kapuk	<i>Ceiba pentandra</i>	17,99	-	-	-
6	Jengkol	<i>Archidendron pauciflorum</i>	19,05	37,77	24,18	19,61
7	Sengon	<i>Albizia chinensis</i>	12,07	-	-	-
8	Laban	<i>Vitex pinnata</i>	4,67	-	-	-
9	Jaha	<i>Dysoxylum sp</i>	11,82	-	-	-
10	Manggis	<i>Garcinia mangostana L.</i>	2,22	12,66	-	14,22
11	Cempaka	<i>Magnolia champaca</i>	7,02	-	-	-
12	Pala	<i>Myristica fragrans</i>	2,16	-	4,32	-
13	Melinjo	<i>Gnetum gnemon</i>	15,18	8,37	32,67	-
14	Pulai	<i>Alstonia scholaris</i>	5,00	7,68	-	8,82
15	Nangka	<i>Artocarpus heterophyllus</i>	2,28	-	5,22	-
16	Cengkeh	<i>Syzygium aromaticum</i>	-	14,51	10,56	2,45
17	Kopi	<i>Coffea canephora</i>	-	8,21	27,74	30,39
18	Kayu afrika	<i>Maesopsis eminii Engl.</i>	-	4,18	-	-
19	Kayu manis	<i>Cinnamomum verum</i>	-	3,90	-	2,94
20	Jaling	<i>Archidendron bubalinum</i>	-	3,56	-	-
21	Pinang	<i>Areca catechu</i>	-	8,26	27,06	2,94
22	Kandis	<i>Garcinia xanthochymus</i>	-	-	8,64	-
23	Kupu-kupu	<i>Bauhinia purpurea.</i>	-	-	6,78	-
24	Kayu lada	<i>Piper nigrum L</i>	-	-	4,75	-
25	Katu	<i>Sauropus androgynus</i>	-	-	4,75	2,45
26	Kecombrang	<i>Etilingera elatior</i>	-	-	-	6,86
27	Cempedak	<i>Artocarpus integer</i>	-	-	-	2,45
28	Petai cina	<i>Leucaena leucocephala</i>	-	-	-	3,43
29	Bayur	<i>Pterospermum javanicum</i>	-	-	-	9,80
30	Rilek	<i>Curcuma sp.</i>	-	-	-	16,18
31	Pacing	<i>Costus speciosus</i>	-	-	-	9,31
32	Kayu sepat	<i>Macaranga triloba</i>	-	-	-	2,45
33	Salam	<i>Syzygium polyanthum</i>	-	-	-	8,33
34	Sirih	<i>Piper betle L.</i>	-	-	-	7,84
35	Tuba	<i>Derris elliptica</i>	-	-	-	3,43
36	Cakar Kucing	<i>Uncaria rhynchophylla</i>	-	-	-	2,45
37	Pakis	<i>Diplazium esculentum</i>	-	-	-	14,22

Table 1 presents the Important Value Index (IVI) of vegetation in the Repong Damar area of Ngaras District, Pesisir Barat Regency, showing that the vegetation structure undergoes significant changes at each growth stage. *Damar mata kucing* (*Anthoshorea javanica*) continues to dominate the tree stage with a very high IVI value (108.72), indicating its role as the principal canopy species shaping the stand structure. This aligns with Taonda

et al. (2024), who stated that a high IVI indicates that a species plays a crucial role in the ecosystem in terms of individual abundance, distribution, and biomass contribution. However, this dominance decreases sharply at the pole stage (44.65), the sapling stage (32.19), and is even absent at the seedling stage. The absence of damar at the seedling stage indicates weak regeneration,

suggesting that the rejuvenation process of damar is no longer functioning optimally.

In contrast, fast-growing economic species such as petai, duku, jengkol, coffee, mangosteen, areca nut, and various understory plants such as ferns, rilek, pacing, and betel dominate the younger growth stages. This is consistent with Idris et al. (2023), who stated that understory vegetation plays an essential role in maintaining ecosystem balance. However, this shift reflects changes in community preferences, which increasingly prioritize daily economic commodities over long-lived forest species. This pattern illustrates the rising diversity of species in the understory and younger growth layers, yet it is not supported by the sustainability of the primary species that form the forest structure, namely damar.

Changes in vegetation composition at regenerative stages not only reflect socio-economic dynamics but also have important ecological implications for ecosystem sustainability and species diversity. As a major canopy species, damar contributes to maintaining microclimate stability, providing habitat for various fauna, preserving soil moisture, and contributing substantially to carbon storage. When its

regeneration declines, the existence of damar as the structural backbone of the ecosystem becomes threatened. One factor contributing to this decline is the long interval required for seed production; according to Bintoro (2020), *damar mata kucing* produces fruit only once every 4–5 years. This prolonged fruiting cycle drives the shift toward economically valuable plant species. If this decline continues, the Repong Damar ecosystem risks losing its balance between species diversity and forest structural sustainability, ultimately reducing long-term ecological functions such as carbon sequestration, soil protection, and the biodiversity that depends on large canopy trees. Thus, the sustainability of the Repong Damar ecosystem strongly depends on efforts to maintain damar regeneration while simultaneously preserving the diversity of plant species that support the socio-economic resilience of the local community.

3.2 Utilization of Biodiversity in Ethnobotanical Practices as Food Sources

Based on the analysis, 13 plant species were identified as food ingredients, with various plant parts used and varying processing methods. Details are presented in Table 2.

Table 2. Ethnobotanical Uses and Their Forms of Utilization

No	Local Name	Scientific Name	Plant Parts Used	Processing Method
1	Duku	<i>Lansium domesticum</i>	Fruit	Raw
2	Durian	<i>Durio zibethinus</i>	Fruit	Raw
3	Jengkol	<i>Archidendron pauciflorum</i>	Fruit	Raw and cooked
4	Petai	<i>Parkia speciosa</i>	Fruit	Raw and Cooked
5	Manggis	<i>Garcinia mangostana L.</i>	Fruit	Raw
6	Melinjo	<i>Gnetum gnemon</i>	leaves and fruit	Cooked
7	Pinang	<i>Areca catechu</i>	Fruit	Raw
8	Kelapa	<i>Cocos nucifera</i>	Fruit	Raw, mixture of cooking ingredients
9	Cempedak	<i>Artocarpus integer</i>	Fruit	Raw
10	Kecombrang	<i>Etlingera elatior</i>	Flower	mixture of cooking ingredients
11	Arbei	<i>Rubus rosifolius</i>	Fruit	Raw
12	Jaling	<i>Archidendron bubalinum</i>	Fruit	Cooked
13	Jambu air	<i>Syzygium aqueum</i>	Fruit	Raw

Based on the data analysis in Table 2, various plant species were identified as food sources used by the Ngaras community. These plants are utilized in several ways, including cooking, consuming them directly, or using them as ingredients in traditional dishes. Most of the community consumes them directly, particularly fruit species such as *Lansium domesticum*, *Durio zibethinus*, *Garcinia mangostana L.*, *Cocos nucifera*, *Rubus rosifolius*, and *Syzygium aqueum*. There are also species that are processed in two ways—both cooked and eaten raw—namely *Archidendron pauciflorum* and *Parkia speciosa*. These two species are typically used as side dishes or accompaniments. Some species are specifically used as seasoning or cooking ingredients in traditional dishes, such as *Etlingera elatior* and *Cocos nucifera*. Additionally, several

species are processed solely by cooking, including *Gnetum gnemon*, *Artocarpus integer*, and *Archidendron bubalinum*. This indicates that the community indeed possesses ethnobotanical knowledge, although not comprehensively, and primarily based on traditional knowledge passed down through generations. This finding aligns with Rahmi et al. (2020), who stated that communities living near forests tend to utilize the biological resources available in or around forest areas due to limited access to other food sources. The minimal variation in the plant parts used—except for melinjo leaves and kecombrang flowers—also indicates that the community's ethnobotanical knowledge is centered mainly on fruit-bearing plants as primary food sources.

This study is consistent with previous research on food plants conducted in Pahlungan by Susanti et al. (2024), which identified 50 species used directly as food. Similar research by Wahyuni et al. (2021) in Cipang Kiri Hulu Village documented 40 species of food plants. Compared to these findings, the number of species identified in the present study is lower. On the other hand, the predominantly non-destructive utilization pattern—where most species are harvested only for their fruits—supports ecosystem sustainability. Fruit harvesting does not damage vegetative structures, allowing plant populations to regenerate and maintain ecological balance in their natural habitat. The integration of wild and cultivated plant use also reflects a harmonious relationship between the community and their environment, where utilization occurs within the regenerative capacity of nature. Thus, the ethnobotanical practices observed in this study remain aligned with ecological sustainability as long as harvesting is conducted responsibly.

3.3 Processing and Presentation Techniques of Biodiversity-Based Foods

Ethnobotanical data show that the Ngaras community utilizes biodiversity primarily through simple, adaptive food-processing and serving techniques tailored to the characteristics of each plant species. The most dominant method is consuming fruits directly without any cooking process. Species such as *Lansium domesticum*, *Durio zibethinus*, *Garcinia mangostana* L., *Rubus rosifolius*, *Cocos nucifera*, and *Syzygium aqueum* are eaten raw as fresh fruit. This direct-consumption pattern not only reflects the community's preference for natural foods that are practical and readily available, but also indicates that most local fruits possess acceptable organoleptic properties without additional treatment. This serving technique is non-destructive, simple, and allows efficient utilization without the need for extra tools or energy sources.

In addition to being eaten raw, the data also show other processing techniques such as cooking, which are applied to certain species like *Gnetum gnemon*, *Artocarpus integer*, and *Archidendron bubalinum*. Cooking these species aims to enhance flavor, reduce strong odors (as in *jengkol* and *petai*), and improve consumption safety. This aligns with Puarada et al. (2020), who stated that *melinjo* can be consumed as a vegetable and can also be processed into chips. Similarly, Nauw et al. (2016) reported the use of *cepedak* fruit as a traditional food ingredient inherited across generations in West Papua. There are also species that can be processed in two ways either eaten raw or cooked such as *Archidendron pauciflorum* and *Parkia speciosa*, indicating that the community has flexibility in processing techniques depending on needs and types of dishes. Meanwhile, certain plants such as *Etilingera elatior* (torch ginger) and *Cocos nucifera* serve as cooking additives or flavor enhancers (Rusanti et al., 2017).

Overall, these food-processing and serving techniques remain within the framework of traditional practices that take advantage of the natural characteristics of local biodiversity. The simplicity of the processing reflects a lifestyle closely connected to nature, utilizing plants according to their availability and inherent traits without excessive exploitation. This is consistent with Jadid et al. (2020), who stated that humans and plants share a relationship considered essential to the development of civilization. Moreover, the minimal-destructive processing techniques, which rarely harm the vegetative parts of plants, support ecosystem sustainability, as most uses focus on harvesting fruits. Thus, the community's culinary practices not only reflect ethnobotanical knowledge but also demonstrate a harmonious reciprocal relationship between fulfilling food needs and preserving biological resources in their environment.

4. CONCLUSIONS

The findings of this study indicate that the *repong damar* ecosystem in Ngaras District remains relatively diverse, as evidenced by the presence of 37 plant species within the *repong damar* area. The high Importance Value Index (IVI) of *damar mata kucing* also shows that the area is still dominated by this species. This suggests that the traditional agroforestry system within the region is stable and well maintained. In addition, 13 plant species were identified as potential food sources, each processed in various ways—such as being cooked into vegetables or chips, consumed raw, or used as ingredients to enhance flavor in culinary preparations. These practices demonstrate the existence of local knowledge related to processing plant-based materials into consumable products. Future studies should explore strategies for developing and managing *repong damar* to ensure ecosystem sustainability, as well as investigate additional plant-processing techniques that may provide new benefits for the community.

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