DIVERSITY AND ETHNOBOTANICAL USES OF WILD FOOD PLANTS IN GIRIMANIK NATURAL FOREST, CENTRAL JAVA, INDONESIA

Bunga Melati[1], dan Santhyami[1,2*]
[1]Department of Biology Education, Faculty of Teacher and Education, Universitas Muhammadiyah Surakarta, Indonesia
[2]Center for Innovation Studies on Tropical Climate Change Mitigation and Adaptation, Universitas Muhammadiyah Surakarta, Indonesia

ABSTRACT. *Wild plant as one of Non Timber Forest Product (NTFP) have significant potential as an alternative food source for communities, especially in areas that still have access to natural resources. This research aims to (1) inventory the types of wild plants utilized as food by the community and analyze their usage forms, and (2) determine the community consensus value and the priority of wild food plant species considered important based on the analysis of the Informant Consensus Factor (ICF) and Relative Frequency of Citation (RFC) indices. The research was conducted using participatory observation methods, semi-structured interviews with key informants and general informants, as well as field exploration (guided tour) to discover and collect plant samples. Data were analyzed descriptively and quantitatively using the ICF and RFC indices. The research results show the presence of various species of wild food plants utilized by the community, with a dominance of herbaceous plants. The family with highest diversity of species is Asteraceae. The leaves are the most commonly utilized component, primarily employed as vegetables. The species Galinsoga parviflora has the highest RFC value (RFC=0.81) and is used as a vegetable, although the snack food category possesses the highest ICF value (ICF=1.00), followed by staple food (ICF=0.86). This research shows that wild plants play an important role in supporting food security based on local biological resources and emphasizes the importance of documenting and preserving traditional community knowledge related to the utilization of wild plants.*

Keywords: *Ethnobotany; Wild Food Plants; Traditional Knowledge; Non Timber Forest Product; Girimanik*

ABSTRAK. Tanaman liar Produk Hutan Non Kayu (PHNK) memiliki potensi penting sebagai sumber pangan alternatif bagi masyarakat, terutama di kawasan yang masih memiliki akses terhadap sumber daya alam. Penelitian ini bertujuan untuk (1) menginventarisasi jenis tanaman liar yang dimanfaatkan sebagai bahan pangan oleh masyarakat serta menganalisis bentuk pemanfaatannya, (2) mengetahui nilai kesepakatan masyarakat dan prioritas spesies tanaman pangan liar yang dianggap penting berdasarkan analisis indeks *Informant Concensus Factor* (ICF) dan *Relative Frequency of Citation* (RFC). Penelitian dilakukan dengan metode observasi partisipatif, wawancara semi-terstruktur kepada informan kunci dan informan umum, serta eksplorasi lapangan (*guided tour*) untuk menemukan dan mengumpulkan sampel tanaman. Data dianalisis secara deskriptif dan kuantitatif menggunakan indeks ICF dan RFC. Hasil penelitian menunjukkan adanya beragam spesies tanaman pangan liar yang dimanfaatkan masyarakat, dengan dominasi tumbuhan herba. Famili dengan jumlah spesies terbanyak yaitu Asteraceae. Bagian yang paling banyak dimanfaatkan adalah daun, dan sebagian besar digunakan sebagai sayuran. Nilai RFC tertinggi yaitu spesies *Galinsoga parviflora* (RFC=0,81) yang dimanfaatkan sebagai sayuran, sedangkan nilai ICF tertinggi terdapat pada kategori pemanfaatan makanan ringan (ICF=1,00) dan makanan pokok (ICF=0,86). Penelitian ini menunjukkan bahwa tanaman liar memiliki peran penting dalam mendukung ketahanan pangan berbasis sumber daya hayati lokal serta menegaskan pentingnya dokumentasi dan pelestarian pengetahuan tradisional masyarakat terkait pemanfaatan tanaman liar.

Kata kunci: Etnobotani; Tanaman Pangan Liar; Pengetahuan Tradisional; Produk Hutan Non Kayu; Girimanik

Penulis untuk korespondensi: surel: san915@ums.ac.id

INTRODUCTION

Indonesia is one of the megadiverse countries with many species, ecosystems, and genetic resources. This biodiversity allows for the utilization of various natural resources to improve human quality of life, especially in terms of meeting food and health needs. The biodiversity of Indonesia's forests has great

potential to support food production by providing various natural resources (Putri et al., 2023). Food production is one of the many benefits supported by the biodiversity of forests. Forests not only assist small-scale agricultural production but also provide direct food supplies to many families in rural areas. One of the direct benefits of forest resources is the use of non-marketable forest products (Munandar, 2016).

One of the natural resources that can be utilized by the community is wild plants. Wild plants have various benefits for the community, including as food, traditional medicine, and other raw materials. Various parts of wild plants such as fruits, leaves, stems, shoots, and tubers can be utilized as food sources by the community (Silalahi et al., 2018). Beside being a food source, wild plants are also often used as traditional medicine, herbal remedies, or jamu, which have long been utilized in traditional medical practices (Utami et al., 2019). Wild plants can also be utilized as non-food raw materials such as building materials and other household needs (Arba et al., 2023).

The community's use of wild plants is intrinsically linked to the customary knowledge transmitted through generations. In some conditions, the community still prefers to utilize wild plants as medicine or food rather than using modern products. This is influenced by economic factors, education levels, and trust in traditions passed down by previous generations (Destryana & Ismawati, 2019). Food crops are types of plants that can be utilized as food by humans, such as grains, fruits, vegetables, and tubers, which can be consumed directly or processed beforehand (Santhyami et al., 2025; Santhyami & Yunita, 2024; Sholichah & Alfidhdhoh, 2020).

The utilization of various types of plants by the community in daily life is studied in the field of ethnobotany. Ethnobotany is a field that examines the relationship between humans and plants, including how communities identify, utilize, and manage plant resources in their daily lives. This leads to community activities in utilizing plants (Khuluq et al., 2021; Rahma et al., 2022). According to several studies that have been conducted, wild food plants play an important role in supporting local food security, preserving biodiversity, and providing alternative food sources for communities (Shah et al., 2025). Ethnobotanical studies are very important for preserving knowledge about local wisdom regarding the use of wild food plants by traditional communities (Hapsari & Roziaty, 2023). Furthermore, quantitative approaches in ethnobotany such as the Relative Frequency of Citation (RFC) and the Informant Consensus Factor (ICF) have been widely used to determine the level of importance and consensus within the community regarding the utilization of a plant species. The ICF value indicates the level of agreement among informants on the utilization categories of a particular plant, while the RFC value shows how often a species is mentioned by informants (Albuquerque et al., 2014).

The life of the communities around the forest heavily depends on the forest to maintain sustainability and support their livelihoods (Asysyifa et al., 2023). Forests not only serve as ecosystem buffers but also as sources for fulfilling the needs of the community, both in the form of timber and non-timber forest products (Ramli et al., 2022). One form of non-timber forest products that is often utilized by the community is wild food plants, which can serve as an alternative food source for the people living around the forest (Yusro et al., 2023).

The Girimanik Natural Forest Area (NFA) is a natural forest area located in Setren village, Slogohimo District, Wonogiri Regency, Central Java Province. Astronomically, the Girimanik Forest area is located between 110º41'-111º18' E and 7º32'-8º15' S (Kusuma & Suryani, 2017). The Girimanik Natural Forest Area has become one of the areas with the potential for plant diversity that can be utilized by the community. However, scientific information regarding the types of wild food plants and their utilization by the community around the Girimanik Natural Forest Area is still limited and has not been systematically documented. Therefore, this research was conducted with the aim of (1) inventorying the types of wild plants utilized as food by the community and analyzing their utilization forms, and (2) determining the community consensus value and prioritizing wild food plant species considered important based on the analysis of the Informant Consensus Factor (ICF) and Relative Frequency of Citation (RFC) indices.

METHODS

The research was conducted in the Natural Forest Area (NFA) Girimanik located in Setren village, Slogohimo sub-district, Wonogiri

district, Central Java province (Figure 1.) The implementation of the research takes approximately 3 months, starting from preparation, data collection, data processing, to the compilation of the research report. This research uses a descriptive-quantitative approach to examine the utilization of wild food plants by the community factually without testing inferential hypotheses (Wiwik & Wahyudi, 2022). To determine the data sources, informants are divided into key informants and general informants. Key informants are selected using purposive sampling based on their knowledge of wild food plants, and general informants are selected using snowball sampling based on recommendations from previous informants. Participatory observation, semi-structured interviews, and field exploration with key informants were used to collect data. Types of plants, local and scientific names, parts used, processing methods, and categories of use as food sources are all the information collected. During the research, all data was recorded and documented.

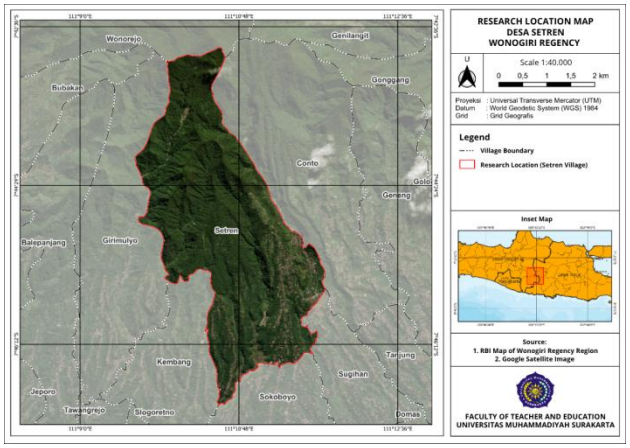

Figure 1. Research Location

Data is analyzed quantitatively and descriptively. Descriptive analysis presents data in the form of tables and graphs that show the utilization of wild food plants by the community. Quantitative analysis calculates the level of agreement among informants and the relative importance of each plant species thru the calculation of the Informant Consensus Factor (ICF) and Relative Frequency of Citation (RFC) values.

a. *Informant Consensus Factor* (ICF)

Informant Consensus Factor (ICF) is used as a parameter to evaluate the level of homogeneity (agreement) in the local knowledge possessed by the informants. The ICF value is calculated using the following equation (Albuquerque et al., 2014):

$$ICF = \frac{[Nur - Ns]}{[Nur - 1]}$$

Explanation:

Nur : The total number of usability reports for each category.

Ns : The number of species used for a specific category by all informants.

The ICF value varies in the range of 0 to 1.

b. *Relative Frequency of Citation* (RFC)

Relative Frequency of Citation (RFC) is applied to measure the local importance level of each species. This value is obtained thru the following equation (Albuquerque et al., 2014):

$$RFC = \frac{Fc}{N}$$

Explanation:

Fc : The number of informants who mentioned the usefulness of a species.

N : Total number of informants.

The RFC value ranges from 0 to 1.

RESULTS AND DISCUSSION

Research findings indicate the presence of 36 species of wild food plants, with the Asteraceae family comprising the highest number of species (6), followed by Dioscoreaceae (4), and Araceae, Fabaceae, and Solanaceae, each containing 3 species. This aligns with the research conducted by Sholichah & Alfidhdhoh (2020), which identified 43 varieties categorized into 26 families, with Asteraceae being the most prevalent family. The prevalence of Asteraceae may be linked to its ecological versatility, as numerous species within this family are pioneer plants that flourish in disturbed environments, including forest margins and agricultural areas. This condition enhances their accessibility and engagement frequency with local communities, hence influencing their increased consumption. In contrast to regions like the Karangasem area in Bali (Ratnani et al., 2020), which exhibit greater species diversity, the comparatively lower species count in this study may indicate variations in ecological conditions, land use practices, and the degree of community engagement with forest resources. The prevalence of the Asteraceae family signifies that this group of plants possesses significant potential for human use.

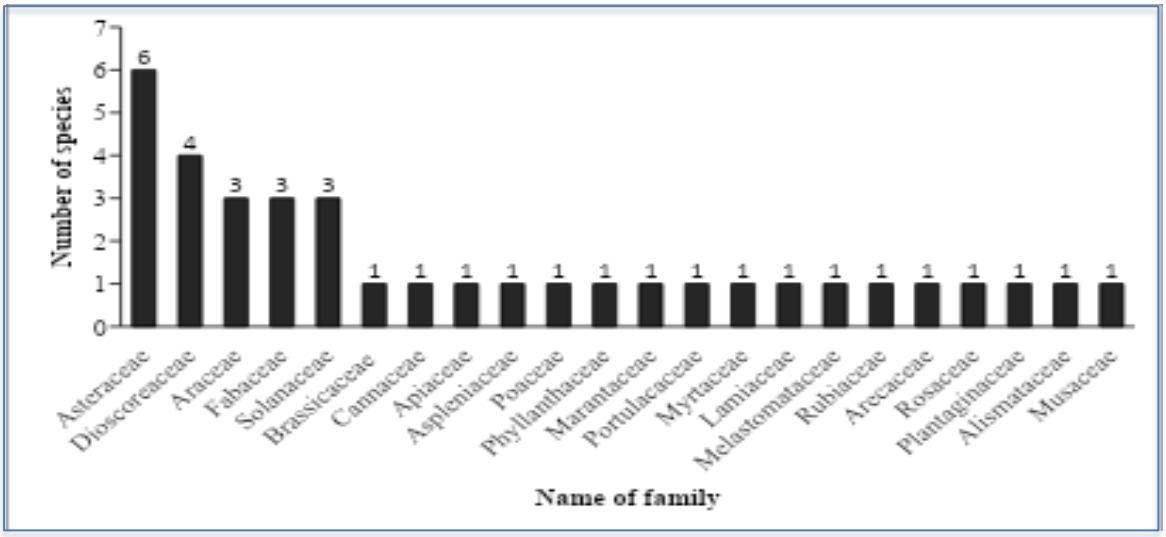

Figure 2. Families of wild food plants with the number of species utilized by the community in the Girimanik Natural Forest Area (NFA), Setren Village

Various types of wild food plants show that the community still knows how to utilize the natural resources around them. Wild food plants have long been known to play an important role in traditional food systems because they can provide additional sources of nutrition and help communities cope with domestic food shortages. This signifies that local knowledge remains actively preserved and serves as an adaptive approach to ensure food supply, particularly in environments of restricted access to market-based food systems. Recent ethnobotanical studies show that edible wild food plants are an important alternative food source and can help increase local food diversity and resilience. In contrast to research conducted in other places (Nasution et al., 2023), the function of wild plants in Girimanik seems to be more supplementary than fundamental, indicating a transitional pattern in which traditional knowledge coexists with contemporary food systems.

Table 1. Wild food plants not cultivated by the community in the Natural Forest Area (NFA) Girimanik, Setren Village

No	Family	Scientific Name	Local Name	Edible Parts	Lifeform	Use Categoties	How to Process	RFC value	IUCN
1	Alismataceae	*Limnocharis flava* (L.) Buchenau	Genjer	Leaf	Herb	Vegetable	Boiled	0,13	LC (Least Concern)
2	Apiaceae	*Centella asiatica* (L.) Urb.	Pegagan	Leaf	Herb	Vegetable	Boiled	0,50	LC (Least Concern)
3	Araceae	*Amorphophallus paeoniifolius* (Dennst.) Nicolson	Suweg	Tuber	Herb	Staple food	Steamed	0,19	NE (Not Evaluated)
4	Araceae	*Leucocasia gigantea* (Blume) Schott	Talas	Stem	Herb	Vegetable	Steamed	0,50	LC (Least Concern)
5	Araceae	*Xanthosoma sagittifolium* (L.) Schott	Keladi	Stem	Herb	Vegetable	Boiled	0,13	LC (Least Concern)
6	Arecaceae	*Adonidia merrillii* (Becc.) Becc.	Palem	Shoot	Tree	Vegetable	Boiled	0,13	NT (Near Threatened)
7	Aspleniaceae	*Diplazium esculentum* (Retz.) Sw.	Pakis	Leaf	Herb	Vegetable	Sauteed	0,25	LC (Least Concern)
8	Asteraceae	*Spilanthes acmella* L.	Legetan	Leaf	Herb	Vegetable	Boiled	0,38	NE (Not Evaluated)
9	Asteraceae	*Galinsoga parviflora*	Bribil	Leaf	Herb	Vegetable	Boiled	0,81	LC (Least Concern)
10	Asteraceae	*Bidens pilosa* L.	Ketul	Leaf	Herb	Vegetable	Boiled	0,13	LC (Least Concern)
11	Asteraceae	*Crassocephalum crepidioides*	Sotolempung	Leaf	Shrub	Vegetable	Boiled	0,56	NE (Not Evaluated)
12	Asteraceae	*Cosmos caudatus*	Kenikir	Leaf	Herb	Vegetable	Boiled	0,25	NE (Not Evaluated)
13	Asteraceae	*Pluchea indica* L.	Luntas	Leaf	Shrub	Vegetable	Boiled	0,06	NE (Not Evaluated)
14	Brassicaceae	*Nasturtium officinale*	Jrembak	Leaf	Herb	Vegetable	Sauteed	0,19	LC (Least Concern)
15	Cannaceae	*Canna discolor*	Ganyong	Tuber	Herb	Staple food	Steamed	0,56	NE (Not Evaluated)
16	Dioscoreaceae	*Dioscorea alata* L.	Uwi	Tuber	Climber	Staple food	Steamed	0,50	DD (Data Deficient)
17	Dioscoreaceae	*Dioscorea esculenta*	Gembili	Tuber	Climber	Staple food	Steamed	0,44	NE (Not Evaluated)
18	Dioscoreaceae	*Dioscorea bulbifera* L.	Gembolo	Tuber	Climber	Staple food	Steamed	0,13	LC (Least Concern)
19	Dioscoreaceae	*Dioscorea hispida*	Gadung	Tuber	Climber	Snack	Fried	0,38	NE (Not Evaluated)
20	Fabaceae	*Leucaena leucocephala*	Mlanding	Fruit	Tree	Vegetable	Steamed	0,19	LC (Least Concern)
21	Fabaceae	*Calliandra callothyrus*	Andra	Leaf	Shrub	Vegetable	Boiled	0,13	LC (Least Concern)
22	Fabaceae	*Paraserianthes lophantha*	Mlandingan	Fruit	Tree	Fruit	Eaten raw	0,19	LC (Least Concern)
23	Lamiaceae	*Platostoma palustre*	Janggilan	Leaf	Herb	Drink	Dried	0,06	NE (Not Evaluated)
24	Marantaceae	*Maranta arundinacea* L.	Garut	Tuber	Herb	Staple food	Steamed	0,44	NE (Not Evaluated)
25	Melastomataceae	*Medinilla magnifica*	Parijoto	Fruit	Shrub	Fruit	Eaten raw	0,06	LC (Least Concern)
26	Musaceae	*Musa acuminata*	Pisang liar	Stem	Herb	Vegetable	Boiled	0,19	LC (Least Concern)
27	Myrtaceae	*Syzygium polyanthum*	Salam	Leaf/ Fruit	Tree	Spice/Fruit	Sauteed/Eaten raw	0,19	LC (Least Concern)
28	Phyllanthaceae	*Phyllanthus emblica* L.	Malaka	Shoot	Tree	Fruit	Eaten raw	0,19	LC (Least Concern)
29	Plantaginaceae	*Plantago major* L.	Otot-ototan	Leaf	Herb	Vegetable	Boiled	0,06	LC (Least Concern)
30	Poaceae	*Bambusa vulgaris*	Rebung	Tunas	Herb	Vegetable	Boiled	0,31	DD (Data Deficient)
31	Portulacaceae	*Portulaca oleracea* L.	Krokot	Leaf	Herb	Vegetable	Sauteed	0,13	LC (Least Concern)
32	Rosaceae	*Rubus rosifolius*	Gucen	Fruit	Shrub	Fruit	Eaten raw	0,19	NE (Not Evaluated)
33	Rubiaceae	*Lasianthus obscurus*	Nyodo	Fruit	Shrub	Fruit	Eaten raw	0,31	NE (Not Evaluated)
34	Solanaceae	*Solanum nigrum* L.	Ranti	Leaf	Shrub	Vegetable	Boiled	0,31	LC (Least Concern)
35	Solanaceae	*Solanum torvum*	Pokak	Fruit	Shrub	Vegetable	Sauteed	0,06	NE (Not Evaluated)
36	Solanaceae	*Physalis angulata* L.	Ciplukan	Fruit	Herb	Fruit	Eaten raw	0,13	LC (Least Concern)

The number of wild food plant species found in this study indicates that the research area has significant biodiversity potential. Environmental conditions that support the growth of various types of plants, along with local knowledge passed down thru generations, are often associated with the diversity of wild plants utilized by the community. The relationship underscores that biodiversity alone is inadequate; its use is significantly influenced by cultural knowledge and practices. Consequently, regions with analogous ecological conditions may demonstrate varying use patterns based on the robustness of ancient knowledge systems. Ethnobotanical research in various regions also shows a similar pattern, where local communities are able to recognize and utilize various species of wild plants as food sources. For example, a study conducted in the Karangasem area of Bali recorded 87 species utilized by the local community, indicating that the local community has a close relationship with their natural environment and uses wild plants as food sources (Ratnani et al., 2020). The diminished number in this study indicates a possible degradation or constraint of information, or variations in biological richness, necessitating more examination.

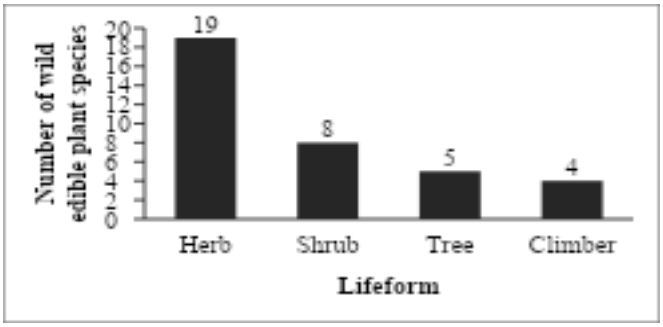

Figure 3. The number of species and life forms of wild food plants utilized by the community in the Girimanik Natural Forest Area (NFA), Setren Village

The type of plants most utilized based on their life forms is the herb group with 19 species (Figure 3). The next group is shrubs with 8 species, trees with 5 species, and climbers with 4 species. The dominance of herbaceous plants indicates that smaller and more easily found plant types are more frequently utilized by the community because they are easy to locate and process into food. This trend indicates that accessibility and processing ease are primary factors in plant selection, rather than merely nutritional merit. Herbaceous plants necessitate minimal labor for harvesting and processing, rendering them more pragmatic for everyday use. The life form of the plants shows that herbaceous plants are the most utilized group. Herbaceous plants dominate the utilization of wild plants due to their abundance in nature, rapid growth, and ease of harvesting. In comparison to research conducted in India (Kencharaddi et al., 2026), which similarly highlights herb predominance, this consistency suggests a wider ethnobotanical trend wherein communities emphasize efficiency and accessibility in resource utilization.

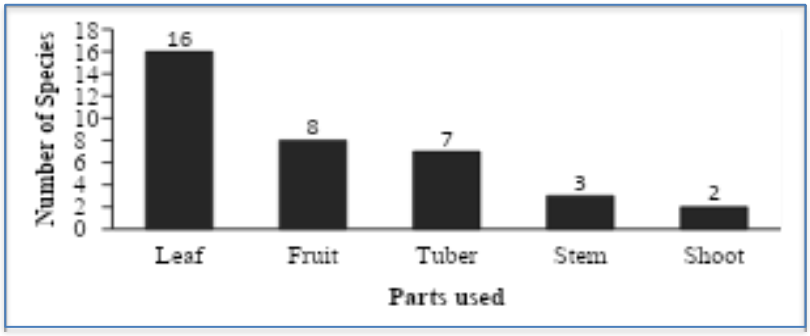

Figure 4. The number of species and parts of plants utilized as food by the community in the Girimanik Natural Forest Area (NFA), Setren Village

The leaves are the most commonly utilized section of the plant. 8 species are utilized in the fruit category, 7 species in the tuber category, 3 species in the stem category, and 2 species in the bud category (Figure 4). Leaves are widely utilized because they can be harvested easily without damaging the entire plant and are often used as vegetables or food ingredients. This exemplifies a sustainable harvesting strategy, as leaf collection permits repeated utilization without substantially diminishing plant populations. Because leaves do not always result in the death of the plant, their use tends to be more sustainable. Leaves contain many beneficial nutrients, such as vitamins, minerals, and fiber, which make them a popular vegetable. In comparison with research in Morocco (Atouife et al., 2026), where leaf use is also dominant, this indicates a global trend in ethnobotanical practices that prioritize both nutritional value and sustainability.

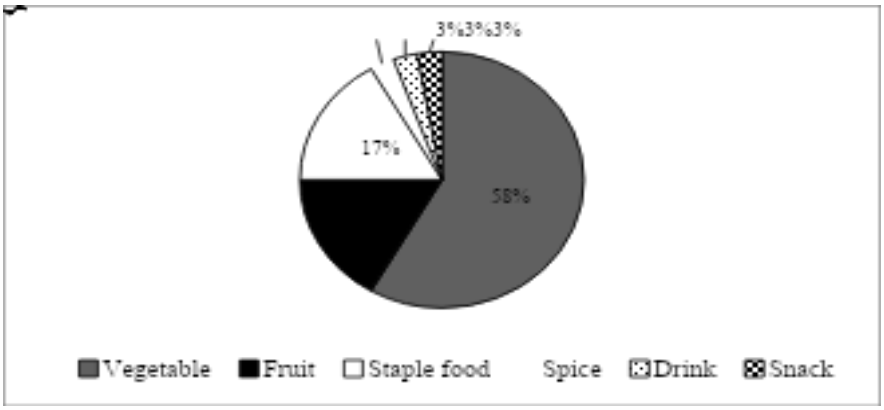

Figure 5. Percentage of species and benefits of wild food plants utilized by the community in the Girimanik Natural Forest Area (NFA), Setren Village

Fifty-eight percent of species are into the category most frequently utilized as vegetables. Furthermore, 16% of species are utilized as fruits, 17% as staple foods, and 3% each as spices, beverages, and snacks (Figure 5). This indicates that wild plants are an additional food source that can meet the nutritional needs of the community. The significant presence of vegetables indicates that wild plants mostly serve as dietary supplements instead than staple substitutes, impacting nutritional diversity rather than caloric adequacy. Wild plants are usually consumed as vegetables by boiling, sautéing, or using them as side dishes. The use of wild plants as vegetables also shows that the community has the ability to identify safe plants for consumption and how to process them. In contrast to earlier research (Asfaw et al., 2023), which indicate that wild plants may function as primary food sources in food-insecure areas, the role in this study seems more ancillary, suggesting comparatively improved availability to cultivated food sources.

In the quantitative analysis of this research, Relative Frequency of Citation (RFC) is used to determine the importance of a species based on the frequency mentioned by informants. The analysis results show that certain species have a higher RFC value compared to other species, indicating that these plants are more well-known and utilized by the community. A high RFC value usually indicates that a species has high cultural or practical value for the community. Ethnobotanical research often uses the RFC index to determine plant species that are highly utilized and have potential for development. Recent ethnobotanical studies also show that RFC values can be used to identify plants with cultural and economic value within a community (Rehman et al., 2024).

Table 2. Relative Frequency of Citation (RFC) of wild food plants utilized by the community in the Girimanik Natural Forest Area (NFA), Setren Village

RFC value	Number of Species
0,0-0,20	21
>0,20-0,40	7
>0,40-0,60	7
>0,60-0,80	0
>0,80-0,99	1
1	0

The Relative Frequency of Citation (RFC) analysis shows that 21 species have RFC values between 0.0 and 0.20, indicating that most plants have a relatively low mention rate by respondents. However, one species has a very high RFC value, around 0.80-0.99, indicating that this species is highly utilized and well-known by the community (Table 2). This disproportionate distribution indicates that only a limited number of species possess considerable cultural significance, whereas others may be recognized yet hardly utilized. This pattern may suggest a contraction of ethnobotanical knowledge, with only select species remaining in active use.

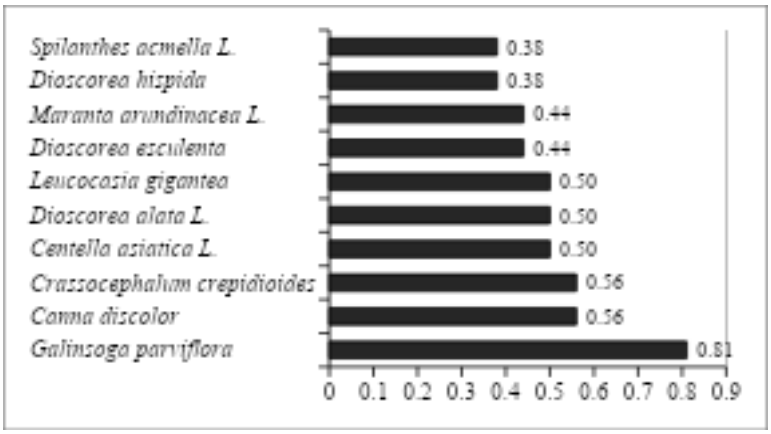

Figure 6. RFC values of the top 10 wild food plants utilized by the community in the Girimanik Natural Forest Area (NFA), Setren Village

Galinsoga parviflora has the highest RFC value (0.81). This species is among the most prevalent herbaceous plants in residential yards and gardens. Moreover, Galinsoga parviflora can be employed as a vegetable by harvesting its leaves and incorporating them into a stew (Figure 6). The elevated RFC value is attributable to its prevalence, ease of cultivation, and community familiarity, which enhance both accessibility and cultural recognition. Followed by a value of 0.56 for *Canna discolor* and *Crassocephalum crepidioides,* as well as a value of 0.50 for *Centella asiatica* and *Dioscorea alata.* In contrast to results from prior ethnobotanical studies (Rehman et al., 2024), plants with elevated RFC values frequently possess multiple functions (nutritional and medicinal), indicating possibility for further advancement and domestication.

In addition to RFC, this study also uses the Informant Consensus Factor (ICF) to determine how uniform the informants' knowledge is about the utilization of wild plants. A high ICF value indicates that the informants have relatively uniform knowledge about the utilization of certain plants. This indicates that the process of social learning within the community allows knowledge about wild plants in society to be passed down thru generations. Ethnobotanical studies show that a high ICF value indicates that informants have the same perceptions and experiences regarding the use of the plants. This shows that the plants are often used in daily life and play an important role in the community's life (Dangwal & Lal, 2024).

Table 3. Informant Consensus Factor (ICF) of wild food plants utilized by the community in the Girimanik Natural Forest Area (NFA), Setren Village

Use Categories	Number of Usability Reports	Number of Species	ICF value
Vegetable	86	21	0,76
Fruit	19	6	0,72
Staple food	36	6	0,86
Spice	1	1	0,00
Drink	1	1	0,00
Snack	6	1	1,00

The results of the Informant Consensus Factor (ICF) (Table 3) analysis show that the snack food category received the highest score with a value of 1, followed by the staple food category with a value of 0.86, vegetables with a value of 0.76, and the fruit category with a value of 0.72. On the other hand, the spice and beverage categories received an ICF score of 0 indicating that information about the utilization of plants among respondents is lacking. The elevated ICF value in the snack category signifies robust consensus but may also suggest restricted species variety, given that only a single species is utilized. Conversely, diminished ICF values in vegetables and fruits imply a broader range of applications but reduced consensus, reflecting diversity in informants' expertise. This pattern underscores disparities in knowledge allocation and cultural significance among usage groups.

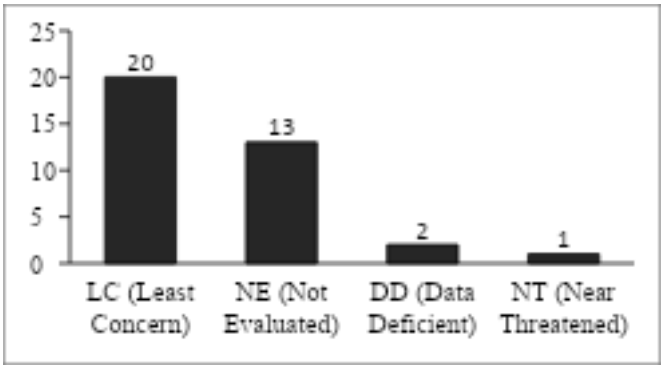

Figure 7. The number of species and conservation status of wild food plants utilized by the community in the Girimanik Natural Forest Area (NFA), Setren Village

Most species fall into the Least Concern (LC) category of the 20 species according to the IUCN conservation status, indicating that these species are not yet threatened with extinction. In addition, there are thirteen species that are classified as Not Evaluated (NE), two species that are Data Deficient (DD), and one species that is Near Threatened (NT) (Figure 7). Though the majority of species are classified as LC, the existence of NE and DD categories highlights deficiencies in conservation data, perhaps underestimating associated dangers. The species classified as Near Threatened (NT) is *Adonidia merrillii* (Becc.) Becc. Recent studies show that factors such as climate change and human actions make species more vulnerable to threats, even species with NT status often do not receive adequate attention for conservation(Liu et al., 2023). Therefore, even species presently deemed secure may become susceptible if exploitation escalates without adequate management. This indicates that, while the majority of species remain in a secure state, documenting and sustainable management of plant consumption are essential for their preservation. This shows that, although most species are still in a safe condition, efforts in documentation and sustainable plant utilization management are necessary to maintain their existence.

Overall, the findings of this research indicate that wild plants are very important for the community's life, especially as an alternative food source and as part of traditional knowledge passed down from generation to generation. The diversity of flora and fauna found in this study indicates that the research area has highly potential biological resources. Therefore, the documentation and preservation of local knowledge about wild plants are very important to maintain the sustainability of their use in the future. In addition, to support the development of sustainable alternative food sources, further research is needed on the nutritional content, economic potential, and domestication efforts of several highly beneficial wild plant species.

CONCLUSION AND SUGGESTIONS

Conclusion

This study discovered 36 species of wild food plants, with Asteraceae as the predominant family, underscoring the significant biodiversity potential of the study area and the robust interaction between local inhabitants and their environment. Herbaceous plants and leaves were the predominant forms exploited, indicating a preference for readily

available and responsibly harvested resources, mostly consumed as vegetables to enhance nutritional diversity and food resilience. Quantitative investigation revealed that certain species, notably *Galinsoga parviflora*, possess significant cultural and practical relevance, corroborated by robust informant consensus in primary food categories, signifying well-maintained traditional knowledge. While the majority of species are categorized as Least Concern, the existence of a Near Threatened species highlights the necessity for sustainable management and conservation initiatives. Wild food plants are essential for local food security and cultural continuity, highlighting the necessity for recording, conservation, and additional research on their nutritional and economic potential.Berisi simpulan yang dibentuk dalam satu paragraph.

Suggestions

It is recommended that future studies focus on analyzing the nutritional content, economic value, and domestication potential of highly utilized wild food plant species to support their development as sustainable alternative food sources. In addition, efforts to document and preserve local ethnobotanical knowledge should be strengthened through community-based approaches and intergenerational knowledge transfer. Conservation strategies, particularly for species with vulnerable statuses, need to be integrated with sustainable harvesting practices to ensure long-term availability. Furthermore, collaboration between researchers, local communities, and policymakers is essential to promote the sustainable use and management of wild food plants while enhancing local food security and biodiversity conservation.

ACKNOWLEDGMENT

The authors would like to express their sincere gratitude to the management of the Girimanik Natural Forest for granting permission and supporting the research activities, as well as to the community of Setren Village for their cooperation and invaluable contributions during the fieldwork. We also extend our appreciation to the Biology Education Laboratory, Faculty of Teacher Training and Education, Universitas Muhammadiyah Surakarta, for providing facilities and assistance in fieldwork and plant identification. Finally, we thank all individuals and parties who have contributed, directly or indirectly, to the completion of this research.

REFERENCES

Albuquerque, U. P., Cunha, L. V. F. C., Lucena, R. F. P., & Alvess, R. R. N. (2014). *Methods and Techniques in Ethnobiology and Ethnoecology*. New York: Humana Press. https://doi.org/10.1007/978-1-4614-8636-7

Arba, Sudiarto, & Yuniansari, R. (2023). Perlindungan Hutan dan Fungsinya Bagi Kehidupan Manusia dan Lingkungan Alam. *Jurnal Kompilasi Hukum*, *8*(2), 127–142. https://doi.org/10.29303/jkh.v8i2.144

Asfaw, A., Lulekal, E., Bekele, T., Debella, A., Tessema, S., Meresa, A., & Debebe, E. (2023). Ethnobotanical study of wild edible plants and implications for food security. *Trees, Forests and People*, *14*, 2–3. https://doi.org/10.1016/j.tfp.2023.100453

Asysyifa, A., Hafizianor, H., & Rahmawati, R. (2023). Social Structure of Community Local Wisdom in Forest Management in Pa'au Village, Banjar District. *Jurnal Hutan Tropis*, *11*(3), 395–401. https://dx.doi.org/10.20527/jht.v11i3.17634

Atouife, S., Essaih, S., Naciri, K., Kalili, A., Elbiyad, J., El Habazi, A., & Belahsen, R. (2026). Ethnobotanical knowledge of wild edible and medicinal plants in Southern Morocco: The case of Guelmim Province. *Ethnobotany Research and Applications*, *33*. https://doi.org/10.32859/era.33.9.1-16

Dangwal, L. R., & Lal, T. (2024). Diversity, Informant Consensus Factor and Cultural Significance Index of Wild Edible Plants in the Jaunpur region, Tehri Garhwal, Uttarakhand. *Ecological Questions*, *35*(2), 7–14. https://doi.org/10.12775/EQ.2024.011

Destryana, R. A., & Ismawati. (2019). Etnobotani Dan Pengggunaan Tumbuhan Liar Madura (Studi Di Kecamatan Lenteng , Guluk-Guluk. *Journal of Food Technology and Agroindustry*, *1*(2), 1–8.

https://doi.org/10.24929/jfta.v1i2.724

Hapsari, K. M. D., & Roziaty, E. (2023). Ethnobotanical Study of Tea Plants Based on Local Wisdom in Ngargoyoso District, Karanganyar Regency, Central Java. *International Conference on Biology Education, Natural Science, and Technology*, *1*(1), 550–557. https://proceedings.ums.ac.id/incobest/article/view/3462/3267

Kencharaddi, H., Marak, A. C. M., Marak, T. B., Teli, Shridevi B. Majumdar, S. N. R. M., Vastrad, J. V., Devi, M. P., & Dinesha, S. (2026). Ethnobotanical knowledge of wild edible plants for empowering food and nutritional security in the Garo Hills, India. *Journal of Ethnobiology and Ethnomedicine*, *22*(29), 2–54. https://doi.org/10.1186/s13002-026-00868-7

Khuluq, H., Zukhruf, N., Cahyani, T., Stefani, A., Fitriyati, L., Majidah, K., Dwi, B., & Yuliana, J. (2021). Etnomedisin Obat Hipertensi di Kabupaten Kebumen. *Jurnal Kesehatan*, *14*(1), 59–67. https://doi.org/10.23917/jk.v14i1.13898

Kusuma, N. A., & Suryani, T. (2017). Eksplorasi Tumbuhan Obat di Kawasan Hutan Alam Girimanik Setren Kecamatan Slogohimo Wonogiri. *Proceeding Biology Education Conference*, *14*(1), 88–92. https://jurnal.uns.ac.id/prosbi/article/view/18708

Liu, Q., Xue, T. T., Zhang, X. X., Yang, X. D., Qin, F., Zhang, W. Di, Wu, L., Bussmann, R. W., & Yu, S. X. (2023). Distribution and conservation of near threatened plants in China. *Plant Diversity*, *45*(3), 272–283. https://doi.org/10.1016/j.pld.2023.02.005

Munandar, M. (2016). Economic Valuation of Non Marketable Forest Product on Sultan Adam Grand Forest Park, SDouth Kalimantan. *Jurnal Hutan Tropis*, *4*(2), 109–119. https://dx.doi.org/10.20527/jht.v4i2.3597

Nasution, I., Jayanthi, S., Nurliyanti, Hijjati, N., Yurida, & Anggri. (2023). Inventarisasi Edible Plant yang Tumbuh Liar Di Kawasan Universitas Samudra. *Jurnal Biosense*, *6*(02), 233–246. https://doi.org/10.36526/biosense.v6i02.3360

Putri, M., Ramadhani, M., & Ginting, R. P. B. (2023). Peran hutan dalam mendukung ketahanan pangan di indonesia. *Research Gate*, *1*, 1–13. https://www.researchgate.net/publication/376390018

Rahma, K. A., Nugroho, A. S., Mulyaningrum, E. R., & Hayat, M. S. (2022). Jenis Tumbuhan Obat yang Dimanfaatkan Oleh Masyarakat Rt 09 Rw 04 Desa Kayen Pati Jawa Tengah. *Bioeksperimen: Jurnal Penelitian Biologi*, *8*(2), 106–113. https://doi.org/10.23917/bioeksperimen.v8i2.17141

Ramli, Wardenaar, E., & Setyawati, D. (2022). Pemanfaatan Hasil Hutan Bukan Kayu (HHBK) sebagai Bahan Pangan di Desa Sejuah Kecamatan Kembayan Kabupaten Sanggau. *Jurnal Lingkungan Hutan Tropis*, *1*(2), 431–439. https://jurnal.untan.ac.id/index.php/jlht/article/view/61167

Ratnani, D. A. S., Kriswiyanti, E., & Dhana, I. N. (2020). Ethnobotany Wild and Semi-Wild Edible Plants of Ngis Manggis Society of Karangasem Bali. *In Proceeding 1st International Conference of Innovation on Science and Technology for Sustainable Development (ICISTSD)*, *1*, 55–65. https://e-journal.unmas.ac.id/index.php/ICISTSD/article/view/2215

Rehman, S., Iqbal, Z., Qureshi, R., Shah, G. M., Afzal, A., Rahman, K. U., Hussain, W., Younas, M., Latif, S., Siddiqa, A., & Shah, S. S. H. (2024). Quantitative ethnomedicinal survey of wild edible fruits used by the indigenous community in North Waziristan, Khyber Pakhtunkhwa, Pakistan. *Ethnobotany Research and Applications*, *28*, 1–20. https://doi.org/10.32859/era.28.13.1-20

Santhyami, Agustina, L., Fauziah, D. E. N., Pratiwi, S. N., & Damayanti, A. V. (2025). Edible Plants Of The Traditional Market Of Surakarta, Indonesia: An Urban Ethnobotanical Study. *Tropical and Subtropical Agroecosystems*, *28*(102), 1–20. http://dx.doi.org/10.56369/tsaes.5692

Santhyami, & Yunita, H. (2024). Sustainable Food Security: An Ethnobotanical Study of Dlingo Village, Grobogan Regency. *IOP Conference Series: Earth and Environmental Science*, *1357*(1).

https://doi.org/10.1088/1755-1315/1357/1/012013

Shah, S. H. A., Shah, G. M., Rehman, S., Ali, N., Alam, J., Waheed, F., Ali, F., & Hussain, W. (2025). Ethnobotanical study of wild edible plants traditionally used by the inhabitants of Lalku Valley, District Swat, Pakistan. *Ethnobotany Research and Applications*, *30*. https://doi.org/10.32859/era.30.1.1-22

Sholichah, L., & Alfidhdhoh, D. (2020). Ethnobotany of the Wild Plant as a Food Crop in Mendiro Village, Wonosalam District, Jombang. *Jurnal Ilmu Pertanian Indonesia*, *25*(1), 111–117. https://doi.org/10.18343/jipi.25.1.111

Silalahi, M., Pikoli, M. R., & Sugoro, I. (2018). Studi Etnobotani Tumbuhan Pangan Yang Tidak Dibudidayakan Oleh Masyarakat Lokal Sub-Etnis Batak Toba, Di Desa Peadungdung Sumatera Utara, Indonesia. *Jurnal Pengelolaan Sumberdaya Alam Dan Lingkungan (Journal of Natural Resources and Environmental Management)*, *8*(2), 264–270. https://doi.org/10.29244/jpsl.8.2.264-270

Utami, N. U. R. R., Rahayuningsih, M., Abdullah, M., & Haka, F. H. (2019). Etnobotani tanaman obat masyarakat sekitar di Gunung Ungaran , Jawa Tengah Ethnobotany of medicinal plants surrounding communities on Mount Ungaran , Central Java. *Pros Sem Nas Masy Biodiv Indon 5*, *5*(2), 205–208. https://doi.org/10.13057/psnmbi/m050210

Wiwik, S., & Wahyudi. (2022). Analisis Motivasi Belajar Siswa Dengan Model Blended Learning Di Masa Pandemi Covid19. *Kadikma*, *13*(1), 68. https://eprints.umpo.ac.id/id/eprint/11641

Yusro, F., Oramahi, H. A., Mariani, Y., & Windra, E. A. (2023). Pemanfaatan Tanaman Pangan Oleh Masyarakat Desa Sungai Muntik Kabupaten Sanggau. *Jurnal Hutan Lestari*, *11*(2), 451. https://doi.org/10.26418/jhl.v11i2.63852