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Local knowledge and the utilization of non-medicinal plants in home garden by the people of Donorejo Village in the Menoreh Karst Area, Purworejo, Central Java, Indonesia

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Abstract. *Sholekha AM, Yulia IT, Hanun Z, Perwitasari IG, Cahyaningsih AP, Sunarto, Sutarno, Sugiyarto, Buot Jr IE, Setyawan AD. 2023. Local knowledge and the utilization of non-medicinal plants in home garden by the people of Donorejo Village in the Menoreh Karst Area, Purworejo, Central Java, Indonesia. Biodiversitas 24: 645-657.* Donorejo Village, in Purworejo District, Central Java, Indonesia, is one of the villages in the Menoreh Karst Mountains that uses non-medicinal plants. Donorejo villagers typically own vast plots of land that might be used for a wide range of productive purposes if planted with suitable vegetation. This study aims to investigate the knowledge of local people in the Menoreh Karst Mountain Area, Donorejo Village regarding the use of non-medicinal plants for daily life and document the use of plants by locals that can be useful to prevent delays in the transmission of local knowledge to future generations. Interviews and surveys conducted in the field using a purposive sampling strategy provided the bulk of the study's information. The age range of the 48 informants was from 25 to 91 years old, and the vast majority of them had only completed elementary school. A total of 119 species of non-medicinal plants were identified, representing 62 families and 12 different purposes, based on the results of the inventory of plants indicated by respondents and field observations. These plants were utilized as ornamental plants (48 species), food plants (44 species), cooking spices (16 species), animal feed (13 species), firewood (6 species), building materials (6 species), household items (2 species), and funeral ritual, prayer beeds, food wrapper, fence, fire starter (1 species). Based on these findings, it is clear that the residents of Donorejo Village continue to employ various non-medicinal plants in their gardens for various purposes.

Keywords: Ethnobotany, local knowledge, Menoreh karst, non-medicinal plants

INTRODUCTION

It is known that 20% of Indonesia's geographical area consists of karst. Hence karst ecosystem landscapes are vital to the country. According to Regulation No. 17 of 2012 issued by the Indonesian Minister of Energy and Mineral Resources, karst landscapes are areas formed by dissolved water in limestone or dolomite. Karst is a physical landscape typified by broad plateaus, steep hills, sunken valleys, and pointed carbonate rock peaks (Sulistiyowati et al. 2021). Due to the unique characteristics of the karst region, this area is home to an abundance of plant and animal species (Mane et al. 2019). Menoreh Karst is one of the karst regions of Java Island. The plains of the Menoreh hills span three districts - Kulon Progo, Purworejo, and Magelang, and were formed by the breakdown of the old seabed, which generated carbonate rock plains. This 15 km^2 karst region is comprised of a landscape of steep and pointy hills. This karst location is approximately 700 meters above sea level, has cool and humid weather, and a deep soil structure; thus, there is a profusion of vegetation, ranging from pine forests to multifunctional wild plants (Soedwiwahjono and Utomo 2020).

Ethnobotany studies the relationship between plants and local cultures, including traditional plant uses and features (Listiani and Abrori 2018). The Menoreh karst land's enormous vegetation may sustain the establishment of numerous plant species, one of which is a non-medicinal plant species (Liu et al. 2021). Non-medicinal plants are used for purposes other than medicine, such as ornamental plants, food plants, cooking spices, animal feed, firewood, and house-building plants. The purpose of ethnobotany is to maintain the culture around the local community's use of plants (Pei et al. 2020). Ethnobotany is centered on the daily lives of local people, particularly those who live in rural areas and have a habit of using wild or cultivated plants (Zhou et al. 2018).

One of the settlements in the Menoreh karst mountains, Donorejo Village in the Purworejo District, relies on various non-medicinal plants for daily requirements. Due to limited transportation to access the city core, the residents of Donorejo Village concentrate on fulfilling daily requirements using land in their home garden. The residents of Donorejo Village have access to a large home garden of land on which they can cultivate plants for various purposes. The vast plots of land can also serve as a home garden, one of the complex ecosystems close to people's homes and used to grow plants (Mekonen et al. 2015). The home garden serves aesthetic and ethnobotanical purposes. Its aesthetic sense is planting decorative plants that provide aesthetic value to the home (Wakhidah et al. 2020). In contrast, its ethnobotanical function is the interaction and mutual relationship between humans and plants in the home garden, which develops knowledge of the uses of plants (Purnomo et al. 2019).

However, the advancement of knowledge and the passage of time may result in the decline of people's plant-based practices (Pan et al. 2014). Globalization, which gives convenience through technical advances and modern facilities, or modernity, which has a significant impact on ethnobotanical knowledge in society, is the primary driver (Sujarwo et al. 2014). On the other hand, it is undeniable that access from the city center to Donorejo Village will continue to improve and make it easier for residents of the village to reach there in the future. However, it will result in a loss of knowledge regarding the exploitation of surrounding plants. The community, which previously met its needs through the forest and home-grown plants, has become more dependent on market-sold completed goods. Future generations with less awareness about non-medicinal plants due to a lack of utilization will feel the effects (Malini et al. 2017). Consequently, it is necessary to document information to preserve knowledge regarding the uses and features of the plants utilized by local people. This study aims to investigate the understanding of local people in the study area regarding the use of non-medicinal plants for daily life, documenting the use of plants by local people to prevent delays in the transmission of local knowledge to future generations.

MATERIALS AND METHODS

Study area

The study was conducted in Donorejo Village, Kaligesing District, Purworejo District, Central Java, Indonesia, in November 2022 (Figure 1). The four hamlets of Donorejo Village are Katerban, Denansri, Jogowono, and Rejosari. This region's geographical coordinates are -7.758877112319293S, 110.09313231731153E, and its elevation is between 500 and 750 meters above sea level. This community has an area of 597,3730 hectares and a population density of 592 persons per square kilometer (BPS 2021). Donorejo Village has a tropical climate, with an average annual precipitation of 2,218 millimeters. Donorejo Village is likewise included in the karst area arrangement in the Menoreh hills.

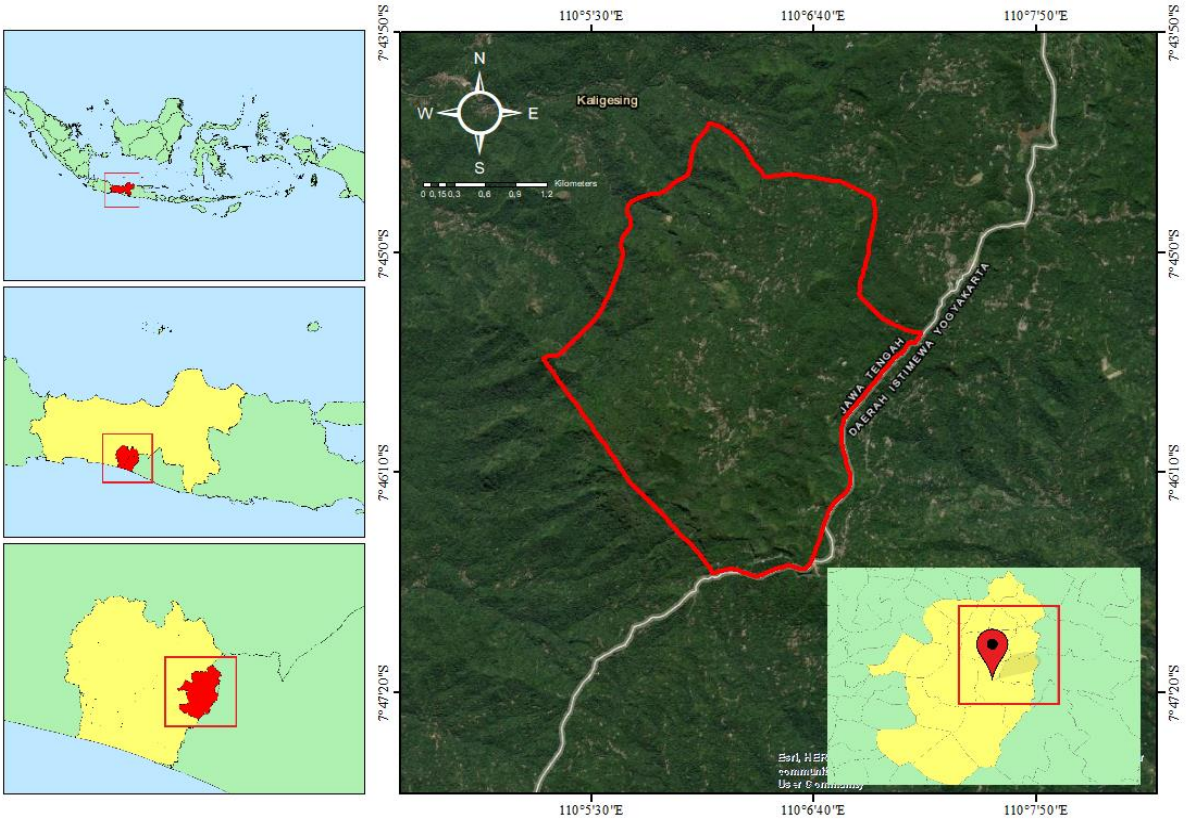

Figure 1. Map of the research location in Donorejo Village, Purworejo District, Central Java, Indonesia

Data collection

Interviews with residents of Donorejo Village, Purworejo, provided the data for this study. The data gathered pertained to the traditional use of non-medicinal plants that grow in village areas and home garden by local communities. Interviews with a total of 48 respondents were utilized for data collection. The interview was done using the purposive sample technique (Palinkas et al. 2015), with the criterion that the informants selected had many plants in their home garden. The information gathered during the interviews included the names of the informants, their ages, their highest level of education, the local names of the plants used, the parts of the plants utilized, the uses of the plants, and how to use the plants (Suwardi et al. 2020). Oral interviews were conducted with questions and responses from the interviewer (1 person) and resource individuals (1 person). The language used in the interview was a combination of Javanese and Indonesian. The interviews were recorded with a tape recorder, and each informant's answer was documented on a tally sheet. In addition to interviews, field observation techniques were used to obtain data. Local plant names obtained from interviews and field surveys were identified using POWO (Plants of the World Online) to obtain the scientific names of plants.

Data analysis

Data from interviews and field surveys were analyzed using quantitative methods and descriptive statistics, and presented in graphs and tables. Use Values (UVs) are calculated using the formula below. Use Values are used to determine which non-medicinal plants were most utilized by the people of Donorejo Village (Kurniawan and Jadid 2015).

$$UVs = \frac{\sum UVis}{n_i}$$

Where:
UVs: Use Values
UVis: The number of uses of the named species
ni: The total number of interviewed informants

Plants with a high UVs index have an increased number of reported uses, implying that they are essential and widely used by local people, while low UVs indicate that there are few reports of their use (Siahaan et al. 2022).

RESULTS AND DISCUSSION

In this study, 48 respondents, 15 males, and 33 women were interviewed for data collection (Table 1). The number of female informants exceeded that of male informants because, during field research, women were frequently at home while men went to work. The educational backgrounds of the informants ranged from elementary school to tertiary degree, with 27 respondents having an elementary school education. The ages of the informants ranged from 25 to 91 years, with the majority falling between the ages of 25 and 45. The village leader was the first informant to collect data on home garden plants.

Regarding the utilization of home garden plants, the local population, notably female respondents, maintains a high level of knowledge from young to elderly. The only source of information about the use of these plants is the community's everyday practice, which has become a habit. In ethnobotanical investigations, such as those conducted in the hamlet of Tulakan Pacitan, it has also been demonstrated that homemakers can keep their local knowledge since they utilize numerous plants in their daily lives (Cahyaningsih et al. 2022). Based on interview results, parents also pass on to their children the use of plants in the house's home garden and the surrounding. As with ethnobotanical studies of medicinal plants, local people learn to utilize plants through trial and error and then pass them on (Gurib-Fakim 2006). Additionally, the community uses non-medicinal plants in their daily lives and maintains information regarding the use of plants (Cahyaningsih et al. 2022).

Purposes

Donorejo Village residents utilize home garden plants for various purposes (Table 2). According to the data, ornamental plants account for 40.3% of home garden use, followed by edible plant at 36.9%, cooking spices at 13.4%, animal feed at 10.9%, firewood and house building at 5% each, rituals at 1.6%, and plants with various other purposes at 0.8%. According to the research findings, some plant species serve several roles, one of which is *Cocos nucifera* is used as a cooking spice, firewood, and fire starter. *Calliandra calothyrsus* is utilized as animal feed and firewood. Donorejo Village has high diversity of plants grown in their home garden, with the study indicating that there are 119 species of plants from 62 families.

Table 1. Demographic data of respondents in Donorejo Village, Purworejo, Central Java, Indonesia

Parameter	Specification	Frequency
Number of respondents		48
Gender	Male	15
	Female	33
Age	25-45	22
	46-65	18
	66-85	7
	91	1
Education	Elementary school	27
	Junior high school	9
	Senior high school	11
	University	1

Table 2. Types of plant utilization by the people of Donorejo Village, Purworejo, Central Java, Indonesia

Purposes	Number of species	Number of genera	Number of families	Percentage (%)
Ornamental plant	48	47	34	40.3
Food plant	44	40	31	36.9
Cooking spices	16	15	9	13.4
Animal feed	13	13	9	10.9
Firewood	6	6	5	5
House building	6	6	6	5
Household appliances	2	2	2	1.6
Funeral ritual	2	2	2	1.6
Prayer beads	1	1	1	0.8
Food wrapper	1	1	1	0.8
Fence	1	1	1	0.8
Fire stater	1	1	1	0.8

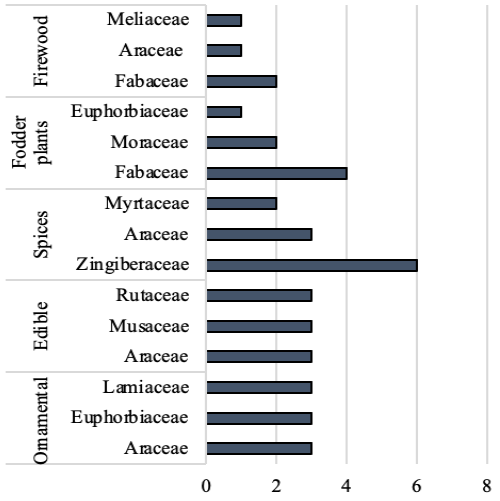

Figure 2. The top 3 of family for each type of purposes by the people of Donorejo Village, Purworejo, Central Java, Indonesia

A high plant variety is supported by soils that are still fertile and are located in karst mountain regions with stable forest areas (Yang et al. 2022). As a result of the distance between their dwellings, the occupants have a very large home garden, which they utilize by cultivating a variety of plants that satisfy their daily requirements. Most Donorejo Village residents raise *Capra aegagrus hircus* (*etawa* goat) as animals. Like in many other villages, the social level of the Donorejo Village community is reflected in the livestock industry (Bettencourt et al. 2015). Many livestock farmers utilize food plants such as *Ananas comosus* and *Musa paradisiaca* as animal feed. Some village communities cultivate food plants and plants whose products are marketed to generate additional household income in existing forest areas surrounding the village, in addition to their home garden (Ashari et al. 2012).

Food plants

The inhabitants of Donorejo Village cultivate a wide variety of food plants, including 45 plant species from 40 genus and 31 families (Table 3). Most of the food plants utilized by the community are grown in individual home garden, making them easier to manage and utilize. Donorejo Village residents cultivate edible fruit and vegetable plants that can be either raw or cooked. Donorejo Village residents' knowledge and understanding of food plants are restricted to the plants they cultivate in their home garden and those they consume daily. The population utilizes them as vegetables, fruits, and snacks with various Use Values (UV).

Donorejo Village residents utilize Araceae, Musaceae, and Rutaceae as their primary food plant families (Figure 2). In addition, the community utilizes *Amorphophallus campanulatus*, *Colocasia esculenta*, and *Xanthosoma sagittifolium* from the Araceae family. Methods of boiling, steaming, and frying are employed to prepare the tubers of the three plants. The Araceae family was also discovered in Cisoka Village, Majalengka, through ethnobotanical research (Mutaqin et al. 2018). There are Araceae plants in the home's home garden, gardens, and rice fields. The inhabitants of Cisoka Village also consume *A. campanulatus* and *C. esculenta* as primary foods. Similarly, to the Donorejo Village, the villagers of Cisoka Village boil, fry, salt, or sweeten these herbs by custom. The tubers of *A. campanulatus* and *C. esculenta* contain essential carbohydrates for human health (Ekowati et al. 2015). Moreover, *A. campanulatus* and *C. esculenta* tubers contain minimal protein and fat (Septiani et al. 2015).

Centella asiatica leaves, also known as *pregedek*, is one of Donorejo's unique ways of utilizing natural plants as food plants. Many of these plants are found growing in the home garden or on land in the village. The community utilizes these plants by frying the leaves with flour to create leaf chips.

In addition to being enjoyed as a snack, people sell *C. asiatica* leaf chips to generate additional revenue. The *C. asiatica* is a plant belonging to the Apiaceae family that is indigenous to the tropical region of Asia and is usually found in rice fields and meadows. The *C. asiatica* thrives in China, Indonesia, Malaysia, India, and other Asian nations (Hashim 2011). In Malaysia, *C. asiatica* is also consumed as a food plant through the consumption of its leaves in salads (Harun et al. 2019). Potassium and calcium are present in The *C. asiatica*, which is poor in protein, carbs, and fat. Vitamins C, B1, B2, niacin, tannins, saponins, carotene, and vitamin A are also abundant in *pregedek* (Rahman et al. 2013).

Table 3. Utilization of food plants by the people of Donorejo Village, Purworejo District, Indonesia

Scientific name	Local name	Family	Life-form	Used part	Mode of preparation	UV
Amaranthus viridis L.	*Bayam*	Amaranthaceae	Herb	Leaf	Boiled, cooked	0.10
Amorphophallus campanulatus Decne	*Suweg*	Araceae	Herb	Tuber	Steamed	0.02
Ananas comosus (L.) Merr	*Nanas*	Bromeliaceae	Herb	Fruit	Raw	0.04
Annona muricata L.	*Sirsak*	Annonaceae	Herb	Fruit	Raw	0.02
Artocarpus heterophyllus Lam.	*Nangka*	Moraceae	Tree	Fruit	Raw, cooked	0.14
Brassaica rapa subsp. *chinensis* (L.) Hanelt	*Sawi sendok*	Brassicaceae	Herb	Leaf	Cooked	0.02
Canavalia ensiformis L. DC.	*Koro*	Fabaceae	Climber	Seed	Cooked	0.02
Carica papaya L.	*Pepaya*	Caricaceae	Herb	Leaf, fruit	Cooked, raw	0.23
Centella asiatica (L.) Urb.	*Pregedek*	Apiaceae	Herb	Leaf	Fried	0.02
Citrus grandis (L.) Osbeck	*Jeruk bali*	Rutaceae	Shrub	Fruit	Raw	0.06
Citrus nobilis Lour.	*Jeruk siam*	Rutaceae	Shrub	Fruit	Raw	0.06
Citrus x sinensis (L.) Osbeck	*Jeruk manis*	Rutaceae	Shrub	Fruit	Raw	0.08
Cocculus orbiculatus (L.) DC.	*Daun cincau*	Menispermaceae	Climber	Leaf	Squeezed	0.10
Coffea sp.	*Kopi*	Rubiaceae	Shrub	Seed	Baked, mashed, brewed	0.27
Colocasia esculenta (L.) Schott	*Sundo*	Araceae	Herb	Tuber, leaf	Steamed	0.17
Cosmos caudatus Kunth	*Kenikir*	Asteraceae	Herb	Leaf	Boiled, raw	0.02
Dendrocalamus asper (Schult. & Schult.f.) Backer	*Bambu/rebung*	Poaceae	Tree	Shoots	Cooked	0.02
Durio zibethinus L.	*Durian*	Malvaceae	Tree	Fruit	Raw	0.10
Etlingera elatior (Jack) R.M.Sm.	*Benteot*	Zingiberaceae	Herb	Flower	Cooked	0.02
Foeniculum vulgare Mill	*Adas*	Apiaceae	Herb	Leaf	Boiled	0.02
Garcinia mangostana L.	*Manggis*	Clusiaceae	Tree	Fruit	Raw	0.02
Gnetum gnemon L.	*Melinjo*	Gnetaceae	Tree	Fruit, leaf	Cooked	0.02
Gynura procumbens (Lour.) Merr.	*Sambung nyawa*	Asteraceae	Scrub	Leaf	Raw	0.02
Ipomoea batatas (L.) Lam.	*Telo rambat*	Convolvulaceae	Climber	Leaf, tuber	Cooked, steamed, fried	0.08
Lansium parasiticum (Osbeck) Mabb.	*Duku*	Meliaceae	Tree	Fruit	Raw	0.02
Mangifera indica L.	*Mangga*	Anacardiaceae	Tree	Fruit	Raw	0.06
Manihot esculenta Crantz	*Singkong*	Euphorbiaceae	Shrub	Leaf, tuber	Boiled, steamed, fried	0.27
Maranta arundinacea L.	*Garut*	Marantaceae	Herb	Tuber	Boiled, steamed, fried, shredded	0.04
Momordica charantia L.	*Pare*	Cucurbitaceae	Climber	Fruit	Cooked	0.04
Moringa oleifera Lam.	*Kelor*	Moringaceae	Tree	Leaf	Cooked	0.04
Musa acuminate Colla	*Pisang susu*	Musaceae	Tree	Fruit	Raw	0.02
Musa balbisiana Colla	*Pisang kapok*	Musaceae	Tree	Leaf	Raw, fried, steamed	0.06
Musa paradisiaca L.	*Pisang*	Musaceae	Tree	Leaf, flower	Raw, cooked	0.17
Nephelium lappaceum L.	*Rambutan*	Sapindaceae	Tree	Fruit	Raw	0.04
Persea Americana Mill.	*Alpukat*	Lauraceae	Tree	Fruit	Raw	0.08
Physalis angulata L.	*Ciplukan*	Solanaceae	Herb	Fruit	Raw	0.04
Psidium guajava L.	*Jambu*	Myrtaceae	Tree	Fruit	Raw	0.10
Psophocarpus tetragonolobus (L.) DC.	*Kecipir*	Fabaceae	Herb	Fruit	Cooked	0.10
Sauropus androgynus (L.) Chakrab. & N.P.Balakr.	*Katuk*	Phyllanthaceae	Shrub	Leaf	Cooked	0.10
Sechium edule (Jacq.) Sw.	*Labu siam/ jipang*	Cucurbitaceae	Climber	Fruit	Cooked	0.06
Solanum melongena L.	*Terong*	Solanaceae	Herb	Fruit	Cooked	0.02
Solanum nigrum L.	*Leunca*	Solanaceae	Herb	Fruit	Raw	0.02
Theobroma cacao L.	*Kakao*	Sterculiaceae	Tree	Fruit	Dried, mashed, brewed	0.04
Xanthosoma sagittifolium (L.) Schott	*Kimpul*	Araceae	Herb	Tuber	Boiled, steamed, fried	0.12

The inhabitants of Donorejo Village utilize plants with edible flower parts. The floral portions of the plant species *Etlingera elatior*, popularly known as *benteot*, are prepared and consumed as vegetables. Local Indonesians are accustomed to consuming the blooms of this Zingiberaceae species, as evidenced by an ethnobotanical study in Pacitan, East Java, which identified this species as the *kecombrang* (Cahyaningsih et al. 2022). The flower of *M. paradisiaca* is also prepared as a vegetable. It is processed by boiling it and then cooking it with various spices, including garlic, chili, and coconut milk. Banana is a plant widely cultivated as a food plant in several regions of Indonesia, including its edible flower (Indraswari 2014).

Some wild plants are also utilized as food plants by the Donorejo Village residents. *Physalis angulata*, also known as *ciplukan*, is a wild herb consumed by inhabitants. These plants grow wild in the home garden and neighboring areas, and inhabitants consume the fruit immediately if they find it ripe during an activity. They also know that the fruit has therapeutic characteristics and a fresh flavor. *Physalis* is a genus commonly used as food and medicine, with its local use being the most extensive and widespread in some nations (Arenas and Kamienkowski 2013). *Solanum nigrum*, or *leunca*, is another plant whose fruit is ingested uncooked. In addition to growing wild, these plants are typically consumed as fresh vegetables. The Sundanese (Septiani et al. 2020) and Batak (Ayu et al. 2020) have used the raw fruit of *S. nigrum* as fresh vegetables. However, Albouchi et al. (2018) indicated that the *S. nigrum*, in some parts, can be toxic to humans, therefore it is suggested to consume ripe fruit and cooked leaves.

Ornamental plants

There are 48 species from 47 genus and 34 families of ornamental plants in Donorejo Village, which has a great diversity (Table 4, Figure 3). The ornamental plant families that are most prevalent in Donorejo Village include Araceae, Euphorbiaceae, and Lamiaceae. Almost all of the informants who participated in this study had ornamental plants in their home garden, but they occasionally had plants that grew naturally in their home garden. This finding is because Donorejo Village has favorable environmental conditions and fertile soil, allowing plants to flourish. Most villagers also collect ornamental plants from the karst forest surrounding their community.

Residents of Donorejo Village decorate the front porches of their homes with native plants, distinctive leaf forms, and vivid colors. Ferns with distinctive leaf shapes, such as *Asplenium nidus*, *Drynaria sparsisora*, *Huperzia carinata*, and plants with vibrant leaf colors, such as *Cordyline fruticosa* and *Codiaeum variegatum*, are among the wild species collected from karst forest. Ferns have been utilized as ornamental plants since ancient times (Keller and Prance 2015), and other regions are also known to use ferns as ornamental plants, such as Nilgiris, Tamil Nadu, India, where as many as 153 species are employed (Abraham et al. 2012).

Wild plants spontaneously growing in the village are also used as ornamental plants because of their beautiful flower colors, such as *Hippobroma longiflora*, *Impatiens walleriana*, and *Kalanchoe pinnata*, or because they have multiple uses, such as being used as medicinal plants. Other home garden-grown wild plants, such as *Coleus scutellarioides*, are also utilized as ornamental plants and bath soap. The *I. walleriana* is a beautiful ornamental plant widely cultivated in the home garden of local households (Putri 2016).

Figure 3. Several species of ornamental plants in the home garden of the Donorejo Village, Purworejo District, Indonesia. A. *Hedychium coronarium*. B. *Hydrangea macrophylla*. C. *Salvia coccinea*. D. *Chrysothemis pulchella*. E. *Asplenium nidus*. F. *Huperzia carinata*. G. *Cordyline fruticosa*. H. *Codiaeum variegatum*

Table 4. The use of ornamental plants by the people of Donorejo Village, Purworejo District, Indonesia

Scientific name	Local name	Family	Life-form	UV
Acalypha wilkesiana Müll.Arg.	*Mantel yakup*	Euphorbiaceae	Shrub	0.02
Aglaonema modestum Schott ex Engl.	*Sri rejeki*	Araceae	Herb	0.02
Aloe vera (L.) Burm.f.	*Lidah buaya*	Asphodelaceae	Herb	0.02
Asplenium nidus L.	*Paku sarang burung*	Aspleniaceae	Herb	0.02
Begonia sp.	*Begonia*	Begoniaceae	Herb	0.02
Bougainvillea spectabilis Willd.	*Bunga kertas*	Nyctaginaceae	Shrub	0.02
Caladium bicolor (Aiton) Vent.	*Keladi*	Araceae	Herb	0.08
Cananga odorata (Lam.) Hook f. & Thomson	*Kenanga*	Annonaceae	Shrub	0.02
Celosia cristata L.	*Celosia*	Amaranthaceae	Herb	0.02
Chrysothemis pulchella (Donn ex Sims) Decne.	*Lonceng senja*	Gesneriaceae	Herb	0.06
Codiaeum variegatum (L.) Rumph. ex A.Juss.	*Puring*	Euphorbiaceae	Shrub	0.10
Coleus scutellarioides (L.) Benth.	*Iler*	Lamiaceae	Scrub	0.02
Cordyline fruticosa (L.) A.Chev	*Andong*	Asparagaceae	Herb	0.12
Cosmos caudatus Kunth	*Kenikir*	Asteraceae	Herb	0.02
Dendrobium sp.	*Anggrek*	Orchidaceae	Herb	0.06
Dianella tasmanica Hook.f.	*Alang-alang varigata*	Asphodelaceae	Herb	0.02
Dieffenbachia seguine (Jacq.) Schott	*Diven*	Araceae	Herb	0.02
Dracaena fragrans (L.) Ker Gawl.	*Hanjuang batang*	Asparagaceae	Shrub	0.04
Drynaria sparsisora (Desv.) T.Moore	*Simbar*	Polypodiaceae	Herb	0.02
Epiphyllum anguligerum (Lem.) M.Á.Cruz & S.Arias	*Wijayakusuma*	Cactaceae	Herb	0.02
Erythrina humeana Spreng.	*Dadap*	Fabaceae	Shrub	0.02
Euphorbia milii Des Moul.	*Euphorbia*	Euphorbiaceae	Scrub	0.04
Ficus benjamina L.	*Beringin*	Moraceae	Tree	0.02
Ficus pumila L.	*Dolar*	Moraceae	Herb	0.02
Maranta leuconeura É.Morren	*Maranta*	Marantaceae	Herb	0.06
Hedychium coronarium J.Koenig	*Gondosuli*	Zingiberaceae	Herb	0.02
Hibiscus rosa-sinensis L.	*Bunga sepatu*	Malvaceae	Shrub	0.10
Hippobroma longiflora (L.) G.Don	*Kitolod*	Campanulaceae	Herb	0.02
Huperziacarinata (Desr.) Trevis.	*Kumpai*	Lycopodiaceae	Herb	0.02
Hydrangea macrophylla (Thunb.) Ser.	*Pancawarna*	Hydrangeaceae	Scrub	0.04
Hypoestes phyllostachya Baker	*Polka dot*	Acanthaceae	Herb	0.02
Iresine herbstii Hook.	*Bayam bayaman*	Amaranthaceae	Herb	0.02
Impatiens walleriana Hook f.	*Pacar air*	Balsaminaceae	Scrub	0.02
Ixora javanica (Blume) DC.	*Soka*	Rubiaceae	Shrub	0.04
Jasminum sambac (L.) Aiton	*Melati*	Oleaceae	Scrub	0.04
Kalanchoe pinnata (Lam.) Pres.	*Cocor bebek*	Crassulaceae	Herb	0.02
Crinum asiaticum L.	*Bakung*	Liliceae	Herb	0.02
Orthosiphon aristatus (Blume) Miq.	*Kumis kucing*	Lamiaceae	Herb	0.02
Polyscias scutellaria (Burm.f.) Fosberg	*Mangkokan*	Araliaceae	Shrub	0.02
Rosa sp.	*Mawar*	Rosaceae	Shrub	0.21
Salvia coccinea Buc'hoz ex Etl.	*Salvia*	Lamiaceae	Herb	0.02
Sansevieria trifasciata (Prain) Mabb.	*Lidah mertua*	Agavaceae	Herb	0.04
Scadoxus multiflorus (Martyn) Raf.	*Bunga desember*	Amaryllidaceae	Herb	0.02
Schefflera actinophylla (Endl.) Lowry & G.M.Plunkett	*Walisongo*	Araliaceae	Shrub	0.02
Syzygium myrtifolium Walp.	*Pucuk merah*	Myrtaceae	Tree	0.06
Thunbergia erecta (Benth.) T.Anderson	*Bunga trumpet*	Acanthaceae	Shrub	0.02
Trimezia martinicensis (Jacq.) Herb.	*Iris*	Iridaceae	Herb	0.06
Zinnia elegans Jacq.	*Kembang kertas*	Asteraceae	Shrub	0.02

The most often found ornamental plants with the highest UV (0.21) in Donorejo Village were *Rosa* sp., also known as the rose. Roses are obtained by residents from the forest and replanted in their home garden. In addition, residents use roses as sowing flowers in funeral rituals in the village. The dual function of roses as ornamental plants and ritual causes residents to grow more roses, so most houses in Donorejo Village planted these flowers in their home gardens. *Rosa* sp. is a shrub with the characteristics of a thorny tree and can grow up to 2 to 5 meters high. Initially, the plant species was used as medicine and perfume, but because of the beautiful flowers, roses are used as ornamental plants (Chahar 2016). *Rosa* sp. has been widely used as an ornamental plant by the general public. Rose plants have aesthetic value and beauty to be used as ornamental plants because they have a variety of colors in their flowers. Flowers vary in size but are usually large and showy. Color varies from red, pink, and white (Ahmad et al. 2013).

Cooking spices

The people of Donorejo Village utilize many plants as cooking spices, comprising 16 species from 9 families (Table 5). These plants are planted around the home garden

to make them more accessible and practical. The plant parts vary from rhizomes, stems, leaves, flowers, flower sap, fruit, and seeds. The people of Donorejo Village use plants as seasonings in various ways, including pounding, cutting, boiling, drying, cooking, grating, and pressing. The people of Donorejo Village also used coconut sap to be processed into brown sugar and used as a cooking seasoning.

Zingiberaceae family is the most widely used by the public as a cooking spice. The family members are *Zingiber officinale, Z. officinale* var. *rubrum, Curcuma domestica, Kaempferia galanga, Alpinia galangal,* and *Amomum cardamomum.* The parts of the six plants used as spices in the kitchen are the rhizomes using crushed, chopped, and boiled. Zingiberaceae family is a herb plant used as a dominant kitchen spice because a suitable habitat environment supports it. Zingiberaceae can grow in humid habitats and tropical and subtropical areas (Saensouk et al. 2016). The family has many essential nutrients (Betancur and Berenjumea 2014). Based on ethnobotanical studies in other rural karst areas, such as in Bungur Pacitan Village, Zingiberaceae is the family with the most species used by local people as cooking spices (Cahyaningsih et al. 2022).

The most widely used plant species as a seasoning with a UV value of 0.43 is *Z. officinale*. The plant species is widely used as a cooking ingredient where the rhizome is used to enhance the taste of food and flavoring. The *Z. officinale* can also help eliminate foul odors in processed raw foods such as meat, fish, chicken, and others. For example, it was proven by Aisyah et al. (2021) that adding ginger to raw jerky fish can eliminate the fishy smell due to the presence of essential oil liquid, which gives off the distinctive aroma of ginger. Other species with high use value in cooking ingredients are *C. domestica,* with a UV value of 0.31, and *Cymbopogon citratus,* with a UV value of 0.23.

The people of Donorejo Village also use a lot of *C. nucifera* and *Arenga pinnata,* which grow a lot in their home garden and the area around the village, as cooking ingredients. The two types of plants are used by cooking the sap into brown sugar. Processing brown sugar begins with coconut flower sap which is taken by collecting the sap in a container in the morning and then waiting until the evening when the container is full. The community adds betel lime-soaking water to each container can full of sap water so that the sap water does not go stale and turn thick (Jupri et al. 2020). After the sap is collected, it is put into a large cauldron, and sugar is added to the sap water. The sap water and granulated sugar mixture are processed by boiling it for 4-5 hours without stopping and are marked by the thickening of the sap and the change in color, which has turned red. Finally, the brown sugar is produced, molded, and allowed to stand until it hardens.

Animal feed

Donorejo Village residents utilize a variety of plants as animal feed, totaling 13 species from 9 family (Table 6, Figure 4). These fodder plants are abundant in the home garden, the area surrounding the village's communities, and the neighboring forest. The inhabitants of Donorejo Village engage in daily activities to find and collect plants as *ngarit*, with each activity involving a different variety of plants. Residents feed *C. a. hircus* (*etawa* goat) straight to their livestock after collecting the feed. The Fabaceae family is the most commonly utilized family for fodder.

Table 5. Utilization of plants for cooking spices by the people of Donorejo Village, Purworejo District, Indonesia

Species Name	Local Name	Family	Life-form	Part use	Mode of preparation	UV
Alpinia galangal L. Willd.	*Laos*	Zingiberaceae	Herb	Rhizome	Crushed, cut	0.21
Amomum compactum (Sol. ex Maton) Škorničk. & A.D.Poulsen	*Kapulaga*	Zingiberaceae	Herb	Rhizome	Boiled	0.19
Arenga pinnata (Wurmb) Merr.	*Aren*	Araceae	Tree	Flower sap	Tapped, cooked	0.02
Capsicum frutescens L.	*Cabai*	Solanaceae	Shrub	Fruit	Cooked, cut	0.10
Cocos nucifera L.	*Kelapa*	Araceae	Tree	Flower sap, Fruit	Tapped, cooked, shredded, squeezed	0.12
Curcuma domestica Valeton	*Kunyit*	Zingiberaceae	Herb	Rhizome	Crushed, mashed	0.31
Cymbopogon citratus (DC.) Stapf	*Serai*	Poaceae	Herb	Stem	Crushed, cut	0.23
Kaempferia galangal L.	*Kencur*	Zingiberaceae	Herb	Rhizome	Mashed	0.06
Myristica fragrans Houtt.	*Pala*	Myristicacea	Tree	Seed	Boiled	0.08
Pandanus amaryllifolius Roxb. ex Lindl	*Pandan*	Pandanaceae	Herb	Leaf	Boiled	0.10
Piper nigrum L.	*Merica*	Piperaceae	Climber	Fruit	Mashed	0.06
Syzygium aromaticum (L.) Merr. & L.M.Perry	*Cengkeh*	Myrtaceae	Tree	Flower	Dried	0.21
Syzygium polyanthum (Wight) Walp.	*Salam*	Myrtaceae	Tree	Leaf	Dried, boiled, cooked	0.10
Vanilla planifolia Andrews	*Vanili*	Orchidaceae	Climber	Fruit	Dried, cooked	0.10
Zingiber officinale Roscoe	*Jahe*	Zingiberaceae	Herb	Rhizome	Crushed, cut	0.43
Zingiber officinale var. *rubrum* Theilade	*Jahe merah*	Zingiberaceae	Herb	Rhizome	Crushed, cut	0.02

Calliandra calothyrsus is mainly used as fodder in Donorejo Village, where the UV index is 0.37. This plant is abundant in the village's home garden and surrounding village area. Villagers on the island of Java began using *Calliandra* leaves as animal feed more than 50 years ago (National Research Council 1983), and Donorejo Village residents continue to do so now. On the island of Java, *Calliandra* plants are only found in regions with a height greater than 250 meters above sea level (Heripan et al. 2021). It is consistent with the Donorejo Village region, which is located between 500 and 750 meters above sea level. The *C. calothyrsus* can reach a maximum height of 12 meters and a trunk diameter of approximately 20 centimeters with red or grey bark. 20-25% protein is present in the leaves of *C. calothyrsus* (Maulana et al. 2021), which is highly useful for the growth of animal body weight (Siswoyo 2020).

Other utilization

The people of Donorejo Village utilize many plants for various uses, with a total of 19 plant species from 14 families (Table 7). The parts of the plants used include wood, stems, leaves, and flowers. The people of Donorejo Village use these plants as firewood, fire starter, house-building materials, household furniture, bath soap, funeral rituals, prayer beads, food wrappers, and hedges. Fabaceae is a family most widely used as firewood and building materials.

Most Donorejo Village residents use firewood as a cooking fuel, especially when preparing brown sugar from coconut sap, which takes a lengthy cooking period. Multiple species, including The *C. calothyrsus, C. nucifera, Switenia mahagoni, Albizia chinensis, Elaeocarpus ganitrus,* and *Nephelium lappaceum*, provide the firewood. As firewood, the The *C. calothyrsus* and *C. nucifera* species with the most significant UV are utilized. In addition to being used as cooking fuel, the dry leaves of *C. nucifera* are also utilized as fire starters to make it easier to burn other types of wood. For the past four decades, *Calliandra* has been utilized as firewood by villagers in Java (National Research Council 1983), and the locals of Donorejo Village, Central Java, continue to use it now. The Semende Bengkulu tribe also uses the stems of *C. nucifera* and *N. lappaceum* as firewood (Wiryono et al. 2019).

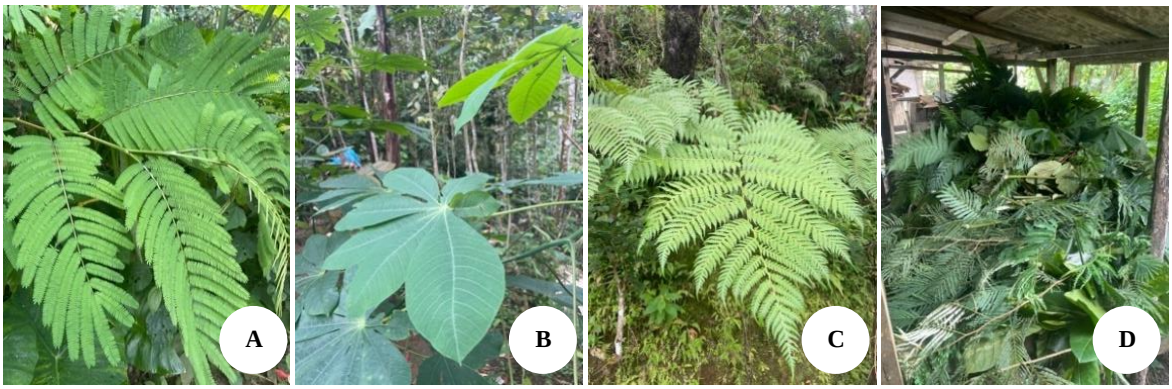

Figure 4. Some examples of fodder plant species for *Capra aegagrus hircus* in Donorejo Village, Purworejo District, Indonesia. A. *Calliandra calothyrsus* B. *Manihot carthagenensis* subsp. *glaziovii* C. *Cyathea* sp. D. Results of residents to find and collect livestock fodder (*ngarit*)

Table 6. Utilization of plants for fodder by the people of Donorejo Village, Purworejo District, Indonesia

Scientific name	Local name	Family	Life-form	Used Part	Mode of preparation	UV
Amorphophallus muelleri Blume	*Porang*	Fabaceae	Herb	Leaf	Fed directly	0.08
Artocarpus heterophyllus Lam.	*Nangka*	Moraceae	Tree	Leaf	Fed directly	0.08
Calliandracalothyrsus Meisn.	*Kaliandra*	Fabaceae	Shrub	Leaf	Fed directly	0.37
Carica papaya L.	*Papaya*	Caricaceae	Herb	Leaf	Fed directly	0.04
Cyathea sp.	*Paku pohon*	Cyatheaceae	Herb	Leaf	Fed directly	0.04
Albizia chinensis (Osbeck) Merr.	*Sengon/besiah*	Fabaceae	Tree	Leaf	Fed directly	0.04
*Ficus fistulosa*Reinw. ex Blume	*Wilodo*	Moraceae	Tree	Leaf	Fed directly	0.08
Gliricidia sepium (Jacq.) Kunth	*Kleresede*	Fabaceae	Shrub	Leaf	Fed directly	0.02
Manihot carthagenensis subsp. *glaziovii* (Müll.Arg.) Allem	*Singkong*	Euphorbiaceae	Shrub	Leaf	Fed directly	0.17
Musa paradisiaca L.	*Pisang*	Musaceae	Tree	Leaf	Fed directly	0.06
Pennisetum purpureum (Schumach.) Morrone	*Rumput gajah*	Poaceae	Herb	Leaf	Fed directly	0.02
Sauropus androgynus (L.) Chakrab. & NP.Balakr	*Katuk*	Phyllanthaceae	Scrub	Leaf	Fed directly	0.04
Switenia mahagoni (L.) Jacq.	*Mahoni*	Meliaceae	Tree	Leaf	Fed directly	0.02

Table 7. Utilization of plants for various other uses by the people of Donorejo Village, Purworejo District, Indonesia

Scientific name	Local name	Family	Life-form	Used Part	Type of uses	UV
Albizia chinensis (Osbeck) Merr.	*Sengon/besiah*	Fabaceae	Tree	Wood	Firewood	0.04
					House building	0.08
Calliandra calothyrsus Meisn.	*Kaliandra*	Fabaceae	Tree	Wood	Firewood	0.06
Cananga odorata (Lam.) Hook.f. & Thomson	*Kenanga*	Annonaceae	Herbaceous	Flower	Funeral ritual	0.02
Cocos nucifera L.	*Kelapa*	Araceae	Tree	Stem, leaf	Firewood	0.06
					Fire stater	0.04
					Broomstick	0.02
Dendrocalamus asper (Schult. & Schult.f.) Backer	*Bambu*	Poaceae	Tree	Stem	House building	0.04
Elaeocarpus ganitrus Roxb. ex G.Don	*Jenitri*	Elaeocarpaceae	Tree	Wood, seed	Firewood	0.02
					House building	0.02
					Prayer beeds (*Tasbih*)	0.02
Gigantochloa apus (Schult.f.) Kurz ex Munro	*Bambu apus*	Poaceae	Tree	Stem	Household appliances	0.02
Hibiscus tiliaceus L.	*Waru*	Malvaceae	Tree	Stem	House building	0.02
Ligustrum ovalifolium Hassk.	*Teh-tehan*	Oleaceae	Shrub	All parts	Fence	0.08
Musa paradisiaca L.	*Pisang*	Musaceae	Tree	Leaf	Food wrapper	0.02
Nephelium lappaceum L.	*Rambutan*	Sapindaceae	Tree	Wood	Firewood	0.02
Rosa sp.	*Mawar*	Rosaceae	Shrub	Flower	Funeral ritual	0.02
Switenia mahagoni (L.) Jacq	*Mahoni*	Meliaceae	Tree	Wood	House building	0.02
					Firewood	0.04
Syzygium aromaticum (L.) Merr. & L.M.Perry	*Cengkeh*	Myrtaceae	Tree	Stem	House building	0.02

The people of Donorejo Village also use wood to create buildings and furnish their homes. The *A. chinensis*, *S. mahagoni*, *Dendrocalamus asper*, *E. ganitrus*, *Syzygium aromaticum*, *Hibiscus tiliaceus*, and *C. nucifera* are the plants utilized. Most houses in Donorejo Village continue to utilize wood on the roof, the terrace, a place to dry clothing, and cattle pens *C. a. hircus* (Figure 5). As a building material, *A. chinensis* is the most common plant. The plant species is a tree with a height of up to 40 meters and a robust wooden structure. It grows and frequently thrives in tropical regions as a characteristic of Indonesian wood. The *A. chinensis* is utilized for building materials due to its wood's malleability and anti-termite qualities, which are particularly advantageous when used as a building material. The *A. chinensis* has been widely utilized as a building material in Indonesia (Nugroho et al. 2021).

People in Donorejo Village, the majority of whom are Muslims, also use plants for worship equipment, specifically *E. ganitrus* seeds as *tasbih* or prayer beads. Several other religious ceremonies, such as funerals, utilize plants on *Rosa* sp. and *Cananga odorata*'s floral sections to sow flowers during funerals, graves, and pilgrimages. Chinese and Jewish individuals also utilize prayer beads (Wernik 2009). Chinese people, particularly Buddhists, employ prayer beeds to assist individuals in preparing for tests. In contrast, Jews increasingly utilize beeds for relaxation and stress management. The British have used rose species for a long time as a flower sown during funeral ceremonies (Ives 2021). Flowers are sown by sprinkling in or on top of the coffin in British culture.

The population in Donorejo Village, which has a vast home garden, has eliminated the usage of iron fences in front home garden. Instead, the village population prefers to utilize plants as barriers by employing *Ligustrum ovalifolium* plants that are densely grown to form a barrier. As a hedge, floridians utilize the *L. ovalifolium* (Matoli et al. 2013). In addition to employing the tea plant as a hedge plant, floridians also utilize it as a decorative plant in parks and gardens. The shrub of *L. ovalifolium* is a member of the Oleaceae family. The *L. ovalifolium* is fairly universally distributed (Shaw et al. 2018). This plant is appropriate for use as a hedge because it can attain a height of roughly 2 meters and has thick, dense leaves (Jang et al. 2020).

The utilized plant parts

According to the results of the interviews, ten plant components are utilized as non-medicinal plants by the residents of Donorejo Village. All plant parts are included here, including rhizomes, tubers, shoots, stems, wood, leaves, flowers, flower sap, fruit, and seeds. All parts of 49 plant species, including 48 ornamental plant species and one coconut plant, are utilized. The leaves of 39 plants (25.3%) and fruit of 29 plants (18.8%) accounted for the second and third-highest proportions of plant parts used (Figure 6).

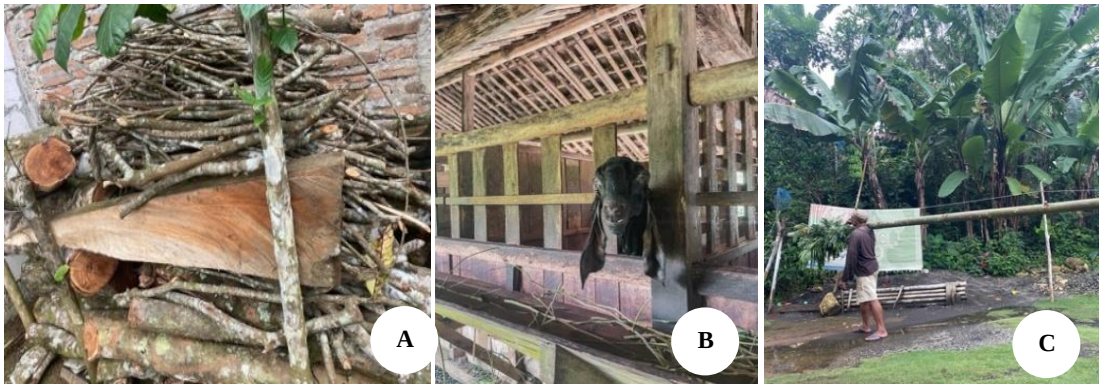

Figure 5. Several uses of wood in Donorejo Village, Purworejo District, Indonesia. A. The stock of firewood. B. *Capra aegagrus hircus* cage. C. The activity of the residents in taking bamboo

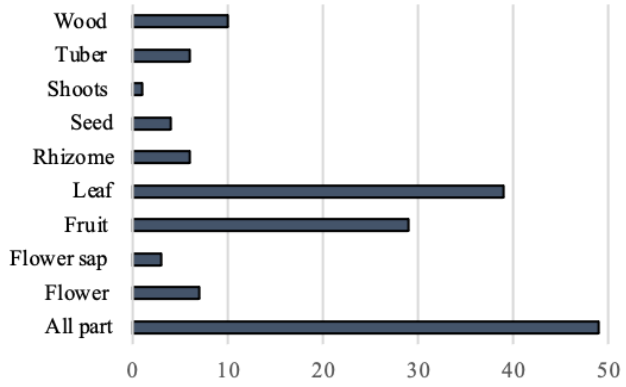

Figure 6. The use of plant parts by the people of Donorejo Village, Purwerejo District, Indonesia

It is well-known that the residents of Donorejo Village make extensive use of ornamental plants that grow in the karst forest or are purposefully transplanted in their home garden. Ornamental plants are plants in which all parts are employed, yet each species of ornamental plant has portions with unique aesthetic qualities, such as lovely blooms or vibrantly colored leaves. Coconut plants offer several valuable elements, including flower and fruit sap used as cooking spices, stems and leaves used as firewood and fire starter, and dry leaf bones used as broomstick cleaning tools. Erawan et al. (2018) identified the usage of coconut in a broader range of applications, beginning with the edible sections as cooking components, medicinal ingredients, souvenirs, and others. This study lends credence to the widespread use of the coconut's favorite part.

In terms of exploiting plants as animal feed plants and food crops, plant leaves are predominant. It pertains to most Donorejo Village residents who raise *C. a. hircus* as a source of income. According to studies conducted by Awang-Kanak (2021), the leaf is the part of the plant most commonly used by locals as animal feed since it is the part of the plant that animals most easily digest compared to other plant parts. Moreover, the leaves contain metabolic chemicals that can boost animal production (Susanti and Marhaeniyanto 2016).

In conclusion, 119 of the enumerated plant species are utilized as ornamental plants, food plants, cooking spices, animal feed, firewood, fire starter, building materials, household items, funeral rituals, prayer beeds, food packaging, and fence. Plant parts include leaves, shoots stems, rhizomes, tubers, wood, flowers, flower sap, fruit, and seeds. The community uses food plants in various ways, including eating them directly, eating them raw, cooking, boiling, frying, and making beverages. Donorejo Village residents' knowledge of the traditional use of non-medicinal plants is still high from adulthood to old age. The diversity of types and functions of plants in the home garden ensures the sustainability of traditional plant use.

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