Study of Bamboo Ethnobotany by the Local Community Residing around Mount Galunggung in Tasikmalaya Regency (Indonesia)

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ABSTRACT

This research aims to determine the ethnobotany of bamboo plants by the community around Mount Galunggung, Tasikmalaya Regency, as a source of biology learning. The research method used was descriptive qualitative. Sampling was carried out using purposive sampling with the population of Mandalagiri Village, precisely in the Paniis and Sukatani Villages. The data collection method was by interviews with primary and secondary data sources. Data analysis was carried out using data reduction techniques, data presentation, and conclusions, and a qualitative SUV (Species Use Velues) analysis was carried out to determine the use value of bamboo species. The results of the research show that the community around Mount Galunggung utilizes six species of bamboo, namely Chinese bamboo (*Bambusa multiplex*), yellow bamboo (*Bambusa vulgaris*), apus bamboo (*Gigantochloa apus*), black bamboo (*Gigantochloa atroviolaceae*), ater bamboo (*Gigantochloa atter*), and bamboo *gombong* (*Gigantochloa verticillata*) in everyday life. This use is done in arts, crafts, agriculture, furniture, food, medicine, construction, collections, ornamental plants, beliefs, and ecology. *Gigantochloa apus* has the most essential value, with a score of 0.42, meaning this species has the most benefits.

Keywords: Bamboo, Ethnobotany, Mount Galunggung

INTRODUCTION

Plants play an essential and inseparable role in human life because plants fulfil needs in various aspects of life (Dikaumaya & Wati, 2019). Indonesian people have been utilising bamboo plants for a long time and in various forms, such as clothing, medicine, food, building construction, and industrial purposes. Aziz et al. (2018) stated that the Indonesian people, consisting of many tribes, have long used plants in their daily lives, including in various ceremonial activities, religious rituals, weddings, proposals, death, pregnancy, and birth, as craft materials, household equipment, food, clothing, houses, play facilities, means of transportation, and others.

The relationship between human culture and the use of surrounding plants is significant to study. Ethnobotany explains how the use of plants is related to human culture. Ethnobotany is essential because it can provide knowledge and insight into how people interact with their environmental resources locally (Rukmana et al., 2021; Arida, 2022). In addition, ethnobotany can contribute to biodiversity conservation, primarily through the documentation and maintenance of local wisdom about plants (Pei et al., 2020).

The results of observations around the Galunggung mountain area show that there are still many people who utilize plants for their daily needs. Mount Galunggung has many potential plants that can benefit the surrounding community. The use of these plants has been passed down from generation to generation in oral tradition. Research on the ethnobotany of plants around Mount Galunggung has been carried out. Soraya (2023) found 12 local plants species used by the community according to several categories. Hernawati et al., (2021) The people around Mount Galunggung utilize Rangkat bananas as an herbal medicine for back pain and a kidney cleanser. This shows that they have a close relationship with plants.

Bamboo is a clumping plant in the Poaceae family that is abundant in nature and widely used by society around Mount Galunggung. It is a plant that proliferates in various climates, including tropical, subtropical, and temperate climates (Siskawati & Sukenti, 2021). Bamboo is one of the plants that people widely use because bamboo can be used in almost all aspects of human life. This is also supported by the nature of bamboo, which has strong, thorny, straight, even, easy-to-shape, easy to split, and light stems (Jamaludin et al., 2022).

People who live around Galunggng have used bamboo in their daily lives, including those in Paniis and Sukatani Villages. According to the section head of Mandalagiri Village, almost 65% of the residents of Mandalagiri Village make their living as craftsmen who weave bamboo from bamboo rope, either as their main or secondary source of income. This is supported by Alawiyah et al. (2021) who stated that Mandalagiri Village has excellent potential in bamboo crafts. The bamboo-woven artisans are almost everywhere, especially in Paniis Village. This is marked by a bamboo weaving craft centre in Paniis Village belonging to Oman Sudirman, which has become a legal entity and is under the supervision of the Tasikmalaya Regency Industry and Trade Service. Apart from that, the use of bamboo can also be seen in the arts sector, where in Sukatani Subdistrict, Mandalagiri Village gave birth to a typical Sundanese traditional art called *Lodong Gejlig* art, which is made from bamboo (Kurnia & Milyartini, 2022). This musical instrument comes from a *lodong* or container for holding sap water which is used by the community in their livelihood activities as sugar palm farmers. This *lodong* is made from a type of gombong bamboo (*Gigantochloa atriviolaceae*) which is cut and when dropped on the ground produces a sound. Apart from being a musical instrument, bamboo is also used by the community to fulfill daily needs such as ater bamboo shoots (*Gigantochloa atter*) as a food ingredient, namely, yellow bamboo (*Bambusa vulgaris*) as a medicine, apus bamboo (*Gigantochloa apus*) as a building material, black bamboo as a material for home furnishings, and others.

Many types and benefits of bamboo discovered and utilized by communities around Mount Galunggung have yet to be documented. This is a particular concern for researchers to be able to document the ethnobotany of bamboo by the communities around Mount Galunggung. This research is essential so that knowledge about the use of bamboo is preserved. Apart from that, the types of bamboo plants can be preserved so that they do not disappear as the forest decreases.

METHODS

Study Area

The research method used in this research was descriptive with a qualitative approach, which was carried out from December 2023 to March 2024. The research location is in Mandalagiri Village, Leuwisari sub-district, Tasikmalaya Regency, which has an outer area of 315 hectares with a height above sea level of 600 meters, and an average temperature 23^{o}C to 26^{o}C. The northern part of the village is directly bordered by Mount Galunggung, the eastern part is Padakembang Village, the southern part is Ciawang Village, and the western part is Cigadog Village. Specifically, the research was carried out in Sukatani and Paniis hamlets because in these hamlets there is a lot of use of bamboo plants.

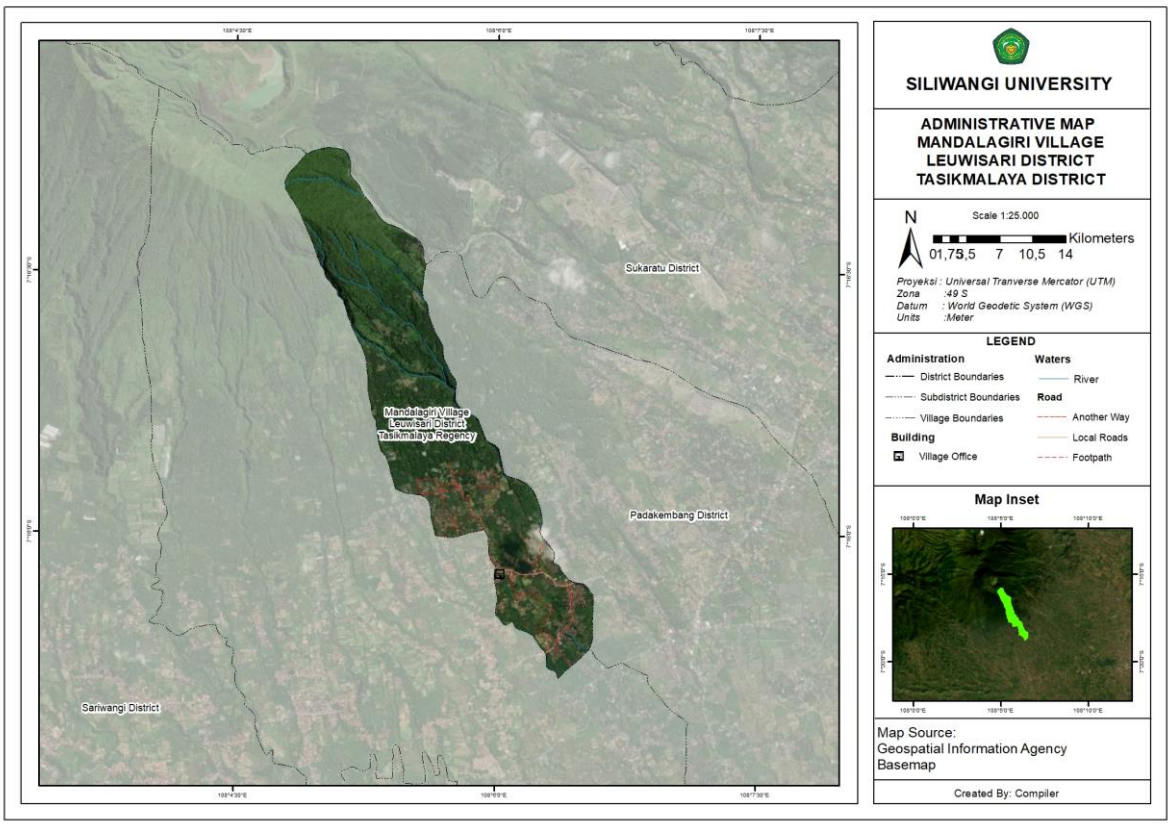

Figure 1. Study area

Data Collection

Data collection techniques used included participant observation, semi-structured interviews, documentation, and literature study, using a purposive sampling technique with the population of Mandalagiri Village. Research stages include preparation, implementation, and data processing stages. Important aspects explored include the types of bamboo plants used by the community, how the community obtains bamboo plants, utilization of bamboo plants, how people use bamboo plants, the advantages of this species of bamboo plant, and community efforts to preserve bamboo plants. Selected respondents included village heads, hamlet heads, bamboo woven artisans, bamboo farmers, Lodong Gejlig artists, vegetable farmers, sugar palm farmers, bird cage artisans, bamboo shoot traders, chicken breeders, and the general public with a total of 21 respondents.

Data Analysis

Data analysis techniques included data reduction, data presentation, and conclusion. In addition, the use value of a plant type was calculated using the SUV (Species Use Velues) calculation technique (Hoffman & Gallaher, 2007).

$$UVs = \frac{UVis}{ni}$$

Description:
UVs = Use value
UVis = The number of benefits mentioned from a single species
ni = Total number of respondents interviewed

RESULTS AND DISCUSSION

Based on the research results, it was found that six species of bamboo were used by the community around Mount Galunggung, which are listed in Table 1. The use of bamboo by the community around Mount Galunggung is listed in Table 2, as follows.

Table 1. Species of bamboo used by communities around Mount Galunggung

Family	Sub-family	Genus	Species	Common Name	Local Name
Poaceae	Bambu-soideae	*Bambusa* Schreb.	*Bambusa multiplex* (Lour.) Raeusch. ex Schult. & Schult. f.	Chinese bamboo	*Awi pager* or *awi cina*
			Bambusa vulgaris Schrad. Ex J.C. Wendl.	Yellow bamboo	*Awi haur koneng*
		Gigantochloa Kurz ex Munro	*Gigantochloa apus* (Schult. & Schult. f.) Kurz	Wormwood bamboo	*Awi tali*
			Gigantochloa atroviolacea Widjaja	Black bamboo	*Awi hideung*
			Gigantochloa atter (Hassk.) Kurz ex Munro.	Ater bamboo	*Awi temen*
			Gigantochloa verticillata (Willd.) Munro	Gombong bamboo	*Awi surat*

Table 2. The use of bamboo by the community around Mount Galunggung

No	Species	Common Name	Utilization Field	Benefits by Society
1	*Bambusa multiplex* (Lour.) Raeusch. ex Schult. & Schult. f.	*Awi pager*	Decorative plants	Decorative plants
2	*Bambusa vulgaris* Schrad. Ex J.C. Wendl.	*Awi koneng*	Ecology	Landslide prevention
			Food	Processed bamboo shoots
			Medicine	Hepatitis

				medication
			Trust	Exorcist of evil spirits
	Gigantochloa apus (Schult. & Schult. f.) Kurz	*Awi tali*	Agriculture	Fertilizer, *Sigay*, *Turus*
			Art	*Lodong gejlig*
			Building construction	*Gapura*, Livestock enclosure, Pole, Roof frame, Wall
			Collection	Bird cage, Prevents erosion, *Sasag*
			Craft	Woven crafts
4	*Gigantochloa atroviolacea* Widjaja	*Awi hideung*	Building construction	*Gapura*, Wall
			Furniture	Chair
5	*Gigantochloa atter* (Hassk.) Kurz ex Munro.	*Awi temen*	Agriculture	Pipe, *Sigay*
			Food	Processed bamboo shoots
6	*Gigantochloa verticillata* (Willd.) Munro	*Awi surat*	Agriculture	Fertilizer, *Lodong*, *Turus*
			Art	*Lodong gejlig*
			Collection	Birdcage
			Craft	Woven craft framework
			Ecology	Prevents erosion


a)


b)


c)


d)


e)


f)


g)


h)

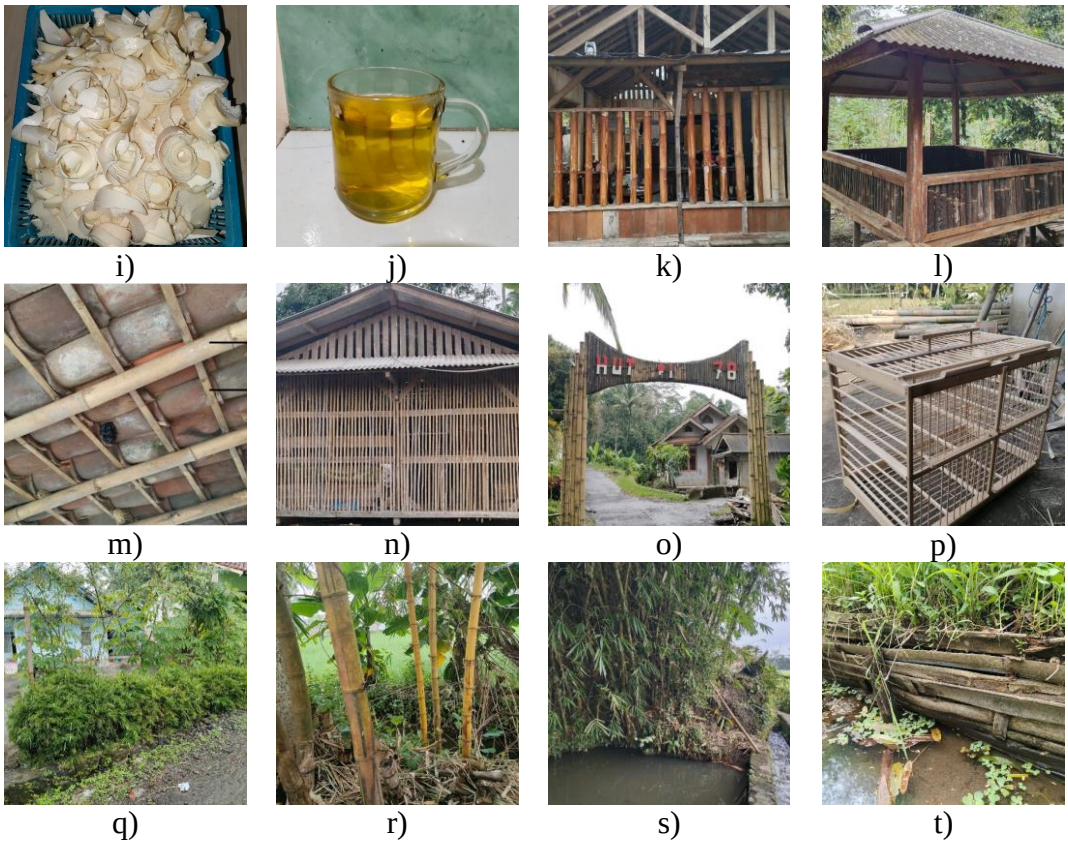

Figure 2. Forms of bamboo utilization by the community around Mount Galunggung: a) *lodong gejlig*; b) *weaving crafts*; c) *sigay*; d) *lodong*; e) *turus*; f) bamboo leaf charcoal fertilizer; g) bamboo pipe; h) sofa; i) bamboo shots; j) boiling water of yellow bamboo shoots; k) poles; l) wall; m) roof frame; n) cattle shed; o) *gapura*; p) bird cage; q) decorative bamboo; r) bamboo that repels evil spirits; s) bamboo erosion prevention; t) *sasag*

The bamboo plant is *Bambusa multiplex*, which is usually called Chinese bamboo or *awi pager*, is used as an ornamental plant, namely as a living fence plant (Figure 2q) because, unlike other types, this type of bamboo is small and forms dense clumps and congested (Rahmadani et al., 2022).

Bambusa vulgaris, which is usually called yellow bamboo or *awi koneng* is used to treat hepatitis (Figure 2j) or jaundice because bamboo shoots are high in protein, carbohydrates, minerals, and vitamins, where the protein content in bamboo shoots can help fight infection and repair damaged liver tissue (Mutmainah et al., 2021). Apart from that, *Bambusa vulgaris* is used to prevent landslides (Figure 2s) because it is a drought-resistant plant, can grow well on steep land, has a strong root structure so that bamboo can bind water and soil well, and has the potential to withstand landslides (Sujarwanta & Zen, 2023). *Bambusa vulgaris* is also used as an exorcist for evil spirits (Figure 2r) because it has become a custom that has been passed down from ancient ancestors where bamboo is an object that is feared by spirits and demons that can disturb the community (Arifin et al., 2020).

Gigantochloa apus or what is usually called *apus* bamboo or *awi tali* is used as material for making *lodong gejlig* art (Figure 2a) where bamboo sticks of a certain size are cut and then formed into a *lodong* and then played by throwing them on the ground. These pieces of bamboo slats produce a *dong-dong* sound that has no pitch, making it unique to the art of *lodong gejlig* (Nurbaeti et al., 2021). *Gigantochloa apus* is also used as a basic material for woven crafts (Figure 2b) because it is flexible, do not break easily, is strong, and has long

fibers so it is easy to weave (Ginting, 2019). *Gigantochloa apus* is used as a material for making sigay (Figure 2c) or a tool for climbing palm trees because *apus* bamboo has a strong structure, is large enough for stepping on, straight (Syafitri & Arianti, 2021), and has a segment length that is suitable as a foothold. A part from that, ash from apus bamboo leaves (*Gigantochloa apus*) is used as fertilizer because bamboo leaves (Figure 2f) contain phosphorus (P) and potassium (K) which are useful substances that can improve plant growth and soil structure (Sinurat et al., 2023). Bamboo shoots from *Gigantochloa apus* are used as food (Figure 2i) because bamboo shoots contain quite a lot of nutrients such as complex carbohydrates (fiber), antioxidants, protein, fat, vitamin C, vitamin A, riboflavin, thiamin, and other minerals such as phosphorus, calcium, iron, and potassium (Makatita, 2020). In the construction sector, *apus* bamboo (*Gigantochloa apus*) is used as poles (Figure 2k), walls (Figure 2l), roof frames (Figure 2m), livestock pens (Figure 2n), and gates (Figure 2o) because *apus* bamboo has strong characteristics. It is soft, flexible and has long fibers, and is not easily attacked by pests even though it is not cured, so it is widely used as building construction material (Utomo et al., 2022). *Apus* bamboo is used as material for bird cage bars (Figure 2p) because it is not easily broken or flexible. (Anthori et al., 2021) so it is easy to cut into smaller pieces to make bird cage bars. In the ecological field, *apus* bamboo is used as a plant to prevent erosion and landslides (Figure 2s) because the root structure of *apus* bamboo has a broad and strong root system and has a high growth rate so that it can prevent landslides, addition to regulating water flow, and reducing the risk flood (Herdananta et al., 2024).

Gigantochloa atroviolacea or what is known as black bamboo or *awi hideung* comes from the *Gigantochloa* genus and is used as a material for making sofa furniture (Figure 2h) because it has good quality and has a distinctive purplish black color on the stem so it is a unique thing that attracts consumer interest (Destiyanti, 2021). *Gigantochloa atroviolacea* is also used for building construction materials, namely walls, and gates (Figures 2l, 2o) because of the unique color of black bamboo and its size which is not too large. However, when using bamboo as a building material, it is necessary to preserve it because bamboo is not resistant to termites. After all, it contains high levels of starch (Putra et al., 2021).

Gigantochloa atter is known as bamboo *ater* or *awi temen*, bamboo shoots are used as a food ingredient (Figure 2i) which can increase appetite. This is because bamboo shoots contain curcumin compounds which can stimulate the digestive system, are antiflatulent, and can speed up gastric emptying which causes hunger quickly (Putri et al., 2021). Apart from that, *ater* bamboo shoots taste sweet (Malik et al., 2020). *Gigantochloa atter* is also used as a material for making *sigay* (Figure 2c) or a tool for climbing sugar palm trees because *ater* bamboo has quite good natural durability characteristics and is large in thickness and diameter (Suardika et al., 2023) so it is suitable to support the weight of the human body when ridden. Apart from that, *ater* bamboo is used as a material for making traditional pipes (Figure 2g) because it has a large diameter, besides that the bamboo nodes are easy to cut or remove.

Gigantochloa verticillata or what is known as gombong bamboo or *awi surat* is used as material for making frames for woven bamboo crafts (Figure 2b). This is because *gombong* bamboo has a fairly large diameter with a longer distance between the nodes so it has quite a large bending force (Mutiara et al., 2021). This causes *gombong* bamboo to be used as a frame for crafts such as hamper boxes. *Gombong* bamboo is also used as material for making *lodong* for the bass section in *lodong gejlig* art (Figure 2a) because *gombong* bamboo has a larger stem diameter than apus bamboo so it produces a lower sound. Bamboo can produce sound because of the characteristics of the cavity of the bamboo stem (Joyodiharjo et al., 2024). Bamboo instruments have acoustic and static properties or short sounds (Fauzi et al.,

2023). In connection with making *lodong* for the art of *lodong gejlig*, *Gigantochloa verticillata* or *gombong* bamboo is used to make *lodong* (Figure 2d) as a container for collecting sap water because it has a large enough stem diameter and long enough segments so that it can hold a lot of sap. Then *gombong* bamboo is used as a pole (Figure 2e) or as a tool as a prop for plants with a height of 1.5-2 meters. This tool aims to make it easier to maintain plants, a medium for plant propagation, and a tool to support hanging fruit (Mustakim et al., 2023). *Gigantochloa verticillata* just like *Gigantochloa apus*, is widely used as a fertilizer (Figure 2f) from the charcoal of its leaves because bamboo leaves contain phosphorus (P) and potassium (K) which are useful as substances that can improve plant growth and soil structure (Sinurat et al., 2023). Apart from that, *gombong* bamboo is used as a frame for bird cages (Figure 2p) because the characteristics of *gombong* bamboo stems have good strength as a support so that the frame remains upright (Nugroho et al., 2023). In the ecological field, *Gigantochloa verticillata* is used as an erosion barrier (Figure 2t) because its root system in the form of strong rhizomes can also bind soil and water well so it is used as a conservation plant (Rahmawati & Sriyati, 2024).

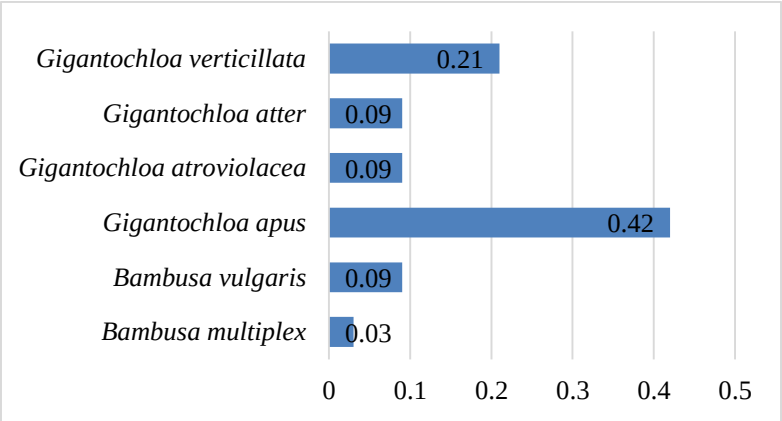

Figure 3. Species use values

Based on the calculation of species use values (SUV), the bamboo plant with the highest use value is *G. apus* with an SUV of 0.42 followed by *G. verticillata* or *gombong* bamboo with an SUV of 0.21 (Figure 3). This shows that the use of bamboo plants in society is quite extensive and is divided into several fields. Based on the SUV value, *G. apus* is one of the most important species because it is most widely used by the people around Mount Galunggung. Apart from that, the species with the lowest SUV is *B. multiplex*, an SUV value of 0.03 which only has one benefit.

The community around Mount Galunggung obtains bamboo plants from the main source, whether from forest area or owned land. Generally people in Tasikmalaya Regency have bamboo plants in the privat forest. Until now, there have been no efforts to cultivate bamboo by the people of Mandalagiri Village because bamboo is still abundant in the wild. This is proven by data that 1,500 m^3 of bamboo has been produced in Mandalagiri Village.

CONCLUSION

Based on the results of the research that has been carried out, it can be concluded that there are six species of bamboo (Poaceae, a member of the Bambusoideae) found around Mount Galunggung, precisely in Mandalagiri Village, Leuwisari Subdistrict, from two genera. Several categories of use of bamboo by the community in Mandalagiri Village have

eleven categories of use, including arts, handicrafts, agriculture, furniture, foodstuffs, medicine, building construction, collections, ornamental plants, beliefs, and ecology. Based on the results of the Species Use Velues (SUV) analysis which aims to determine the use value of species, it shows that two species have the highest species use value, namely *Gigantochloa apus* (*apus* bamboo) with an SUV of 0.42 and *Gigantochloa verticillata* (*gombong* bamboo) with an SUV 0.21, which means that these species have the most benefits.

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