



Cultural significance index of useful plants at *Marga* forest, batutegi FMU, Lampung province, Indonesia

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Abstract

The community's use of plants is a valuable source of local knowledge that must be documented through ethnobotanical research. The CSI scores assess each plant's potential practical uses in terms of its support to traditional culture survival. The community around the Batutegi FMU has developed a tradition of managing the *marga* forest using useful plants and local wisdom. Of course, this contributes to the long-term viability of *marga* forests, which has economic, ecological, and social implications. The purpose of this study was to examine the level of utilization of useful plants as an effort to preserve the *marga* forest around Batutegi FMU. This research was conducted in November 2021 at Ngarip and Datarajan Village, Ulubelu District, Tanggamus Regency, Lampung Province, Indonesia. Respondents were selected purposively with the criteria to obtain 30 respondents. The instrument used in this study was an ethnobotanical questionnaire. Data were analyzed based on identification of plant species, plant uses, intensity of plant use, and plant exclusivity. Quantitative data are presented in the form of a cultural significance index (CSI). Based on the results of the study, plant that has an CSI value in the highest category (53.75) is padi (*Oryza sativa*). Plants that have an CSI value with a very low category (0.5) are mahoni (*Swietenia mahagoni*). The highest CSI in this type of padi is due to the familiarity of the benefits of rice among communities around the Batutegi FMU *marga* forest, making padi the main food ingredient favored by the majority of people.

Keywords: local wisdom, ethnobotany, *marga* forest, cultural significance index

Introduction

Knowledge of ethnobotany is often found in traditional tribes in Indonesia, which is the result of interactions, attitudes, and processes in the use of forest plants to meet human needs. Through the use of these plants, sustainable forest management can be realized by involving local communities in it because local communities are actors who interact directly with the existence of the forest (Hadijah *et al.*, 2016) ^[4]. The use of the cultural significance index (CSI) as a tool to calculate the importance of a plant species is part of quantitative ethnobotanical research. The cultural importance index is used to measure the value of the benefits of a plant species for the community, which refers to the intensity value, exclusivity value, and quality value (Turner, 1988) ^[15]. The CSI scores indicate the potential practical applications of each plant ranked according to the contribution of each separate application to survival in traditional cultures. The more benefits a plant has, the higher the value of its cultural importance in a particular community (Helida *et al.*, 2015) ^[5].

Knowledge of ethnobotany is an indicator of sustainable forest use (Iswandono *et al.*, 2015) ^[7]. The focus of ethnobotany is about documenting data on species, local names, and uses of plants. With this recording, the role of ethnobotany in society becomes quite vital (Silalahi, 2020). This makes the use of plants by the community an important source of local knowledge that must be documented through ethnobotanical studies. According to Walujo *et al.* (2017) ^[16], traditional knowledge and wisdom in managing forests in ethnobotany studies have the essence of introducing plant biodiversity for the sustainability of human life for development and overall welfare in forest areas.

One type of forest in Lampung is the *marga* forest. The Lampung tribe calls the *marga* forest, which is actually a private forest. A private forest is a forest located on land that has been encumbered with land rights according to the provisions of Law Number 41 of 1999. The *marga* forest owned by the community is located around the Batutegi FMU (Forest Management Unit). The community around the Batutegi FMU manages the *marga* forest utilizes useful plants, one of which is to meet food needs. Research shows that 46.01% of food ingredients come from community forests (Irodu and Fatmawaty, 2019) ^[6]. This is supported by Wulandari (2015) that *marga* forests secure the availability and sustainable contribution to long-term development so that their sustainability deserves to be maintained. The sustainability of *marga* forests is influenced by ecological aspects, such as clean air, controlled erosion, carbon sequestration, regulation of water systems, ecosystem buffers, guardians of ecological stability, and environmental protection (Safe'i *et al.*, 2019) ^[3]. Therefore, knowledge of the local wisdom of the community around the Batutegi FMU *marga* forest related to the use of useful plants is very

important to continue to be maintained and develop its existence in the hope that the *marga* forest can meet the needs of the community in a sustainable manner.

Material and Methods

This research was conducted in November 2021. The location for this research is in Ulubelu District, Tanggamus District, Lampung Province. The instruments used in this study were ethnobotany questionnaires, literature documents, and village monographs. The number of 30 respondents was determined purposively with certain criteria (Sugiyono, 2013)^[14] to be research subjects. There are four established criteria, namely people who work as shamans/healers, community leaders/traditional elders, users, and/or people who know and utilize useful plants in the research area. The data collected consisted of primary data in the form of various useful plant species collected using a closed questionnaire instrument and several semi-open questionnaires, which were distributed to data sources in the form of respondents. The variables asked in the questionnaire are the names of plant species and their uses, intensity of use, and plant exclusivity.

Questionnaire data that have been obtained, processed and analyzed based on the identification of plant species, plant uses, the intensity of plant use, and plant exclusivity. Furthermore, the data matrix about the types and benefits of each plant mentioned by the respondents was discussed to determine the ranking of the benefits of plants to determine the cultural significance index (CSI) (Turner, 1988)^[15]. The CSI value is used to measure the value of the benefits of a type of plant for the community, which refers to the intensity value, exclusivity value, and quantity value. CSI can be calculated using formula (1), whereas if a plant species has more than one benefit, it can be calculated using formula (2).

$$CSI = \sum_{i=1}^n (q \times i \times e)_{ni} \dots \dots \dots (1)$$

$$CSI = \sum_{i=1}^n (q_1 \times i_1 \times e_1)_{n1} + (q_2 \times i_2 \times e_2)_{n2} + \dots + (q_n \times i_n \times e_n)_{nn} \dots \dots \dots (2)$$

description :

q= quality value; i= intensity value; and e= exclusivity value.

Turner allocates five weight scales for the quality of use and intensity of use variables, namely 5, 4, 3, 2, 1, and allocates three scales for the exclusivity of use variable, which is 0, 5, 1, and 2. The level of cultural significance index (CSI) on the use of useful plants can be categorized into five categories, namely very low, low, medium, high, and very high (Navia *et al.*, 2017)^[8].

Result and Discussions

Based on the results of the study obtained, 24 types of useful plants are commonly used by the community. These types of plants are generally used to meet secondary needs, and most of them are multi-purpose tree species (MPTs). In addition to meeting food needs, the *marga* forest community uses several types of these plants as commodities that are traded because they have high prices, for example, coffee, pepper, cloves, and nutmeg. The groups of medicinal plants found included ginger, galangal, and nutmeg. These three types were widely planted by the community because they were useful as medicine and cooking spices. The use of medicinal plants is quite popular, not only by people living around the forest in rural areas but also by people in urban areas (Novriyanti, 2018)^[9]. The types of plants found in the research location can be seen in Table 1.

Table 1: CSI values and categories by plant species

No	Local Names	Scientific Names	CSI	Category	Utility of Plants
1	Padi	<i>Oryza sativa</i>	53,75	High	Food needs, traditional needs, animal feed
2	Galendra	<i>Calliandra</i> sp	40	Medium	Animal feed, herbal drugs
3	Kelapa	<i>Cocos nucifera</i>	40	Medium	Building material, drinks, herbal drugs, traditional needs
4	Kopi	<i>Coffea</i> sp.	33,87	Medium	Drinks, aromatic
5	Aren	<i>Arenga pinnata</i>	30,8	Medium	Food needs, building material, herbal drugs, drinks
6	Cabai	<i>Capsicum frutescens</i>	30,67	Medium	Herbs and spices
7	Jambu	<i>Psidium guajava</i>	24	Medium	Fruit, herbal drugs
8	Jahe	<i>Zingiber officinale</i>	20,3	Medium	Spice, herbal drugs
9	Pisang	<i>Musa paradisiaca</i>	19,69	Low	Fruit, food needs
10	Lada	<i>Piper nigrum</i>	17,42	Low	Herbs and spice
11	Durian	<i>Durio zibethinus</i>	13	Low	Fruit
12	Petai	<i>Parkia speciosa</i>	10	Low	Vegetables
13	Alpukat	<i>Persea americana</i>	8,58	Low	Fruit
14	Cengkeh	<i>Syzygium aromaticum</i>	8,05	Low	Herbs and spices
15	Lengkuas	<i>Alpinia galanga</i>	7	Low	Herbs and spices
16	Pala	<i>Myristica fragrans</i>	4,75	Very Low	Herbs and spices

17	Jengkol	<i>Archidendron pauciflorum</i>	4	Very Low	Vegetables
18	Kayu Rimau	<i>Citrus sp</i>	4	Very Low	Building material, shade plants
19	Pepaya	<i>Carica papaya</i>	4	Very Low	Vegetables, fruit
20	Singkong	<i>Manihot esculenta</i>	4	Very Low	Vegetables
21	Talas	<i>Colocasia esculenta</i>	3	Very Low	Vegetables, food needs
22	Nangka	<i>Artocarpus heterophyllus</i>	2	Very Low	Fruit, building material
23	Dadap	<i>Erythrina variegata</i>	0,5	Very Low	Building material, shade plants
24	Mahoni	<i>Swietenia mahagoni</i>	0,5	Very Low	Building material, shade plants

Based on the results of the study, the plant with the highest CSI value, padi (*Oryza sativa*), with a score of 53.75, was included in the high category. Plants that have a very low CSI value are Mahoni (*Swietenia mahagoni*), with a total score of 0.5. Padi or rice plants have a high CSI value because people make this type of staple food for consumption. Indonesian people tend to prioritize padi as a staple food, even though its function as a carbohydrate supply can still be replaced by sweet potatoes. The various benefits of padi that are used by the community around the Batutegi FMU *marga* forest can affect the high quality, intensity, and exclusivity scores on the CSI value, which causes the value to be higher. Mahoni has a low CSI value because it is only used as secondary material. Most farmers use this plant only as a shade for other plants.

Shade plants are one of the efforts in implementing community land agroforestry practices. In addition to mahoni, there are forestry plants that act as shelters, such as dadap, both of which have very low CSI values, which means that community knowledge regarding the benefits of these plants is low. At the same time, plants such as mahoni and dadap are agroforestry plants. Ecologically, agroforestry provides the benefit of preventing erosion. Plants with a high canopy can protect the understory and maintain the presence of springs in forest areas (Febryano *et al.*, 2017) ^[3]. In addition, according to the study of Purnomo *et al.* (2016) ^[11], some efforts to conserve forests can be made by making terraces and applying conservation cropping patterns that apply cover crops, cultivated plants, and trees that make up the forest. This is in accordance with what the community around the Batutegi FMU *marga* forest has done. In addition to ecological functions, agroforestry land management is also socially and economically beneficial. Some of the plants grown on *marga* lands are grown using an agroforestry pattern. The form of sustainable land management in agroforestry considering biodiversity in community cultivated land is a challenge in supporting sustainable development (Wulandari *et al.*, 2014) ^[18]. If viewed from the strata form, the agroforestry system can reduce the occurrence of flooding because the rain will fall on a high canopy, then to a medium canopy, and finally to a low canopy; in the end, the water that falls on the ground surface is only in the form of droplets. While economically, it can provide an increase in income because the agroforestry system helps the community to still get maximum results on minimalist land exploitation (Wulandari, 2009) ^[12]. Thus, the existence of agroforestry cropping patterns can support the sustainability of protected forests from an economic, ecological, and social perspective (Wulandari, 2011) ^[17].

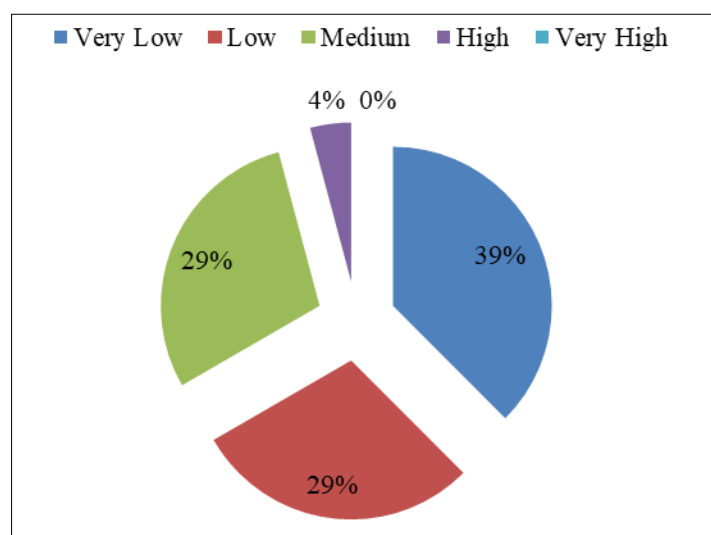


Fig 1: Percentage of CSI value categories

Based on the results of the study, the CSI value in the "Very Low" category has a frequency of 9 types of plants with the largest percentage of 37.5%. The CSI value is influenced by the quality, intensity, and level of exclusivity, as well as the number of uses of various types of plants. Thus, it can be said that plants that have the highest CSI value are species that have a higher level of cultural importance than other species in a community. The low CSI value can be caused by the low knowledge of the community around the Batutegi FMU *marga* on the use of certain plant species so that no plant species has quality, intensity, and exclusivity values with a

maximum score indicating the contribution of a plant species to a community. Therefore, plants that are used by the surrounding community still have low cultural importance. This statement is in accordance with the study of Helida *et al.* (2015) ^[5]; the more benefits of a plant, the higher the possibility of its cultural importance in a particular community. Knowledge of traditional wisdom related to the use of plants in the community around the Batutegei FMU *marga* forest can influence a conservative attitude to support forest sustainability. In line with the research of Walujo *et al.* (2017) ^[16], traditional knowledge and wisdom in managing forests in ethnobotany studies have the essence of introducing plant biodiversity for the sustainability of human life for development and overall welfare in forest areas. Conservative attitude, according to Angin *et al.* (2020) ^[1], can grow through local community awareness of the importance of useful plant species so that it will have an impact on forest sustainability. Knowledge of the use of plants can be in the form of use to meet the daily needs of the community or use for commercial purposes, for example, the use of non-timber forest products obtained on *marga* land. According to the study of Aziz *et al.* (2018) ^[2], ethnobotany plays a role in plant conservation efforts, including the preservation of various types of plants used in agriculture and plantations in traditional tropical farming systems, as well as the preservation of other biological resources. Therefore, knowledge of the local wisdom of the community around the Batu Tegi FMU *marga* forest related to the use of useful plants is very important to continue to be maintained and developed for future generations. This is in line with Pei's (2013) research, which explains that local wisdom in the traditional use of natural resources can affect forest sustainability.

Conclusion and Recommendation

Conclusion

Plants that have an CSI value in the High category (53.75) are padi (*Oryza sativa*), Medium plants that have an CSI value in the Very Low category (0.5) are Mahoni (*Swietenia mahagoni*). The high CSI in this type of padi is due to the familiar benefits of padi in the community around the Batutegei FMU *marga* forest, making padi the main food ingredient favored by the majority of the community.

Recommendation

Communities around the Batutegei FMU *marga* forest are expected to maintain local culture and knowledge regarding the use of useful plants, one of which is by planting trees with agroforestry schemes in protected forest areas.

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References

1. Angin I S, Sunimbar S. Kearifan lokal masyarakat dalam menjaga kelestarian hutan dan mengelola mata air di Desa Watowara, Kecamatan Titehena Kabupaten Flores Timur Nusa Tenggara Timur. *Geoedusains: Jurnal Pendidikan Geografi*,2020:1(1):51-61.
2. Aziz IR, Raharjeng ARP, Susilo S. Peran etnobotani sebagai upaya konservasi keanekaragaman hayati oleh berbagai suku di Indonesia. *Prosiding Seminar Nasional Biologi*,2018:4(1):55-57.
3. Febryano IG, Safe'i R, Banuwa IS. Performa pengelolaan Agroforestri di Wilayah Kesatuan Pengelolaan Hutan Lindung Rajabasa. *Jurnal Hutan Tropis*,2017:5(2):127-133.
4. Hadijah S, Hendra M, Hariani N. Etnobotani obat tradisional oleh masyarakat kutai di kec. Muara bengkal kab. Kutai timur. *Bioprospek: Jurnal Ilmiah Biologi*,2016:11(2):19-24.
5. Helida A, Zuhud EAM, Hardjanto H, Purwanto Y, Hikmat A. Index of cultural significance as a potential tool for conservation of plants diversity by communities in the Kerinci Seblat National Park. *Jurnal Manajemen Hutan Tropika*,2015:21(3):192-201.
6. Irundu D, Fatmawaty D. Potensi hutan rakyat sebagai penghasil pangan di Desa Paku Kabupaten Polman, Sulawesi Barat. *Jurnal Hutan dan Masyarakat*,2019:11(1):41-48.
7. Iswandono E, Zuhud E A M, Hikmat A, Kosmaryandi N. Pengetahuan etnobotani Suku Manggarai dan implikasinya terhadap pemanfaatan tumbuhan hutan di Pegunungan Ruteng. *Jurnal Ilmu Pertanian Indonesia*,2015:20(3):171-181.
8. Navia Z I, Suwardi A B, Saputri A. Penelusuran ragam jenis tanaman buah pekarangan sebagai sumber nutrisi bagi masyarakat di Kota Langsa, Aceh. *Prosiding Seminar Nasional Biodiversitas dan Ekologi Tropika Indonesia Ke-4 dan Kongres Penggalang Taksonomi Tumbuhan Indonesia Ke-12*, 2017, 15-17.
9. Novriyanti N. Ragam jenis tumbuhan obat potensial di areal Hutan Kota Muhammad Sabki Kota Jambi. *Media Konservasi*,2018:23(1):169-177.
10. Pei S J. Ethnobotany and sustainable use o biodiversity. *Plant and Diversity Resources*,2013:35(4):401-406.
11. Purnomo D W, Sandrawati A, Witono J R, Fijridiyanto I A, Setiyanti D, Safarinanugraha D. Desain vegetasi bernilai konservasi dan ekonomi pada kawasan penyangga sistem tata air DAS Bolango (Designing of vegetation which conservation and economic values in the buffer area of water system at the Bolango Watershed). *Jurnal Manusia dan Lingkungan*,2016:23(1):111-121.

12. Safe'i R, Wulandari C, Kaskoyo H. Analisis kesehatan hutan dalam pengelolaan hutan rakyat pola tanam agroforestri di wilayah Kabupaten Lampung Timur. *Talenta Conference Series: Agricultural and Natural Resources (ANR)*,2019:2(1):97-103.
13. Silalahi M, Nisyawati N, Anggraeni R. Studi etnobotani tumbuhan pangan yang tidak dibudidayakan oleh Masyarakat Lokal Sub-etnis Batak Toba, di Desa Peadungdung Sumatera Utara, Indonesia. *Journal of Natural Resources and Environmental Management*,2018:8(2):241-250.
14. Sugiyono. *Metode Penelitian Kuantitatif, Kualitatif, dan R & D*. Alfabeta. Bandung, 2013, 380.
15. Turner NJ. The importance of a rose: Evaluating the cultural significance of plants in Thompson and Lillooet Interior Salish. *American Anthropologist*,1988:90(2):272-290.
16. Walujo E B. Sumbangan ilmu etnobotani dalam memfasilitasi hubungan manusia dengan tumbuhan dan lingkungannya. *Jurnal Biologi Indonesia*,2017:7(2):375-391.
17. Wulandari C. *Agroforestry: Kesejahteraan masyarakat dan konservasi sumberdaya alam*. Universitas Lampung. 2011, 91.
18. Wulandari C, Budiono P, Yuwono S B, Herwanti S. Adoption of agro-forestry patterns and crop systems around Register 19 Forest Park, Lampung Province, Indonesia. *Jurnal Manajemen Hutan Tropika*,2014:20(2):86-93.
19. Wulandari, C. Predicting Sustainability of Agroforestry in a Customary Forest (Hutan Marga) in Lampung Province, Indonesia. *SEARCA*, 2015, 46.
20. Zulharman, Aryanti N A. Etnobotani tumbuhan penghasil bahan bangunan, kerajinan dan rumah adat masyarakat Suku Sambori Kabupaten Bima NTB. In *Seminar Nasional dan Gelar Produk*, 2016, 256-265.