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CONSERVATION OF USEFUL PLANT SPECIES IN THE BUKIT KANGIN FOREST, TENGANAN PEGRINGSINGAN TRADITIONAL VILLAGE, KARANG ASEM, BALI

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Abstract

The purpose of this study was to determine the efforts made in the preservation of useful plant species by the indigenous village of Tenganan Pegringsingan, Karang Asem, Bali. This research was conducted in the traditional village of Tenganan Pegringsingan, Karang Asem Bali. The population of this research is all the people of the traditional village of Tenganan Pegringsingan. The research sample consisted of 20 people. The sampling technique is a systematic sampling technique. Data were collected using the method of observation, questionnaires, and in-depth interviews. Data were analyzed descriptively. The results showed that plants species at Bukit Kangin, there are about 46 species of useful plants which are used by the people of the Tenganan Pegringsingan Traditional Village. Useful plants traditionally utilized by local communities are for the purposes of religious ceremonial material (Hindu) as many as 29 plant species (35.80%), for medicinal purposes as many as 18 plant species (27.70%), as many as 17 plant species food (20.99%), the need for board materials is 13 plant species (16.05%), the need for clothing and industrial materials is 2 plant species (2.47%). The conservation efforts carried out by applying local wisdom, aspects of religion, myth, and awig-awig (traditional rule).

Keywords*: Conservation; Useful Plants; Traditional Village; Tenganan Pegringsingan*

Introduction

Forest is a natural resource that must be protected and used sustainably for community welfare [1-3]. Basically, forests are very important for human life, because forests have several benefits, including production (economic) benefits, environmental protection benefits and nature preservation, and recreational benefits [4-6]. However, in recent years, forest management in Indonesia has been disrupted by rampant illegal logging [7-9]. Even in Bali, where people traditionally carry out their activities based on the balance of nature through the Tri Hita Karana concept, cases of forest encroachment, theft of endangered species and theft of protected timber also occur. The philosophy that has been proud of seems to be fading due to the swift currents of consumerism.

According to several studies that have been carried out in Bali [10-17], but also in other countries [2-4, 6-8, 18-20] for the ecotourism development of insufficiently studied areas, they focused on the assessment of the importance of forests for the local population [11-15].

When we refer to Bali, each location such as in the buffer forest of Lake Batur (Bangli), the buffer forest of Lake Buyan (Buleleng), Tenganan Pegringsingan Village (Karangasem), the

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customary forest of Penglipuran Village (Bangli), Tigawasa Traditional Village and Cempaga Village (Buleleng), and the tourist beach vegetation of Lovina (Buleleng). The results of the above research all examine the diversity of plant species that exist in the research location in general, no one has yet conveyed specific research such as research on rare plants, useful plants and their mapping [11, 12].

One thing that is quite interesting can be found in the village of Tenganan Pegringsingsingan, where for generations the local people have never been worried about the preservation of the forests in their area. They have a strong view and belief that the forest is the creation of Ida Sang Hyang Widhi Wasa (God Almighty) that must be preserved. This concept or perspective creates collective behavior or wisdom that has a positive impact on forest conservation in the area. This kind of phenomenon is interesting to research, especially in relation to the conservation of biological resources and the role of traditional communities in environmental conservation.

Tenganan Pegringsingan Village is one of the villages included in the Bali Aga Village family [13, 14]. The life of the people in this village is not much affected by the flow of modernization, because it has a very strong attachment to *awig-awig* or village customary regulations. This customary rule has been written since the 11th century, updated in 1842, and is still used as a reference in the implementation of people's daily lives [15, 16].

Tenganan Pegeringsingan village is located at an altitude of 70 m above sea level. To the west of the village there is the Kauh Hill, to the east there is the Kangin Hill and to the north there is the Kaja Hill. The Bukit Kangin (Kangin Hill) looks greener than Bukit Kaja (Kaja Hill) and Bukit Kauh (Kauh Hill). This village area includes residential areas (8,000ha), village roads (25,000ha), graves (3,000ha), and dry land (583,035ha) consisting of forests (197,321ha) and moor (385,741ha). All areas or village authorities are seen by the local community as something that is sanctified or sacred.

The results of research conducted by Wijana and Setiawan, 2018 [17] on body symbol plants show that traditionally the Balinese Age Tenganan Pegringsingan village does not use body symbol plants in the *ngaben* ceremony (corpse cremation ceremony). The use of plant species in the village of Bali Age Tenganan Pegringsingan does not affect the destruction of the customary forests in the village, the customary forests are still sustainable. Useful plants in the forest in the village of Bali Age Tenganan Pegringsingan are not only useful in terms of economic value, but also from a cultural, social and religious perspective. From the results of this study, it is very interesting to be a new tourist attraction concerning useful plant species based on the socio-cultural village of Bali Age Tenganan Pegringsingan. Furthermore, the purpose of this study was to determine the pattern of preservation of useful plants in their original natural socio-cultural orientation of Bali Age Tenganan Pegringsingan.

Research and Methods

The research was carried out in an exploratory manner, namely recording the types of plants that make up the forest vegetation in Kangin Hill, Pegringsingan Village, Manggis District, Karangasem Regency, Bali Province. Observations were made using the quadratic method, which was made by stretching the squares in the direction of the contour or cutting the contour. The sample determination is based on a systematic sampling method [21-24]. The square size is $20x20m^2$ with the number of squares at each research location, both the stations that cut the contour and those in the direction of the contour are 60 squared. Squares are placed alternately between line transects.

For the purpose of identifying the types of plants observed, herbarium specimens were made. Meanwhile, to find out the use of plant species in the Kangin Hill area, interviews were conducted with the surrounding community, especially with elderly people who were considered to understand the ins and outs of plants and the local community's philosophy in

forest management. Interviews were also conducted with people who studied or practiced traditional medicine in the village concerned. The collected ecological data were then analyzed statistically ecology to determine the characteristics of the vegetation [25-27]. Meanwhile, the plant utilization data were analyzed descriptively.

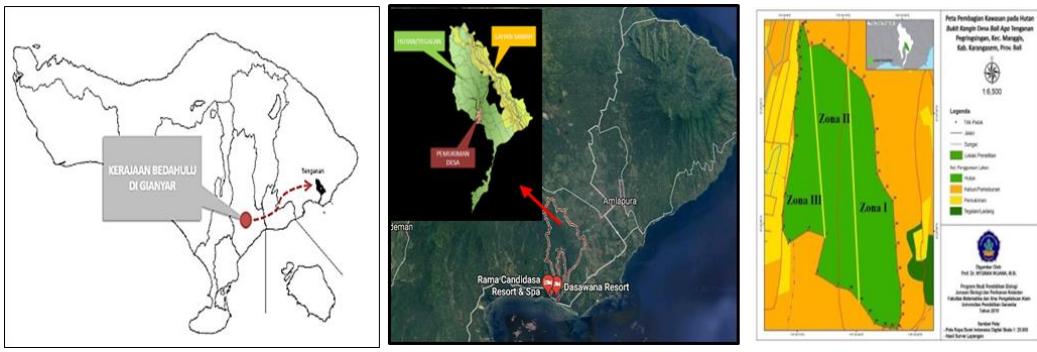

Fig. 1. Research Location and Sampling Zone. (A) Bali Island. (B) Tenganan Pegringsingan Village. (C) Bukit Kangin Forest (Source: Wijana and Setiawan 2020a and b [10, 11])

Results and Discussion

Result

The categories of plant use consist of clothing, boards, food, medicines, household needs (firewood), religious ceremonies and others. While the plant parts used include roots, stems, leaves, flowers and fruit. The results of interviews regarding the use of plants in Bukit Kangin by the people of the Tenganan Pegringsingan Traditional Village can be described as follows:

a. There are about 46 species of plants. Of the 46 plant species, including 40 families, with a total of 2,574 individual species. Furthermore, from the 46 plant species found, based on interviews, literature studies, and field observations, 46 plant species were obtained which were used by the local community traditionally. Details about the types of plants, types of utilization and parts of plants used can be seen in Table 1.

Table 1. The Composition and Utilization of Useful Plant Species in Bukit Kangin Fores

No	Local Name	Scientific Name	Family	Individual Number	Cl	Fd	Sh	Md	Rg	In
1	Cogongrass	*Imperata cylindrica* (L.) P. Beauv.	Poaceae	7		+		+		
2	Avocado	*Persea americana* Mill.	Lauraceae	1				+	+	
3	Tamarind	*Tamarindus indica* L.	Fabaceae	2				+	+	
4	Ata	*Lygodium circinatum* (Burm.) Sw.	Lygodiaceae	79					+	+
5	Badung	*Garcinia dulcis* (Roxb.) Kurz	Clusiaceae	5					+	
6	Rope Bamboo	*Gigantochloa apus* Kurz	Poaceae	76			+		+	
7	Bayur	*Pterospermum celebicum* Miq.	Malvaceae	188			+	+		
8	Belalu	*Hopea celebica* Burck	Dipterocarpaceae	20			+			
9	Belalu Bali	*Hopea sp.*	Dipterocarpaceae	1			+			

10	Bilimbi	*Averrhoa bilimbi* L.	Oxalidaceae	4		+		+	+	
11	Banyan	*Ficus benjamina* L.	Moraceae	4					+	
12	White Magnolia	*Michelia alba* DC.	Magnoliaceae	21			+		+	
13	Dracontomelon	*Dracontomelon mangiferum* Bl.	Anacardiaceae	1					+	
14	Durian	*Durio zibethinus* Murr.	Bombacaceae	34		+	+		+	
15	Sugar Palm	*Arenga pinnata* Merr.	Arecaceae	1.091		+	+	+	+	
16	Bitter Ginger	*Zingiber aromaticum* Valeton	Zingiberaceae	32				+	+	
17	Gegirang	*Leea sp.*	Leeaceae	27					+	
18	Ilak	*Amomum sp.*	Zingiberaceae	25					+	
19	Guava	*Psidium guajava* L.	Myrtaceae	1		+		+		
20	Bay Leaf	*Syzygium polyanthum* Miq.	Myrtaceae	1				+		
21	Grapefruit	*Citrus maxima* (Burm.) Merr.	Rutaceae	3		+			+	
22	Jeruk Lemo	*Citrus amblycarpa* Ochse	Rutaceae	3		+			+	
23	Java Plum	*Syzygium cumini* (L.) Skeels	Myrtaceae	1		+		+		
24	Cinnamon	*Sauropus androgynous* (L.) Merr.	Euphorbiaceae	10				+		
25	Coconut	*Cocos nucifera* L.	Arecaceae	37		+	+	+	+	
26	Candlenut	*Aleurites moluccanus* Willd.	Euphorbiaceae	30	+				+	+
27	Kepundung	*Baccaurea racemosa* Mull.Arg.	Phyllanthaceae	21	+	+	+			
28	West Indian Lantana	*Lantana camara* L.	Verbenaceae	14				+		
29	Kutat	*Planchonia valida* Blume	Lechytidaceae	38			+			
30	Majegau	*Dysoxylum densiflorum* Miq.	Meliaceae	3			+	+		
31	Mango	*Mangifera indica* L.	Anacardiaceae	38		+	+			
32	Mangosteen	*Garcinia mangostana* L.	Clusiaceae	4		+	+			
33	Pineapple	*Ananas comosus* (L.) Merr.	Bromeliaceae	7		+			+	
34	Jakcfruit	*Artocarpus heterophyllus* Lam.	Moraceae	46		+	+		+	
35	Pakel	*Mangifera odorata* Griff.	Anacardiaceae	59					+	
36	Thatch Screwpine	*Pandanus tectorius* B.C. Stone	Pandanaceae	3					+	
37	Pangi	*Pangium edule* Reinw.	Achariaceae	5					+	
38	Areca Palm	*Areca catechu* L.	Clusiaceae	11				+	+	
39	Banana	*Musa paradisiaca* L.	Musaceae	72		+			+	
40	Pule	*Alstonia scholaris* (L.) R.Br.	Apocynaceae	145				+		
41	Pulet	*Urena lobata* L.	Malvaceae	11				+		
42	Rambutan	*Nephelium lappaceum* L.	Sapindaceae	3		+			+	
43	Snake fruit	*Salacca zalacca* (Gaertn.) Voss	Aecaceae	1		+			+	
44	Breadfruit	*Artocarpus altilis* (Parkinson) Fosberg	Moraceae	7				+		
45	Tabia Bun	*Piper retrofractum* Vahl	Piperaceae	3					+	
46	Taro	*Colocasia esculenta* (L.) Schott	Araceae	54					+	
Total		46	31	2.249						

b. The majority (60%) of these plants is used by the local community and 40% are not traditionally used by the local community. Useful plants traditionally utilized by local communities are for the purposes of religious ceremonial material (Hindu) as many as 29 plant species (35.80%), for medicinal purposes as many as 18 plant species (27.70%), as many as 17 plant species food (20.99%), the need for board materials is 13 plant species (16.05%), the need for clothing and industrial materials is 2 plant species (2.47%).

c. The parts/organs of plants that are used can be grouped into 4 parts, namely 1) plants used for 1 part of the plant; 2) plants that are used 2 parts of the plant; 3) plants that are used for 3 parts of the plant; and 4) plants for which 4 parts of the plant can be used. The number of plant species used for one part/organ alone contained 28 plant species (60.97%). The number of plant species used in two parts/organ was 11 plant species (23.91%). There are 6 plant species used for three parts of the plant (13.04%). For plants that are used 4 parts/organs of the plant, there is 1 plant species (2.17%), See Table 2.

Table 2. Percentage of Useful Plant Parts Used by the Community of the Traditional Village of Tenganan Pegeringsingan with Balinese Aga Culture

No	Number of Utilization Parts	Parts / Organs Plant.	Number of Species	Presentage (%)	Total Presentage (%)
1	1 part	Root	1	2.17	60.97
2		Trunk	7	15.22	
3		Leaf	12	26.2	
4		Flower	1	2.17	
5		Fruit	7	15.22	
6	2 parts	Roots and Stems	1	2.17	23.91
7		Stems and Leaves	2	4.35	
8		Stems and Fruits	3	6.52	
9		Leaves and Fruit	4	8.7	
10		Fruits and Seeds	1	2.17	
11	3 parts	Stems, Leaves and Fruit	3	6.52	13.04
12		Stems, Fruits and Seeds	1	2.17	
13		Leaves, Flowers and Fruits	2	4.35	
14	4 parts	Stems, Leaves, Flowers, and Fruits	1	2.17	2.17
	Total		46	100	100

The land classification in the Tenganan Pegringsingan Traditional Village is as follows: (i) Village/collective/communal ownership rights called Duwen Desa (Laba Pura, Duwen Sekeha) are regulated by awig-awig (traditional rules); (ii) The personal management rights of the villagers (inherited) cannot be transferred to other people from outside the village. Village rights in forest management are Ngalang, Ngrampang, Ngambeng, and Ngambang.

Ngalang, the right to take forest/moor products for ceremonial purposes in a tegalan/abian area, namely: coconut 7 fruit, 5 bunches of bananas, 1 betel nut, fruit (Mango, Wani, Kepundung, Ceroring and others) as much as 1 kise roras (size 12 pieces of kise), 1 jackfruit, 9 pineapples, and 3 bunches of betel/Cekel. Ngrampang, the right to take forest/tegalan products for building materials belonging to the village/jointly: firewood, palm fibers, five feet per tree, areca trees, 1 tree per area or plot of tegalan/abian, bamboo, 1 clump of stems (a lingseh), and coconut tree. Ngrambeng, the right to take forest products/tegalan for ceremonial purposes such as Nira/Tuak, and Durian. Ngrambang, the right to catch chickens that still have their mother for religious ceremonies.

Tri Hita Karana as one of the philosophies of the Balinese people, including the people of the village of Tenganan Pegringsingan. Tri Hita Karana means that there are three factors causing happiness that must be carried out by the Balinese people. The three factors are: (1) the relationship between man and God; (2) Human relations with the environment and (3) Human-human relations. The Tri Hita Karana concept in Tenganan Pegringsingan village has been applied in forest conservation efforts in Tenganan Pegringsingan Village, especially in the Palemahan or zone section. The Tenganan Pegringsingan Traditional Village has regulations to preserve the forest. These rules are contained in awig-awig (Traditional Village Rules), among which are the rules regarding the prohibition of cutting trees carelessly [13, 28, 29].

Tumapung right is a privilege given to someone who has just married. According to the rules in this village, three months after the wedding ceremony, the bride and groom must separate from her parents and build a new household. The village gave the new family a plot of land measuring 2.432 acres. To build a house on that land, the bride and groom are allowed to cut wood trees but only in moderation.

The Tenganan Pegringsingan Traditional Village also prohibits four kinds of fruit that the owner cannot pick, either belonging to the village or individually. The four fruits are durian, pangi, candlenut and tehep. If the fruit falls on its own, then the fruit may be taken. It is not necessarily the owner who takes the fallen fruit, but whoever finds the fallen fruit may take it.

There are several types of trees that are prohibited or not allowed to be felled, including jackfruit, cempaka, durian, candlenut, pangi, teep, jaka (enau/palm) trees which are located west of the river and in the north of the village. If one of the local villagers is cutting down, the tree wood is taken back (daut) by the customary village management. The sanction given is that the feller must pay the price of the wood being cut, plus a fine. If someone from outside the village of Tenganan Pegringsingan picks up four prohibited fruits, (durian, pangi, candlenut and teep hen the penalty given is a fine of 10 catu (equivalent to 25 kilograms of rice). If someone from outside the village of Tenganan Pegringsingan picks four pieces of tadai (durian, pangi, candlenut and teep) the penalty is a fine of 10 catu (equivalent to 25 kilograms of rice) plus the price of fruit picked. The fines will be distributed with the calculation: 50% will be paid to the village and 50% will be given to the reporter. The identity of the whistleblower remains confidential [30, 31].

In the preservation of flora, residents in the Tenganan Pegringsingan Traditional Village are not allowed to sell or give fibers to others. However, when selling fibers, the village does not prohibit it. This prohibition aims not to disturb the life of the enau tree as a palm fiber producer. Meanwhile, the enau tree itself is a staple plant in the Tenganan Pegringsingan forest. Although there are a lot of palm/enau plants in the village of Tenganan Pegringsingan, Tenganan Pegringsingan residents are not allowed to make arak and palm sugar. However, if the palm sugar is used to make palm wine (sap) then this is allowed by the village. The community is also not allowed to make red bricks using the clay in the village. This prohibition is intended to prevent excessive use of firewood. However, what is quite unique is that the awig-awig (traditional rules) of Tenganan Pegringsingan Village also prohibits its residents from planting tarum trees. In fact, tarum is the material used to dye gringsing cloth (a woven cloth typical of Tenganan Pegringsingan village), especially for blue dye. Therefore, the people of Tenganan Pegringsingan have to look for this tarum tree outside the village. The meaning of the prohibition of not planting tarum trees is so that the people of Tenganan Pegringsingan will cooperate with residents outside the village.

In more detail, the following is awig-awig (Traditional Rules) which regulates forest management in Tenganan Pegringsingan Village [30, 31]:

- ✓ Not cutting down trees at will, no cutting down trees that are still alive. If they violate, they will be subject to sanctions in the form of a fine of 400 kepeng, and the wood that is cut is confiscated by the custom;
- ✓ Trees may be felled for building purposes or for firewood, after the tree dies;
- ✓ Trees that have died, if they want to be cut, must be reported to the customary village, who then checks the truth;
- ✓ Types of trees that are prohibited from being felled are for example candlenut, teep, durian, cempaka, palm, pangi and jackfruit;
- ✓ For certain reasons, for example because they prevent other trees from growing, or they are too close to other trees, these prohibited trees may be felled after obtaining permission from the customary court;

- ✓ The felling of living trees on one's own land may be carried out for the need of house building materials for newly married families. This is called Tumapung. Logging may be carried out with the consent of the customary village;
- ✓ Tree felling for village needs, such as for repairing temples, may be done with the consideration of customary manners without considering the condition of plants and ownership (rampangan);
- ✓ Fruits must not be picked from the tree. The fruit can only be taken if it has fallen from the tree. This applies whether the fruit trees are located on private land or in village land. Those who violate are subject to a penalty of 25kg of rice plus the price of the fruit picked. 50% of the fine is given to the customary village, and 50% is handed over to the reporter whose identity is withheld;
- ✓ Not selling/pawning land outside the village. Those who violate the land will be confiscated by the customary village.

According to folklore, King Bedahul lost one of Onceswara's horses and people searched the East for it. The horse was found dead by Ki Patih Tunjung Biru, a confidant of the king. For his loyalty, Ki Patih Tunjung Biru has the authority to regulate his area which has the aroma of the Onceswara horse carrion. Ki Patih got a fairly large area because he cut the Onceswara horse carcass and spread it as far as the horse carcass was smelled.

The parts of the Onceswara horse's carcass are scattered in various places around Tenganan Pegringsingan Village, such as: his right leg is placed in Penimbalan Kangin, his left leg is placed in Penimbalan Kauh, his large stomach is placed in Batukeben (North), his feces are placed in Tikik Temple, his genitals placed in Pura Kaki Dukun, and the tail is placed in Rambut Pule. The places where the parts of the Onceswara horse's carcass were found are then considered as holy places by the local community. The holy places associated with the death of the Onceswara horse can be seen until now as shown in figure 2. The sanctified places are in the middle of the forest in the village of Tenganan Pegringsingan.

Fig. 2. Holy places where the bodies of the Onceswara horse were found:
(a) Pura Batu Keben, (b) Batu Jaran, (c) Pura Rambut Pule, (d) Pura Kaki Dukun, (e) Pura Taikik

Discussion

The model of plant use grouping varies according to research interests. In this study, grouping model is used because it is considered more general and in accordance with the habits of the local community. The other hand, grouping model emphasizes more specific uses, such

as medical, religious ceremonies, dyes/dyes, edible, ornamental, gamelan instruments, and weaving tools [32]. However, not all of these utilization criteria can be found in the villages around Bukit Kangin. Meanwhile, classifies the use of plants based on the philosophy of Hinduism known as 5 W, namely *Wareg*, which means the need for food to fulfill a feeling of fullness, not hunger; *Wastra* means fulfilling the need for clothing; *Wesma*, which means meeting the needs of a board/house; *Waskita*, which means fulfilling the need for education; and *Wesia* means meeting the needs for health.

Most of the utilization of plant species in Tenganan Pegringsingan Village is for religious ceremonial material (Hindu) as many as 29 plant species (35.80%). This can indicate how closely the relationship between the existence of the forest is and the daily life of the surrounding community. This means that forests are one of the important sources for meeting the primary needs of the community for religious ceremonial. In this case, the parts of the plant that are widely used are the leaf (26.2%). Therefore, it can be understood if the people in the area really care about the preservation of the existing forests.

The closeness of the relationship between the people of Tenganan Pegringsingan Village and the plants on Kangin Hill is also shown by the many types of plants that are used for religious ceremonies (35.80%), each of the total plant species used for various purposes). In Hindu society, the need for treatment is generally inseparable from religious needs, because treatment efforts are identical to the implementation of religious ceremonies to ask for healing to God or *Ida Sang Hyang Widhi Wasa*. In this case, the parts of the plants used were generally leaves (26.2%), Trunk and fruits (15.22% each).

G. Breguet and R. Ney [33] studied the development of treatment methods ("evolution of medical practice") in Tenganan Pegringsingan Village. It is stated that prior to 1978, only 3 local people went to doctors outside the village, while most of the others chose to go to a dukun or balian for traditional medicine. However, in 1978 the number of people using modern medicine was increasing. Furthermore, when the research was continued in 1991 it was found that of 373 respondents, 48% of them went to a doctor, 24% went to a doctor and a doctor, while 28% still chose to go to a doctor. Especially in the *banjar Pande*, women are more likely to go to Balian than to a doctor. This shows that in the midst of the swift currents of modernization in the world of medicine, the Tenganan people still have a strong connection with the traditional medical system that utilizes plants from the forest. Meanwhile, for needs related to clothing, the Tenganan people do not depend much on the surrounding forest resources. For the purposes of coloring materials, for example, the community brings in materials derived from the *sunti* plant from Nusa Penida island, because these plants are no longer found in the surrounding forest area.

The area of the Tenganan Pegringsingan Traditional Village consists of hilly dry land and rice fields. Land ownership in this village is generally divided into: (1) joint ownership, namely temple property (*duwen pura*), village property (*duwen desa*), and community group ownership (*duwen desa sekaha*), and (2) private property, both from within. and outside the village of Tenganan Pegringsingan. Dry soil vegetation (*tegalan)* is divided into three groups, namely: *tegal nyuh, tegal jaka*, and mixed. *Tegal nyuh* has the core of coconut (*nyuh*) and other plants, namely bananas, coffee, chocolate, *salak* and others. *Tegal bet/jaka* is based on palm or *aren/jaka* plants and other plants, namely jackfruit, *cempaka, durian*, hazelnut, *pangi, teep*, fruits of various types of mango, *duku, kepundung, kaliasem, wani, sentul, belalu* and trees. other trees. While the mixed *tegal*, contains a mixture of various types of plants (forests).

Forest management is regulated with the aim of community welfare. However, traditional villages have special rights in the form of *ngalang, ngambeng, ngambang, ngerampag* for ceremonial purposes. *Ngalang* is the right to take 7 coconuts, 5 comb bananas, 9 pineapples, 1 jackfruit, mango, *wani, duku, kepundung, ron* (palm leaves), *janur* (coconut leaf) and 1 bamboo stick per clump. *Ngambeng* is the right to *take tuak atakeh* and random,

according to need. *Ngambang* is the right to catch one chick per parent. Meanwhile, *ngerampag i*s the right to cut 1 tree per *cutak.*

In terms of felling trees, there are several regulations according to the criteria for use, namely firewood, building material wood, *penaho*, wean and *tumapung*. Firewood is felling for the purposes of firewood, generally from the *cutat, bayur, wangkal, poh, pakel, gatep* and other trees. The wood for building materials is for building purposes, derived from jackfruit, *tehep, duren, cempaka, blalu*, and palm trees, provided that only trees to the west of the river in the village may be felled, while trees next to it. north of the village should not be cut down. Penaho is *kekeran* or area wood that grows in coconut grove or *tegal nyuh* and can be felled only if the plant has the shade of other plants (*penaho*). The results of the felling are used to pay the workers' wages and the rest is partially paid to the village and part of it belongs to the owner. Weaning is logging for thinning purposes. If a number of similar trees grow in a land, the land owner is obliged to report it to the customary village management for weaning/thinning. Logging can only be carried out after a team of three representatives from the customary village checks and states that they have met the requirements for cutting. Meanwhile, tumapung is the felling of trees on private land for the purposes of building houses. This right is especially given to newly married couples, because according to customary rules, three months after the wedding ceremony, the couple must separate from their parents and build a new household. In the construction of a new house, the land is prepared by the village while the building wood materials can be taken from the local forest [30].

Apart from the tree felling rules, there is another rule called nuduk ulung-ulungan, which is the regulation regarding the collection of forest products for four types of fruit (*durian, pangi*, candlenut, and *teep*). The four types of fruit cannot be picked by the land owner, but anyone who falls can be picked up.

The traditional rules (*awig-awig*) regarding the utilization of forest products which are quite "complex" are related to the historical story of the birth of the Tenganan Pegringsingan Traditional Village which was able to shape wisdom and awareness that the area they occupy was given by Ida Sang Hyang Widhi Wasa (God), so it should be respected, maintained and preserved. This myth is believed to have contributed significantly to the preservation of Tenganan Pegringsingan Village.

Conclusions

The conclusions of this study are:

- In Bukit Kangin, there are about 46 species of useful plants which are used by the people of the Tenganan Pegringsingan Traditional Village. Useful plants traditionally utilized by local communities are for the purposes of religious ceremonial material (Hindu) as many as 29 plant species (35.80%), for medicinal purposes as many as 18 plant pecies (27.70%), as many as 17 plant species food (20.99%), the need for board materials is 13 plant species (16.05%), the need for clothing and industrial materials is 2 plant species (2.47%).

- The parts/organs of plants that are used can be grouped into 4 parts, namely: 1) plants used for 1 part of the plant; 2) plants that are used 2 parts of the plant; 3) plants that are used for 3 parts of the plant; and 4) plants for which 4 parts of the plant can be used.

- Forest management efforts carried out by the people of the Tenganan Pegringsingan Traditional Village are based on traditional rules (*awig-awig*) which reflect local wisdom and respect for religious principles and myths that are believed from generation to generation. This effort has proven to be quite effective in maintaining the preservation of the richness of plant species in the area.

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