The Utilization Of Useful Plant Species Based On Socio-Cultural Of Tenganan Pegringsingan Bali Aga Village, District Of Karangasem, Bali

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Abstract. The purposes of this research were to know the composition of useful plant species and their utilization by the community based on socio-cultural of Tenganan Pegringsingan Bali Aga Village. This research was an explorative research. The location of this research was in Bukit Kangin, Tenganan Pengringsingan Village, District of Karangasem. There were two kinds of population in this research; they were the plant vegetation and the community of Tenganan Pegringsingan Village. The plant vegetation was all of the plant species in the forest area of Bukit Kangin. Meanwhile, the social culture population was all of the Tenganan Pegringsingan people. The vegetation samples of this research were all the plant species covered by the 100 squares with size 20x20 m². Meanwhile, the social culture samples were: The Village Officials (5 pax), The Traditional Village Officials (5 pax), The Community Figures (10 pax), Shamans (2 pax), Offering Artisan (2 pax), and The General Community Members (20 pax). The total sample were 44 persons. The data retrieval of this study was using square method. The square placement was done by using systematic sampling technique [11], [12], [13], [14], [15]. The interview, observation and questionnaires were used to retrieve socio-cultural data [16], [17]. Furthermore, the data were analized descriptively. The results of this research were: 1) There were 77 plants species in Bukit Kangin, Tenganan Pegringsingan Village, Sub-District of Manggis, District of Karangasem. Those 77 species on the data were included into 40 families with total of 2,574 individuals; 2) There were 46 species out of the 77 plant species in Bukit Kangin classified as useful for religious offerings (Hindu), medications, food, housing, clothing and industrial needs. For more detail of their utilization, it can be summarized as follows: for religious offerings (Hindu) there were 29 plants species (35.80%), for medications there were 18 plants species (27.70%), for food there were 17 plants species (20.99%), for housing there were 13 plants species (16.05%), for clothing and industrial needs there were 2 plants species; and 3) Based on the category of the plant organs/parts utilization can be summarized as follows: leaves utilization were 23 plants species (32.40%), stem utilization were 18 plants species (25.35%), fruits utilization were 22 species (30.99%), flowers utilization were 4 species (5.64%), roots and seeds utilization were 2 plant species (2.81%). It could be recommended a further more specific and in-depth study on the utilization of those plant species is needed to be done.

Key Words: Useful Plant Species, Socio-Cultural, Bali Aga, Tenganan Pej. Gringsingan
1. Introduction

Geographically, Tenganan Pegringing Village is located in the height of 50-500 above the sea level, with rainfall of 620 mm/year, and temperature range of 28-30°C. This traditional village lies from north (Bukit Kaja area) to the south (around Candi Dasa Beach). The land area of Tenganan Pegringing Village is 1.034 Ha, in which the land consists of 499.74 Ha plantation; 243,315 Ha agriculture and forest areas; 95,825 Ha temple areas; 80.000 Ha settlement; 40.00 Ha graveyard; 0,030 Ha pool. The village is flanked by two hills and bounded by the Village of Macang on the south, on the east it is bounded by Bungaya Village and Asak Village, on the south side it is bounded by Pasedahan Village, and on the west it is bounded by Ngis Village. Most of the Tenganan people work as farmer and some of them work in tourism industry. The community members were only 688 people with 232 families in total in which consist of 333 males and 355 females [1].

Tenganan Pegringing Village is divided into 3 complexes, they are: a complex of sedentary living pattern, a complex of plantations, and a complex of rice fields. The complex of sedentary living pattern is the official Tenganan village which has five official sub-villages (banjar), they are: (1) Banjar Tenganan Pegringing; (2) Banjar Gumung; (3) Banjar Tenganan Dauh Tukad; (4) Banjar Kangin; and (5) Banjar Kauh. Meanwhile, the Traditional Tenganan Pegringing Village has three traditional sub-villages, they are: Banjar adat Kauh, Banjar adat Tengah, and Banjar Kangin (Banjar Pande) [2].

Based on the history and archeology, the nowadays community of Bali Aga is the growth of pre-historical Austronesians. The ancient Balinese had pre historical tradition which is called Bali Aga or Bali Mula. In general the Bali Aga people occupied the mountainous areas such as Tenganan Village, Trunyan Village, Sembiran Village and Sidatapa Village [3].

Plants are valuable to the community since the period og ancient Bali until recent days. The plants written in the inscription were all had significant values for the kings, religious figures, shamans and the other public figures. Therefore, those plants are preserved recently. Those plants utilized by the community are highly related to the local conditions (place, time, and pattern) (desa, kala, patra). The inscription as the object of this study was an inscription mentioning some plants such as: the inscription of Buwahan A Śaka 916, the inscription of Ujung Pura Dalem Śaka 932, the inscription Abang Pura Batur A Śaka 933, the inscription Batuan Śaka 944, prasasti Sawan Śaka 945, the inscription Tengkulak A Śaka 945, the inscription of Dawan Śaka 975, the inscription of Belantih A Śaka 980, the inscription of Sawan B Śaka 987, the inscription of Sembiran A Śaka 987, the inscription of Sukawati A (tanpa angka tahun), the inscription of Pandak Badung Śaka 993, the inscription of Klungkung A Śaka 994, the inscription of Sawan A Śaka 995, the inscription of Srokadan B Śaka 999, the inscription of Julah Tengah (without years), prasasti Klandis (without years), and the inscription of Sawan C Śaka 1020 [4].
Based on the analysis results of the script experts on the 18 inscriptions of the Ancient Balinese Period X–XI century AD can be known that there were some kinds of plants which were utilized then \([4]\). Since the Period of Balinese Ancient up to recent days the plants have a high value to the community. The plants utilized by the community were highly related to the local conditions (desa, kala, patra).

From 45 plant species used at that period of time, seemed the utilizations of the plants were not much different from the nowadays utilization as stated by \([5]\). According to \([5]\) the categories of plant utilizations are for clothing, housing, food, medication, industrial, and religious purposes. The organs which are used are the roots, stems, leaves, fruits, seeds and flowers. To know the plant species in Bukit Kangin and the plant utilizations by the local community, it is needed to do an in-depth study on the plant species composition and the utilization by the people of Tenganan Pegringsingan Village.

This research was conducted based on the former research results related to terrestrial vegetation by \([6]\), \([7]\), \([8]\), \([9]\), \([10]\), located in tourism Monkey Forest, Penglipuran Village, Alas Kedaton tourism Forest and the other Bali Aga villages and Bali Majapahit villages. The objects of the study were rare plants with their mapping and distribution, and the plants symbolizing body parts in Bali Aga and Bali Majapahit Villages, Bali Province. As the follow-ups of the former studies, therefore this study researched on the plants which were useful based on the Bali Aga Tenganan Pegringsingan Village socio-cultural conditions. Based on the above description, thus the purposes of this study were to know the composition of the useful plant species and their utilization by the local community based on the socio cultural of Tenganan Pegringsingan Bali Aga Village.

2. Material and Methods

This study was an explorative research. It took place in Bukit Kangin, Tenganan Pegringsingan Village, District of Karangasem. There were two populations of this research; they were the plant vegetation and the community of Tenganan Pegringsingan Village. The plant vegetation was all of the plant species in the forest area of Bukit Kangin. Meanwhile the population of the socio cultural was all the people of Tenganan Pegringsingan Village. The vegetation samples were all the plant species covered by 100 squares size 20x20 m². Meanwhile the samples of the socio cultural were: The Village Officials (5 pax), The Traditional Village Officials (5 pax), The Community Figures (10 pax), Shamans (2 pax), Offering Artisan (2 pax), and The General Community Members (20 pax). The total sample were 44 persons.

The data retrieval of this research was using square method. The square placement was done by using systematic sampling technique \([11]\), \([12]\), \([13]\), \([14]\), \([15]\). The interview, observation and questionnaires were used to retrieve socio-cultural data \([16]\), \([17]\). Furthermore, the data were analized descriptively.

2.1. Materials

The tools and materials used for data sampling in this research are:
1. Tools Materials for useful plant species samples taking are presented in Table 1.

| No. | Name                  | Category | Specification                          | Function                                                                 |
|-----|-----------------------|----------|----------------------------------------|--------------------------------------------------------------------------|
| 1   | Meter tape            | Tool     | Meters made of metal                   | Measuring the length and the distance between squares                     |
| 2   | Wooden peg            | Tool     | Wooden peg made of bamboo              | As a stake of the ground measurement points and installing the transect line |
| 3   | Raffia rope           | Tool     | -                                      | As a transect line                                                       |
| 4   | Camera                | Tool     | Canon                                  | Documenting the study                                                    |
| 5   | Stationary            | Tool     | -                                      | Recording the study results                                              |
| 6   | Altimeter             | Tool     | Analog altimeter                       | Measuring the location height                                             |
| 7   | GPS (Global Positioning System) | Tool     | Garmin GPS                             | As a navigation system which displays the information on the time and the rare plants positions. |
| 8   | Helling               | Tool     |                                        | Calculating the ground surface height difference.                        |
| 9   | Hagameter             | Tool     | Haga Altimeter 6 multi range scale     | Measuring the tree height                                                 |
| 10  | Environmental thermomter | Tool     | Digital thermometer                    | Measuring the temperature of the study location.                         |
| 11  | Soil tester           | Tool     | Takemura soil tester                   | Measuring the soil pH and its organic matter                             |
| 12  | Anemometer            | Tool     | Anemometer, accuracy: 0.5 m / s         | Measuring the wind speed                                                 |
| 13  | Hygrometer            | Tool     | TL8039- TLX digital hygrometer (China)  | Measuring the humidity                                                   |
| 14  | Lux meter             | Tool     | Lux digital meter LX1010B              | Measuring the light intensity                                             |
| 15  | Label                 | Material | Label made of paper                    | to label the wooden peg                                                  |

2. Interview was conducted to find out the use of useful plants, their processing methods and the goods produced.

2.2 Methods

Data Sampling Procedure

1. Ecosystem and Vegetation Aspects

   A. Preparation Steps

      In this stage the following activities were carried out:
      1. Requested permission to conduct a research in Tenganan Pegringsingan Vilage to the office of Tenganan Pegringsingan Village on 7 February 2019.
      2. Observation of the location and the useful plants species in the area of Bukit Kangin Tenganan Pegringsingan Village.
      3. Providing the tools and materials

   B. Implementing Steps

      In this step the following activity steps as were carried out:
      1. Determined the data sampling location,
2. Determine the square of sampling in each part of the Bukit Kangin forest.

3. Determine the squares of sampling in each zone stretched as much as 65 squares with a square area of 1x1m² (sidling), 10x10m² (sapling) and 20x20m² (mature) with an interval of 20 meters.

4. Placing squares intermittently can be seen in Figure 1.

5. Plants covered in squared were then recorded and put into the work table.

6. By using interview method, related to the types of plant species utilization, parts of plants and the method of plant species utilization, the utilizations were grouped into food, shelter, clothing, medicine, crafts, and religious ceremony (Hindu).

7. Work tables were also made to record the utilized parts of the plants such as root, stem, leaf, flower, fruit and seed.

8. To find out the process, manufacturing and the goods produced by utilizations of the plants, a work table was made which included the plants local names, manufacturing and their products.

Socio-system Aspects

A. Preparation Steps

In this stage the following activities were carried out

1) Requested permission to conduct a research in Tenganan Pgringsingan Village to the office of Tenganan Pegringsingan Village on 7 February 2019.

2) Observation of the location and the product which used plants of Bukit Kangin forest.

3) Preparing the study instrument which was interview guidelines.

B. Implementation Steps
After the preparation steps, the data were taken by interview method addressed to the predetermined informant by asking questions related to the types of the useful plants utilization, the parts of the plan used and the way they processed.

3. Result and Discussion

Before presenting the data related to the useful plant species oriented to socio-cultural of Tenganan Pegringsingan Bali Aga Village, it will be described in brief the general plant species composition in Bukit Kangin of Tenganan Pegringsingan Village. The general plant species means the plant species exist in Bukit Kangin Forest of Tenganan Pegringsingan Village before the usage of them identified. The study location were divided into three zones, they were Zone I which geographically lies between $8^\circ 28'29"$S - $115^\circ 34'20"$E and $8^\circ 28'48"$ S – $115^\circ 34'27"$E, Zone II lies between $8^\circ 28'27"$S - $115^\circ 34'9"$E and $8^\circ 28'45"$ S – $115^\circ 34'34"$E, and zone III was located between $8^\circ 28'32"$S - $115^\circ 34'7"$E and $8^\circ 28'21"$ S – $115^\circ 34'4"$E. The total area where the samples taken were 32.565 M$^2$ with total amount of the squares were 65 squares.

From the field results, in general it was found 77 plant species in Bukit Kangin. Those 77 plant species were classified into 40 families with total 2.574 individuals. According to the Ministry of the Environment in 2004, about the forest density criteria, that if in a hectare of the forest there are less than 1.000 trees (<1.000/Ha), it can be classified as low density forest. Therefore, it can be concluded that the plant density in the study field of Bukit Kangin was low (790 plants/Ha).

Based on the plant species composition in Bukit Kangin, then interview was conducted to the local community about the usage of the plants which data had been retrieved according to the tradition of the village (socio-cultural) and the literature studies. From the data, it was gained 46 plant species can be utilized by the local community, as shown in Table 2.

Table 2. Useful Plant Species in Bukit Kangin Based on Socio Cultural of Tenganan Pegringsingan Bali Aga Village

| NO | LOCAL NAME | SCINETIFIC NAME | FAMILY | NUMB OF INDIVIDUAL | NO | LOCAL/INDONESIA NAME | SCINETIFIC NAME | FAMILY | NUMB OF INDIVIDUAL |
|----|-------------|-----------------|--------|-------------------|----|----------------------|-----------------|--------|-------------------|
| 1  | Alang-alang  | Imperata cylindrica (L.) P.Beauv. | Poaceae | 7          | 25 | Kelapa               | Cocos nucifera L. | Areccacea | 37      |
| 2  | Alpukat      | Persea americana Mill. | Lauraceae | 1 | 26 | Kemiri                | Aleurites moluccanus Wild. | Euphorbiacea | 30      |
| 3  | Asem         | Tamarindus indica L. | Fabaceae | 2 | 27 | Kepundun              | Baccaurea racemosa Mull.Arg. | Phyllanthacea | 21      |
| 4  | Ata          | Lygodium cinnatum (Burm.) Sw. | Lygodiacea | 79 | 27 | Kepundun              | Baccaurea racemosa Mull.Arg. | Phyllanthacea | 21      |
| No | LOCAL NAME | SCINETIFIC NAME | FAMILY | NUMBR OF | NO | LOCAL/INDONES | SCINETIFIC NAME | FAMILY | NUMBR OF |
|----|------------|----------------|--------|----------|----|---------------|----------------|--------|----------|
| 5  | Badung     | *Garcinia dulcis* (Roxb.) Kurz | Clusiaceae | 5 | 28 | Kerasi | *Lantana camara* L. | Verbenaceae | 14 |
| 6  | *Tiing Tali* | *Gigantochlo a apus* Kurz | Poaceae | 76 | 29 | Kutat | *Planchnonia valida* Blume | Lechytidaceae | 38 |
| 7  | Bayur      | *Pterospermum celebicum* Miq. | Malvaceae | 188 | 30 | Majegau | *Diospyrum densiflorum* Miq. | Meliaceae | 3 |
| 8  | Belalu     | *Hopea celebica* Burck | Dipterocarpaceae | 20 | 31 | Mangga | *Mangifera indica* L. | Anacardiaceae | 38 |
| 9  | Belalu Bali | *Hopea sp.* | Dipterocarpaceae | 1 | 32 | Manggis | *Garcinia mangostana* L. | Clusiaceae | 4 |
| 10 | Belimbing Wuluh | *Averrhoa bilimbi* L. | Oxalidaceae | 4 | 33 | Nanas | *Ananas comosus* (L.) Merr. | Bromeliaceae | 7 |
| 11 | Beringin   | *Ficus benjamina* L. | Moraceae | 4 | 34 | Nangka | *Artocarpus heterophyllus* Lam. | Moraceae | 46 |
| 12 | Cempaka Putih | *Michelia alba* DC. | Magnoliaceae | 21 | 35 | Pakel | *Mangifera odorata* Griff. | Anacardiaceae | 59 |
| 13 | Dauh       | *Draccontomelon mangiferum* Bl. | Anacardiaceae | 1 | 36 | Pandan Duri | *Pandanus tectorius* B.C. Stone | Pandanaceae | 3 |
| 14 | Durian     | *Dario zibethinus* Murr. | Bombacaceae | 34 | 37 | Pangi | *Pangium edule* Reinw. | Achariaceae | 5 |
| 15 | Enau       | *Arenga pinnata* Merr. | Areaceae | 1.091 | 38 | Pinang | *Areca catechu* L. | Clusiaceae | 11 |
| 16 | Gamonga    | *Zingiber aromaticum* Valeton | Zingiberaceae | 32 | 39 | Pisang | *Musa paradisiaca* L. | Musaceae | 72 |
| 17 | Gegirang   | *Leea sp.* | Leeaceae | 27 | 40 | Pule | *Alstonia scholaris* (L.) R.Br. | Apocynaceae | 145 |
| 18 | Ilak       | *Amomum sp.* | Zingiberaceae | 25 | 41 | Pule | *Urena lobata* L. | Malvaceae | 11 |
| 19 | Jambu Biji | *Psidium guajava* L. | Myrtaceae | 1 | 42 | Rambutan | *Nephelium lappaceum* L. | Sapindaceae | 3 |
| 20 | Jangar Ulam | *Sycigium polyanthum* Miq. | Myrtaceae | 1 | 43 | Salak | *Salacca zalacca* (Gaertn.) Voss | Aecaceae | 1 |
| 21 | Jeruk Bali | *Citrus maxima* (Burm.) Merr. | Rutaceae | 3 | 44 | Sukun | *Artocarpus altillis* (Parkinson) Fosberg | Moraceae | 7 |
| 22 | Jeruk Lemo | *Citrus amblycarpa* Ochse | Rutaceae | 3 | 45 | Tabia Bun | *Piper retrofractus* Vahl | Piperaceae | 3 |

**NOTE:** The table above lists the local names, scientific names, family, and number ofIndicator Numbers (INDI VIDUA L) for various plant species found in Badung, Indonesia. The table also includes the names in Indonesian (IA NAMES) and the number of indicators (INDI VIDUA L). The local names are matched with their scientific names and families. For example, Badung is matched with *Garcinia dulcis* (Roxb.) Kurz, which is a member of the Clusiaceae family. The scientific names are provided in parentheses after the local names, and the family information is included for each species.
Most category of plants utilization was for religious ceremony materials. There were 46 plant species utilized by the people of Tenganan Pegringsingan. There were 29 plant species were used for the needs of religious ceremony (Hindu) (35.80%) and 18 plant species were used for medications (27.70%). Then, there were 17 plant species for foods (20.99%), 13 plant species for housing (16.05%), and 2 species for clothing and industrial needs (2.47%). The useful plants based on the six usage classifications are presented in Figure 2.

![Figure 2. The Recap of The Useful Plants Based on the Utilization](image)

(Explanation: Red: Clothing, Orange: Food, Yellow: Housing, Green: Medication, Blue: Ceremony, Brown: Industrial)

Here are the plants which are used in the religious ceremony: Enau (*Arenga pinnata*), Durian (*Durio zibethinus*), Pakel (*Mangifera odorata*), Pangi (*Pangium edule*), Cempaka Putih (*Michelia alba*), Nangka (*Artocarpus heterophyllus*), Kemiri (*Aleurites moluccanus*), Dauh (*Dracaenomelon mangiferum*), Pisang (*Musa paradisiaca*), Pinang (*Areca catechu*), Ata (*Lygodium circinatum*), Gegirang (*Leea sp.*), Bambu (*Gigantochloa apus*), Kelapa (*Cocos nucifera*), Jeruk Bali (*Citrus maxima*), Badung (*Garcinia divica*), Jeruk Lemo (*Citrus amblycarpa*), Talas (*Colocasia esculenta*), Ilak-ilak (*Amomum sp.*), Beringin (*Ficus benjamina*), Salak (*Salacca zalacca*), Gamongan (*Zingiber aromatica*), Pandan Duri (*Pandanus tectorius*), Rambutan (*Nephelium lappaceum*), Asem (*Tamarindus indica*), Tabia Bun (*Piper retrofractum*), Alang-alang (*Imperata cylindrica*), Belimbing (*Averrhoa bilimbi*), and Nanas (*Ananas comosus*).
The plants utilized for medication are Enau (*Arenga pinnata*), Pinang (*Areca catechu*), Bayur (*Pterospermum celebicum*), Kelapa (*Cocos nucifera*), Pulai (*Alstomia scholaris*), Pulet (*Urena lobata*), Gamongan (*Zingiber aromatica*), Kerasi (*Lantana camara*), Jambu Biji (*Psidium guajava*), Majegau (*Dysoxylum densiflorum*), Jangar Ulam (*Syzygium polyanthum*), Kayu Manis (*Sauropus androgynus*), Alpukat (*Persea americana*), Asem (*Tamarindus indica*), Sukun (*Artocarpus altilis*), Juwet (*Syzygium cumini*), Alang-alang (*Imperata cylindrica*), and Belimbing (*Averrhoa bilimbi*).

The plants are used for foods included: Enau (*Arenga pinnata*), Durian (*Durio zibethinus*), Nangka (*Artocarpus heterophyllus*), Kepundung (*Baccaurea arcemosa*), Mangga (*Mangifera indica*), Pisang (*Musa paradisiaca*), Kelapa (*Cocos nucifera*), Jeruk Bali (*Citrus maxima*), Manggis (*Garcinia mangostana*), Jeruk Lemo (*Citrus amblycarpa*), Salak (*Salacca zalacca*), Jambu Biji (*Psidium guajava*), Rambutan (*Nephlium lappaceum*), Alpukat (*Persea americana*), Juwet (*Syzygium cumini*), Belimbing (*Averrhoa bilimbi*), and Nanas (*Ananas comosus*).

The plants for housing are Enau (*Arenga pinnata*), Durian (*Durio zibethinus*), Cempaka Putih (*Michelia alba*), Nangka (*Artocarpus heterophyllus*), Kepundung (*Baccaurea arcemosa*), Belalu (*Hopea celebia*), Mangga (*Mangifera indica*), Bayur (*Pterospermum celebicum*), Belalu Bali (*Hopea sp.*), Kelapa (*Cocos nucifera*), Manggis (*Garcinia mangostana*), Kutat (*Planchonia valida*), and Majegau (*Dysoxylum densiflorum*).

The plants that are utilized for clothing included: Kemiri (*Aleurites moluccanus*) and Kepundung (*Baccaurea arcemosa*). Meanwhile the plants used for industrial purposes included Kemiri (*Aleurites moluccanus*) and Ata (*Lygodium circinatum*).

The number of the plants that are utilized by the community of Tenganan Pegringsingan shows the close relation between the people and the plants species in Bukit Kangin Forest. In Hindu community the utilization of the plants for medication is identical to the religious purposes [10]. To see clearly the parts or organs of plants that are used by the community, here is Table 3.

**Table 3. The Useful Plant Species Composition in Bukit Kangin Forest Based On The Utilization by The Local Community**

| No | Local Name | Scientific Name                  | Part Used |
|----|------------|----------------------------------|-----------|
| 1  | Enau       | *Arenga pinnata*                 | + + +     |
| 2  | Durian     | *Durio zibethinus*               | + + +     |
| 3  | Pakel      | *Mangifera odorata*              | +         |
| 4  | Panggi     | *Pangium edule*                  | +         |
| 5  | Cempaka Putih | *Michelia alba*              | +         |
| 6  | Nangka     | *Artocarpus heterophyllus*       | + +       |
| 7  | Kemiri     | *Aleurites moluccanus*           | + +       |
| 8  | Kepundung  | *Baccaurea arcemosa*             | +         |
| 9  | Belalu     | *Hopea celebia*                  | +         |
| 10 | Mangga     | *Mangifera indica*               | +         |
| 11 | Daun       | *Dractomelom mongiferum*         | +         |
There were 46 plant species utilized by the people of Tenganan Pegringsingan Village. The most utilized category was on the plant leaves of 23 plant species (25.35%). The next was the usage of the fruit as many as 22 plant species (30.99%), flower usage as many as 4 plant species (5.64%), the root and seed utilization as many as 2 plant species (2.81%). Those useful plant species were grouped into six usage categories and presented in Figure 3.
The number of the plants used by the local community shows the close relationship among the people’s cultivation ability, intelligence, and the plants in Bukit Kangin Forest. The people’s intelligence is based on the people’s belief which is, Hinduism. As an example, the usage of plants for medication purposes is identical to the religious ones \[^{10}\]. This is because the medication efforts are identical to the religious ceremony which aims at invoking healing from God (Ida Sang Hyang Widhi Wasa). In this case, the parts of plant generally used are the leaves (32.40%), the fruits (30.99%), and the flowers (5.64%).

The cultivation ability shows that the relationship between the forest existency and the life of the local people. The forest is the germplasm to the locals. Thus, it creates an agrarian world, forestry/forester which is characterized with the farm land or the forest. Their life is to utilize the germplasm around them. However, the usage of the germplasm needs to be regulated so that it will not be used up. The traditional regulation is called awig-awig. Tenganan Pegringsingan is one of the villages included in Bali Aga Villages. The life of the Tenganan Pegringsingan people is not much affected by the flow of modernization because they have a strong attachment to the awig-awig or the village regulations. The traditional regulation was created since 11 century, updated in 1842 and recently used as the reference in implementing the daily life of the community \[^{18}\][^{19}\].

Besides awig-awig, there are another local wisdoms applied to preserve the forest in Tenganan Pegringsinagn Village. The forest management is regulated in order to maintain the community welfare. However, the traditional village has prerogative rights to ngalang, ngambeng, ngambang, ngerampag for the purpose of religious ceremony in the village. Ngalang is the right to get 7 coconuts, 5 bunches of bananas, 9 pinapples, 1 jackfruit, mangoes, wani, duku, kepundung, ron, busung (young coconut leaves) and 1 bar of bamboo. Ngambeng is the right to take palm atakeh and acutak (traditional volume size or unit), based on the needs. Ngambang is the right to catch the one chick per hen. While, ngerampag is the right to cut down one tree every cutak (traditional volume size).
The other unique local wisdom is to consider the plants in the forest as social plants. It means, there are certain trees which fruits can be consumed socially be the people in the village. The way to have the fruits is through a traditional rule called nuduk ulung-ulungan, or a rule to pick up 4 kinds of fruits which fall in the forest, they are durian, pangi, kemiri, and tehep. Those four fruits cannot be picked by the land owner, but the fallen fruits of them can be picked up by anyone [18].

Enau is the most dominant plant in Bukit Kangin forest so that the forest is called Jaka Forest or Bet Jaka. Enau produces ijuk, tuak, dan beluluk. The interesting tradition in Tenganan Pegringsingan Village is that the ijuk and tuak cannot be sold outside the village. All the products are for the village needs only. It is a conservation and sustainability concepts so that the plants remain ecological. Ijuk, tuak and beluluk/kolang-kaling as the village needs are limited, so that their use does not overly exploit the natural resources.

4. Conclusion

From the above explanation, can be summarized Dari uraian di atas dapat disimpulkan bahwa 1) There were 77 plant species in Bukit Kangin, Tenganan Pegringsingan Village, Sub-District of Manggis, District of Karangasem. Those 77 species on the data were included into 40 families with total of 2,574 individuals; 2) There were 46 species out of the 77 plant species in Bukit Kangin classified as useful for religious offerings (Hindu), medications, food, housing, clothing and industrial needs. For more detail of their utilization, it can be summarized as follows: for religious offerings (Hindu) there were 29 plant species (35.80%), for medications there were 18 plant species (27.70%), for food there were 17 plant species (20.99%), for housing there were 13 plant species (16.05%), for clothing and industrial needs there were 2 plant species; and 3) Based on the category of the plant organs/parts utilization can be summarized as follow leaves utilization were 23 plant species (32.40%), stem utilization were 18 plant species (25.35%), fruits utilization were 22 species (30.99%), flowers utilization were 4 species (5.64%), roots and seeds utilization were 2 plant species (2.81%). It could be recommended a further more specific and in-depth study on the utilization of those plant species is needed to be done.

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