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Ethnobotany of food plants in dayak taman tribe, west kalimantan, Indonesia

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Abstract
Dayak Taman tribe community in Ingko' Tambe Village, South Putussibau District, Kapuas Hulu Regency, West Kalimantan Province, Indonesia have a large area of customary forest and protected forest. The community usually uses forest products to meet their daily needs as food. However, the potential of food plants found in customary forests and protected forests is now threatened to disappear because of several activities carried out including shifting fields, illegal logging, forest fires, there was no cultivation effort by the local community and knowledge about food crops was conveyed orally. The purpose of this research is to find out the types of food plants that are utilized by the Taman Dayak tribe community. The research method used is a survey. Interview and field observation were used to collect the data. The Data was analyzed by calculating the percentage of families, percentage of plant parts used, percentage of habitat type. The results showed that plants used as food as many as 73 species from 36 families. The highest family is *Moraceae* (9.58%). The most widely used part is fruit (65.75%). Plants that are used are found in the garden (35.53%).

Keywords: ethnobotany, plants, food, dayak taman

1. Introduction
The number of Dayak tribes in the West Kalimantan region is 151 subethnic (Alloy *et al.*., 2008) [1], one of them is the Dayak Taman subethnic which is administratively located in Ingko Tambe' village, Kapuas Hulu District, West Kalimantan Province, Indonesia. Ingko Tambe' village has a customary forest area and protected forest with an area of ± 31,207 Ha so that there are many food plants that are used by the community to meet their daily needs. Food plants are all things originating from biological sources and water, whether processed or not processed, which are intended as food or drinks for human consumption, including food additives, food raw materials and other materials used in the preparation, processing, and / or manufacture of food or beverages (UU No.7, 1996). According to the Indonesian Ministry of Health (1983), food crops are groups of plants that are commonly consumed daily by humans, in the form of vegetables and fruits which contain nutrients, vitamins and minerals that are useful for human health and are an important component for a healthy diet.
The Knowledge of utilizing plants that have food potential in the Dayak Taman tribe community is still maintained. This is as a local wisdom in the local community. Local wisdom has a relationship with nature in a long history, adapts to the local ecological system, is dynamic and is always open with the addition of new knowledge (Wahyu, 2007) [20]. Keraf (2002) [8] defines local wisdom as all forms of knowledge, beliefs, understanding or insight as well as customs or ethics that guide human behavior in life in ecological communities. Supiandi *et al.*., (2019) [14] state that insights about the use of local plants are obtained by the community through inheritance from parents, and also from relatives and others. Rukeh, *et al.*., (2013) [13] state that local cultural practices have contributed to forest conservation. Diaz (2010) [5] argues that local knowledge or wisdom is an important asset in achieving biodiversity targets and is the key to preventing biodiversity damage and realizing sustainable development.
Knowledge about the use of local plants as food in Dayak Taman tribe community has a problem because of the following things: (a) it has not been well documented, (b) it is delivered orally, (c) those who have knowledge about food crops have begun to diminish, (d) shifting cultivation, (e) forest fires, (f) there is no cultivation efforts by local communities, (g) oil palm plantations. These problems are in line with research conducted by Setiawan (2010); Supiandi *et al.*., (2019) [14]; Supiandi & Leliavia (2019) [14]. Based on these problems, it becomes a necessity and it becomes increasingly important to conduct a research on ethnobotany in the Dayak Taman tribe community in Desa Ingko' Tambe.
Ethnobotany is a study that studies how humans use natural products wisely according to the knowledge of a group of people. According to Choudhary *et al.* (2008) [3]; Martin (1998) [9], ethnobotany is a scientific discipline concerning the interaction between plants and humans. Suwahyono *et al.* (1992) [17] states that ethnobotany studies the behavior patterns of community groups in regulating the knowledge systems of their members towards plants in the surrounding environment, which are used not only for economic purposes but also for other spiritual and cultural purposes. Ethnobotany needs to be studied as an effort to preserve and conserve diversity of plant species as well as community knowledge about the plants around them (Aryal, 2009; Reta, 2010; Zaman *et al.*., 2013; Pieroni *et al.*., 2014; Supiandi *et al.*., 2019) [12, 21, 11, 15].

2. Method
2.1 Research time and location
This research was conducted in May 2019. The research was carried out in Ingko' Tambe village, South Putussibau District, Kapuas Hulu Regency, West Kalimantan Province.

The research location can be seen in Figure 1.

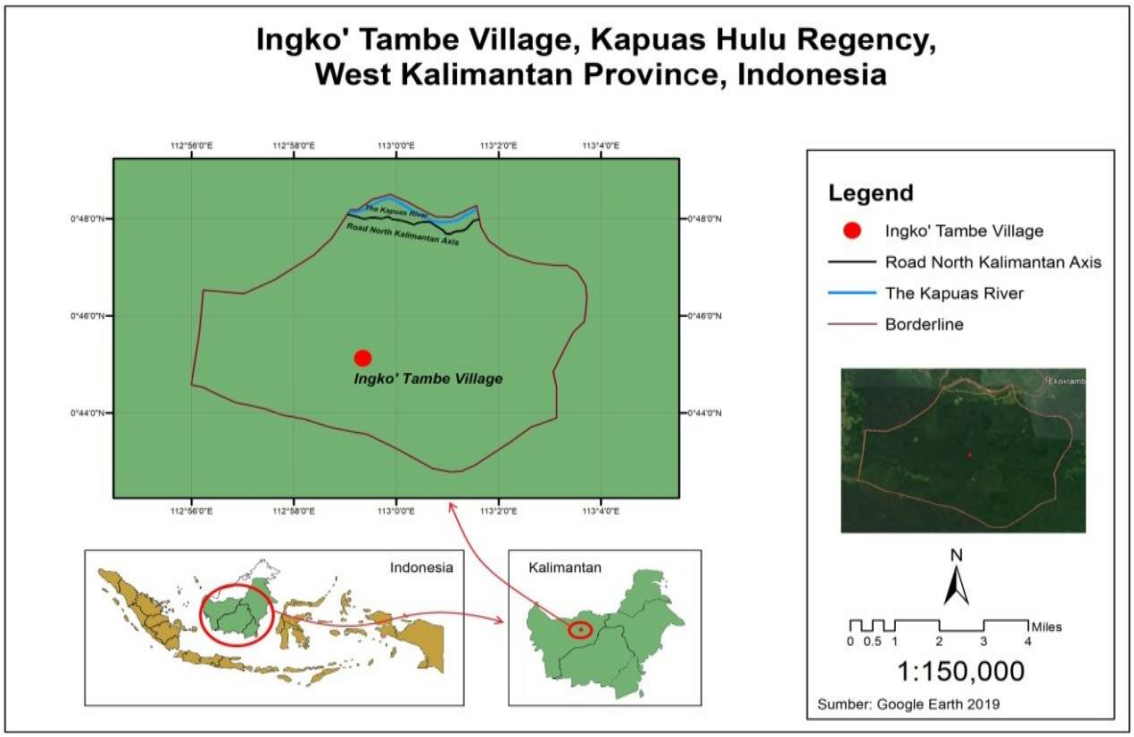

Fig 1: Research location

2.2 Research data collection

Research data on ethnobotany of food plants that are utilized by Dayak Taman tribe community in Ingko'Tambe village obtained through interviews and field observations. The interview aims to obtain complete data about food plants in the local community. The interview was aimed at the traditional leader, village head, temenggung, shaman, and people who have activities in and out of the forest (people who understand about the use of plants). The number of informants interviewed was 12 people. The next stage is field observation. Field observations were carried out to verify data on food plants that had been obtained during interviews with informants. During the field observation, the researchers carried out documentation (photos) of the plants found. Plants found will be photographed from the roots, stems, leaves, flowers and fruit to facilitate identification.

2.3 Research data analysis

Research data obtained from interviews and field observations will be determined by scientific names through consultations with supervisors, flora books, articles related to plants, website about plants (www.theplantlist.org). The next stage is to calculate the percentage of families, the percentage of parts used, and the percentage of habitat types.

3. Results

3.1 Food plants diversity

Plants which were obtained based on the results of interviews and field observations in the community of Dayak Taman in Ingko' Tambe village, South Putussibau District, Kapuas Hulu Regency were 73 species of 36 families that are presented in Table 1.

Table 1 shows that the people of Dayak Taman tribe in Ingko' Tambe village have good interaction with indigenous and protected forest. It can be seen from the activity of the people in utilizing plants as a portion of food were 73 species in 36 families.

3.3 Families' percentage

The results of the calculation show that there were 36 families of plants were utilized as foods by the people of the Dayak Taman tribe which is presented in Table 2.

Table 1: Food plant diversity in Ingko' Tambe village

No	Local name	Scientific name	Family	Plant part	Procedure	Status	Habitat
1.	Abuk	*Ipomoea batatas* L.	Convolvulaceae	Fruit and leafs	Stewed fruit, salad, saute	Cultivation	Field
2.	Antimun	*Cucumis sativus* L.	Cucurbitaceae	Fruit	Sliced and saute	Cultivation	Garden
3.	Antimun balao	*Benincasa hispida* (Thunb) Cogn.	Cucurbitaceae	Fruit	Pounded or sliced, saute	Cultivation	Field
4.	Ase	*Oryza sativa* L.	Poaceae	Seeds	Drying, pounded, cooked	Cultivation	Field
5.	Balubit	*Averrhoa carambola* L.	Oxalidaceae	Fruit	The fruit was eaten immediately	Cultivation	The yard
6.	Balubit wuluh	*Averrhoa bilimbi* L.	Oxalidaceae	Fruit	The fruit was eaten immediately	Cultivation	The yard
7.	Bapang	*Capsicum annuum* L.	Solanaceae	Fruit	Pounded and sliced	Cultivation	Garden
8.	Arosan	*Ananas comosus* (L.) Merr.	Bromeliaceae	Fruit	Peeled the fruit, and the fruit was eaten immediately	Cultivation	Garden
9.	Semangkak balanda	*Annona muricata* L.	Annonaceae	Fruit	Peeled the fruit, and the fruit was eaten immediately	Cultivation	The yard
10.	Kele	*Manihot utilissima*Crantz.	Euphorbiaceae	Fruit	Peeled the fruit, dismembered,boiled/fried/burned	Cultivation	Garden
11.	Paranggi	*Cucurbita muschata* Duch.	Cucurbitaceae	Leafs and fruit	Cleaned up the leafs young, dismembered, saute. Peeled the fruit, dismembered, saute.	Cultivation	Field
12.	Sio	*Nephelium lappaceum* L.	Sapindaceae	Fruit	Peeled the fruit, and the fruit was eaten immediately	Cultivation	The yard
13.	Bumbungkang	*Syzygium polyanthum*.	Myrtaceae	Leafs	The old leafs used to add taste of cooking	The Wild Plant	Forest
14.	Cimadak	*Artocarpus integer* (Thunb.) Merr.	Moraceae	Fruit	Peeled the fruit, dismembered and saute	Cultivation	The yard
15.	Coklat	*Theobroma cacao* L.	Sterculiaceae	Fruit	Split the fruit and the fruit was eaten immediately	Cultivation	Garden
16.	Daruen	*Durio zibethinus* L.	Bombacaceae	Fruit	Split the fruit, and the fruit was eaten immediately	Cultivation	Garden
17.	Arum	*Amaranthus Tricolor* L.	Amaranthaceae	Leafs	Cleaned up the leafs young, saute	Cultivation	Field
18.	Jogo	*Amaranthus spinosis* Linn.	Amaranthaceae	Leafs	Cleaned up the leafs young, saute	Cultivation	Field
19.	Kele	*Manihot esculenta* Crantz.	Euphorbiaceae	Leafs	Dismembered the leafs young, pounded, saute	Cultivation	Field
20.	Nunuk	*Ficus fistulosa* Reinw.	Moraceae	Leafs	Dismembered the leafs young, saute	The wild plant	Forest
21.	Sangkok	*Sauropus androgynus* L.	Euphorbeaceae	Leafs	Saute the leafs young	Cultivation	Garden
22.	Gandis	*Garcinia parvifolia* (Miq).	Guttiferae	Fruit	Cut the fruit, dry, then used to add to the acid on food	The wild plant	Forest
23.	Genjer	*Limnocharis flava* L.	Limnocharitaceae	Stems and leafs	Stems and leafs young dismembered, saute	The wild plant	The edge of the river
24.	Imbawang	*Pangium edule* Reinw.	Achariacae	Fruit	Peeled the fruit, sliced, and then eaten	The wild plant	Forest
25.	Imbung paring	*Bambusa vulgaris* Schrad. Ex J.C.	Poaceae	The young shoots	Peeled the bamboo, sliced	The wild plant	Forest
26.	Jagum	*Zea mays* L.	Poaceae	Fruit	Peeled the fruit and boiled immediately	Cultivation	Field
27.	Jambu ae	*Syzygium aqueum* (Burm. F).	Myrtaceae	Fruit	The fruit was eaten immediately	Cultivation	The yard
28.	Jambu biji	*Psidium guajava* L.	Myrtaceae	Fruit	The fruit was eaten immediately	Cultivation	The yard
29.	Jambu bol	*Syzygium malaccense* L.	Myrtaceae	Fruit	Can be eat directly	Cultivation	The yard
30.	Jambu guru	Anacardium occidentale L.	Anacardiaceae	Fruit	Can be eat directly	The Wild Plant	The yard
31.	Jengkol	*Pithecellobium jiringa* Benth.	Leguminaceae	Fruit	Peel the rind, boiled the fruit, sliced, and fry	Cultivation	The yard
32.	Karam	*Ficus variegate* Blume.	Moraceae	Fruit	Can be eat directly	The Wild Plant	Forest
33.	Kajang panjang	*Vigna unguiculata sesquipedalis* (L.) Verdc.	Fabaceae	Fruit	Sliced, fry	Cultivation	Garden
34.	Kacang tanak	*Arachis hypogaea* L.	Fabaceae	Seed	Boiled, peel the rind	Cultivation	Field
35.	Kalimanting	*Melastoma affine* D. Don.	Melastomataceae	Fruit	Can be eat directly	The wild plant	Forest
36.	Kangkong	*Ipomoea aquatica* Forssk.	Convolvulaceae	Leafs	Sliced the leafs, fry	Cultivation	Garden
37.	Korok	*Colocasia esculenta* L.	Araceae	All the part of plants	Cut, fry	Cultivation	Field
38.	Kucai	*Allium fistulosum* L.	Liliaceae	All the part of lants	Cut, fry	Cultivation	Yard
39.	Kundur	*Artocarpus communis*.	Moraceae	Fruit	Peel, cut, fry	Cultivation	Garden

40.	Kunyit	*Curcuma longa* L.	Zingiberaceae	Leafs	Sliced the leafs, fry	Cultivation	Garden
41.	Kuranjik	*Dialium indum* L.	Fabaceae	Fruit	Split, eat directly	The wild plant	Forest
42.	Labuk	*Lagenaria siceraria*.	Cucurbitaceae	Fruit	Peel, cut, fry	Cultivation	Garden
43.	Lada	*Piper nigrum* L.	Piperaceae	Fruit	Dried, chopped	Cultivation	Garden
44.	Laiya	*Zingiber officinale* Roscoe.	Zingiberaceae	Rhizome	Chopped, fry	Cultivation	Garden
45.	Langkuas ton	*Alpina galanga* L.	Zingiberaceae	Rhizome	Chopped and become ingredient	The wild plant	Forest
46.	Lanjang	*Stenochlaena palustris* (Burm.).	Blechnaceae	Leafs	Fry	The wild plant	Forest
47.	Lenca	*Solanum nigrum* L.	Solanaceae	Fruit	Cut, fry	Cultivation	Garden
48.	Lenset	*Lansium domesticum* Correa.	Meliaceae	Fruit	Peel, eat directly	Cultivation	Garden
49.	Mangkak	*Artocarpus integra* Merr.	Moraceae	Fruit	Peel, cut, fry	Cultivation	Garden
50.	Papaan	*Durio kutejensis*.	Malvaceae	Fruit	Peel, eat directly	The wild plant	Forest
51.	Papari	*Momordica charantia* L.	Cucurbitaceae	Fruit	Cut, fry	Cultivation	Field
52.	Patikala	*Etlingera elatior* (Jack).	Zingiberaceae	Young stem	Peel, cut, chop, fry	The wild plant	Forest
53.	Pau	*Diplazium esculentum*.	Athyriaceae	Leafs	Cut, fry	The wild plant	Bank
54.	Pinang	*Areca catechu* L.	Arecaceae	Fruit	Peel, eat directly	Cultivation	Yard
55.	Kakabu	*Ceiba pentandra* L.	Malvaceae	Seed	Split, seed can be eat directly	Cultivation	Garden
56.	Pusut	*Luffa acutangula* L.	Cucurbitaceae	Fruit	Cut, fry	Cultivation	Field
57.	Rambean	*Baccaurea motleyana*.	Phyllanthaceae	Fruit	Peel, eat directly	Cultivation	Yard
58.	Sampalam	*Mangifera indica* L.	Anacardiaceae	Fruit	Peel, eat directly	Cultivation	Field
59.	Sasawi	*Elephantopus scaber* L.	Asteraceae	Leafs	Sliced the leafs, fry	Cultivation	Filed
60.	Sialam ton	*Garcinia mangostana* L.	Clusiaceae	Fruit	Peel, eat directly	The wild plant	Forest
61.	Sukun	*Artocarpus altilis*.	Moraceae	Fruit	Peel, cut, fry	Cultivation	Garden
62.	Tabu	*Saccharum officinarum* L.	Poaceae	Rod	Peel the bark, squeeze to take the water	Cultivation	Field
63.	Tarap	*Artocarpus sarawakensis*.	Moraceae	Fruit	Peel the bark, cut, fry	Cultivation	Yard
64.	Tarung asam	*Solanum ferox* L.	Solamaceae	Fruit	Peel the bark, cut, fry	Cultivation	Field
65.	Tarung babulu	*Solanum ferox* Linn.	Solamaceae	Fruit	Peel the bark, cut, fry	Cultivation	Field
66.	Tarung perek	*Solanum torvum* Swartz.	Solamaceae	Fruit	Boiled, fried	Cultivation	Field
67.	Tarung sina	*Solanum melongena* L.	Solamaceae	Fruit	Peel, cut, fry	Cultivation	Field
68.	Top-top	*Passiflora foetida* L.	Passifloraceae	Fruit	Can be eat directly	The wild plant	Forest
69.	Tuak	*Arenga pinnata* Merr.	Arecaceae	Tuber	Bark can sliced the fry	The wild plant	Forest
70.	Unjer	*Cocos nucifera* L.	Arecaceae	Tuber, fruit	Bark can sliced the fry, peel, can be eat directly	The wild plant	Yard
71.	Unti	*Musa paradisiaca*.	Musaceae	Fruit	Peel, eat directly	The wild plant	Garden
72.	Unti ban	*Musa acuminata* Red Dacca.	Musaceae	Fruit	Peel, eat directly	The wild plant	Forest
73.	Unti pulang	*Carica papaya* L.	Caricaceae	Leaf, flower, and fruit	Leaf and flower can be sliced, fry. Peel, cut, eat directly)	Cultivation	Yard

Table 2: Percentage of the plant of food families

No	Family	Number of plant species	Percentage
1.	*Bromeliaceae*	1	1.36%
2.	*Annonaceae*	1	1.36%
3.	*Sapindaceae*	1	1.36%
4.	*Sterculiaceae*	1	1.36%
5.	*Bombacaceae*	1	1.36%
6.	*Guttiferae*	1	1.36%
7.	*Limnocharitaceae*	1	1.36%
8.	*Achariacae*	1	1.36%
9.	*Leguminaceae*	1	1.36%
10.	*Melastomataceae*	1	1.36%
11.	*Araceae*	1	1.36%
12.	*Liliaceae*	1	1.36%
13.	*Piperaceae*	1	1.36%
14.	*Blechnaceae*	1	1.36%
15.	*Meliaceae*	1	1.36%
16.	*Athyriaceae*	1	1.36%
17.	*Phyllanthaceae*	1	1.36%
18.	*Asteraceae*	1	1.36%
19.	*Clusiaceae*	1	1.36%
20.	*Passifloraceae*	1	1.36%
21.	*Caricaceae*	1	1.36%
22.	*Malvaceae*	2	2.73%
23.	*Musaceae*	2	2.73%
24.	*Convolvulaceae*	2	2.73%
25.	*Oxalidaceae*	2	2.73%
26.	*Amaranthaceae*	2	2.73%
27.	*Anacardiaceae*	2	2.73%
28.	*Euphorbiaceae*	3	4.10%
29.	*Fabaceae*	3	4.10%
30.	*Arecaceae*	3	4.10%
31.	*Poaceae*	4	5.47%
32.	*Myrtaceae*	4	5.47%
33.	*Zingiberaceae*	4	5.47%
34.	*Solamaceae*	6	8.21%
35.	*Cucurbitaceae*	6	8.21%
36.	*Moraceae*	7	9.58%

Table 2 shows that the family of Moraceae was the most widely discovered family of the plants with a percentage of 9.58%. Family Moraceae includes c1imadak (*Artocarpus integer* Thunb. Merr.), nunuk (*Ficus blechnum* Reinw), karam (*Ficus variegate* Blume), kundur (*Artocarpus communis*), mangkak (*Artocarpus integra* Merr.), breadfruit (*Artocarpus altilis*), tarap (*Artocarpus sarawakensis*).

3.3 Percentage of the utilized parts

Parts of the plant that were utilized as food by the community of Dayak Taman Tribe namely flower, bud, rhizome, tuber, stem, seed, leaf, fruit and all parts of the plant which are presented in Table 3.

Table 3: Parts of the plant which Aae utilized by Dayak Taman tribe communicity

No	Part of plants	Number of plant species	Percentage
1.	Flower	1	1.36%
2.	Bud	1	1.36%
3.	Rhizome	2	2.73%
4.	Tuber	2	2.73%
5.	All the part of plants	2	2.73%
6.	Stem	3	4.10%
7.	Seed	3	4.10%
8.	Leaf	15	20.54%
9.	Fruit	48	65.75%

Table 3 shows the parst of the plant which are widely utilized by the community of Dayak Taman tribe (65.75%). The plant' part that was utilized in the second highest percentage was leaf (20.54%), and the third highest was seed and trunk (4.10%).

3.4 Percentage of Habitat Types

Plants which were utilized by the Dayak Taman people were taken from different habitat, such as river, field, forest, yard, and garden which are presented in Table 4.

Table 4: Plant Habitat Which Was Utilized by Dayak Taman tribe community

No	Habitat	Number of plant species	Percentage
1.	Riverbank	2	1.64%
2.	Fields	20	16.52%
3.	Forest	24	19.83%
4.	Yard	32	26.44%
5.	Garden	43	35.53%

Table 4 shows that the plants which were utilized by Dayak Taman tribe community were found in the garden (35.53%), yard (26.44%), forest (19.83%), fields (16.52%) and riverbank (1.64%).

4. Discussion

The Dayak Taman tribe community has long lived side by side with the natural resources (forests) that are around it. The forest is a natural resource that provides many benefits for the Dayak Taman tribe community. Forests also play a very important role for the Dayak Taman tribe community, in this case the forest provides plants that can be used as food in sustaining daily life. The results showed that the Taman Dayak tribe people used forest products as food for 73 species. This shows that the Dayak Taman tribe has a good pattern of interaction with customary forests and protected forests in the area

The plants that are widely used by the Taman Dayak tribe are the Moraceae family (9.58%). Moraceae family is widely used because it is easy to find, easy to process and easy to cultivate. Moraceae family is a family that is very useful for the Dayak Taman tribe because it is used as a source of life. The *Moraceae* family includes cimadak (*Artocarpus integer* Thunb. Merr.), Nunuk (*Ficus fistulosa* Reinw), Karam (*Ficus variegate* Blume), Kundur (*Artocarpus communis*), Mangkak (*Artocarpus integra* Merr.), Sukun (*Artocarpus altilis*), Tarap (*Artocarpus sarawakensis*). Plants of the *Moraceae* family, in addition to being a food plant are also used as building materials, clothing, and as a natural coloring agent in the Dayak Taman tribe community. This is in line with the results of research Nurcahyani *et al.* (2019) [10] which states that the family *Moraceae* can be used as a basic material for making clothes, natural dyes and building materials

Parts of plants that are widely used by the Dayak Taman tribe are fruits (65.75%). Fruit is widely used by the community because it is available in large quantities in each season, and in each fruit has a different content to meet balanced nutrition, besides the processing is very easy. Fruit is also a reference for the community to balance nutritional intake, known as " Healthy four five perfect" (Karyadi, 1997) [7]. Tarwotjo (1998) [18] states fruits are a source of vitamins (especially vitamin C and carotene or provitamin A) and minerals (such as calcium, phosphorus, and other minerals) in small amounts. Fiber is found in many fruits on the skin. Nurcahyani *et al.* (2019) [10] states that the use of fruit in the Dayak Taman tribe because it has followed a pattern that has been done by parents or previous ancestors so that it becomes a habit that is carried out until now.

Food plants that are utilized by the Dayak park community are found in the garden habitat (35.53%). The garden is the habitat most commonly found by food plants because some people use the land to grow food plants to make it easier to extract and save the cost of household expenses. Nurcahyani *et al.* (2019) [10] stated that gardens are the habitat most found by food plants because all the people have land for gardening so they prefer to plant plants in the garden. The community uses the garden optimally for cultivation activities. The reason the community uses the garden as a suitable place of cultivation is because it can support family income, low operational costs, does not require expensive capital and technology, can be done by family members at leisure time, supports health and nutrition fulfillment of the family (Hakim, 2015) [6].

5. Conclusion

The results of the research through interviews and field observations conducted in the Dayak Taman tribe community in Ingko' Tambe village were obtained 73 species of 36 families had utilized by the Dayak Taman people in Ingko' Tambe village as food. The largest number of families was *Moraceae* (9.58%). The widely utilized plant parts were fruit (65.75%). Plants that were utilized by people of Dayak Taman tribe were found in the plantation habitat (35.53%). The results showed that the Dayak Taman tribe community has close proximity to indigenous and protected forests so that the people know and utilize plants as food to sufficient their daily needs.

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