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The Plant Wisdom of Dayak Ot Danum, Central Kalimantan

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ABSTRACT

This research aims to describe plants diversity having local wisdom value for Ot-Danum Dayak people, Tumbang Payang village and Tumbang Kania village, Central Kalimantan. The result reveals that since a long time ago, Ot-Danum Dayak people truly depend on natural resources to meet various daily needs. The vast majority of subsistence and society's income are form forest plants product. Plant diversity can provide food product for society, can produce various plants to be consumed and also produce alternative income sources, such as exploited for food, medicine, fermentation, tonic, cosmetic, building material and etc. However, the existing plant diversity is endangered since deforestation and forest degradation, and even there are many lesser-known species. Therefore, it needs to quickly find the information about the species to conservation effort, given the existing forest resource has a big potential to be developed and cultured to the species through domestication and providing a genetic resource for hybridization and selection.

Keywords: *Domestication, subsistence, perception, genetic, culture, conservation*

INTRODUCTION

Indonesia has a wide variety of ethnic groups living throughout the archipelago from Sabang to Merauke. The tribes in used to be dependent on the natural resources to meet the needs of everyday life. Each tribe has different knowledge in the use of plants. The diversity of plants and the related knowledge are ones of Indonesia's cultural richness to keep [1].

Central Kalimantan also has a vast natural biodiversity supported by the potential traditional knowledge, characterized by every Dayak ethnic group in Kalimantan. Biodiversity is always closely linked to the culture of the local community [1]. One of them is through the utilization of various types of plants used in meeting the daily needs, especially the people who are around the forest area. The diversity of plant species is the basis of sustainable development because it incorporates complex experience, skills, and insights by local communities about the surrounding environment [2].

Dayak Ot Danum tribe living in the upstream of Katingan still have beliefs, customs, culture, and empirical data related to natural phenomena and the historical process of environmental change. The environmental changes in Tumbang Payang and Tumbang Kania villages, due to deforestation and excessive forest degradation, have brought great impact on the surrounding Dayak communities. For example, several types of plants are beginning to extinct due to logging and some have become extinct due to the utilization of biological resources and the use of land by human intervention. Development policies that are less concerned about environmental sustainability also play a role in the species extinction process. These finally lead to the extinction of the traditional and indigenous inheritance [3]. Therefore, efforts to document traditional knowledge along with cultural-based plant conservation efforts for knowledge, conservation, and community welfare must be done.

To support the policy pattern, based on information from the community, there should be a sustainable management of indigenous woody species, medicinal plants, crops, and other plant species. In line with the paradigm, this study is expected to generate a synergy of public perceptions on local plant species and current conditions. This will become the basis for the placement of plant species in accordance with the conditions and

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place of growth, especially in the utilization and use of indigenous plants biodiversity in forest ecosystems. The study is important as it deals with some data on the local culture of Dayak Ot Danum tribe.

MATERIALS AND METHODS

Study sites

The research was conducted in Tumbang Payang village and Tumbang Kania village, Bukit Santuai District of Kotawaringin Timur, Central Kalimantan (Figure 1). Tumbang Payang is the village closest to the center of PT. Sarpatim, Bai Base Camp (BBC), about 12 km. This village is located on the Kuayan River, the settlement is lined north-south. It is located on the left side of the upstream direction, or according to the term used by the local people, it is the *kiri mudik* of Kuayan River with an area of 105 km^2. Administratively, Tumbang Payang is part of Mentaya Hulu District, Kotawaringin Timur Regency, Central Kalimantan Province. Tumbang Payang consists of 1 (one) *kampung* (hamlet)and 4 (four) *Rukun Tetangga* (neighborhoods). It is geographically located on 01°47'09.0" – 01°47'17.6" south latitude and 112°17'31.9" – 112°18'03.6" east longitude.

Tumbang Kania is located on the upstream of the Kuayan River; the distance from the center of PT. Sarpatim, Bai Base Camp (BBC) is about 11 km. Unlike other villages that are located on the *kiri mudik*, Tumbang Kania Village is located on the right lane of Kuayan River. Administratively, the village of Tumbang Kania is the definitive village that belongs to the administrative area of Tanggang Santuai District, Kotawaringin Timur Regency, Central Kalimantan Province. The administrative area of Tumbang Kania Village covers an area of 164 km^2. Based on geographical location, it lies in position 01°47'16.4" – 01°47'21.0" south latitude and 112°16'00.2" – 112°16'.8" east longitude.

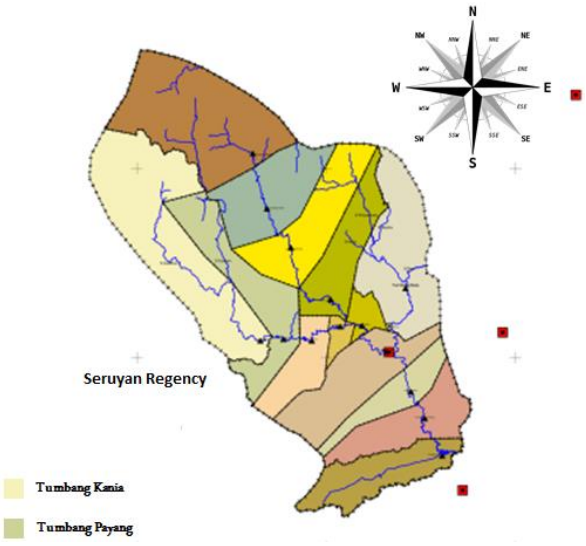

Figure 1. The Study Sites – Tumbang Payang and Tumbang Kania Village

Data collection technique

A preliminary study was conducted before the main study to find out the profile of Dayak Ot Danum community in Katingan Hulu, i.e. Tumbang Payang village and Tumbang Kania village. Data were collected through focused discussions and interviews with key informants. There are 106 family heads in Tumbang Payang and 40 family heads in Tumbang Kania; as many as 40 people were chosen randomly as respondents in this study. To fill out the questionnaires, respondents were assisted by research assistants who guided the process of answering questionnaires and ensuring that all questions were answered by the respondent. The questionnaire showed a set of questions systematically arranged. Filling questionnaires were conducted, among others, at home, public places, and fields. In any data collection activity that involved the community, the researchers began by introducing themselves and telling the intent and purpose of the study. Small talks were made to build good communication between researchers and respondents.

The research used a descriptive method with a qualitative approach. Data collection was obtained from semi-structured in-depth interviews with small groups or with individuals, then field data were made by observation plot (PCP) with 20 × 100 m size of 5 (five) replications and a snowball sampling system (excluding PCP). The result was made based on the number of species criterion and its use to explain the existing phenomenon in the field [4].

RESULTS AND DISCUSSION

Characteristics of respondents

Data collection through purposive sampling was conducted to complement each respondent's data. The information obtained provided the necessary data input. Through the distribution of questionnaires, characteristics of the respondents according to the categories are described in Table 1.

Table 1 describes the data of each respondent in 2 (two) villages, i.e. the data of the questionnaire which shows the most dominant frequency. It shows that people in their productive age are still dependent on the

Table 1. Characteristics of Respondents in Tumbang Payang and Tumbang Kania

Description	*Category*
Sex	Male 75% and female 25%
Age	Most are in the range of 40-50 years, Tumbang Kania 35%; Tumbang Payang 45%.
Education background	Elementary school (35%); Undergraduate ((S1) 5%).
Main job	75% farmers; 5% traders
Side job	The majority or 75% chose entrepreneurs such as cutting timber from forests, hunting, selling crops, ranching, and the fewest jobs as laborers and 5% fishermen
Origin of family head	85% Dayak tribe; 15% migrants from Java (Javanese)
Tribe	95% Dayak Ot Danum; 5% Javanese
Income	45% earn IDR 500,000 – 1,000,000 and 10% earn more than IDR 4,000,000.
Marital status and number of family members	90% married; 10% married and widower; 35% respondents bear the family burden and 15% bear a family
Ownership of land and buildings	95% own private land; 5% cultivate customary land
Extent of land for business around the forest	The village land is around 10 - 100 ha.
Types of plants	Dominant such as *palawija* (coarse grains, pulses, roots and tuber (CGPRT) crops), rubber, rattan, fruits.

Source: Research data, 2016

surrounding nature, such as forests. The main work is farming (in paddy fields, fields, and gardens).

They usually plant food crops in their paddy fields, while annual plant species planted in the garden. Types of food crops cultivated by the community include rice, corn, yams, beans, and vegetables. Annual types of crops such as coffee, rubber, rattan, and bananas can be found in their gardens. These plants are grown for commercial use. Most communities have rattan gardens harvested each year to earn money used as a means of exchange for purchasing goods not available in the community, as well as for paying tuition fee and health expenses. The side jobs to meet the necessities of life are hunting, gardening, livestock raising, and also cutting timber from the forest. Their average monthly net income is in the range of IDR 500,000 – 1,000,000. In order to take advantage of leisure time, the people in the two villages also raise cattle. The livestock products are used to meet the needs of the family, party preparation, and for sale. The most widely raised species of livestock are pigs, as pigs are always used in the ritual or party, such as during rice planting, rice harvesting, wedding ceremonies, as well as funeral. Another animal mostly raised is chicken. Chickens are served for guests and in other ceremonies to honor the ancestral spirits. The other types of animals currently raised by the community include cattle, ducks, and goats [5].

The most dominant land use patterns are for rubber plantations and the rest are for rattan, fruits, and mixed crops. In recent years, the way the people treat paddy fields has begun to change. In the past, the harvested fields were abandoned until they were ready for the next rice cultivation. Nowadays, these harvested fields are planted with rubber seeds given by the company or individually bought [5, 6].

The Dayak Ot Danum community

Tumbang Payang comes from the word *tumbang* which means estuary and *payang* which means trees that grow in the river. The word *kania* in Tumbang Kania refers to the first person who occupied the village located at the estuary of Kania or Muara Kania.

Both villages adhere to the *Kaharingan* belief system and have existed since long. Some embrace the beliefs of Islam and Christianity. The kinship system is the patrilineal system, based on the descendants of the father.

Tumbang Payang and Kania villagers are forbidden to marry relatives of very close relationships, such as marrying a nephew or members of the same bloodline. In terms of the inheritance law, the wealth of the parents is divided equally between girls and boys, especially the fields.

In Tumbang Payang, a leader is chosen based on the age, the eldest among them, or passed down from generation to generation from their parents. The main consideration in customary leadership is the knowledge about the village and the ownership of community land and forest [5]. Tumbang Kania has two systems leadership, customary and village. Of the two traditional leaders, each has different authorities, although sometimes the two works together to solve the problem or carry out activities in Tumbang Kania. Communities of both villages are always cooperating as happened in the area of West Lombok, West Nusa Tenggara [7], one of which is cooperation in the utilization of forest products called by *royong* [8].

Customs and cultural sites of Dayak Ot Danum

Traditional ceremonies still done in utilizing forest resources and farming activities are chickens cutting during royong followed by putting chicken blood on the rock and then placed on the borders of the fields. The ceremony is intended to make the paddy fields fertile and produce a lot of rice, as well as to get protection from the ancestors. The people of Tumbang Payang still maintain sacred places as cultural sites to keep the salvation of life. The examples are big trees believed as the place for the spirits to live—this is the place to ask for fortune and success [5] and the *basampuh* stone, a stone shaped like a waterfall with slippery rock, believed as the abode of ancestral spirits [5, 9]. Communities have relics of art and traditional heritage such as traditional ceremonies related to the human life cycle. Funeral and its ceremony are highly respected; customary rituals are performed to honor the spirit of the dead. The ceremony is called as *tiwah*. People also know *sandhung*, *sipundhu*, and *patar* to honor the spirits of the deceased family. The villagers of Tumbang Kania also has a customary ritual called the *manyanggar*, to pray for successful farming activities throughout the year using traditional tools such as *gong*, drums, and *tengkanung*. The traditional dance *nganjan* for the marriage ceremony and tiwah, with 7 (seven) people as the dancers. In addition, the two villages are also familiar with the birth ceremony called *habalas bidan*. Traditional ceremonies are also known in some areas such as Dayak Ngaju, Dayak Kahayan, Dayak Maanyan, Timpah village, Central Kalimantan [17].

Forest resources

Forest area managed by Tumbang Payang is 9,299 ha and 13,535 ha [5]. The community has been utilizing the areas to meet their subsistence needs as well as commercial ones. The forest has fulfilled the needs of the community, both for art, religious, and entertainment purposes, such as wood for construction of houses, fruits, vegetables, and meat for food needs, as well as other natural products. The community is heavily dependent on the surrounding environment. Forest products utilized by Tumbang Payang villagers are ulin wood, rattan, rubber, and durian. The people of Tumbang Kania use *ulin* wood, *ulin* shingle, rattan, and honey. *Ulin* wood is utilized by the community for house building materials and some is made for shingles (roofs of houses); yet, the utilization of *ulin* wood has decreased with the decline of the plant species as the impact of illegal logging activities in the past. Rattan is made into semi-finished or finished goods—it is important to do in order to realize a sustainable and independent forest village development program. Rubber and honey have been used since long and the activity is adaptive to the local ecological and cultural systems. The patterns of forest product utilization such as rattan and rubber also occur in some areas such as in Malinau, East Kalimantan [8]. The pattern of rubber plantation, i.e. planting rubber crops after intensive cultivation, is a good solution for sustainable use of forest resources [8, 10].

Distribution and utilization of plants by Dayak Ot Danum

Distribution of plants that were utilized by Dayak Ot Danum Katingan Hulu in Tumbang Payang and Tumbang Kania, is presented in Table 2. It explains that the distribution based on type is better found in Tumbang Kania, meaning that the plants are more evenly distributed in Tumbang Kania than Tumbang Payang. The number of species per individual is higher with different types of hardy plants, shrubs with varying levels of growth at seedling, stake, pole, and tree level, in large and small diameter. The diversity of plant species is utilized primarily to meet the daily needs of families, such as fruits. Other plants such as food plants, drugs, and other commodities are also kept. In terms of vegetation structure, plants in Tumbang Kania form layers such in tropical forests. In the upper layers, tall

Tabel 2. Recapitulation of plant distribution in 2 (two) villages

Village name	*Inside the observation site (ha)*		*Outside the observation site (type)*	*The number of utilized types*
	The number of individuals	*The number of types*		
Tumbang Payang	553	58	35	59
Tumbang Kania	655	139	64	123

Source: Research data, 2016

Table 3. Recapitulation data of plant utilization in 2 (two) villages

Utilization	*Number of species*	
	Tumbang Payang	*Tumbang Kania*
a. Foodstuff	17	39
b. Medicine	29	35
c. Fermentation	-	5
d. Tonic	1	4
e. Cosmetics	2	1
f. Building materials	8	43
g. Others	3	3

Source: Research data, 2016

plants form a canopy, followed by a canopy of medium-sized of plants. At the bottom, there is a layer of bush plants. Tumbang Payang, although still dependent on the forest and the surrounding plant species, has an uneven distribution of each species in terms of structure and vegetation, surrounded by rivers and open land due to logging activities and the effects of fire. The fundamental equations of the two are that both have commodities to maintain, harness, and harvest over time such as durian (*Durio zibethinus*) and mangosteen (*Garcinia mangostana*). Same plant species are found in the garden and home yards such as *sarai* (*Cymbopogon nardus* (L.) Rendle) and *henda* (*Curcuma longa*). The types of plants that have reached climax are also the same like rubber (*Hevea brasiliensis*), *kuini* (*Mangifera odorata*), as well as for the types of old woody plants, such as *ulin (Eusidoxylon zwagerii*), *tengkawang* (*Shorea pinanga*), *sungkai* (*Peronema canescens*) and others.

The utilization of plants by Dayak Ot Danum community in these two villages can improve their standard of living. They have traditional medicinal culture including the use of medicinal plants since long time ago and have been preserved for generations; they also plant kinds of plants in plantation and home garden.

Utilization of medicinal plants in each region has different ways [11]. The differences can be seen from the traditional ethnic group of Dayak Ot Danum which also has a clearly defined culture, so it is suspected that the perception and conception of the community towards the plant resources in the environment is different from other places, including the use of plants as traditional medicine. Meanwhile, research conducted in the Derashe and Kucha in Ethiopia shows that 92% of medicinal plants there are obtained from natural vegetation, but local people are less likely to grow medicinal plants in yards and home gardens [6, 12, 13].

Recapitulation data of plant utilization by Dayak Ot Danum tribe in Tumbang Payang and Tumbang Kania is presented in Table 3. It shows that the number of plant species in Tumbang Kania is higher than that of Payang, although the two villages have similarity in their utilization. The existing biological natural resources have the potential to be developed as foodstuffs, medicines, fermentation materials, tonic materials, cosmetic materials, building materials, and other materials.

a. Foodstuff

Recorded no less than 56 species of plants are taken from the forest by the community of Ot Danum in two villages used as food (vegetables). The highest potential is in Tumbang Kania, as compared to Tumbang Payang. The big potential in Tumbang Kania is because its structure and vegetation are denser than Tumbang Payang, which is surrounded by many rivers and burnt forest areas. Of the 56 types of plants, 27 species are used as the fruit, while the rest is used for the stems, leaves, seeds, roots, and tubers (Table 4 and 5 appendices).

These plants are used as a source of carbohydrates, proteins, vitamins, fiber, fat, and other compounds. The plant families in Tumbang Payang are Anacardiaceae (3 species), Moraceae (3 species), Euphorbiaceae (2 species), Myrtaceae (2 species), and Sapindaceae (2 species); The plant families found in Tumbang Kania are Aracaceae (4 species), Euphorbiaceae (4 species), Anacardiaceae (3 species), Cannabaceae (3 species), Zingiberaceae (3 species), Annonaceae (2 species), Meliaceae (2 species), Moraceae (2 species), and Myrtaceae (2 types).

The same potential to be developed in two villages is the one like from seeds by sowing directly on plantations or home gardens, or in the nursery mixed with soil and manure such as tamarind (*Mangifera macrocarpa*), *cempedak* (*Artocarpus integer*), *durian* (*D. zibethinus*), *kasturi* (*Mangifera asturi*), *marianandau* (*Lepisanthes amoena* (Hassk.), *rambai* (*Baccaurea mottleyana*), *rambutan* (*Nephellium lappaceum*), *sungkai* (*Peronema canescens*), tangkuhis (*Dimocarpus longan* ssp. Malesianus), *cempedak* (*A. integer*), can be directly eaten for vegetables such as *tengkurong* (*Cleistanthus erycibifolius* Airy Shaw), *kastela* (*Carica papaya*), cucumber (*Xanthophyllum obscurum* A.W. Bennett.), *hambie* or *rumbia* (*Metroxylon sagu*), *singkah potok* (*Calamus trachycoleus*), *singkah undus* or palm (*Elais guinensiss* Jacq), derived from cuttings such as *rambutan* (*N. lappaceum*), *sungkai* (*P. canescens*). Such foodstuffs are also utilized in Nepal as vegetables cooked with a mixture of other ingredients to be consumed to meet daily needs [14].

b. *Medicine*

In everyday life, Dayak Ot Danum community in two villages still practice traditional medicine. The largest potential is in the village of Tumbang Kania as many as 35 types of medicinal plants, which are used to cure various diseases. Traditional medical skills must be controlled by people who have expertise in medicines. The community utilizes medicinal plants as an alternative and the first step in treating an illness due to lack of health facilities.

As many as 64 species have been recorded from both villages to cure various diseases (Table 4 and 5 appendices). *Dadaup* root (*Meliosma nitida* Blume), *ulin* root (*E. zwagerii*), *jering* (*Archidendron pauciflorum*), *panahan* (*Barringtonia scortechini* King) are used to treat postpartum. The roots are boiled and the boiled water must be taken every morning, day, and night until the illness is healed. Likewise, with other diseases such as liver disease, plants used are *akar kuning* (*Santiria griffithi* (Hook. F.) Engl.), *isin iru (Oncosperma harrida*), *maraly* (*Adenanthera pavonina* L.). The parts of the plants used are roots, stems, barks, leaves, and fruit; they are boiled and the boiled water must be taken every morning, day, and night until the illness is healed. The method of utilization and use of medicinal plant species is similar to the one done in Timpah, Central Kalimantan [15].

In line with the development of modern medicine, traditional medicine needs to be developed, considering the pattern of the community life. The effort to preserve and develop traditional medicine in Indonesia is inseparable from the fact that the archipelago is rich in traditional medicinal materials and as anticipation in facing globalization era. Now traditional medicines have been produced under better standard and quality in the form of tablets, capsules or liquid, employing technology like the one done in China [16].

c. *Fermentation*

Plants used in fermentation in Tumbang Kania as a fermentation come from 5 (five) families such as *alang-alang* (*Imperata cylindrica* (L.) Beauv.), *sahang* (*Piper albi* Linn), *tewu* (*Saccharum officinarum* L.), *uhat enyuh* (*Cocos nucifera*, Linn), and *uhat pinang* (*Areca cacteche* L.). They are often used as a fermentation material, food, and cooking spices. These ingredients are usually made with a mixture of other ingredients such as sticky rice to make traditional drinking water called as baram [17]. Meanwhile, rare plant species often used in a fermentation process can also be found in India and Pakistan [15, 18].

d. *Tonic*

There is only 1 (one) type of plant used as tonic in Tumbang Payang, namely *saluang belum* (*Luvunga eleutheandra*); and there are 4 (four) plants used in Tumbang, namely ginseng (*Panax notoginseng*), *lampesu* (*Baccaurea lanceolata*), *pasak bumi* (*Eurycoma longifolia*), and *saluang belum* (*L. eleutheandra*). These are used for health and to increase energy. They can be taken as they are or mixed with other plants. The form of the mixture consists of the root of *saluang belum* (*L. eleutheandra*) and *lampesu* (*B. lanceolata*)— they are boiled until and the water is taken three times a day. We can also take only the water of boiled *pasak bumi* (*E. longifolia*), either the root or the stem [3, 15].

e. *Cosmetics*

The people in Tumbang Payang uses *gaharu* (*Aqui laria malaccensis*), *tengkawang* (*S. pinanga*) and *lampinak* or *bajakah* (*Dalbergia* sp.)—these plants are potential. The species can produce mastic, which is highly favored by the people of Middle East, Taiwan, Korea, and Japan, as incense for religious rites, room deodorizer, and as hio. *Gaharu* oil is very expensive and well-known raw material for cosmetics industry such as perfumes, soaps, lotions, facial cleansers, and medicines for hepatitis, liver, anti-allergic drugs, cough, stomach pain, rheumatism, malaria, tuberculosis, cancer, asthma, tonic, and aromatherapy [8]. *Gaharu* is used to make soap, deodorant, beauty materials, and ingredients to make offerings of traditional ritual ceremonies of Dayak Ot Danum [3, 14, 18].

f. Building materials

People in Tumbang Payang use 8 species and people in Tumbang Kania use 43 species. In general, communities to the two villages are very dependent on the surrounding natural resources. The community has used the forest to fulfill the necessities of life, both for subsistence and commercial activities. For community needs such as wood to repair and build houses, such as making beams, rafters, battens, poles, and other benefits as firewood. The types of woody plants used are *banitan* (*Polyalthia hypoleuca*), *bunyau* (*Santiria* sp.), *damar pipit* (*Pentace triptera*), *katiau* (*Madhuca* sp.), *mahang* (*Macaranga triloba*), *mahawai* (*Cyathocalyx biovulatus*), *medang* (*Dehaasia* sp.), *menjalin* (*Xanthophyllum* sp.), *meranti* (*Shorea leprosula*), *tehang* (*Xerospermum* sp.), *terap* (Artocarpus sp.), *ubar* (*Syzygium* sp.), and *ulin* (*E. zwagerii*). Compared to some similar plantation forest in Kalimantan, the woody plants of the two villages have moderate to the severe complexity and endemic species [20]. Several types of woody plants are endemic to the Kalimantan Island, this type is most widely used as home building materials, and can also be made for paper pulp, veneer, plywood, and materials for roof or shingle made of *ulin* [19].

CONCLUSION

This study provides empirical evidence of indigenous varieties of plant species in 2 (two) villages. The results show that the local varieties of plant species are not only a source of food and nutrition for local communities but can also be a means of increasing income if managed sustainably.

The study also highlights the potential species that can be used in the genetic improvement of plant species. Some plant species can benefit local people not only as food but also as a medicine. Multi-value resources will be threatened by several anthropogenic causes of nature such as land clearing, habitat destruction, burning, logging, and invasive species.

Forest resources must be managed for the welfare of the people as well as to conserve species diversity—and the latter is of paramount importance as it can contribute to preserving cultural and genetic diversity. Indigenous plant diversity should be developed in an effort to conserve community forests with a realistic approach to the two villages, as most of the forests are managed only by certain groups. The study also reveals interesting findings of the types of local plants that can be considered in developing certain types.

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Appendix 1.

Table 4. List of plants used in Tumbang Payang

Local Name	*Botanical Name*	*Family*	*Parts Used*	*Functions*
Root kuning	*Arcangelisia Flava Merr.*	Menispermaceae	Root and stem	Cure jaundice / hepatitis, liver disease
Aren	*Arenga pinnata*	Bombaceae	Root	Relieve back pain
asam	*Mangifera macrocarpa*	Anacardiaceae	Fruit	Foodstuffs
Banitan	*Gomphandra* sp.	Icacinaceae	Stem	For bows, boats, billiard equipment, fishing rods
Bawang dayak	*Eleutherine americana*	Iridaceae	Tuber	Cure cholesterol and hypertension, and as anti-cancer
Cempedak	*Artocarpus integer*	Moraceae	Fruit, seed, bark	Foodstuffs
Leaf sepang	*Caesalpinia sappan L.*	Fabaceae	Leaf	Boiled, the sweet taste for seasonings
Durian	*Durio zibethinus*	Bombacaceae	Fruit	Foodstuffs
Gaharu	*Aquilaria malaccensis*	Thymelaeaceae	Bark, stem	Cosmetics, cast out spirits
Jambu	*Syzygium* sp.	Myrtaceae	Fruit	Foodstuffs
Jangkang	*Xylopia* sp.	Annonaceae	Stem	Building material
Jerangau bahanandg	*Acorus calamus*	Araceae	Rhizomes	Snakebite treatment
Jering	*Archidendron pauciflorum*	Fabaceae	Root	Postpartum treatment
Joring	*Archidendron jiringa*	Fabaceae	Seed	Kidney pain medication
Kalapapa	*Vitex pinnata*	Verbenaceae	Leaf, stem, root	Internal medicine
Karet	*Hevea brasiliensis*	Euphorbiaceae	Sap	Making plastic material, tire etc.
Kasturi	*Mangifera casturi*	Anacardiaceae	Fruit	Foodstuffs
Kayu manis	*Cinnamomum burmannii*	Lauraceae	Leaf and root	To help sweating and farting
kayu salam	*Syzygium polycephalum*	Myrtaceae	Stem	The sweet flavor for seasoning
Kayu sungkai	*Peronema canescens Jack*	Verbenaceae	Root, stem, leaf	To freeze rubber latex
Kayu wiara	*Dehaasia* spp.	Lauraceae	Stem	Foodstuffs
Kemiri	*Aleurites moluccanus*	Euphorbiaceae	Seed	Foodstuffs
Kuini	*Mangifera odorata*	Anacardiaceae	Fruit	Anti-cancer drugs
Kusak halamaung	*Myrmecodia penands*	Rubiaceae	Tuber	To cast spirits away
Lagundi	*Vitex trifolia*	Verbenaceae	Root	To relieve stomach
Lampehong	*Baccaurea racemosa*	Euphorbiaceae	Leaf	To cure diarrhea
Langsat	*Lansium domesticum*	Meliaceae	Bark	Foodstuffs
Matanandau	*Lepisanthes amoena (Hassk.)*	Sapindaceae	Stem, leaf	Building material
Meandg	*Litsea firma*	Lauraceae	Stem	To lower cholesterol
Mentuga	*Guioa* sp.	Apocynaceae.	Leaf	Anti-cancer drugs and tumors
Paku atei	*Angiopteris evecta*	Martiaceae	Tuber	The sweet flavor for seasoning
Paku habu	*Cyathea contaminans*	Cyatheaceae	Mucilage	Bee stings and internal medicine
Panguan	*Actinodaphne* sp.	Lauraceae	Stem	Building material
Pasak bumi	*Eurycoma longifolia*	Simaroubaceae	Root	To cure malaria
Payang	*Pangium edule*	Flacourtiaceae	Leaf, stem, Root	To treat hemorrhoids, bleeding
Pelasit	*Santiria griffithii*	Burseraceae	Root, stem, leaf	To expel spirits before and after child-birth
Pendu	*Sterculia*	Malvaceae	Mucilage, leaf	The sap as anti-cancer drug, to prevent internal disease; the leaf to relieve head-ache

continue

Table 4. List of plants used in Tumbang Payang (*continued*)

Local Name	*Botanical Name*	*Family*	*Parts Used*	*Functions*
Rambai	*Baccaurea mottleyana*	Euphorbiaceae	Fruit	Foodstuffs
Rambutan	*Nephellium lappaceum*	Sapindaceae	Fruit	Foodstuffs
Saluang belum	*Luvunga eleutheandra*	Urticaceae	Stem and root	To relieve back pain / tonic to maintain stamina
Samak kawang	*Shorea acuminata* Dyer	Dipterocarpaceae	Bark	To cure wound—the bark is scraped and taped to the wound
Sambung maut	*Cnestis platantha*	Connaraceae	Root	Postpartum treatment
Sampahiring	*Scleria laevis*	Cyperaceae	The soft shoot of the young stem	To relieve ulcer and cough
Singkah uwei patar	*Calamus trachycoleus*	Arecaceae	Stem	To cure poisoning
Sungkai	*Peronema canescens*	Lamiaceae	Leaf, stem	The leaf is to cure high blood pressure and as foodstuff; the stem is for building
Tampang,sukun	*Artocarpus dadah*	Moraceae	Fruit	Foodstuffs
Tangkuhis	*Dimocarpus longan* ssp. *malesianus*	Sapindaceae	Fruit	Foodstuffs
Tawar Gantung	*Cissus sicyoides*	Caricaceae	Root, stem	To prevent malaria
Tebu tawar/tewas tawah	*Saccharum officinarum L.*	Poaceae	Stem	For asthma, the height is ± 1 m, remove the seed and boil the bark
Tehang	*Xerospermum* sp.	Sapindaceae	Stem	Building material
Teken parei	*Helminthostachys zeylanica*	Ophioglossaceae	Root	For prostate diseases and food flavoring
Telangkah	*Lepisanthes* sp.	Dipterocarpaceae	Shoot young leaf	To cure diarrhea
Tengkawang	*Shorea pinanga*	Dipterocarpaceae	Stem	Cosmetics
Tengkurong	*Cleistanthus erycibifolius Airy Shaw*	Phyllanthaceae	Leaf	As a flavoring dish, to lower blood pressure
Terap	*Artocarpus elasticus*	Moraceae	Stem	Building material
Tewu sala	*Saccharum spontaneum*	Poaceae	Stem	For diabetes medication
Tingen	*Imperata cylindrica*	Poaceae	Root	To cure kidney stone
Ubar	*Syzygium* sp.	Dilleniaceae	Stem	Building material
Ulin	*Eusideroxylon zwageri*	Lauraceae	Shell, seed	To blacken the hair and to prevent gray hair

Source: Research data, 2016

Appendix 2

Table 5. List of plants used in Tumbang Kania

Local Name	*Botanical Name*	*Family*	*Parts Used*	*Functions*
Root dadahup	*Meliosma nitida* Blume	Rutaceae	Root	Postpartum treatment—help to move right after
Root kuning	*Santiria griffithi* (Hook. F.) Engl.	Menispermaceae	Root and stem	To prevent jaundice, liver disease
Root ulin	*Eusidoxylon zwagerii*	Lauraceae	Root	Refreshing the entire body after delivery
Alang-alang	*Imperata cylindrica* (L.)Beauv.)	Poaceae	Root , stem, and leaf	Fermentation
Asam	*Mangifera macrocarpa*	Anacardiaceae	Fruit	Foodstuffs
Awang/kangkawang	*Gironniera nervasa Planch*	Cannabaceae	Stem	Its stem is used as a cooking spice just like butter
Balam merah	*Mallotus* sp.	Euphorbiaceae	Root	To cure tooth ache
Balik angin	*Mallotus mollissimus*	Apocynaceae	Bark stem	To cure itchiness, exposed to caterpillars
Banitan	*Polyalthia hypoleuca*	Buseraceae	Stem	Building materials
Bawang lemba	*Eleutherine palmifolia*	Iridaceae	Root and stem	To cure ulcer
Binuang	*Octomeles sumatrana*	Datistaceae	Stem	Building material, pulp and paper, plywood
Fruit awai/pisang	*Xylopia cuspidata Diels*	Annonaceae	Fruit	Fruits
Fruit Kastela mentah	*Carica papaya*	Caricacae	Fruit	Pickles
Fruit menteng	*Baccaurea* sp.	Phyllanthaceae	Fruit	Foodstuffs
Fruit burat	*Tabernaemontana macrocarpa*	Apocynaceae	Fruit	Foodstuffs
Bukar	*Chionanthus* sp	Euphorbiaceae	Stem	Building material
Bunut	*Pternandra* sp.	Melastomataceae	Stem	Building material
Bunyau	*Santiria* sp.	Dipterocarpaceae	Stem	Building material
Cempedak	*Artocarpus integer*	Moraceae	Fruit	Foodstuffs
Damar pipit	*Pentace triptera*	Dipterocarpaceae	Stem	Building material
Durian	*Durio zibethinus*	Bombaceae	Fruit	Foodstuffs
Ginseng	*Panax notoginseng*	Araliaceae	Root, stem, and leaf	For health and increase vitality
Hambie/ rumbia	*Metroxylon sagu*	Arecaceae	Stem	Foodstuffs
Hampalam	*Mangiftera indica* L	Anacardiaceae	Fruit	Foodstuff (vegetables and fruit)
Hanyer bajai	*Goniothalamus* sp.	Annonaceae	Stem, leaf	Foodstuffs
Henda	*Curcuma longa*	Zingiberaceae	Root	Spices
Isin Iru	*Oncosperma harrida*	Arecaceae	Root and stem	To cure liver disease, hepatitis
Jambu	*Syzygium* sp.	Myrtaceae	Fruit	Foodstuffs
Jelatang	*Dendrocnide elliptica*	Meliaceae	Root	Cough medicine
Jering	*Archidendron pauciflorum*	Fabaceae	Root	Postpartum treatment
Kaja	*Aglaia* sp.	Meliaceae	Root, stem	Spices / food
Kalapapa	*Vitex pinnata*	Verbenaceae	Leaf,fruit,stem, Root	Internal medicine
Kamasulan	*Pternandra* sp.	Melastomataceae	Stem	Drugs
Kandis	*Garcinia parvifolia*	Clusiaceae	Stem	Building material

continue

Table 5. List of plants used in Tumbang Kania (*continued*)

Local Name	*Botanical Name*	*Family*	*Parts Used*	*Functions*
Kantong semar	*Nepenthes*	Nepenthaceae	Root, Leaf	Root for cancer, leaf for *ketupat* (rice dumpling), cook rice
Kapul	*Baccaurea macrocarpa*	Euphorbiaceae	Fruit	Foodstuffs
Karet	*Hevea brasiliensis*	Euphorbiaceae	Sap	Making plastic material, tire etc.
Katiau	*Madhuca* sp.	Salicacea	Stem	Building material
Katu	*Sauropus androgynus* (l.) Merr.	Euphorbiaceae	Leaf	For vegetables
kayu asem	*Santiria griffithi*	Burseraceae	Fruit	Foodstuffs
Kayu matan andau/soretang	*Dillenia* spp.	Dilleniaceae	Stem leaf,fruit	To remove dark spots on face
Kayu salam	*Syzygium polycephalum*	Myrtaceae	Bark, stem	Foodstuffs
Kayu tulang	*Pertusadina eurhyncha*	Dipterocarpaceae	Stem	Building material
Kemiri	*Aleurites moluccana*	Euphorbiaceae	Seed	Foodstuffs
Keramu	*Dacryodes rostrata*	Melastomaceae	Stem	Building material
Keranji	*Dialium indum*	Fabaceae	Stem	Building material
Keruing	*Dipterocarpus* sp.	Dipterocarpaceae	Stem	Building material
Ketiau	*Nephelium maingayi*	Sapindaceae	Stem	Building material
Kopi-kopi	*Fragraea fragrans*	Loganiaceae	Stem	Foodstuffs
Kuini	*Mangifera odorata*	Anacardiaceae	Fruit	Foodstuffs
Kumpang	*Diospyros* sp.	Ebenaceae	Stem	To cure ulcer, building materials
ky arang	*Diospyros evena*	Ebenaceae	Stem	Building materials, as fuel. Ply-wood
ky gahung	*Macaranga pachyphylla*	Euphorbiaceae	Stem	Building material
Ky kikir	*Drypetes* sp.	Verbenaceae	Stem	Building material
Ky salap	*Pimelodendron* sp.	Euphorbiaceae	Stem	Building material
Ky tepung	*Ardisia* sp.	Primulaceae	Stem	Building material
Ky tulang	*Pertusadina euryncha*	Rubiaceae	Stem	Building material
Laban	*Vitex pinnata*	Verbenaceae	Stem	Drugs
Lai	*Zingiber officinale*	Zingiberaceae	Root	Seasoning
Lampehong	*Baccaurea lanceolata*	Euphorbiaceae	Leaf	To cure stomachache
Lampesu	*Baccaurea lanceolata*	Euphorbiaceae	Root	To increase stamina
Lampinak/bajakah	*Dalbergia* sp.	Fabaceae	Stem and leaf	Cosmetics
Langkuas	*Alpinia galanga*	Zingiberaceae	Root	Seasoning
Langsat	*Lansium domesticum*	Meliaceae	Fruit, bark	Foodstuff, to cure diarrhea
Lendukung	*Trema tomentosa*	Urticaceae	Stem	Building material
Luwai	*Chisocheton* sp.	Meliaceae	Stem	Building material
Mahang	*Macaranga triloba*	Euphorbiaceae	Stem	Building material
Mahawai	*Cyathocalyx biovulatus*	Annonaceae	Stem	Building material
Mangalit Ot	*Aporosa lusida* Miq.	Phyllanthaceae	Root and stem	For internal wound
Manggis	*Garcinia mangostana* L	Clusiaceae	Fruit	Diabetic drugs
Mara keladi	*Gironniera nervosa*	Cannabaceae	Umbi	Foodstuffs
Maraly	*Adenanthera pavonina* L	Fabaceae	Leaf	For vegetables, to cure diabetic disease
Meandg	*Dehaasia* sp.	Lauraceae	Stem	Building materials, plywood
Menjalin	*Xanthophyllum* sp.	Polygalaceae	Stem	Building materials, plywood
Mentuga	*Guioa* sp.	Apocynaceae.	Stem	Building materials, plywood
Meranti	*Shorea leprosula*	Dipterocarpaceae	Stem	Building materials, plywood

continue

continue

Table 5. List of plants used in Tumbang Kania (*continued*)

Local Name	*Botanical Name*	*Family*	*Parts Used*	*Functions*
Nange	*Flacourtia rukam*	Flacourtiaceae	Fruit and leaf	For vegetables
Nyatoh	*Palaquium* sp.	Sapotaceae	Stem	Building material
Otak uandg	*Buchanania sessifolia*	Anacardiaceae	Stem, root, leaf	To reduce cholesterol level
Pampaning	*Lihocarpus* sp.	Fagaceae	Stem	Building material
Panahan	*Barringtonia scortechini King*	Lecythidaceae	Root, stem, fruit	Postpartum treatment
Panguan	*Actinodaphne* sp.	Lauraceae	Stem	Building material
Pansalingan	*Melicope glabra*	Rutaceae	Stem	Building material
Pasak bumi	*Eurycoma longifolia*	Simaroubaceae	Root and stem	Add vitality, and prevent dengue fever
Pasir	*Stemonurus scorpioides Becc.*	Stemonuraceae	Stem	Building material
Payang	*Pangium edule*	Flacourtiaceae	Leaf, stem, Root	To cure hemorrhoids, bleeding
Pelasit	*Xerospermum* sp.	Burseraceae	Root, stem, leaf	To expel spirits before and after childbirth
Pilang	*Artocarpus* sp.	Moraceae	Stem	Building material
Pisang hutan	*Musa acuminata*	Musaceae	Fruit and stem	For vegetables
Pulai	*Alstonia scholaris*	Apocynaceae	Stem	Building materials, plywood
Puring bahenda	*Phyllostachys sulphurea*	Gramineae	Root	To prevent heart disease
Putat	*Barringtonia serrata*	Lecythidaceae	Stem	Building material
Rambai	*Baccaurea mottleyana*	Euphorbiaceae	Fruit	Foodstuffs
Rambutan	*Nephellium lappaceum*	Sapindaceae	Fruit	Foodstuffs
Rengas	*Gluta wallichi*	Anacardiaceae	Stem	Building material
Sahang	*Piper albi* Linn	Piperaceae	Fruit	Fermentation
Halinjuang	*Cardilline petiolaris*	Liliaceae	Shoot young leaf	To cure cramp
Saluang belum	*Luvunga eleutheandra*	Urticaceae	Root and stem	To cure waist pain, increase vitality
Sarai	*Cymbopogon nardus* (L.) Rendle	Poaceae	Stem	Seasoning
Sarang semut	*Epidendroides* Sol	Rubiaceae	Tuber	For cancer, gout, cholesterol, diabetes
Sawi Tanah	*Nasturtium montanum* Wall.	Cruciferae	Leaf	For vegetables, rheumatism, and gastric pain
Simpur	*Dillenia* sp.	Dilleniaceae	Stem	Building material
Singkah potok	*Calamus trachycoleus*	Arecaceae	Stem	For vegetables
Singkah undus/sawit	*Elais guinensiss* Jacq	Arecaceae	Stem	For vegetables
Sirih	*Piper betle*	Piperaceae	Root and stem	Internal wound
Suli Petak/Tanah	*Leea indica* Merr	Vitaceae	Root, stem,leaf	To prevent diabetes
Suna	*Trema cannabina* Laur	Cannabaceae	Root and leaf	Seasoning, leaf to eat
Sungkai	*Peronema canescens*	Verbenaceae	Leaf, stem	Leaf is to cure high blood pressure / foodstuff, stem is for building material

continue

Table 5. List of plants used in Tumbang Kania (*continued*)

Local Name	*Botanical Name*	*Family*	*Parts Used*	*Functions*
Tabat barito	*Ficus deltoidea* Jack	Moraceae	Root and stem	To cure lung disease, ulcers, internal injuries; postpartum treatment
Tamehas	*Memecylon borneense*	Melasticaceae	Stem	Building material
Tampang	*Artocarpus nitidus*	Moraceae	Stem	Foodstuffs, to cure diarrhea
Tehang	*Xerospermum* sp.	Sapindaceae	Stem	Building material
Telangkah	*Lepisanthes* sp.	Sapindaceae	Shoot young leaf	To cure diarrhea
Tabakut	*Pternandra* sp.	Melastomalaceae	Stem	Foodstuffs, boats
Terap	*Artocarpus* sp.	Moraceae	Stem	Building material
Tewu	*Saccharum officinarum* L.	Poaceae	Stem	Fermentation
Timun	*Xanthophyllum obscurum* A.W.Bennett.	Polygalaceae	Fruit	Pickles
Tongkoi	*Amorphophallus titanum*	Araceae	Fruit and leaf	Fruit and vegetables
Ubar	*Syzygium* sp.	Dilleniaceae	Stem	Building material
Uhat Enyuh	*Cocos nucifera* Linn	Palmaceae	Root	Fermentation
Uhat pinang	*Areca cacteche* L.	Arecaceae	Root	Fermentation
Ulin	*Eusidoxylon zwagerii*	Lauraceae	Stem, seed	To blacken the hair and prevent gray hair
Uru hapit, sangkuan	*Nephrolepis falcata*	Oleandraceae	Root, stem, and leaf	To cure diarrhea