



Cultural Significance Analysis to Support the Valuation of Non Timber Forest Products of the Malay Community in Tanjung Jabung, Jambi, Sumatera

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ABSTRACT

The study of utilizing the diversity of non-timber forest product species by testing the value of cultural importance or *Index of Cultural Significance* (ICS) analysis aims to identify the species of non-timber forest products with highest importance value for local communities. The results of this study documented (1) list of species of non-timber forest products that have an important role in the Malay community in Tanjung Jabung, Jambi, including foodstuffs (51-77 plants), vegetable ingredients (21 plants), medicinal materials (> 77 plants), equipment materials (62 plants), pulp and paper materials (27 plants), and other non-timber forest products; (2) list of species of the potential non-timber forest products to be further developed as fruit-producing plants (12 species), vegetables (10 species), medicinal plants (6 species), pulp and paper-based plants (6 species), plywood (18 species), basic materials for manufacturing equipment, arts and other local technology (8 species); and (3) basic data on economic valuation studies of non-timber forest products. The potential species that have high importance value to be cultivated plants were *rambai* (*Baccaurea* spp.), *cempunik* (*Artocarpus hispidum*), *durian* (*Durio zibethinus*, *Durio oxleyanus*, and *Durio* spp.), and *rambutan* (*Nephelium lappaceum* and *Nephelium* spp.) for fruits, *rotan jernang* (*Calamus draco* and *Calamus* spp.) as a medicinal material, and other uses. Specifically the diversity of potential species of non-timber forest products will be discussed in this paper.

Keywords: Non Timber Forest Products (NTFPs), ICS (*Index Cultural of Significance*), Melayu community

INTRODUCTION

The people of Melayu who live in rural areas close to forest areas such as Sungai Tapa village, Dasal village at Tungkal Ulu District; Sinar Wajo Village and Pematang Rahim Village at Mendahara Ulu District; Kuap Village at Pemayang Village; Panoban Village at

Batang Asam Village; and Lubuk Mandrasah Village at Tengah Ilir Tebo District, Tanjung Jabung, Jambi Province still rely on non-timber forest products to meet their economic needs. Traditionally, the Melayu community in this region is gathering forest products for the sake of meeting their daily needs such as firewood, foodstuffs (fruits and vegetables), medicinal materials, building materials, and gathering types that have economic value such as species types of rattan, clear sap, honey, and various species of animals (Susiarti *et al.*, 2005; Purwanto *et al.*, 2011). To find out the value and potential of these species of non-timber forest products, a quantitative ethnobotany study is carried out which calculated the value of their cultural interests.

Quantitative ethnobotany study by analyzing useful plant species that are important for the community is carried out to support efforts to “value” the diversity of non-timber forest product species in terms of their social and economic values. The study begins by identifying the species of non-timber forest products that are important for the life of the community around the forest area in Tanjung Jabung (Timur and Barat), Jambi Province. One of the methods applied in the valuation study of the cultural importance of non-timber forest products is by conducting an analysis of the Index of Cultural Significance (ICS) developed by Turner (1988); Purwanto (2001) and da Silva *et al.* (2006). Through this ICS analysis, it will know the most important species in the life of the Melayu community around the forest area. The results of the ICS analysis are important for separating between the number of species of non-timber forest products known to the community and the number of species of non-timber forest products that are important in their daily lives. Although the results of identification of non-timber forest products show a fairly high number of species, in fact in daily life both those used for subsistence and commercial interests are not as much as the number of NTFPs they know.

Based on observations in several regions in Indonesia, each ethnic group has a fairly good knowledge about the diversity of useful plant species around which they live (Purwanto, 2010). However, what is used in daily life is no more than 10% of the total number of species known for its benefits (Purwanto, 1997). This shows that there are plant species that have an important role compared to other plant species in the lives of local people in Indonesia. Through this ICS analysis, we find out in detail the important species of NTFPs that are used in the daily lives of rural communities living around forest areas. The results of the ICS calculation and analysis have several benefits, in addition to being able to identify the species of plants that have important values for community life, they can also show the potential of each plant species and provide facilities for further studies that focus on “economic valuation” of non-forest products wood.

METHODS

In this study, the valuation of the value of cultural interests is based on the knowledge of the Melayu people who live in rural areas around the forest such as the community in the Sungai Tapa area; Dasal village, Tungkal Ulu District; Sinar Wajo village and Pematang Rahim village in Mendahara Ulu District; Kuap village in Pemayung District; Panoban village in Batang Asam District; and Lubuk Mandrasah in Tengah Ilir Tebo District, Tanjung Jabung (Timur and Barat), Jambi Province.

Data collection was using two approaches, namely: a qualitative approach and a quantitative approach. Qualitative data is useful for finding out local community knowledge systems about various species of non-forest products found in the forest area around which they live, aspects of their management and use, socio-economic and cultural aspects. Data

collection on diversity of non-timber forest product species and their use was carried out using the “In-depth Interview” technique or in-depth interviews and free open-ended interview techniques with respondents directly in the field and by involving us in community daily activities. We completed data collection with direct observation in the forest area to find out the activities of gathering and extractives of non-timber forest products. While, quantitative data were obtained through structured interviews (questionnaires) and quantitative calculations in the field. Secondary and supporting data were obtained by conducting a literature study and data collection at the village office such as demographic data, socio-economic aspects of farmers such as education level, livelihoods, household socio-economic conditions, and so forth. Respondents or resource persons consisted of members of the community who have a fairly good knowledge of the diversity of non-timber forest product species, including communities that collect and extract non-timber forest products and local community experts who have knowledge about the diversity of non-timber forest product species.

Calculation of Index of Cultural Significance (ICS) is based on a formula developed by Turner (1988) and modified by Purwanto (2001). ICS calculation has the purpose and function to evaluate or measure the importance of a plant species for people’s lives. ICS calculation results can change in the course of time because they vary in terms of quality, intensity and exclusivity of these useful plant species (Purwanto, 2010; Sujarwo and Caneva, 2016). Whereas “purposive sampling” does the determination of examples based on the mastery and knowledge of the community in managing and utilizing the diversity of species of non-timber forest products. The species of non-timber forest products that the community knows and uses are recorded for their local names and uses, how they are used and the parts of plants used and the socio-cultural aspects behind why these species of non-timber forest products are used. Unknown scientific name of non-timber forest products were taken from specimen samples and then identified in the Herbarium Bogoriense. In order to know in depth the system of utilizing the diversity of non-timber forest product species, a calculation and analysis of the Cultural Importance Value for each species of non-timber forest product for the community was done to measure the Cultural Interest Index or Index of Cultural Significance (ICS). The index of cultural significance is the result of a quantitative ethnobotany analysis that shows the importance of each useful plant species based on the level of community needs including its quality, intensity of use and exclusivity. ICS calculations indicate the importance of each species of plant is useful by the community. The index of cultural significance was calculated by using a formula like the following:

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

In connection with each species of plant has several uses; the calculation formula is as follows:

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

Notes: ICS = Index of Cultural Significance, is the sum of the calculation of the utilization of a plant species from 1 to n , where n indicates the use of so many (last); while the symbol i represents the values 1 to n , and so on. As for the calculation of the value of a plant species the parameters are calculated as follows: Value q = quality value (quality value), calculated using how to give a score or value to the quality value of a plant species, for example: 5 = staple food; 4 = secondary/supplementary food + primary material; 3 = other food ingredients + secondary material + medicinal plants; 2 = ritual, mythology, recreation, etc.; 1 = just

recognition (re recognition). Value i = intensity value, which describes the intensity of utilization of useful plant species by providing values, for example: value 5 = very high intensity of use; value 4 = moderately high intensity of use; value 3 = medium of intensity of use; value 2 = low intensity of use; and the value of 1 = the intensity of its use is very rare (minimal). The value e = exclusivity value, for example: value 2 = most preferred and is the first choice and is second to none; value 1 = there are several types that are possible choices; and value 0.5 = secondary source or material which is secondary in nature.

RESULTS AND DISCUSSION

Species Diversity of Non Timber Forest Products

The results of an inventory of species diversity of non-timber forest products in the study area recorded more than 150 species of plants as non-timber forest products (Table 1). The number of non-timber forest products in the former logging area known to the community and these species are still used by the community in order to meet their daily needs and some species are even a source of additional income for the household.

Table 1. Number of species of non-timber forest products in the study area

No	NTFPs	Number of Species	Uses	
			Subsistent	Commercial
1	Fruits	51-77	√	√
2	Vegetables	21	√	-
3	Species	6	√	-
4	Rattan	8	√	√
5	Bamboo	2-4	√	√
6	Medicinal Plant	> 77	√	-
7	Wood bark/tree bark	4	√	-
8	Poison	2	√	-
9	Resin	4	√	√
10	Firewood	30-45	√	√
11	Animal	> 10	√	√
12	Birds	>10	-	-
13	Fish	10-25	√	√
14	Honey	1	√	√
15	Insects	> 5	√	-
16	Local technology, handicraft and arts	65	√	√
17	Pulp and paper material, plywood, and block board	27	-	√

The diversity of species of non-timber forest products based on their uses can be seen in the following ICS calculation section.

Index Cultural Significance (ICS) Calculation and Analysis

The ICS calculation results shown the species that have high ICS values which illustrate that these species are the most preferred by the community in the study area (Table

2-9). The ICS value is strongly influenced by three aspects, namely: (1) the quality of the species of non-timber forest product: The higher the quality of the species of non-timber forest product, the higher the ICS value will be; (2) intensity of use: if the non-timber forest products are used as often as possible in daily life, then of course they have a high value for people's lives; and (3) forest product exclusivity: if the non-timber forest product has benefits that cannot be replaced by other forest products, then the forest product has a high exclusivity value. Through the calculation of "Cultural Significance Index", we can find out what non-timber forest products are very important for people's daily lives. This ICS calculation certainly has weaknesses, one of which is the subjectivity of the researcher and the intelligence of the researcher in revealing data from the local community. This weakness can be overcome by taking data sourced from various sources, so the error of the data can be avoided.

1. Diversity of species of non-timber forest products as food

The diversity of species of non-timber forest products as food includes foodstuffs in the form of fruits, seeds, tubers, and as vegetable material. The activity of gathering non-timber forest products as food for fruits, tubers and seeds cannot be harvested at any time and only happened during the fruiting season, but food ingredients for vegetables, several species of plants can be harvested the leaves at any time, for example species of leaf *bulian* (*Eusideroxylon zwageri*), rattan *umbut* (*Calamus* spp.), and others (Table 3).

(a) Non-timber forest products of fruit food and their cultural value

The species of non-timber forest products as food for fruits and grains that have important value for the supply of community food in the region. The species of fruits that are often mixed and have important values are shown in Table 2 below.

Table 2. ICS calculation for fruits and grains found in old secondary forest areas (calculations are based on the knowledge of the Malay community in Tanjung Jabung, Jambi Province)

No	Local Names	Scientific Names	Uses	ICS Value
1	-	<i>Callophylum soulatri</i>	Fruit has acid taste	24
2	-	<i>Archidendron microcarpum</i>	Grain eaten raw	12
3	-	<i>Castanopsis javanica</i>	Fruit has good taste	24
4	-	<i>Meliosma nitida</i>	Fruit eaten	12
5	Akar karet	<i>Willughbeia beccariana</i> and <i>W. firma</i>	Fruit	12
6	Arang tarau	<i>Nephelium cuspidatum</i>	Fruit	21
7	Balam putih	<i>Palaquium</i> sp.	Fruit	24
8	Balam terung	<i>Palaquium hexandrum</i>	Fruit	24
9	Bekil	<i>Artocarpus elasticus</i>	Fruit eaten	54
10	Berenai	<i>Antidesma bunius</i>	Fruit	21
11	Berenai	<i>Antidisma neurocarpum</i>	Fruit	21
12	Cempedak air	<i>Artocarpus kemando</i>	Fruit	24
13	Cempunik	<i>Artocarpus hispidum</i>	Fruit	24
14	Damak-damak	<i>Sarcotheca diversifolia</i>	Fruit	12

15	<i>Daun cucuk daun</i>	<i>Lasianthus sp.</i>	Fruit eaten	21
16	<i>Durian</i>	<i>Durio zibethinus</i>	Fruit	26
17	<i>Durian daun</i>	<i>Durio oxleyanus</i>	Fruit	26
18	<i>Geraan</i>	<i>Baccaurea macrocarpa</i>	Fruit	36
19	<i>Hujan panas</i>	<i>Elaeocarpus mastersii</i>	Fruit	24
20	<i>Kedondong</i>	<i>Dacryodes rostrata</i>	Fruit	36
21	<i>KerANJI</i>	<i>Dialium indicum</i>	Fruit	24
22	<i>KereseK bulu</i>	<i>Psychophyxis costata</i>	Grain eaten	12
23	<i>Keruping besi</i>	<i>Diospyros toposoides</i>	Fruit eaten	24
24	<i>Kuku balam</i>	<i>Aporosa prainiana</i>	Fruit eaten	24
25	<i>Kumpal benang</i>	<i>Pometia pinnata</i>	Fruit	21
26	<i>Kungkil</i>	<i>Pometia pinnata</i>	Fruit and grain eaten	21
27	<i>Langsat hutan</i>	<i>Lansium domesticum</i>	Fruit	28
28	<i>Manggis hutan</i>	<i>Garcinia rigida</i>	Fruit	37
29	<i>Maropanai</i>	<i>Pimelodendron griffitianum</i>	Fruit	24
30	<i>Mbacang huta</i>	<i>Mangifera magnifica</i>	Fruit	33
31	<i>Medang darah</i>	<i>Myristica iners</i>	Fruit	24
32	<i>Medang molik</i>	<i>Dehaasia firma</i>	Fruit	40
33	<i>Merubi</i>	<i>Pternandra galeata</i>	Fruit	12
34	<i>Pauh kijang</i>	<i>Iringia Melayuana</i>	Grain eaten raw and cooked	12
35	<i>Pauh udang</i>	<i>Mangifera sp.</i>	Fruit	24
36	<i>Payang</i>		Fruit	24
37	<i>Penggang</i>	<i>Aporosa arborea</i>	Fruit	12
38	<i>Plajau</i>	<i>Pentaspadon motleyi</i>	Grain eaten raw or boiled as a snack	28
39	<i>Raman</i>	<i>Bouea macrophylla</i>	Fruit and leaf as fresh vegetable	28
40	<i>Raman burung</i>	<i>Bouea oppositifolia</i>	Fruit	28
41	<i>Rambai</i>	<i>Baccaurea motleyana</i>	Fruit	24
42	<i>Rambutan</i>	<i>Nephelium cuspidatum</i>	Fruit	24
43	<i>Rambutan</i>	<i>Nephelium lappaceum</i>	The fruit is eaten fresh, the flesh is made of preserves	33
44	<i>Ribu-ribu</i>	<i>Anisophylea disticha</i>	Fruit	12
45	<i>Ridan</i>	<i>Nephelium uncinatum</i>	Fruit	24
46	<i>Samak</i>	<i>Hydnocarpus polypetala</i>	Fruit	12
47	<i>Tali genemu</i>	<i>Gnetum gnemon</i>	Fruit is eaten	24
48	<i>Tampui</i>	<i>Baccaurea macrocarpa</i>	Fruit	33

49	<i>Tampui burung</i>	<i>Baccaurea multiflora</i>	Fruit is eaten as a supplementary food	33
50	<i>Tayas</i>	<i>Mangifera laurina</i>	Fruit	33
51	<i>Tengkuk biawak</i>	<i>Xerospermum laevigatum</i>	Fruit	24

From the calculation of the use value based on ICS calculation showed that the species of fruits and grains that have important values for the community are the species of *Artocarpus elasticus*, *Baccaurea* sp., *Baccaurea multiflora*, *Dacryoides* sp., *Nephelium lappaceum*, and *Dehaasia firma*. Besides producing fruits, these species of fruits also have medicinal uses, household appliances, and other purposes.

(b) Diversity of species of non-timber forest products as vegetable material and their cultural importance

These species besides being used as vegetable material also have other benefits including as rope materials, handicrafts and equipment, and traditional medicine (Table 3)

Table 3. Diversity of vegetable producing plants found in the forest area around the Tapa River

No	Local Names	Scientific Names	Uses	ICS Value
1	<i>Bulian</i>	<i>Eusideroxylon zwageri</i>	Leaves are used for vegetables	40
2	<i>Kabau</i>	<i>Archidendron</i> sp.	Grains as food	40
3	<i>Kayu ujan, merimbungan</i>	<i>Milletia atropurpurea</i>	The leaves are vegetables	40
4	<i>Kedondong tunjuk</i>	<i>Pentaspadons motleyii</i>	Fruit as a substitute for vegetable oil	24
5	<i>Kulim</i>	<i>Scorodocarpus borneensis</i>	Fruit as food and the leaves for vegetable (raw and fresh vegetable)	49
6	<i>Maribung</i>	<i>Milletia</i> sp.	Fruit and leaves for raw and fresh vegetable	28
7	<i>Membacang</i>	<i>Mangifera odorata</i>	The fruit can be eaten and the leaves can be sown or vegetables	24
8	<i>Petai</i>	<i>Parkia javanica</i>	Fruit for vegetable	24
9	<i>Putat</i>	<i>Barringtonia sarcostachys</i>	Leaves for fresh and raw vegetables	24
10	<i>Raman</i>	<i>Bouea macrophylla</i>	Fruit and leaves for raw and fresh vegetables	24
11	<i>Rotan batu</i>	<i>Calamus insignis</i>	Umbut (growing point of stem) for vegetable	41
12	<i>Rotan cincin</i>	<i>Calamus sabut</i>	Umbut (growing point of stem) for vegetable	41
13	<i>Rotan lipai</i>	<i>Licuala pumila</i>	But shoot for vegetable	24
14	<i>Rotan peledas</i>	<i>Calamus javensis</i>	Umbut (growing point of stem) for vegetable	41

15	<i>Rotan semut</i>	<i>Korthalsia scaphigera</i>	Umbut (growing point of stem) for vegetable	41
16	<i>Rotan tunggal</i>	<i>Calamus laevigatus</i>	Umbut (growing point of stem) for vegetable	41
17	<i>Rotan udang</i>	<i>Korthalsia echinometra</i>	Umbut (growing point of stem) for vegetable	41
18	<i>Sebekal</i>	<i>Fordia splendidissima</i>	Leaves for vegetables	12
19	<i>Serdang</i>	<i>Pholidocarpus sumatranus</i>	Umbut (growing point of stem) for vegetable	12
20	<i>Tulo-tulo</i>	<i>Helicia robusta</i>	Fruit for raw and fresh vegetable	24
21	<i>Umbut risi</i>	<i>Caryota mitis</i>	Umbut (growing point of stem) for food, like sago	24

For the people who still live around the forest area, the activity of extracting forest products, they are still gathering the vegetables. In addition to the species mentioned above, they also collected the species of ferns such as: *Angiopteris*, *Pteridium*, and others. In general, species of vegetables in the form of seasonal harvesting fruits such as *petai* (*Parkia javanica*), fruit of *Milletia* sp., fruit of *tulo-tulo* (*Helicia robusta*) and others. The species of plants that are useful as vegetables have relatively high ICS values because these plants are not only used as vegetable material, but also as raw material for crafts, rigging, and medicine.

2. Non-timber forest products as spices

The results of the identification and analysis of the ICS of the diversity of non-timber forest products used as a spice material recorded six species of plants, namely *asam bungkul* (*Ampelocissus spicifer*), *asam kandis* (*Garcinia parvifolia*), *kedondong tunjuk* (*Pentaspadons motleyii*), *basau* or *akar bebulus* (*Ancistrocladus tectorius*), a species of *Pleomele angustifolia* and *limbo* (*Curculigo orchidioides*). In more detail the species of non-timber forest products used as spices and ICS values are shown in Table 4 below.

Table 4. Several wild species of plants as spice material with ICS value

No	Local Names	Scientific Names	Uses	ICS Value
1	Asam bungkul	<i>Ampelocissus spicifer</i>	The fruit that tastes sour is used as a substitute for salt and fish seasonings	12
2	Asam kandis	<i>Garcinia parvifolia</i>	The fruit use for spices	37
3	Kedondong tunjuk	<i>Pentaspadons motleyii</i>	The fruit is used as a substitute for vegetable oil	27
4	Basau, akar bebulus	<i>Ancistrocladus tectorius</i>	This species is used as an ingredient for stomachaches (dysentery), malaria medicine, to improve blood circulation and cure for kidney disease	33
5	-	<i>Pleomele angustifolia</i>	This species of plant is used as vegetable oil and medicinal ingredients for GO and beriberi disease, promoting hair growth and natural dyes.	26

6	Lembo	<i>Curculigo orchidioides</i>	Bitter antidote in food	6
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The results of observations of six species of plants that are useful as a spice or seasoning substitutes noted two species of which are quite important, and are used by the community, namely *Ancistrocladus tectorius* and *Garcinia* sp. (Table 4). The five species of non-timber forest products as a spice are still used as food seasonings, especially as a spice for cooking fish. The use of these species has advantages compared to the use of other seasonings namely reducing fishy smell and of course it tastes better.

3. Non-timber forest products as traditional medicinal ingredients and their importance of cultural significance (ICS)

The results of the ICS inventory and analysis of non-timber forest product species as traditional medicinal materials recorded 76 species and can be seen in detail in the following Table 5.

Table 5. Diversity of medicinal plant species and their importance of cultural significance (ICS)

No	Local Names	Scientific Names	Uses	ICS value
1	-	<i>Pleomele angustifolia</i>	Medicinal ingredients for venereal disease (Gonorrhoea, GO) and beriberi drugs. This species is also used as an ingredient to increase hair growth, coloring agents, seasoning ingredients, and as vegetable oil	26
2	-	<i>Archidendron microcarpum</i>	The seeds are toxic if most are diuretic; the leaves are used to cure wounds, chickenpox, leg pain and swelling	18
3	-	<i>Meliosma nitida</i>	Wound medicine ingredients	6
4	-	<i>Forrestia mollissima</i>	All parts of the plant contain the steroid Ecdysterone (commisterone) and are used as ingredients for rheumatic medicine, fever, rheumatic fever and headaches	36
5	-	<i>Gynotroches axillaris</i>	Fever medicine ingredients	6
6	Akar ampelas kijang	<i>Tetrasera scandens</i>	Cough medicines and craft wood refiners	18
7	Akar kapas	-	Cosmetic	6
8	Akar kuning	<i>Coscinium penetratum</i>	Antiseptic drug ingredients, burns and ulcers; medicine for fever, stomach ache, dysentery, hepatitis and inflammation of the eyes. This species of plant contains berberine as an active ingredient and jatrorrhizine	58
9	Akar kunyit	<i>Tinosmiscium venestratum</i>	Hepatitis medicine and aphrodisiac (impotence).	12
10	Akar mati	<i>Spatholobus</i>	Pain medication in the ribs	18

	<i>rusuk</i>	<i>littoralis</i>		
11	<i>Antui condong</i>	<i>Goniotalamus macrophyllus</i>	Limp legs medicinal ingredients	6
12	<i>Asam kandis</i>	<i>Garcinia parvifolia</i>	Medicinal ingredients after childbirth and spices (cooking spices)	15
13	<i>Basan</i>	<i>Ancistrocladus</i> sp.	Medicine for stomached	6
14	<i>Basau, akar bebulus</i>	<i>Ancistrocladus tectorius</i>	Ingredients for drugs of dysentery, malaria, improve blood circulation, kidney disease medicine ingredients, and seasonings	33
15	<i>Bekil</i>	<i>Ficus elastica</i>	Wound medicine	30
16	<i>Bekil atau terap</i>	<i>Artocarpus elasticus</i>	Dysentery and TBC medicine	66
17	<i>Daun cucuk daun</i>	<i>Lasianthus</i> sp.	Impotence and aphrodisiac medicine	21
18	<i>Daun sikentut</i>	<i>Saprosma arboreum</i>	Bloating ingredient medicine (stomached medicine)	12
19	<i>Ekor tupai</i>	<i>Gleeria fulva</i>	Venereal disease medicine: gonorrhea	6
20	<i>Geraan</i>	<i>Baccaurea minutiflora</i>	Animal anti-poison ingredients	6
21	<i>Gerekan</i>	<i>Baccaurea</i> spp.	Medicine for skin pain and inflammation of the eyes	18
22	<i>Jarum-jarum, gading tulang, mata ular</i>	<i>Aidia densiflora</i>	Intestinal or stomachache medicine	6
23	<i>Kandis-2</i>	<i>Garcinia parvifolia</i>	For the care of the stomachache of the mother after giving birth	18
24	<i>Kapur</i>	<i>Dryobalanops oblongifolia</i>	An itchy medicine, cold medicine and bloating medication	18
25	<i>Kayu sepat</i>	<i>Gonothalamus sumatranus</i>	Mosquito repellent ingredients	18
26	<i>Kayu tulang</i>	<i>Galearia filiformis</i>	The ingredients for the stomachache	18
27	<i>Kayu ujan, merimbungan</i>	<i>Milletia atropurpurea</i>	Infectious or swollen medicine and as fish poison	28
28	<i>Kedudu batu</i>	<i>Melastoma malabaricum</i>	Ingredients for skin pain: boils	6
29	<i>Kekapur</i>	<i>Anaxagorea scortechinii</i>	Maternal protective drug ingredients after childbirth	6
30	<i>Kelat</i>	<i>Syzygium cloranthum</i>	Ingredients of traditional medicine: internal disease medicine	18
31	<i>Kenanga utan</i>	<i>Desmos dasymaschalus</i>	Abdominal pain (dysentery drug), fever, vertigo and maternal strengthening medicine after childbirth	18
32	<i>Keruping besi</i>	<i>Diospyros toposoides</i>	Toothache medicine	18
33	<i>Kuku elang</i>	<i>Uncaria</i> sp.	Wound medicine ingredients	6

34	<i>Kungkil</i>	<i>Pometia pinnata</i>	Traditional medicinal: internal diseases medicine	30
35	<i>Kupu-kupu</i>	<i>Phanera</i> sp.	Cough medicinal	6
36	<i>Lancar, bintangor</i>	<i>Calophyllum rubiginasum</i>	Ingredients for skin diseases: itching and poison (toxic)	30
37	<i>Landang</i>	<i>Poikilospermum suaviolens</i>	Ingredients cough medicine, eye medication, fever medication and kidney disorders, itching medication, stomach pain medication after giving birth.	42
38	<i>Lembo</i>	<i>Curculigo orchidioides</i>	Bitter antidote in food	6
39	<i>Lipai, Tirus, selingsingan</i>	<i>Mapania cuspidate</i>	Fever medicine ingredients, as a mother tonic after childbirth	12
40	<i>Lirik</i>	<i>Lestaspis urseolata</i>	Ingredients for skin diseases: boils	6
41	<i>Mahang kukur</i>	<i>Macaranga triloba</i>	Ingredients for internal medicine, abdominal pain; diarrhea medication, dysentery; fever medicine; and as a wound cleanser after giving birth. This plant contains coorilagin, furosin, geranin, and macaranganin.	38
42	<i>Mahang melawai</i>	<i>Macaranga gigantea</i>	Anti-toxic medicinal agent stung by centipedes (animals)	18
43	<i>Mampat</i>	<i>Cratoxylon formosum</i>	Old wound medicinal ingredients	6
44	<i>Manggis hutan</i>	<i>Garcinia celebica</i>	Toothache medicine	37
45	<i>Mardundung</i>	<i>Canarium litorale</i>	Ingredients for skin pain: scabies	30
46	<i>Marpayang</i>	<i>Scapium macropodum</i>	Remedy for fever and heartburn	18
47	<i>Marpayang pecah mangkok</i>	<i>Scapium</i> sp.	Sprue drug ingredients	18
48	<i>Medang daun lebar</i>	<i>Litsea grandis</i>	Body care ingredients: hair cream	18
49	<i>Mbacang</i>	<i>Mangifera</i> sp.	Astringent medicine ingredients, sunburn and snake bite medicine	33
50	<i>Pacar cina</i>	<i>Aglaia odoratissima</i>	As an external medicine and in children with fever; ingredients for venereal disease; sputum decay ingredients, stimulants; fever-lowering; and menorrhagia; as a tonic material; asthma medication ingredients; and jaundice. The flowers contain odorin and odorinol alkaloid compounds to prevent the spread of cancer cells.	58
51	<i>Pagai</i>	<i>Ixonanthes</i>	Headache medicine ingredients	6

		<i>icosandra</i>		
52	<i>Pakis gajah</i>	<i>Angiopteris avecta</i>	Medicine for elephantiasis disease	18
53	<i>Pandan</i>	<i>Pandanus</i> sp.	Impotent drug ingredients	18
54	<i>Pasak bumi</i>	<i>Eurycoma longifolia</i>	Aphrodisiac and malaria medicine	12
55	<i>Paur cacing</i>	<i>Zingiber</i> sp.	Medicine for intestinal worms	6
56	<i>Petaling</i>	<i>Ochanostachys amentacea</i>	Ingredients for fever medication and medicine after giving birth	12
57	<i>Plajau</i>	<i>Pentaspadon motleyi</i>	Balm and skin disease remedies	12
58	<i>Pulus</i>	<i>Gendub</i>	Pig poison ingredients	6
59	<i>Punai</i>	<i>Antidesma cuspidatum</i>	Smallpox ingredients, swelling drugs; and cold medicine. Contains alkaloids for medicine to reduce fever	18
60	<i>Rambutan</i>	<i>Nephelium lappaceum</i>	Muscle tightening ingredients; stomach pain medication; anthelmintic; dizziness medication; and cold medicine. Contains poisonous saponins	33
61	<i>Rambutan pacat</i>	<i>Xerospermum laevigatum</i>	Ingredients of traditional medicinal ingredients: internal medicine	18
62	<i>Rengas</i>	<i>Semecarpus</i> sp.	Old wound medicine ingredient	18
63	<i>Salung</i>	<i>Psychotria viridiflora</i>	Ingredients for skin diseases, scabies, insect repellent, snake venom, itching and skin infections	24
64	<i>Samak</i>	<i>Syzygium</i> sp.	Itchy medicinal ingredients	18
65	<i>Selingsingan</i>	<i>Mapanai cuspidate</i>	Ingredients for fever medicines, tonics in mothers after childbirth, and antidotes	18
66	<i>Sepetir</i>	<i>Sindora sumatrana</i>	Burns medicinal ingredients	18
67	<i>Sibassa, kayu balut</i>	<i>Leptonychia heteroclita</i>	Fever-reducing agents in infants; boils medication, and acne medications	18
68	<i>Sigam</i>	<i>Gendub</i>	Medicine for eye pain	12
69	<i>Sikentut</i>	<i>Saprosma arborium</i>	Medicinal substances prevent digestive disorders, flatulence drugs, and external drugs as a poultice for the mother after giving birth	36
70	<i>Sindur</i>	<i>Sindora sumatrana</i>	The medicine for fever	18
71	<i>Sipetir</i>	<i>Sindora sumatrana</i>	Rub or massage ingredients	18
72	<i>Sulatri</i>	<i>Calophyllum soulatri</i>	Wound medicine ingredient	18
73	<i>Tampui</i>	<i>Baccaurea</i> sp.	Animal anti-toxic drug ingredients	24
74	<i>Tayas</i>	<i>Mangifera odorata</i>	Old wound medicinal ingredients	33
75	<i>Tentubung</i>	<i>Strombosia</i> sp.	Antiseptic ingredient	12
76	<i>Tobung-tobung</i>	<i>Gonocarium</i>	Ingredients for headache, bruising and	18

	<i>gracile</i>	wound medicine	
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Although the public knows various species of plants as medicinal materials, but the utilization of the diversity of medicinal plant species is limited to the species that are generally known by most people, for example *sindur* (*Sindora sumatrana*) which is used as fever medicines, *pasak bumi* (*Eurycoma longifolia*) which is believed to be efficacious as a powerful medicine, and the other common species. Meanwhile, only a few people are familiar with the species of medicinal plants and that person can be categorized as a local expert. So the utilization of these species is very rare or even for now almost forgotten. People prefer to use modern medicines to treat their pain. There are some exceptions for people who live remote and difficult to reach by public transportation, they still use various species of plants for the treatment of their pain. Local medicine experts still have an important role in villages like this in order to maintain public health.

Although these species of medicinal plants are currently underutilized or even tend to be forgotten, this basic information is very important as a documentation of the local knowledge of the community and also important as basic data for ethno-medicinal research using ethno-direct sampling methods that have been proven to produce new findings of active ingredients as basic ingredients of making modern medicine.

Based on the calculation of ICS values, it appears that several species have relatively high values such as *Coscinium penetratum*, *Ancistrocladus tectorius*, *Poikilospermum suaviolens*, *Aglaia odoratissima* and others (Table 5). These species have many uses as ingredients for medicine and are needed for further research in order to know with certainty their usefulness and the possibility of having active compounds as ingredients for making modern medicines.

The Melayu community in this region has good knowledge about the species of diseases and how to treat them. The local community has known 30 types of diseases, and the plant species used as medicinal ingredients (Table 6).

Table 6. Types of diseases and number of species used for treatment

No	Types of diseases	The number of plant species used as medicinal ingredients
1	Gonorrhea (GO), venereal disease	2
2	Beriberi	1
3	Wounds: new wounds, old wounds and burns	7
4	Chicken pox	1
5	Rheumatism: leg pain, aching rheumatic pain, rib pain	4
6	Swollen, boils	5
7	Fever: heartburn, fever	13
8	Headache	5
9	Cough: dry cough, cold cough	2
10	Antiseptic	2
11	Skin pain: ulcers, scabs, scabies	8
12	Hepatitis	2
13	Eye pain: inflammation of the eyes	5
14	Aphrodisiac	2
15	Limp legs	1

16	Childbirth treatment	8
17	Malaria	2
18	Impaired blood circulation	1
19	Kidney disease	2
20	Stomach ache: bloating	2
21	Anti-poison: insect stings	2
22	Mosquito repellent	1
23	Poison ingredients: fish poisons, animal poisons	4
24	Toothache	1
25	Antidote bitter	1
26	Respiration: asthma, ISPA, lungs	1
27	Elephantiasis disease	1
28	Worm disease	1
29	Chicken pox	1
30	Acne	1

Observation and identification of plant species that are useful as material equipment (war equipment, agricultural equipment and household furniture) are intended to find out the species of plants that have the prospect of being developed as the basic material of folk crafts. Table 7 below lists the species of plants used in making various species of equipment such as war equipment, agricultural equipment, hunting equipment, household equipment and others.

Table 7. Species of plants that are useful as basic materials for equipment, crafts and local technology

No	Local Names	Scientific Names	Uses	ICS Value
1	-	<i>Mesua beccariana</i>	Furniture	24
2	-	<i>Archidendron fagifolium</i>	Household appliances, boats, paddles, coffins	56
3	-	<i>Aglaia spectabilis</i>	Shotgun handle	24
4	-	<i>Aporosa arborea</i>	Stalk of tools, rice mash tools	24
5	-	<i>Cyathocalyx bancana</i>	Agricultural tools, tool handles, toys and containers	24
6	-	<i>Actinodaphne angustifolia</i>	Furniture, shipbuilding materials	20
7	-	<i>Dysoxylum cauliflorum</i>	High quality home furnishings	38
8	-	<i>Gonocarium macrophyllum</i>	Furniture, wardrobe, waterwheel	36
9	-	<i>Memecylon oligoneurum</i>	Boat materials, furniture, paddles and tool handles	36
10	-	<i>Euonymus javanicus</i>	Furniture	21
11	-	<i>Urophyllum</i> sp.	Furniture	20
12	<i>Barangan haji</i>	<i>Castanopsis javanica</i>	Bark is made of rice storage barrels, tanners	38
13	<i>Basau</i>	<i>Ancistrocladus</i>	As material to make ships and arrows	20

		<i>tectorius</i>		
14	<i>Bayut batu</i>	<i>Mezzetia parviflora</i>	Interior, containers, boxes, matches, furniture	44
15	<i>Bekil</i>	<i>Artocarpus elasticus</i>	Bark as cloth, shirts, belts, jackets, blankets and carpets	66
16	<i>Bintangor</i>	<i>Calophyllum rubiginasum</i>	Household furniture, furniture	44
17	<i>Cempaka</i>	<i>Gardenia anisophylla</i>	Hammerheads, tool handles	32
18	<i>Dagau</i>	<i>Chisocheton ceramicus</i>	Boats, room decorations, cupboards, rulers, panels, hair combs, crates, toys, wheels	70
19	<i>Dempul lelet</i>	<i>Glochidion rubrum</i>	Tool handles	24
20	<i>Gambir-gambir</i>	<i>Hydnocarpus koentleri</i>	Container, artisanal	24
21	<i>Gendis</i>	<i>Chisocheton macrophyllus</i>	Boats, room decorations, cupboards, rulers, panels, hair combs, crates, toys, windmills	70
22	<i>Kandis burung</i>	<i>Garcinia parvifolium</i>	Furniture	37
23	<i>Kawoyang</i>	<i>Endiandra rubescens</i>	Electric poles, cupboards, carpentry	48
24	<i>Kayu bawang</i>	<i>Dysoxylum alliasium</i>	Crafts, pool tables, matchboxes	36
25	<i>Kayu gula</i>	<i>Apanamixis</i> sp.	Tools, furniture, longboats, boats, windmills and vehicle bodies	56
26	<i>Kayu ribu</i>	<i>Anisophyllea disticha</i>	As a stick, spear shaft, and javelin	28
27	<i>Kayu sipur</i>	<i>Helicia cerrata</i>	Furniture and cupboard	21
28	<i>Kayu tulang</i>	<i>Galearia filiformis</i>	Rice pounder	12
29	<i>Kayu udang</i>	<i>Syzygium lineatum</i>	Furniture	18
30	<i>Kedondong</i>	<i>Dysoxylum</i> sp.	High quality home furnishings	38
31	<i>Kedondong</i>	<i>Dysoxylum ridgewayi</i>	High quality home furnishings	38
32	<i>Kedondong</i>	<i>Dysoxylum grande</i>	High quality home furnishings	38
33	<i>Kedondong</i>	<i>Dysoxylum</i> sp.	High quality home furnishings	38
34	<i>Kedondong</i>	<i>Dacryodes laxa</i>	Home furnishings, rice mills	36
35	<i>Leban jatuh</i>	<i>Cryptocarya cassinervia</i>	Cupboards, tables, chairs	21
36	<i>Mahang</i>	<i>Macaranga</i> sp.	Furniture, shingles, containers, spikes	40
37	<i>Medang</i>	<i>Elaeocarpus mastersii</i>	Boat interior, home furnishing	24
38	<i>Medang</i>	<i>Beilschiedia</i> spp.	Furniture, painting frames, room furniture	30
39	<i>Medang</i>	<i>Dehaasia firma</i>	Furniture, piano, crate	40
40	<i>Medang simpai</i>	<i>Gymnacranthera bancana</i>	Tool handle, cupboard	24
41	<i>Medang api</i>	<i>Elaeocarpus</i>	Boats and furniture	38

		<i>brevipes</i>		
42	Medang kalong	<i>Cinnamomum iners</i>	Cupboards, tables, chairs	21
43	Medang keladi	<i>Litsea machilifolia</i>	Furniture	24
44	Medang mata udang	<i>Alangium ridleyi</i>	Furniture, cupboards, carving materials, mashing tools and rifles	40
45	Medang segueh	<i>Elaeocarpus mastersii</i>	Boats, artisanal and furniture	38
46	Meresik	<i>Neoscortechinia kingii</i>	Boats, windmills, containers, furniture	40
47	Mesekam	<i>Baccaurea sumatrana</i>	Ship building, dock, furniture and crates	40
48	Nyatoh	<i>Palaquium</i> sp.	Furniture, music instrument	24
49	Nyatuh	<i>Madhuca</i> sp.	Furniture	24
50	Pacar cina	<i>Aglaia odoratissima</i>	Wood as furniture is easily formed	58
51	Pantat ulat	<i>Memecylon anplexicaule</i>	Boat materials, furniture, paddles and tool handles	36
52	Pendarahan	<i>Knema cinerea</i>	Boat materials, containers, matchboxes, matchsticks	56
53	Peredah burung	<i>Horsfieldia subglobosa</i>	Furniture, sports equipment, crates, matches	36
54	Petaling	<i>Ochanostachys amentacea</i>	Furniture	32
55	Putat bukit	<i>Barringtonia lanceolata</i>	Ship building, dock, furniture and crates	40
56	Putat rimba	<i>Barringtonia</i> sp.	House stairs, furniture, agricultural equipment, tool handles	40
57	Rengas hitam	<i>Melanochyla elmeri</i>	High-class furniture, wall decorations, souvenirs, and others	56
58	Rengas-1	<i>Melanochylla</i> sp.	Furniture, stick	24
59	Roman, Gandaria	<i>Bouea macrophylla</i>	Tool handle, mash tool	30
60	Sasah	<i>Aporosa subcordata</i>	Household appliances, furniture, pestle	18
61	Temenges	<i>Memecylon myrcinoides</i>	Boat materials, furniture, paddles and tool handles	36
62	Teramayang	<i>Alangium javanicum</i>	Wood as furniture is easily formed	44
63	Terap	<i>Artocarpus kemando</i>	Household appliances, clothing materials, and others	56
64	Tulo-tulo	<i>Helicia robusta</i>	Household appliances	24

4. Diversity of species of non-timber forest products as household material

From the results of the inventory of useful plant species, there are eight species of rattan (Table 8). The eight species of rattan have quite important benefits for the people in the region. Based on the information of the local community, before oil palm plantations and Acacia plantations changes their forest area, rattan was the main source of income for the

people in the area, but now the results of rattan in the area are almost not found. So many household appliances such as *nyiru* (*nyiru* is a tool for filtering rice), *bubu* (*bubu* is a tool to catch fish) and other container equipment, which used to be made of rattan, are now made of bamboo. Communities are very difficult to find rattan in logged-over forests and it will become increasingly difficult if conversion of logged-over forests to oil palm plantations and Acacia plantations continues. It is even possible that rattan will become a rare commodity in this area.

Table 8. Diversity of rattan species in forest areas near the Tappa River

No	Local Name	Scientific Name	Uses
1	<i>Rotan semut</i>	<i>Korthalsia scaphigera</i>	Rope material, material for making container equipment: baskets, creases and others
2	<i>Rotan cincin</i>	<i>Calamus sabut</i>	Material for making baskets, mats and various household furniture
3	<i>Rotan udang</i>	<i>Korthalsia echinometra</i>	Materials for containers, mats and household appliances
4	<i>Rotan paldas</i>	<i>Calamus javensis</i>	Materials for household appliances such as containers, tools and others
5	<i>Rotan dahan</i>	<i>Korthalsia flagellaris</i>	Materials for household appliances, ropes, traps and others
6	<i>Rotan sabut</i>	<i>Calamus sabut</i>	Materials for household appliances, ropes, traps and others
7	<i>Rotan tunggal</i>	<i>Calamus laevigatus</i>	Materials for household appliances, ropes, traps and others
8	<i>Rotan batu</i>	<i>Calamus insignis</i>	Materials for household appliances, ropes, traps and others

According to the community, the species of rattan are equally important even though the economic value is different, but the importance is the same in life. Each species has its advantages.

Field observations noted 27 species of wood that could be used as a basis for paper, plywood and particle board (Table 9). The identification of local wood species as the basis for pulp and paper is intended to record local types that have the potential to be developed as pulp and paper manufacturing, so that this data can be used as initial data in an effort to find alternative pulp and paper raw materials derived from natural species in the area. The problem is that these species of wood do not have fast growing properties like those of Acacia and Eucalyptus species, which dominate industrial plantations in Indonesia today, so the search for pulp and paper material from natural or native wood in the region requires a very strong interdisciplinary research effort.

Table 9. Species of wood that can be used as a basis for making pulp or paper and plywood

No	Local Name	Scientific Name	Uses
1	-	<i>Gonocarium macrophyllum</i>	Plywood
2	-	<i>Horsfieldia crassifolia</i>	Plywood
3	Bayut batu	<i>Mezzetia parviflora</i>	Plywood
4	Dagau	<i>Chisocheton ceramicus</i>	Plywood
5	Gading jantan	<i>Xanthophyllum affine</i>	Plywood, block board

6	Gendis	<i>Chisocheton macrophyllus</i>	Plywood
7	Kawoyang	<i>Endiandra rubescens</i>	Plywood
8	Kayu bawang	<i>Dysoxylum alliasium</i>	Pulp and paper
9	Kayu gula	<i>Apanamixis</i> sp.	Plywood
10	Kayu kundur	<i>Mastixia rostrata</i>	Pulp and paper
11	Kayu tembaga	<i>Syzygium</i> sp.	Plywood
12	Kedondong	<i>Dacryodes laxa</i>	Plywood
13	Kedondong	<i>Santiria</i> sp.	Plywood, particle board
14	Kedondong tulang	<i>Canarium patentinervium</i>	Plywood
15	Mahang kukur	<i>Macaranga triloba</i>	Plywood
16	Medang	<i>Dehaasia firma</i>	Plywood
17	Medang api	<i>Elaeocarpus brevipes</i>	Pulp and paper
18	Medang keladi	<i>Litsea machilifolia</i>	Plywood
19	Medang segueh	<i>Elaeocarpus mastersii</i>	Pulp and paper
20	Mendang	<i>Elaeocarpus glaber</i>	Pulp and paper
21	Meresik	<i>Neoscortechinia kingii</i>	Pulp and paper
22	Pauh kijang	<i>Irvingia malayana</i>	Pulp and paper
23	Pendarahan	<i>Knema cinerea</i>	Plywood
24	Peredah burung	<i>Horsfieldia subglobosa</i>	Plywood
25	Rengas	<i>Melanochylla bracteata</i>	Plywood
26	Rengas hitam	<i>Melanochylla elmeri</i>	Plywood
27	Suren, parak	<i>Parishia maingayi</i>	Pulp and paper

In fact the community is not aware that the species of wood listed in Table 9 can be used as raw material for pulp and paper. However, an observation of these species can be used as basic data for further development both from the aspects of silviculture, biophysical, mechanical, chemical, and aspects of their utilization.

Potential Species of Non-timber Forest Products

1. Species of fruit-producing plants

Based on field observations both from the perspective of the local community and the analysis of the prospects for their use, there are several species of non-timber forest products that have the advantage of being further developed into more profitable plant species for the people in the area. Of course these species of plants need to be developed and tested by agronomists, geneticists, physiologists, and others.

Some species of fruits that have important prospects are listed in the following Table 10. According to the local community, these species of forest fruits are often extracted from the forest and the products are not only consumed by them but also sold to earn additional household income.

Table 10. Diversity of species of fruits and grains that have prospects for further development

No	Local and Scientific Names	Potential Uses
1	Arang tarau (<i>Nephelium cuspidatum</i>)	Fruit
2	Balam canggai atau sunggai (<i>Palaquium</i> sp.)	Fruit
3	Balam merah (<i>Madhuca</i> sp.)	Fruit
4	Balam sudu (<i>Palaquium</i> sp.)	Fruit

5	Balam sundik (<i>Madhuca</i> sp.)	Fruit
6	Balam terung (<i>Palaquium hexandrum</i>)	Fruit
7	Cempunik (<i>Artocarpus hispidum</i>)	Fruit
8	Durian daun (<i>Durio oxleyanus</i>)	Fruit
9	Gelugur (<i>Garcinia atroviridis</i>)*	Fruit
10	Kabau (<i>Archidendron bubalinum</i>)	Fruit
11	Kandis (<i>Garcinia parvifolia</i>)*	Fruit
12	Karet jitan (<i>Willughbeia firma</i>)	Fruit
13	Kepala tako/siwan (<i>Nephelium</i> sp.)	Fruit
14	KerANJI (<i>Dialium indicum</i>)*	Fruit
15	Kulim (<i>Scorodocarpus borneensis</i>)	Fruit
16	Kumpal benang (<i>Pometia pinnata</i>)*	Fruit
17	Petai (<i>Parkia javanica</i>)	Fruit
18	Raman (<i>Bouea oppositifolia</i> , <i>Bouea macrophylla</i>)*	Fruit
19	Rambai (<i>Baccaurea motletana</i>)*	Fruit
20	Ridan (<i>Nephelium uncinatum</i>)*	Fruit
21	Tajam bulat (<i>Spondias</i> sp.)*	Fruit
22	Tampui geraan (<i>Baccaurea macrocarpa</i>)*	Fruit
23	Tampui jentikan (<i>Baccaurea</i> sp.)*	Fruit
24	Tampui labu (<i>Baccaurea bracteata</i>)*	Fruit
25	Tampui sepenggang (<i>Baccaurea</i> sp.)*	Fruit
26	Tampui tungau (<i>Baccaurea</i> sp.)*	Fruit
27	Tengkuk biawak (<i>Xerospermum laevigatum</i> , <i>X. noronhae</i>)	Fruit

The species of plants that produce fruits from the forest are the most preferred by the people and the name of the species marked “ * ” in addition to being used for self-consumption is sometimes also sold.

2. Species of medicinal plants

Based on identification and observations in the field and public opinion, several species of medicinal plants as contained in the following Table 11 have the potential to be further developed. The reason is that these species have more than one property and contain active ingredients that are important in the development of modern medicines.

Table 11. The species of medicinal plants that is important

No	Local Names	Scientific Names	Uses	ICS Value
1	Akar kuning	<i>Coscinium penetratum</i>	Antiseptic medicine, burns, skin diseases (ulcers), fever medicines, stomachaches (dysentery), jaundice and inflammation of the eyes. This plant contains active ingredients berberine and jatrorrhizine	58
2	Basau, akar bebulus	<i>Ancistrocladus tectorius</i>	Ingredients for medicine of dysentery and malaria improve blood circulation; kidney disease medication; and seasonings	33
3	Bekil atau terap	<i>Artocarpus elasticus</i>	Material for dysentery and TBC medicines	66

4	Landang	<i>Poikilospermum suaviolens</i>	Ingredients cough medicine, eye medicine, fever medication and kidney disorders, itching and fever medication, and stomach pain medication for mothers after giving birth.	42
5	Mahang kukur	<i>Macaranga triloba</i>	Ingredients for internal medicine and stomachache; contains coorilagin, furosin, geranin, and macaranganin; Medicinal for diarrhea, dysentery, fever, and as a cleansing wound after giving birth	38
6	Manggis hutan	<i>Garcinia</i> sp.	Toothache medicine material	37
7	Mbacang	<i>Mangifera</i> sp.	Astringent medicine ingredients, medicine for burning skin and snake bites	33
8	Pacar cina	<i>Aglaia odoratissima</i>	External and internal medicine ingredients in children with fever, venereal medicine, phlegm laxatives, appetite stimulants, fever-lowering medicine, menorrhagia medicine, as tonics, asthma medications and hepatitis. The flowers contain odorin and odorinol alkaloid compounds to prevent the spread of cancer cells.	58
9	Rambutan	<i>Nephelium lappaceum</i>	The ingredients for toning muscles, stomach medicine, worm medicine, dizziness and fever medicine. This species contains saponins that are toxic	33
10	Sikentut	<i>Saprosma arborium</i>	Medicinal ingredients prevent digestive disorders, flatulence drugs and external medicine as a poultice for the mother after giving birth	36
11	-	<i>Forrestia mollissima</i>	Ingredients for rheumatic medicine, fever medicine, rheumatic fever and headache. All parts of the plant contain the Ecdysterone (commisterone) steroid.	36

The selection of the 11 species is not only based on ICS assessment but also based on the aspect of the efficacy and content of active ingredients contained in the plant.

3. Species of plants as equipment

The results of identification of plant species used as material for equipment are recorded 30 species. These species have important values for the people around the area. These species need to be protected and where possible further developed so that people still have raw materials for their household equipment needs. The potential species are listed in the following Table 12. The number of species chosen actually aims to provide basic data to researchers having more options to learn more.

Table 12. Species of plants as equipment with potential

No	Local Names	Scientific Names	Uses	ICS Value
1	-	<i>Dysoxylum cauliflorum</i>	High quality home furniture materials: cupboards, chairs, tables and others	38
2	-	<i>Gonocarium macrophyllum</i>	Furniture materials: cupboards and waterwheels	36
3	<i>Barangan haji</i>	<i>Castanopsis javanica</i>	The bark is made of rice storage container and tanning material	38
4	<i>Bayut batu</i>	<i>Mezzetia parviflora</i>	Interior materials, containers, boxes, matches, and household furniture	44
5	<i>Bekil</i>	<i>Artocarpus elasticus</i>	Bark as cloth, shirts, belts, jackets, blankets and carpets	66
6	<i>Bintangor</i>	<i>Calophyllum rubiginasum</i>	Household furniture materials: furniture	44
7	<i>Dagau</i>	<i>Chisocheton ceramicus</i>	Boat-making materials, room decorations, cupboards, rulers, panels, hair combs, crates, toys and waterwheels	70
8	<i>Gendis</i>	<i>Chisocheton macrophyllus</i>	Boat-making materials, room decorations, cupboards, rulers, panels, hair combs, crates, toys and wheels	70
9	<i>Kawoyang</i>	<i>Endiandra rubescens</i>	Materials to make electricity poles, cupboards and carpentry equipment	48
10	<i>Kayu bawang</i>	<i>Dysoxylum alliasium</i>	Handcrafted materials, pool tables and matchboxes	36
11	<i>Kayu gula</i>	<i>Apanamixis</i> sp.	Tooling materials, furniture, longboats, ships, windmills and vehicle bodies	56
12	<i>Kedondong</i>	<i>Dysoxylum</i> sp.	High quality home furniture materials: furniture	38
13	<i>Kedondong</i>	<i>Dysoxylum ridgewayi</i>	High quality home furniture materials: furniture	38
14	<i>Kedondong</i>	<i>Dysoxylum grande</i>	High quality home furniture materials: furniture	38
15	<i>Kedondong</i>	<i>Dysoxylum</i> sp.	High quality home furniture materials: furniture	38
16	<i>Mahang</i>	<i>Macaranga</i> sp.	Material for making furniture, shingles, containers and lighters	40
17	<i>Medang</i>	<i>Dehaasia firma</i>	Home furnishings, pianos and crates	40
18	<i>Medang api</i>	<i>Elaeocarpus brevipes</i>	Boat-making materials and household furniture	38
19	<i>Medang mata</i>	<i>Alangium ridleyi</i>	Household furniture materials:	40

	<i>udang</i>		cupboards, carving materials, mashing tools and rifles	
20	<i>Medang segueh</i>	<i>Elaeocarpus mastersii</i>	Boat-making materials, artisanal and household furniture	38
21	<i>Meresik</i>	<i>Neoscortechinia kingii</i>	Material for making boats, waterwheel, containers and household furniture	40
22	<i>Mesekam</i>	<i>Baccaurea sumatrana</i>	Ship building materials, dock materials, furniture and crates	40
23	<i>Pacar cina</i>	<i>Aglaia odoratissima</i>	Household furniture material: easy to shape	58
24	<i>Pantat ulat</i>	<i>Memecylon anplexicaule</i>	Boat-making materials, household furniture, oars and tool handles	36
25	<i>Pendarahan</i>	<i>Knema cinerea</i>	Boat-making materials, containers, matchboxes and matchsticks	56
26	<i>Putat bukit</i>	<i>Barringtonia lanceolata</i>	Boat-making materials, dock materials, furniture and box materials	40
27	<i>Rengas hitam</i>	<i>Melanochyla elmeri</i>	High quality household furniture materials: furniture, wall decorations, souvenirs and others	56
28	<i>Temenges</i>	<i>Memecylon myrcinoides</i>	Boat-making materials, household furniture, oars and tool handles	36
29	<i>Teramayang</i>	<i>Alangium javanicum</i>	Home furnishings, mash tools, rifle handles and roots can be made as cigarette pipes	44
30	<i>Terap</i>	<i>Artocarpus kemandu</i>	Materials for household appliances, clothing materials and others	56

The problem is that people rarely make such equipment, besides being caused by the intervention of modern equipment made of metal and other synthetic materials, it is also caused by changes in people's lifestyles. At present the community relies more on salaries as workers in Industrial Forest Plantation (HTI) and other plantation companies than on relying on agricultural and forest products that are increasingly diminishing, for example, the community at this time rarely makes canoes because terrestrial access is already available, so that public transportation through the river becomes increasingly reduced. Actually the change in lifestyle is not an obstacle to developing folk crafts whose raw materials are available in the vicinity. The most important thing is how to take advantage of marketing opportunities. Handicraft products from natural materials actually still have high value and there is even a tendency for people to prefer household appliances and furniture made from wood and other species of plants.

4. Species of wood raw materials for pulp and plywood

The main purpose of identifying the species of wood raw material for pulp and plywood (Table 9) is to provide basic data for biomaterial researchers to test the quality of the wood. Furthermore, selected species of wood can be developed by silviculture researchers, agronomists and biotechnology researchers to engineer the possibility of development, the ultimate goal of which is to find local options that have the advantage of growing fast and can compete with other plant species such as Acacia and Eucalyptus. Both species have the advantage of fast growing, but also cause losses in the ecosystem, because this species is allelopathic and invasive, so that the conserved forest area is invaded by these Acacia species.

5. Honey

Traditionally in this research area, local people take honey from trees which are a place where honey bees nest. Some types of plants that become honeycombs include: *pulai* (*Alstonia scholaris*), *jelutung* (*Dyera costulata*), *kempas* (*Koompassia malaccensis*), *kundur* (*Xerospermum noronhianum*, *X. laevigatum*), *kedondong* (*Dacryoides* spp.), *kruing* (Dipterocarpaceae), *arau* (*Ficus* spp.), and others. The results of honey from this area come from the results of taking honey in the forests. The public has not tried to cultivate this honeybee. Actually honeybee cultivation in this area has good prospects for the community. Even though the forest area is decreasing, the source of nectar for honey is still available in this area. Besides that honey marketing is not experiencing difficulties because the demand for honey is quite high. Moreover, the taste of honey produced from this region has a distinctive taste because the source of nectar comes from various types of plants.

6. The results of rattan

During the period of primary forest, this area was an important producer of rattan. But along with the loss of primary forest from this area, rattan becomes a hard material to find. At the time of the study, it was very difficult to find local people making equipment made from raw rattan. This is caused by the difficulty in getting raw rattan. Even the equipment has been replaced with materials from bamboo, so that the quality and aesthetic value is reduced.

Efforts to develop rattan cultivation need to be tried in the former logged-over secondary forest areas whose designation is as a conservation area for protected area of industrial forest plantation, for example, in the protected forest area of industrial forest plantation, the area of protected forest is more than 10% of the concession area.

Role of NTFPs in the Household Economy of the Melayu Community at the Study Site

Broadly speaking, the role of non-timber forest products for the community at this time is decreasing along with the destruction of forest areas in this region. The area of their primary forest, which became an area to carry out extractives activities has been exploited by the timber company (HPH) and subsequently converted into industrial forest plantation and palm oil plantation area.

Research on the socioeconomic role of non-timber forest products (NTFPs) for the Melayu around the HTI area showed that the role of non-timber forest products in the framework of the needs of local community households has decreased dramatically. According to local people in this area, the socio-economic role of forest products in the year before the arrival of Timber Company in 1971 reached 50-60%. Now this role is reduced to

only 0-10% of total community income. Even in some villages such as Dasal, Dasal Lama and other villages that are far from the forest, they no longer rely on their lives from gathering forest products.

Development of Non-timber Forest Product Gathering Community in the Study Location

The results of the study of the diversity of non-timber forest products carried out in the Tanjung Jabung area around the forest area showed that there was a change in the pattern of utilization of non-timber forest products from time to time. During the period before 1995, primary forest was still found around their villages. The forest products like rattan and resin were the main non-timber forest products extracted by the community. According to community information at the time, the sale of rattan and resin provided a contribution of 40-70% to their household income. Field observations show that community income from the gathering of non-timber forest products has decreased dramatically in line with the activities of logging companies in this area. Furthermore, when the HPH Company was still operating in the forest area around their settlement, the main income of the household came from working in the HPH Company.

After the primary forest has been “logged” by the HPH Company, the former logging forest area has been turned into Industrial Forest Plantation and oil palm plantations. Local people in this region turned professions into workers in industrial forest plantation companies and oil palm plantation companies, so that the main income of the community is to become workers in those companies. Some community members have tried to cultivate their land by planting oil palm in accordance with government programs relating to oil palm development partnerships between companies and farmers, but due to pressure from the need and lack of knowledge about developing oil palm plantations, many of their oil palm plantations are sold to newcomers, transmigrates, oil palm and industrial forest plantation companies’ workers.

At this time there has been a very alarming change due to reduced forest area and changes in the status of the land around those controlled by plantation companies and industrial forest plantation, resulting in the majority of local communities not having enough more land for farming and the freedom to gather forest products non-wood. Most of the people make their living as laborers in these plantation and industrial forest plantation companies. Due to the rapid development in the field of transportation, better road facilities, technological pressure, education, population growth, and economic pressure, local people are starting to have difficulty competing with migrants who have better education and stronger capital. As a result, the limited land ownership was forced to be selling to migrants to meet their needs. Another difficulty faced by local communities is that they are not free to enter the forest area that has been determined to be a concession area of a company, so that the traditional habits of the community to carry out the activities of extracting forest products are very difficult and even impossible anymore. As a result of these conditions, several communities carried out illegal logging activities in the company’s protected forest areas that were part of the concession area of palm oil plantation and industrial forest plantation company.

The limited land, which is controlled by local communities, has made them unable to carry out their traditional production activities such as shifting cultivation and gathering forest products. From the latest observations in 2017, the majority of local people do not currently carry out cultivation activities anymore. They have abandoned farming activities since migrants controlled their lands and the forest area around them became the concession area of the industrial forest plantation and oil palm plantation. To make ends meet they

depend on wages as a laborer of the company. Some older members of the community where as laborers are no longer productive, they make a living by fishing in the rivers around their villages and sometime gathering various species of fruit in secondary forests in the protection area of industrial forest plantation concession that have not been converted to plantation land Acacia or Eucalyptus. The company from the beginning of 2004 to avoid the risk of forest fires has actually prohibited this activity. In fact the community has begun to lose their right to be able to carry out forest product extractives activities since 1983 that the HPH took control of the area.

Although the activities of local communities to carry out extractives activities in the forest areas and former logging areas (old secondary forests) around them are rarely done, their knowledge of the diversity of forest products that are useful for their lives is still well maintained. Some communities, whose dwellings are not far from the former logging forest area such as those who live in Sungai Tapa village, are incentivized to carry out activities of extraction of forest products, especially non-timber forest products of building materials.

CONCLUSIONS

From the analysis of the importance cultural significance (ICS) of the species of non-timber forest products, several conclusions are:

1. The community feels lost one of the areas where extractives activities are carried out, so that changes in adaptation strategies occur in order to meet their needs.
2. Although local people are under pressure both from the loss of one of their important areas, namely forests and economic, technological and population growth, they still have good knowledge about the diversity of non-timber forest products found around them.
3. The results of the identification and analysis of importance cultural value, selected several species of plants that have the potential to be developed as (a) fruit plants; (b) medicinal plants; (c) tree species producing pulp; (d) species of plants as a raw materials for making local technology (equipment); (e) other non-timber forest products such as honeybee development; and (f) potential of rattan species. Furthermore, these species need further testing to prove their potential.
4. Based on the calculation of ICS values, species of non-timber forest products (NTFPs) that have high ICS values are an indication that these species are important for the lives of people in the area. Besides that, a high ICS value can be used as one of the parameters to determine the species of potential NTFPs that can be further developed into potentially economic species.
5. The results of this study are the basis for further research in the context of economic valuation of non-timber forest products. Species that are indicated as important as medicinal plants can be continued by phytochemical analysis; NTFPs plant species have the potential as a base material for pulp and plywood and their development can be continued by researchers in biomaterials, agronomics, silviculture and biotechnology. Likewise the NTFPs species have the potential as a fruit producer can be used by horticultural researchers to do the domestication process and create fruit-producing plants or enrichment of fruit species in Indonesia. The community has not cultivated these species of fruit-producing plants, but the results of the extraction of these fruits have provided benefits for people who live around the forest.
6. Local communities as farming communities have lost their livelihoods due to limited land for cultivation. This is caused by the surrounding area has become a palm oil plantation and industrial forest plantation. As a result, there has been a change in

livelihoods from shifting farming communities to workers or laborers in the industrial forest plantation and palm oil plantation companies.

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