Journal of Natural Resources and Environmental Management
11(4): 587-600. http://dx.doi.org/10.29244/jpsl.11.4.587-600
E-ISSN: 2460-5824
http://journal.ipb.ac.id/index.php/jpsl

Potential of forest plants as foodstuffs in KPHP Unit VIII Muntai Palas, South Bangka Regency

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Article Info:
Received: 28 - 08 - 2021
Accepted: 26 - 10 - 2021

Keywords:
AHP-SWOT, foodstuffs, KPH, LUVI, vegetation analysis

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Abstract. *Plants as forest food sources have potential comparative advantages as alternative resources. The existence of KPHP Unit VIII Muntai Palas as a management unit can improve the quality of forest management in South Bangka Regency, Bangka Belitung Islands Province. This research aimed to take an inventory, analyze the utilization, and formulate a conservation village development strategy. This research is explorative with determining four village locations (Kepoh, Pasir Putih, Batu Betumpang, and Bencah) and selecting informants by purposive sampling. The study results found 33 families, 54 genera, 73 species with a total of 1 858 individuals consisting of 1 071 seedlings, 385 saplings, 173 poles, and 226 trees. The highest value of species diversity in the medium category was found in Kepoh village, while the highest value of importance (LUVI) differed in each observation village. Kepoh was owned by* Sandoricum koetjape *Village (LUVI 11.14), Pasir Putih village was mostly inhabitated by* Mangifera odorata *(kuweni) with a LUVI value of 9.68, Batu Betumpang Village was mostly covered by* Nephelium lappaceum *(rambutan) (LUVI 11.20) and Bencah village (LUVI 10.84) belongs to* Garcinia nigrolineata *(kandis). The Strength-Opportunity (SO) strategy was applied in the development of sustainable forest conservation villages with the support of the diversity of forest food sources and regional policies as well as opportunities for the development of tourism forests, health forests, educational forests, natural laboratories and investment in natural resources and the environment to realize a sovereign forest conservation village independent food.*

How to cite (CSE Style 8th Edition):
Chairullah, Zuhud EAM, Sambas EN. 2021. Potential of forest plants as foodstuffs in KPHP Unit VIII Muntai Palas, South Bangka Regency. JPSL **11**(4): 587-600. http://dx.doi.org/10.29244/jpsl.11.4.587-600.

INTRODUCTION

Utilization and preservation of forest food source plants cannot be separated from the activities of the community around the area, where people's lives are very dependent on the forest, then local wisdom appears which is contained in community ethnobotany in the use and preservation of forests. According to Zuhud (2011) Indonesia's tropical forests which consist of various types of ecosystems are a repository of biodiversity for more than 239 species of food plants and more than 2 039 species of medicinal plants.

In the Province of the Bangka Belitung Islands, as a tin island, quite a lot of land contains deposits or minerals such as tin, granite, kaolin, quartz and others in the forest area. Mining activities, plantations and illegal logging of trees have caused a lot of forest degradation. so that the potential of the forest as a forest food source plant habitat needs a potential study.

The establishment of KPHP Unit VIII Muntai Palas in South Bangka Regency based on the decision of the Minister of Forestry of the Republic of Indonesia number: SK.797/MENHUT-II/2009 concerning the determination of the area for the protected forest management unit (KPHL) and the production forest management unit (KPHP) of the Bangka Belitung Islands Province. They have duties and functions, among others, to organize forest management and open investment opportunities to support forest management objectives. Forest management is one of the government's efforts to save forest plant species that can be utilized, forest protection, and nature conservation for economic, social, and environmental interests. Local people have long used the types of forest food plants, but they have not been well documented, so they do not know how many species there are and what they are used for. The usefulness of plants as food sources is generally known by people who are old because along with the development of science and technology, many people have forgotten the benefits of forests as biological resources.

This research was conducted to obtain basic information (baseline) of forest food source plants and analyze the use of plants by the community and formulate a community-based development strategy for community-based forest food source plant conservation development strategies (Figure 1).

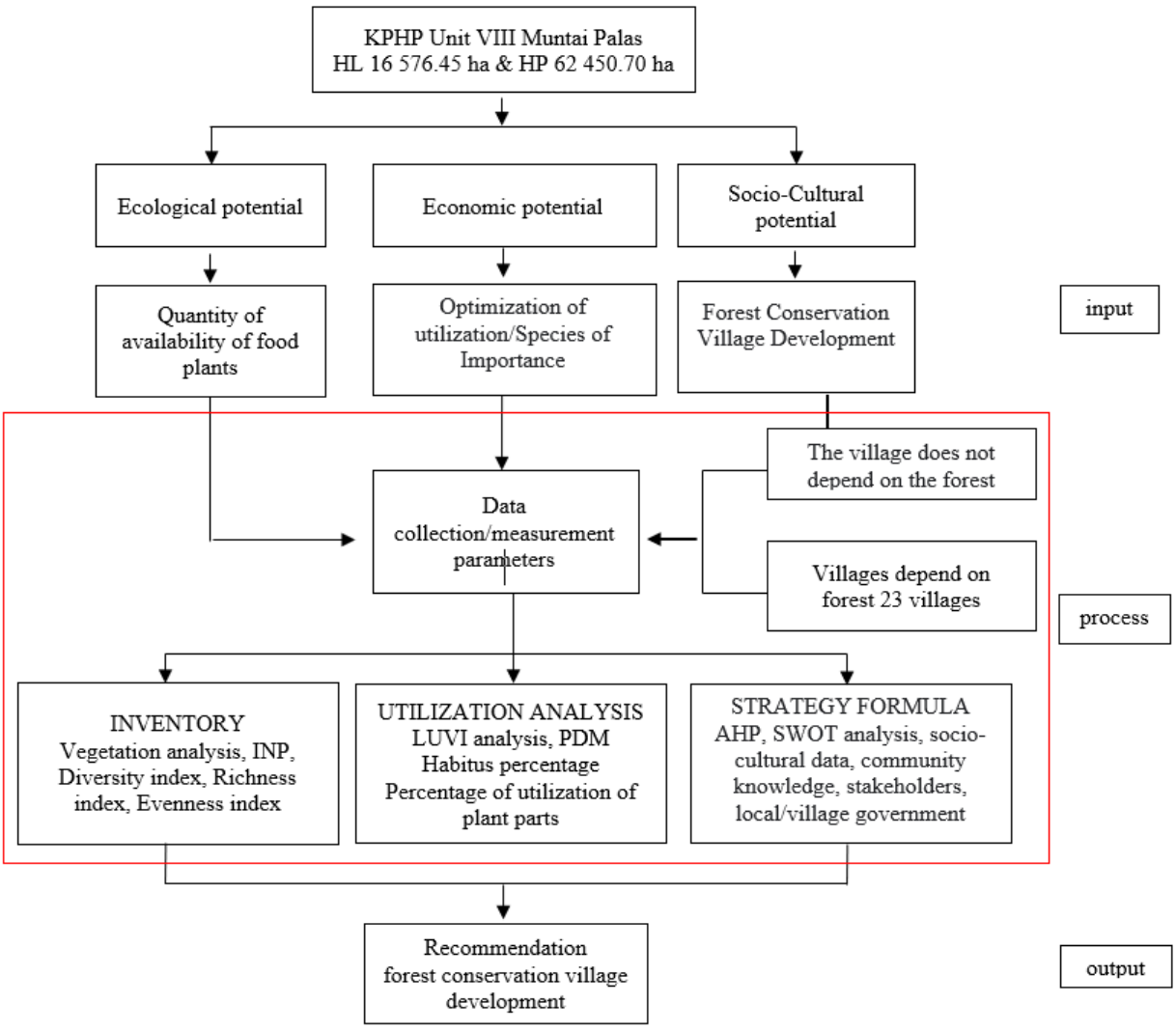


Figure 1 Research flow

METHOD

Location and Time

The research was conducted at KPHP Unit VIII Muntai Palas, South Bangka Regency, Bangka Belitung Islands Province. Geographically it is located between 107°14'31"-105°53'9" east longitude and 2°26'27"-3°5'56" south latitude. The research locations are in four villages, namely Kepoh village, Pasir Putih village, Batu Betumpang village and Bencah village which are in the management area of KPHP Unit VIII Muntai Palas (Figure 2). This research was completed from May-December 2020.

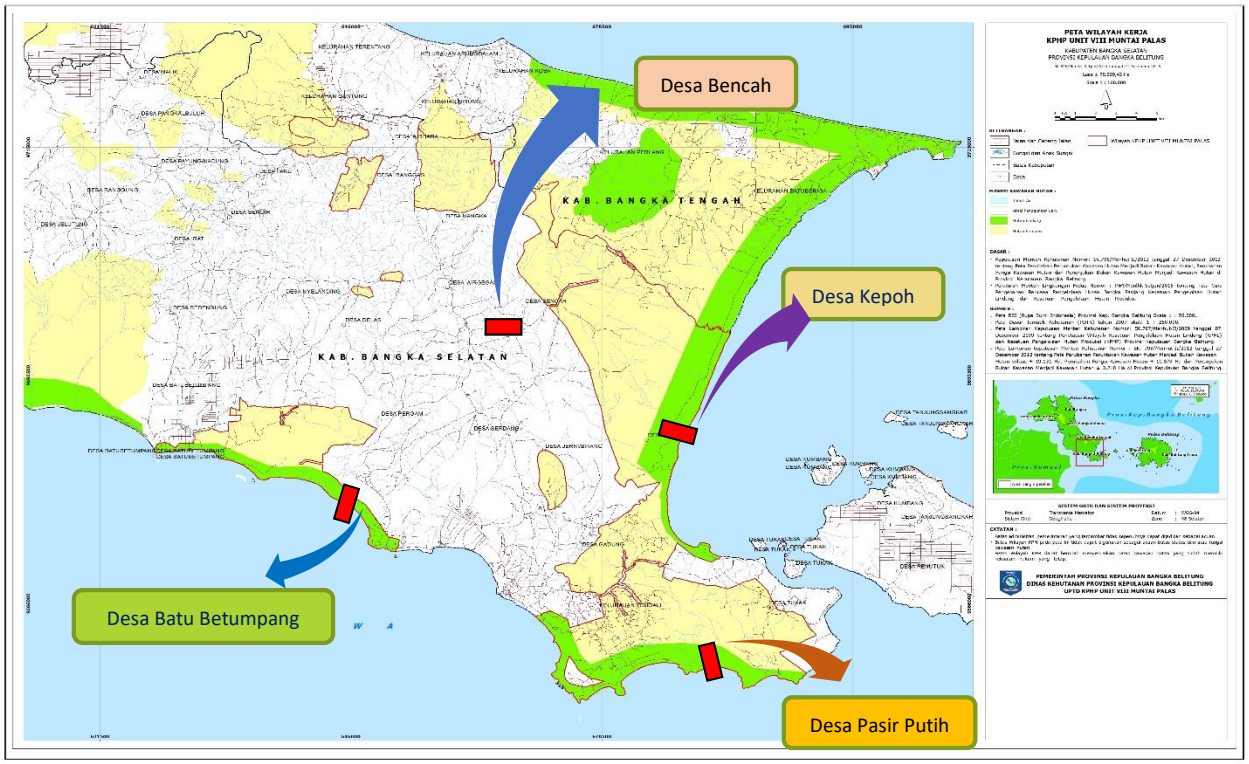


Figure 2 Research location (KLHK, 2018)

Materials and Tools

The materials used include 70% alcohol, newsprint for making herbarium, while the tools used include a Nikon D5600 camera, GPS Garmin 64c, recorder, compass, measuring rope, stationery, tally sheet. Identification of plants in collaboration with the Research Center for Plant Conservation and Botanical Garden LIPI-Bogor.

Data Collection Methods

Data collection methods in this study were carried out through library research, interview, observation, vegetation analysis, identification of herbarium sample, and identification of plant species as forest food sources. The process of collecting qualitative data is done through a literature study and interviews. Interviews are usually conducted before conducting a field survey and serve as cross-check material for the presence of plants in the field (Togola *et al*. 2005).

Interviews in this study were conducted by means of group interviews as a measuring tool that reflects the community's perspective (Frey and Fontana, 2009) and purposive sampling method, namely to 40 key informants and eight primary informants in an open-ended way who are considered to understand the problems and research themes and have time to get involved. The observation data is quantitative using a combination

method of striped and plotted lines (Kusmana 2017) with a total area of 4 hectar or 1 hectar (20x500) m^2 per village. The size of each location was divided into 25 plots which contained observation plots with the size of tree growth rate (20x20) m^2, saplings (5x5) m^2, while seedlings (2x2) m^2 (Figure 3).

Data collected at the seedling level included the species name, the number of individuals of reach species, while for sapling, poles and trees the species name, number of individuals of each species, and stem diameter were recorded (Table 1).

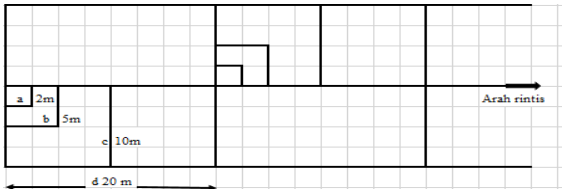


Figure 3 Design of the combination of the path method with the checkered line method (Kusmana, 2017)

Table 1 Types of data and information

No	Aim	Data Type	Source	Methods and Analysis
1	Inventory the potential of forest food plants as a baseline for management, conservation, and utilization.	• Plant species • Village data • Local/regional name • Scientific name (surname, family) • Rod diameter • Stem height • Density/relative density • Relative frequency/frequency • Relative dominance/dominance • Species diversity • Species richness • Evenness of species	• Community unit of analysis • BPS (2021) • KPHP Unit VIII Muntai Palas • Herbarium • Species identification manual	• Questionnaire/Interview/FGD • Literature review • Observation • Documentation • Vegetation analysis (Kusmana, 2017) • Important Value Index (IVI) • Species Diversity Index (Shannon-Wienner) • Species Richness Index (Margalef) • Evenness Index
2	Analyzing the use of forest food source plants in KPHP Unit VIII Muntai Palas, South Bangka Regency	• Species importance • Parts of plants used • Functional classification of plants • How to use the species • Specific habitus data	• Unit of analysis informants • Observation	• LUVI analysis (Sheil *et al.*, 2004) • PDM (Pebble Distribution Method) (Gadgil *et al.*, 2000) • Analysis of plant use • Deep interview
3	Formulate community-based forest food source plant conservation village development strategies	• Factor weight data • Factor rating data • Factor scoring data	• Informants • Village head • Bappeda	• Questionnaire • Interview • Hierarchys Process Analysis (AHP) (Saaty, 1991) • SWOT analysis (Rangkuti 1997)

Data Analysis Method

Plant Inventory Data

Important value index (IVI)

IVI describes the ecological position of a species against other species in a community. According to Soerianegara and Indrawan (1998), the formula used in calculating the Important Value Index (IVI) is:

Relative density (KR) = (density of a species)/(total density) ×100%
Relative frequency (FR) = (frequency of a species)/(total frequency) ×100%
Relative dominance (DR) = (species dominance)/(total dominance) ×100%
Important Value Index (IVI) = KR + FR + DR for tree, pole and sapling level (%)
IVI for seedling and undergrowth (%) = KR + FR

Species diversity index

The value of species diversity is determined by using the Shannon-Wienner index formula:

$$H' = -\Sigma pi \ln pi$$

Information:

H'= Index of Diversity; pi= the proportion of the number of individuals of the its species (ni/N); ni= the number of individuals of the I-th species; N= the total number of individuals of all species.

Species richness index

Species diversity can be measured using the margalef formula (Clifford and Stephenson, 1975 in Magurran, 1988):

$$\mathrm{DMg} = \frac{(S-1)}{\mathrm{Ln}\ N}$$

Information:
DMg= margalef index; S= number of species observed; Ln= normal logarithm; N= total number of observed individuals.

Species evenness index

The evenness of species (evenness index) (Odum, 1993) with the formula:

$$E = \frac{H'}{\mathrm{Ln}\ S}$$

Information:
E= species evenness index; H'= shannon index; S= number of observed species found; Ln= natural logarithm.

Plant Utilization Analysis

Local user's value index (LUVI) value

LUVI is the level of importance possessed by a species as a whole even though the interests are different (CIFOR, 2000). The specific method used is the scoring approach (pebble distribution method (PDM) and the unit sample area of variation (Gadgil *et al*., 2000).

LUVI = ∑ j species, total j, Gij
Gij = ∑ category J Gij = RWJ x RWij

Description:
Gij= the importance of a type of use (j) of a species (i); RWJ= the weight assigned to a broad class of uses, where certain uses j are located RWij= relative weight in category j in the utilization of species i that qualifies as a member-member j.

Plant utilization analysis

$$\text{Percentage of certain habitus} = \frac{\sum \text{certain species of habitus used}}{\sum \text{total species}} \text{ x } 100\%$$

$$\text{Percentage of parts utilized} = \frac{\sum \text{certain parts used}}{\sum \text{total part used}} \text{ x } 100\%$$

Conservation Village Development Strategy

AHP and SWOT Analysis

AHP is a multi criteria decision making technique in which quantitative and qualitative factors are combined so that priorities, positions and evaluations of alternatives can be carried out (Saaty, 1991). In this study, the calculation of the weight of each criterion used the AHP method with the help of R-Studio software and the computer program Excel 2016.

SWOT analysis is a strategic planning technique that is useful for evaluating the strengths and weaknesses, opportunities, and threats in a project (Figure 4). To get the rating value for each criteria for developing a forest conservation village, a strategy formulation using SWOT analysis is generated. SWOT analysis was first introduced by Albert S Humphrey in the 1960s when he led a research project at the Stanford Research Institute using data from Fortune 500 companies. This analysis can logically help in the decision-making process. The decision-making process is related to the vision and mission as well as the objectives of the research project. So that SWOT analysis can be used as an effective tool to analyze the factors that affect the company as a decision-making process to determine strategy.

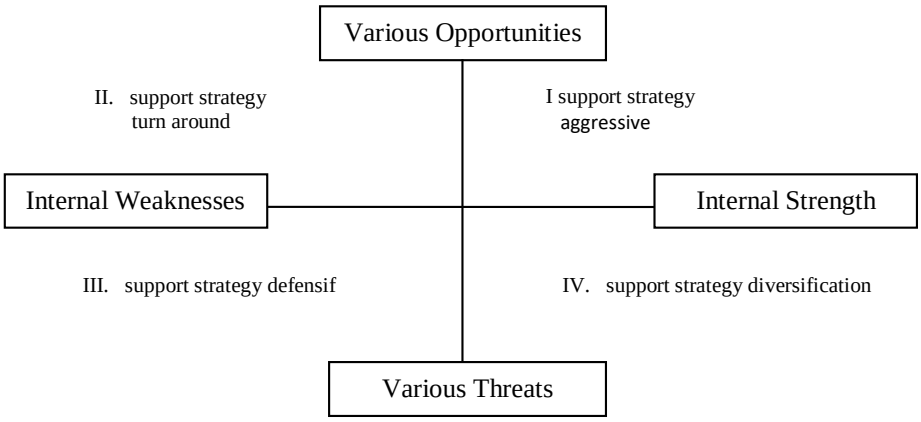


Figure 4 SWOT analysis (Solusu, 2000)

RESULTS AND DISCUSSION

Inventory of Forest Food Source Plants

After making observations to all observation points using the vegetation analysis data collection method, the results recorded were 73 species, 54 genera and 33 families with a total of 1858 individuals with details on the number at the seedling level as many as 1 071 individuals, sapling level 385 individuals, pole level 172

individuals and trees 226 individual. Thirty three (33) families with the most species, Myrtaceae (13 species) followed by Arecaceae (7 species), Sapindaceae, and Melastomataceae (5 species) as shown in Table 2.

Table 2 Number of species and individuals of forest food source plants observed at all growth levels in KPHP Area of Unit VIII Muntai Palas, South Bangka Regency

No	Scientific name	Famili	Quantity Per Growth Rate				Σ
			Seedling	Sapling	Poles	Trees	
1	*Ampelocisus korthalsii* Planch	Vitaceae	1	-	-	-	1
2	*Anisophyllea disticha* (Jack) Baill	Anisophylleaceae	9	5	-	-	14
3	*Archidendron pauciflorum* (Benth.) C.Nielsen	Fabaceae	1	-	-	-	1
4	*Artocarpus integer (*Thunb.) Merr	Moraceae	-	-	-	1	1
5	*Artocarpus lacucha* Buch-Ham	Moraceae	-	-	1	1	2
6	*Avicennia alba* Blume	Acanthaceae	-	-	-	1	1
7	*Blumeodendron tokbrai* (Blume) Kurz	Euphorbiaceae	-	1	-	-	1
8	*Bridelia tomentosa* Blume	Phyllanthaceae	1	2	-	5	8
9	*Calamus melanochaetes* (blume)	Arecaceae	36	-	-	-	36
10	*Calophyllum inophyllum* L	Clusiaceae	-	4	-	-	4
11	*Caryota mitis* Lour.	Arecaceae	19	19	10	2	50
12	*Centrosema pubescens* Benth.	Fabaceae	8	-	-	-	8
13	*Coffea canephora* Pierre ex A Froehner	Rubiaceae	1	1	-	-	2
14	*Cratoxylum glaucum* Korth	Hipericaceae	-	-	14	50	64
15	*Curculigo latifolia* Dryand ex WT Aiton	Amarylidaceae	1	-	-	-	1
16	*Elaeis guineensis Jacq*	Arecaceae	-	-	-	2	2
17	*Elaeocarpus obtusus* Blume	Elaeocarpaceae	-	1	-	1	2
18	*Elaeocarpus submonoceras* subsp lasionyx (Stapf ex Ridl.) Weibel	Elaeocarpaceae	19	33	16	2	70
19	*Eurycoma longifolia* Jack.	Simaroubaceae	1	-	-	-	1
20	*Ficus fistulosa* Reinw.ex Blume	Moraceae	-	2	2	-	4
21	*Ficus racemosa* L.	Moraceae	-	-	1	3	4
22	*Flacourtia rukam* Zoll. and Mor	Salicaceae	95	9	-	6	110
23	*Garcinia nigrolineata* Planch ex T Anderson	Clusiaceae	47	30	1	2	80
24	*Garcinia xanthochymus* Hook.f.ex	Cluciaceae	1	1	-	7	9
25	*Gynotroches axillaris* Blume	Rhizophoraceae	17	37	6	-	60
26	*Hornstedtia tomentosa* (Blume) Bakh.f.	Zingiberaceae	1	-	-	-	1
27	*Ilex laevigata* (Pursh) A Gray	Aquifoliaceae	40	3	-	-	43
28	*Labisia pumila* (Blume.) Fern.-Vill.	Primulaceae	8	-	-	-	8
29	*Lansium domesticum* Corr	Meliaceae	-	-	1	-	1
30	*Leea indica* (Burm f) Merr	Vitaceae	4	7	-	-	11
31	*Lepisanthes amoena* (Hassk.) Leenh.	Sapindaceae	-	1	-	-	1
32	*Licuala spinosa* Wurmb	Arecaceae	2	-	-	-	2
33	*Lijndenia laurina* Zoll. and Moritzi	Melastomataceae	16	4	-	-	20
34	*Mangifera caesia* Jack ex Wall	Anacardiaceae	-	-	-	1	1
35	*Mangifera odorata* Griffith	Anacardiaceae	-	-	-	7	7
36	*Melastoma malabathricum* L	Melastomataceae	1	-	-	-	1
37	*Melicope lunu-ankenda* (Gaertn) TG Hartley	Rutacecea	-	2	2	-	4
38	*Memecylon edule* Roxb.	Melastomataceae	-	1	-	-	1
39	*Memecylon paniculatum* Jack	Melastomataceae	6	-	-	-	6
40	*Memecylon umbellatum* Burm.f.	Melastomataceae	4	2	6	-	12

No	Scientific name	Famili	Quantity Per Growth Rate				Σ
			Seedling	Sapling	Poles	Trees	
41	*Microcos tomentosa* Sm.	Malvaceae	4	19	6	-	29
42	*Mischocarpus pentapetalus* (Roxb.) Radlk.	Sapindaceae	-	1	-	-	1
43	*Nephelium cuspiatum* Blume	Sapindaceae	-	-	1	2	3
44	*Nephelium lappaceum* L	Sapindaceae	-	-	1	2	3
45	*Nephelium maingayi* Hiern	Sapindaceae	219	4	3	9	235
46	*Oncosperma tigillarium* (Jack) Ridl	Arecaceae	23	2	-	-	25
47	*Parkia speciosa* Hassk	Fabaceae	1	-	1	1	3
48	*Pinanga coronata* (blume ex Mart.) Blume	Arecaceae	9	8	-	-	17
49	*Piper nigrum* L	Piperaceae	16	-	-	-	16
50	*Pittosporum ferrugineum* W.T. Aiton	Pittosporaceae	2	7	2	1	12
51	*Psychotria viridiflora* Reinw.ex Blume	Rubiaceae	4	-	-	-	4
52	*Quercus* sp	Fagaceae	1	-	-	1	2
53	*Rhodamnia cinerea* Jack	Myrtaceae	23	51	21	8	103
54	*Salacia korthatsiana* Miq	Celastraceae	-	1	-	-	1
55	*Salacia verrucosa* Wight	Arecaceae	2	-	-	-	2
56	*Sandoricum koetjape* (Burm.f.) Merr.	Meliaceae	-	-	2	1	3
57	*Sonneratia alba* JE Smith	Lythraceae	-	-	-	1	1
58	*Sterculia oblonga* Mast.	Malvaceae	5	2	-	-	5
59	*Symplocos recemosa* Roxb.	Symplocaceae	2	-	-	-	2
60	*Syzygium acuminatissimum* (blume) DC	Myrtaceae	11	7	-	-	18
61	*Syzygium antisepticum* (Blume) Merr.andL.M Perry	Myrtaceae	4	1	-	6	11
62	*Syzygium chloranthum* (Duthie) Merr and LM Perry	Myrtaceae	25	17	-	-	42
63	*Syzygium grande* (Wight)Walp.	Myrtaceae	12	11	3	67	93
64	*Syzygium incarnatum* (Elmer) Merr and L.M. Perry	Myrtaceae	4	10	1	7	22
65	*Syzygium jambos* (L)Alston	Myrtaceae	-	1	1	1	3
66	*Syzygium luehmannii* (F Muell) LAS Johnson	Myrtaceae	-	2	1	-	3
67	*Syzygium nervosum* A.Cunn.ex DC	Myrtaceae	-	1	-	-	1
68	*Syzygium pycnanthum* Merr. and LM Perry	Myrtaceae	158	9	2	-	169
69	*Syzygium rubiginosum* Merr. and L.M. Perry	Myrtaceae	189	60	31	14	294
70	*Terminalia catappa* L	Combretaceae	-	1	1	9	11
71	*Tetracera poggei* Gilg	Dilleniaceae	1	-	-	-	1
72	*Tristaniopis mergueensis* Griff.	Myrtaceae	17	4	36	7	64
73	*Tristaniopsis laurina* (Sm.) Peter G Wilson and JT Waterh	Myrtaceae	-	1	-	-	1
		Amount	1071	385	172	226	1858

Table 3 describes the significant value index (IVI) of tree growth rates in the four villages that were observed differently. In the village of Kepoh, the highest IVI value was in the type of Terminalia catappa (83.29%) of the Combretaceae family which showed a higher density value than other species. *Terminalia catappa* in Kepoh village mostly grows in watery or swampy habitats. Desa Pasirputih, species of *Syzygium grande* family Myrtaceae, has the highest IVI (174.33%). In the village of Batu Betumpang, the species *Ficus racemosa* of the Moraceae family with an IVI of 127.27% and *Cratoxylum glaucum* of the Hipericaceae family in the village of Bencah had the highest IVI of 176.17%. Ecologically it can be explained that the IVI shown

by each species indicates the presence of that species is considered dominant in the area because it has a higher density, frequency and dominance than other species.

Table 3 Types and analysis of forest food source vegetation observed on tree growth rates in four village KPHP Unit VIII Muntai Palas, South Bangka Regency

Lokasi Pengamatan	Nama Ilmiah	Famili	KR (%)	FR (%)	DR (%)	IVI (%)
Desa Kepoh	*Sonneratia alba*	Lythraceae	3.57	4.76	10.47	18.81
	Elaeis guineensis	Arecaceae	7.14	9.52	18.63	35.30
	Terminalia catappa	Combretaceae	32.14	28.57	22.58	83.29
	Mangifera odorata	Anacardiaceae	7.14	9.52	17.74	34.40
	Mangifera caesia	Anacardiaceae	3.57	4.76	15.09	23.43
Desa Pasir Putih	*Syzygium grande*	Myrtaceae	62.62	42	69.71	174.33
	Syzygium rubiginosum	Myrtaceae	4.67	8	2.87	15.54
	Garcinia xanthochymus	Cluciaceae	6.54	10	4.93	21.47
	Syzygium incarnatum	Myrtaceae	6.54	12	5.24	23.79
	Rhodamnia cinerea	Myrtaceae	7.48	12	3.87	23.35
Desa Batu Betumpang	*Ficus racemosa*	Moraceae	23.08	25.00	79.19	127.27
	Bridelia tomentosa	Phyllanthaceae	38.46	25.00	11.43	74.90
	Parkia speciosa	Fabaceae	7.69	25.00	6.45	39.15
	Nephelium lappaceum	Sapindaceae	15.38	16,67	2.02	34.07
	Caryota mitis	Arecaceae	15.38	8,33	0.90	24.62
Desa Bencah	*Cratoxylum glaucum*	Hipericaceae	64.10	45.16	66.85	176.12
	Tristaniopsis merguensis	Myrtaceae	8.97	12.90	5.87	27.75
	Nephelium maingayi	Sapindaceae	11.54	9.68	12.84	34.05
	Syzygium rubiginosum	Myrtaceae	7.69	16.13	7.23	31.05
	Syzygium antisepticum	Myrtaceae	5.13	9.68	4.56	19.37

In Figure 5 each observation location has a different Shannon-Wienner diversity index value. Kepoh village had the highest score at the pole growth rate (2.30), Pasir Putih village at the sapling level (2.21), in Batu Betumpang village at the seedling level (2.26) and Bencah village at the seedling level at 1.86. The diversity index is a quantitative measure (number) that reflects how many different species (such as species) exist in a data set (community). The value of the diversity index in Kepoh village at the high pole growth rate compared to the other three villages. This condition is caused by the diversity of forests ranging from coastal communities, swamp habitats, hilly plains that affect species diversity. The species diversity index is an index that expresses community structure and ecosystem stability. The better the species diversity index, the more stable an ecosystem.

While the condition of the forest as a sample point of observation in Pasir Putih village, Batu Betumpang village has the status of a protected forest (HL) although it starts from the shoreline but does not have species from the coastal community. Meanwhile, specifically for Bencah village, which has the status of forest for other use areas (APL) does not have the sea as a comparison sample.

In Figure 6, the species richness value in KPHP Unit VIII Muntai Palas, South Bangka Regency using the Margalef formula, shows that Kepoh village has a wealth index value of 6.23 or found 30 species from 105 individuals. Followed by Batu Betumpang village with a species richness index value of 4.43 or found 25 species from a total of 226 individuals.

Figure 7 The evenness index of species in Kepoh village has the highest evenness value (0.86) because Kepoh Village has species with each relatively equal or even number of individuals. Meanwhile, Bencah village has the lowest evenness value (0.68) due to species that have a high number of individuals or dominant species, and the number of individuals in each species is not the same or uneven individual.

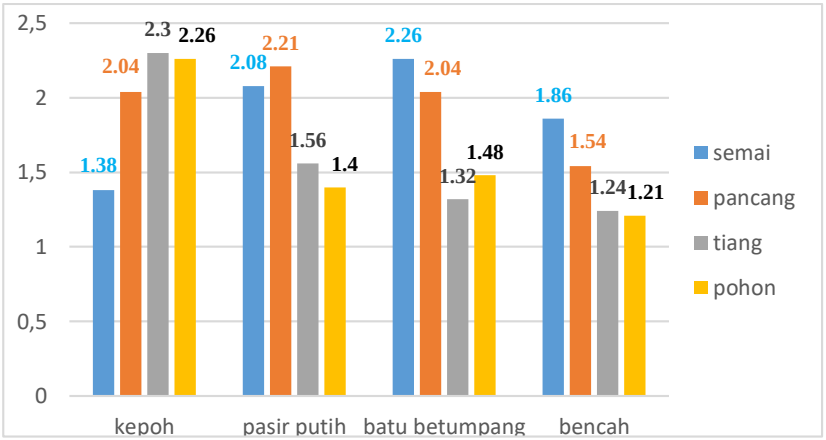


Figure 5 Species diversity index (Shannon-Wienner)

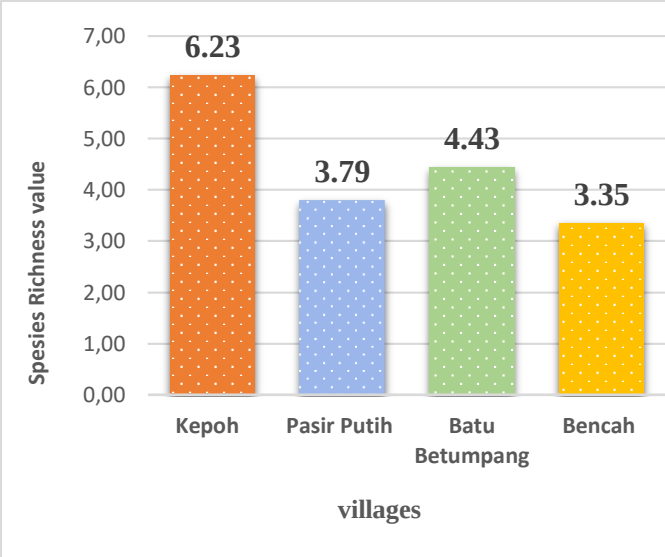


Figure 6 Species richness value

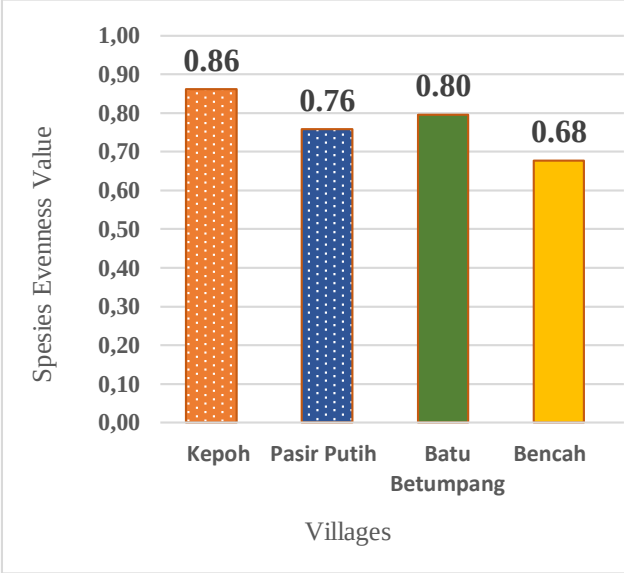


Figure 7 Species evenness value

The evenness index of species in Kepoh village has the highest evenness value (0.86) because Kepoh village has species with each relatively equal or even number of individuals. Meanwhile, Bencah village has the lowest evenness value (0.68) due to species that have a high number of individuals or dominant species, and the number of individuals in each species is not the same or uneven individual.

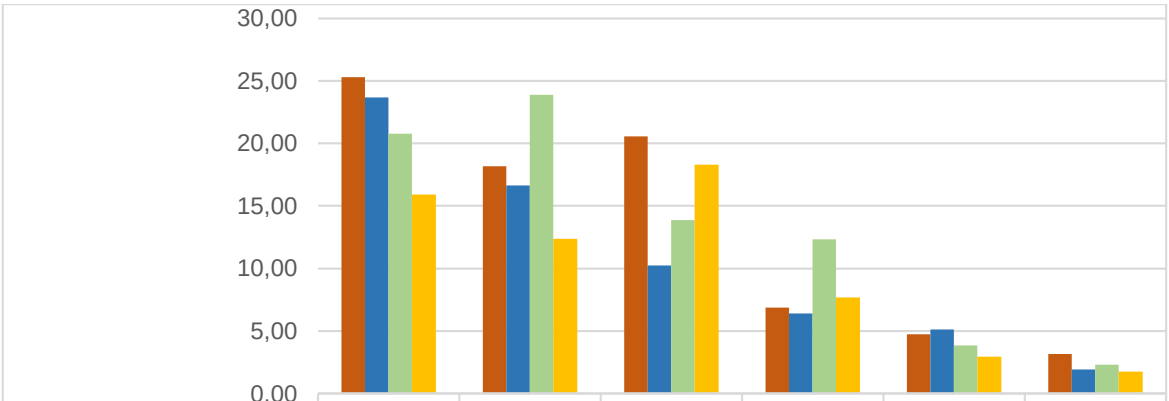
Analysis of Forest Food Source Plant Utilization

Local User's Value Index (LUVI) Value

LUVI is the level of importance shared by a species as a whole even though the interests are different. In Kepoh village the highest fresh food category was 25.31 compared to other categories. the highest importance of the species as a function as a medicinal ingredient (21.06%). Meanwhile, in Pasir Putih, the largest LUVI

value is 23.68%, various forest plants can be consumed as fresh food. In Batu Betumpang village, the largest LUVI value (20.79%) is consumed as fresh food and in Bencah village, the LUVI value of 18.29% is generally used as medicine.

Based on the results of research by Liza *et al*. (2020) in the village of Jawai Laut, Sambas Regency that the group of food sources from fruits is the most dominant, there are 34 species (59%) compared to the groups of vegetables, tubers, spices, sugar cane, and cereals. Zikri's research (2016) explains that the Rejang tribe in Rindu Hati Village, Bengkulu Province utilizes 199 species of food plants. Consists of 58 species of wild food plants and 141 species of cultivated food plants.



	fresh food	vegetables	medicinal ingredient	snack	spices	coloring/flavoring
Kepoh village	25,31	18,17	20,54	6,88	4,74	3,16
Pasir putih village	23,68	16,64	10,24	6,40	5,12	1,92
Batu betumpang village	20,79	23,87	13,86	12,32	3,85	2,31
Bencah village	15,93	12,39	18,29	7,67	2,95	1,77

Figure 8 LUVI value for the use of forest food sources

The higher the LUVI value, the more important it is to conserve this species. Based on the results of the LUVI analysis of the species in each village (Figure 8). it was noted that in the village of Kepoh *Sandoricum koetjape* it had a LUVI value of 11.14, in the village of Pasir Putih *Mangifera odorata* (LUVI= 9.68), Batu Betumpang village was owned by *Nephelium lappaceum* (LUVI= 11.20) and LUVI= 10.84 for *Garcinia nigrolineata* candida in Bencah village.

Forest Conservation Village Development Strategy

AHP and SWOT Analysis

After evaluating internal factors and external factors, the results are shown in Tables 4 and 5. The community-based forest conservation village development strategy based on the SWOT analysis shows a position in quadrant 1 (x= 0.46 and y= 0.10) (Figure 9) and is progressive by optimizing strengths and taking advantage of opportunities. The strategy of developing forest conservation villages by relying on the value of plant diversity as forest food sources is in a strategic geographical position supported by the topography of the sea, coastal areas, swamps, rivers, lowlands, highlands and with commitment and implementation of regional policies to support sustainable development, forest tourism potential can be developed. Nature, health forest, educational forest as a natural laboratory, and build investment cooperation in the natural resources and environmental sectors. With the quality and quantity of human resources is the power to create innovation and creativity to obtain added value, plant diversification by utilizing technology. Central government support and the potential of forest Natural Resources (SDA) as a source of Regional Original Revenue (PAD) can be an opportunity to get a larger budget allocation.

Table 4 IFE (Internal Factor Evaluation) matrix

No	Internal Factors	Weight	Rating	Score	No	Internal Factors	Weight	Rating	Score
Strength					*Weakness*				
S1	Biodiversity	0.04	4.0	0.15	W1	Public knowledge	0.04	2.8	0.12
S2	Geographic position	0.02	3.0	0.07	W2	Capacity and performance	0.02	3.6	009
S3	Topographical conditions	0.03	2.4	0.08	W3	Coaching program	0.05	3.4	0.17
S4	Government commitment	0.14	3.0	0.43	W4	Empowerment	0.07	3.8	0.28
S5	Human resources	0.14	3.2	0.44	W5	Society participation	0.12	2.8	0.33
S6	Economic income	0.08	2.6	0.21	W6	Potential promotion	0.11	2.4	0.25
S7	Forest presence	0.13	2.6	0.34	Total Weakness (W)		0.42		1.25
Total strength (S)		0.58		1.71	Total		1		2.96
					Total IFAS (S-W)				0.46

Table 5 EFE (External Factor Evaluation) matrix

No	External Factors	Weight	Rating	Score	No	External Factors	Weight	Rating	Score
Opportunity					*Threat*				
O1	Functional forest	0.06	3.8	0.21	T1	Illegal mining	0.11	2.4	0.27
O2	Innovation and creativity	0.03	3.0	0.09	T2	Forest destruction	0.16	2.8	0.44
O3	Natural resource invenstment	0.13	3.6	0.47	T3	Crisis of confidence	0.14	2.8	0.38
O4	Plant diversification	0.09	3.4	0.31	T4	People's plantation	0.14	2.2	0.31
O5	Allocation of village funds	0.06	3.4	0.22	Total Threat (T)		0.55		1.40
O6	Technological progress	0.09	2.4	0.21	Total		1.00		2.90
Total Opportunity (O)		0.45		1.50	Total EFAS (O-T)				0.10

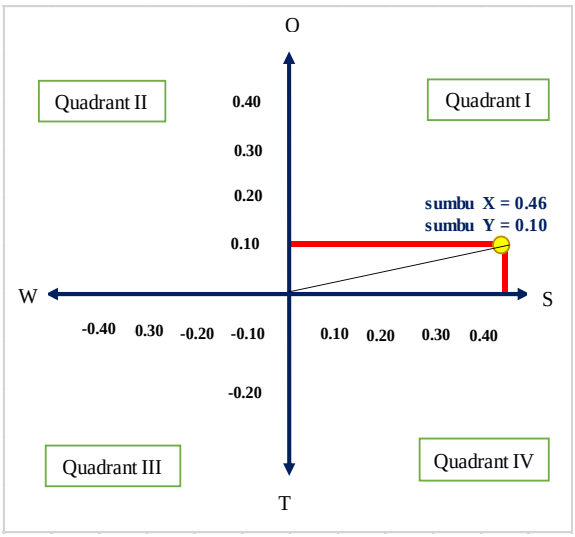


Figure 9 Position of the SWOT quadrant for conservation village development

CONCLUSION

The wealth of forest biodiversity in the form of forest food plants found in the research area both in quality and quantity is the capital for the development of the forestry sector. This potential becomes a consideration for forest conservation and forest land use decision makers, especially in the development of forest conservation villages. Forest food products can support village food security programs in facing the threat of a food crisis. The number of species inventoried is 73 species, 54 genera and 33 families.

The importance of the use of forest food source plants calculated by the LUVI (Local User's Value Index) analysis shows the potential for valuable food, namely the choice of food sources that are most needed by the community, most exploited and have a threat of extinction for these resources so that they can disrupt village food security. Therefore, it is necessary to conserve and develop species based on LUVI values. The higher the LUVI value, the more important it is to conserve this species. In the village of Kepoh *Sandoricum koetjape* it has the highest LUVI value of 11.14, the village of Pasir Putih *Mangifera odorata* has a LUVI of 9.68, in the village of Batu Betumpang it is owned by *Nephelium lappaceum* with a LUVI of 11.20 and in the village of Bencah *Garcinia nigrolineata* it has a LUVI value of 10.84.

Forest conservation village development strategies supported by food plant resources, human resources and government policies can be developed as natural tourism forests, health forests, educational forests as natural laboratories, building investment cooperation in the natural resource sector, creating innovation and creativity to obtain added value, diversifying plants by utilizing technology and increasing sources of income.

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