THE DIVERSITY OF LOCALLY USEFUL PLANTS IN BATU AMPAR VILLAGE NEAR BUKIT RAJA MANDARA PROTECTED FOREST AREA IN SOUTH BENGKULU DISTRICT

(Keanekaragaman Jenis Tumbuhan yang Berguna Secara Lokal di Desa Batu Ampar, di Dekat Kawasan Hutan Lindung Bukit Raja Mandara, Kabupaten Bengkulu Selatan)

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Abstract

The diversity of plant species serves many purposes for community, especially those living in rural areas. Each traditional community in Indonesia may have specific knowledge and use of plants found in their environment. Having many plant species and tribes, Indonesia is rich in biological and cultural diversity. Modern agriculture and globalization, however, tends to reduce both diversities. It is, therefore, essential that traditional knowledge and uses of biological diversity be preserved. This study was aimed to document the diversity of plants used by villagers of Batu Ampar, Kedurang Subdistrict, South Bengkulu District. Results showed that villagers used as many as 83 species of plants for eight categories, namely food, followed by medicine, construction, firewood, fence and hedge, handycraft, coloring agent and poison with 35, 30, 16, 9, fence and hedge 9, handicraft 9, coloring agent 1 and poison 1 species respectively. Fifty five of the plant species were taken from private land and 28 from forest. Economically, 54 species were used for the villagers' own purpose, while 29 species were not only for their own use but also for sale.

Keywords: ethnobotany, plant diversity, traditional ecological knowledge, Bengkulu.

Abstrak

Keanekaragaman jenis tumbuhan memiliki banyak fungsi bagi masyarakat, terutama adalah mereka yang tinggal di daerah pedesaan. Masing-masing masyarakat tradisional di Indonesia memiliki pengetahuan khusus tentang tumbuhan yang terdapat di lingkungan mereka dan pemanfaatanya. Memiliki banyak jenis tumbuhan dan suku bangsa, Indonesia kaya akan keanekaragaman biologi dan budaya. Namun, pertanian modern dan globalisasi cenderung menurunkan keanekaragaman biologi dan budaya tersebut. Oleh karena itu, pelestarian pengetahuan dan pemanfaatan tradisional sangat penting untuk dilakukan. Penelitian ini bertujuan untuk mendokumentasikan keanekaragaman jenis tumbuhan yang digunakan oleh penduduk desa Batu Ampar, di Kecamatan Kedurang, Kabupaten Bengkulu Selatan. Hasil penelitian menunjukkan bahwa penduduk desa tersebut memanfaatkan 83 jenis tanaman dalam 8 kategori, yaitu bahan makanan sebanyak 35 jenis, bahan obat-obatan 30 jenis, bahan bangunan 16 jenis, kayu bakar 9 jenis, pagar dan pagar hidup 9 jenis, kerajinan tangan 9 jenis, pewarna 1 jenis dan racun 1 jenis. Lima puluh lima jenis tumbuhan diambil dari lahan pribadi dan 28 jenis dari hutan. Secara ekonomis, 54 jenis tumbuhan dimanfaatkan untuk keperluan sendiri, sedangkan 29 jenis tumbuhan selain dimanfaatkan sendiri juga dijual.

Kata kunci: ethnobotani, keanekaragaman jenis tumbuhan, pengetahuan tradisional ekologi, Bengkulu.

INTRODUCTION

Indonesia has very high biological and cultural diversities. Those two aspects of diversity are reflected in the variety of plant uses by different ethnic groups in Indonesia. The knowledge of plants and their uses is an essential part of ecological knowledge which is acquired by societies through long and intensive interaction with nature searching for food and other needs (Pilgrim *et al*. 2008). Both biological diversity and cultural diversity are our precious treasure which we must preserve and protect from threats of globalization and modernization of agriculture. Around the world, globalization of culture and modernization of agriculture tend to homogenize culture and biological resources.

Throughout the world, traditional knowledge of plants is being lost (Ramirez, 2007). In agriculture sector, during the 20th century, about 70% of plant genetic diversity has disappeared as farmers worldwide have abandoned their local varieties for genetically uniform, high-yielding varieties (Gleissman, 2007). In Sumatra, modern agriculture and forestry have converted vast areas of highly diverse natural forest into monoculture, such as oil palm plantation or acacia plantation (Uryu *et al*, 2010).

The negative impact of modern agriculture has revived interest on traditional agriculture which usually maintains high diversity through agroforestry. The combination of agricultural crops and trees makes agroforestry ecologically and economically beneficial to local people (Langenberger *et al*, 2009). In Indonesia, agroforestry has several forms, such as home garden (*pekarangan*) and traditional garden (*kebun*). Unlike modern plantation which is usually monoculture, home gardens to some degree resembles natural forest in structure and species diversity (Soemarwoto, 1983). Despite modernization of agriculture, it is encouraging that many villagers maintain their traditional home gardens and gardens. Those traditional agricultural lands as well as forest still provide high diversity of plants to rural community for many purposes. For example, as many as 113 plant species from forest, gardens and home gardens were used by villagers in Kandang Village, in Bengkulu (Sunesi and Wiryono, 2007), 99 species in Enggano Island of Bengkulu (Arianto, 2008) and 160 species in Aimas Village, Papua (Attamimi, 1997), 65 species in Kabaena Island, Central Sulawesi (Rahayu and Rugayah, 2010) .

Maintenance of local knowledge on plant diversity and its uses is important for biodiversity conservation, which in turn is essential for the survival of human. Aiona *et al* (2007) declared that ethnobotany is the science of survival. The objective of this study was to know the diversity of useful plants in Batu Ampar village, near Bukit Raja Mandara protected forest area, South Bengkulu District.

MATERIALS AND METHODS

Sites and time

The study was conducted in 2006 in Batu Ampar Village, Kedurang Sub-District, South Bengkulu District, Bengkulu province. The village was purposively chosen for this study because it is located near Bukit Raja Mandara Protected Forest and the people still use plants for several purposes in their daily life. The village is located at an elevation of 500 m above sea level, with an average temperature between 25^{o}C – 28^{o}C. The average rainfall is 300 mm per month, and relative humidity between 80% - 88%. Most of villagers (60%) did not graduated from elementary school, 23% graduated from elementary school, and only 9% graduated from junior or senior high school. All villagers work as farmers, although some have additional income from other jobs. The majority of villagers belong to Serawai and Semende tribes.

Data collection

Every species of plant has intrinsic value and is ecologically useful. But in this study, the term useful plants refer to species of plants utilized by the community of Batu Ampar Village for one or more purposes. This anthropocentric point of view, however,

does not mean to neglect the intrinsic and ecological values of other species. Data of useful plants were collected from respondents, selected through a stratified random sampling. A total of 170 families in the village were divided into 4 classes based on education level, and then 20% of them were sampled randomly from each class. Each respondent was interviewed to get data of the plant name and its parts which were used, types of uses, its economic value (for sale or for own use), and its origin (state-owned forest area or private land).

Data analyses

Based on raw data, the uses of plants were grouped into 8 categories, namely food, medicine, construction material, hedge and fence material, fire wood, craft and ropes, coloring agent, and poison. The usefulness (use value) of each species was calculated using this formula (Albuquerque *et al*, 2006).

$$UV = \sum_{i}^{n} \frac{Ui}{n}$$

Whereby UV is use value and Ui is the number of uses of the species mentioned by each respondent and n is the total number of respondents. All data were then tabulated and analyzed descriptively.

For comparison with similar studies (Arianto, 2008; Sunesi and Wiryono, 2007), a modified Sørensen Index of Similarity was calculated, using this formula:

Sørensen Index of Similarity =

$$IS_S = \frac{2c}{A+B} \text{ x } 100\ \%$$

c = common species used by 2 communities being compared.
A = the number of all species utilized by community A
B = the number of all species utilized by community B

This formula is originally used to compare the species composition of two biological communities (Mueller-Dumbois and Ellenberg, 1974).

RESULTS AND DISCUSSION

The diversity of useful species

Villagers of Batu Ampar village used as many as 83 species, 55 of which were used solely for their own needs, while 28 of which were also sold to other people. Most plant species (50) were taken from private land, and 33 from forest. The plant uses could be classified into eight categories, namely 1) food, 2) medicine, 3) construction, 4) firewood, 5) fence and hedge, 6) handicraft, 7) coloring agent and 8) poison. Most plants (35 species) fell into the category of food, followed by medicine 30, construction material 16, handicraft 9, firewood 9, fence and hedge 9. Only one species was used as a coloring agent, and also one species for poisoning. Parts of the plants used were fruit (30 times), woody trunk (24), root, rhizome and tube (11), bark (4), non woody stem (4) and flower (3).

Villagers of Batu Ampar utilized fewer species than Kandang Villagers, Bengkulu, which was 113 species (Sunesi and Wiryono, 2007), and in Enggano Island, Bengkulu, 99 species (Arianto, 2008). Assuming that the number of utilized species reflected the local knowledge of economic botany, Batu Ampar villagers knew less than the other two communities. The similarity indexes between useful plants in Batu Ampar and Kandang Village was the same with that between Batu Ampar and Enggano Island, which was 39%. Considering that the three communities live in the same province, the similarity index was relatively low.

The number of species used by communities in three communities in Bengkulu Province above was lower than that in Aimas Villages, Sorong, Papua which was 160 species (Attammimi, 1997), in villages surrounding Gunung Halimun National Park, which was 243 species (Rahayu and Harada, 2004) and in Banten which was 163 species (Wardah, 2003).

Judged from several aspects, coconut was the most useful species in Batu Ampar. It had the highest use value, namely 76 and it was used by all respondents in four cat-

egories. The leaves, fruit and trunk were all useful. Its fruit and milk were used for variety of foods, and its milk was also used to treat poisoned persons. Its trunk was used as construction material and its leaves were used for fire wood. Compared with the use of coconut in Javanese tribe, the types of coconut uses in Batu Ampar village was relatively low. In Java, the coconut leaves as well as young fruits are used as decoration for many cultural ceremonies, such as wedding, and the husk is used for handicraft. The second most useful plant was bamboo which had 52 use value and was used by 95% of respondents. Bamboo was used for construction material and handicraft.

Plants used as food

Of the 35 plant species used as food, only three were sources of carbohydrate, namely rice (*Oriza sativa*), yam (*Ipomoea batatas*) and cassava (*Manihot utilissima*). Rice is still the most important staple food in most areas in Indonesia, including in Batu Ampar village. The data of plants utilized by respondents in this study were based on the plants they took from their private land or state forest, and didn't include the plant products they bought from market. If the latter included, rice should have been used by 100% respondents because everybody eats rice every day.

Other food species were mainly used as vegetables, spices and fruits. Only one species was used as beverage, namely coffee. Before the booming of oil palm plantation in Bengkulu in the 1990s, coffee was the most common plantation in Bengkulu. Until now, coffee plantation is still important in Bengkulu. Compared with oil palm plantation, coffee plantation requires less caring.

Plants used as medicine

Many traditional communities in Indonesia as well as in other countries still used traditional medicine in combination with modern medicines (Calvet-Mir *et al*, 2008). In Puguk village, as many as 30 species of plants were used as traditional medicines. This number was relatively small compared with 119 species used as medicines in Keluru Village, Kerinci District, Jambi Province (Asra *et al*, 2008) and 161 species in the buffer zone of Bukit Tiga Puluh National Park in Semerantihan hamlet, Tebo District, Jambi Province (Julianti *et al*, 2008).

Plants used for construction materials

Trees were the main sources for wood as construction material. Out of 16 tree species used as construction material, 15 were taken from state forest and only one from private land. Forest apparently played a very important role in supplying construction material in this village. Legally, it is forbidden to cut trees from state forest, but in many places in Sumatra, rural people still get timber from forest.

Plants used for handicrafts

As many as 9 plants species were used to make ropes, baskets and other woven products. Six of them were taken from forest and only three from private land. In Kandang village of Bengkulu (Sunesi and Wiryono, 2007) and in Enggano of Bengkulu (Arianto, 2008), only 7 species were used for handicraft.

Plants used for fences and hedges

In Batu Ampar Village, people still used living plants as hedges and dead plant materials as fences. As many as 9 species of plants were used for hedges and fences. Hedges in Indonesian villages usually serve several purposes. In addition to being used as border between private lands hedges also provide many plant products such as timber, fire wood, forage and fruits.

Plants used as firewood

Wood is the main energy for cooking in the village. The respondents used as many as 9 species of plants for firewood, 5 or which were taken from forest and 4 from private land. In Kandang village also in Bengkulu, the community used 17 species of plants for firewood (Sunesi and Wiryono, 2007), in Muko-muko, Bengkulu 11 species (Yeniarti, 2007), and in Sorong 10 species (Attamimi, 1997).

Plants used for coloring agent and poison

Only two 2 species of plants were used as coloring agent and one species as poison.

CONCLUSSION

As many as 83 species of plants, 55 of which from private land and 28 from forest, were used by Villagers of Batu Ampar in eight categories of uses, namely food as many as 35 species, medicine 30, construction 16, firewood 9, fence and hedge 9, handicraft 9, coloring agent 2 and poison 1. Fifty four species were taken for the villagers' own use, while 29 species were not only for their own use but also for sale.

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Table 1. The diversity of plants utilized by villagers of Batu Ampar, near Bukit Raja Mandara Protection Forest, South Bengkulu District

No	Local name	Scientific name	Family	Parts	uses	origin	eco-nomic	UV	% users
1	Niugh	*Cocos nucifera* L	Arecaceae	Frt, Trk,Lef	Fod, Med, Con, Frw	PL	SL, OU	76	100.0
2	Buluh	*Bambusa* spp	Poaceae (Graminae)	Trk, Sht	Con, Hcr	SF	OU	52	94.1
3	Umbut wi	*Calamus* spp	Arecaceae	Sht,Trk	Fod, Hcr	SF	OU	47	100.0
4	Merampoyan	*Rhodamnia cinerea* Jack	Myrtaceae	Trk	Con, Frw, Fen	SF	OU	43	85.3
5	Teghap	*Artocarpus elasticus* Reinw. ex Bl.	Moraceae	Trk	Con, Hcr	SF	OU	42	100.0
6	Deghian	*Durio zibethinus* L	Bombacaceae	Frt, Trk	Fod, Con, Frw	PL	SL, OU	36	70.6
7	Serikan			Rot	Hcr	SF	OU	34	100.0
8	Kawe	*Coffea arabica* L	Rubiaceae	Frt, Trk	Fod, Frw	PL	OU,SL	33	58.8
9	Padi	*Oriza sativa* L	Poaceae (Gramineae)	Frt	Fod	PL	SL, OU	32	94.1
10	Unji	*Amomum maximum* Roxb.	Zingiberaceae	Flw, Frt	Fod	SF	SL, OU	31	91.2
11	Kayu res	*Gliricidia sepium* Steud	Fabaceae (Leguminosae)	Trk	Frw, Fen	PL	OU	31	91.2
12	Pisang	*Musa paradisiaca* L	Musaceae	Frt	Fod, Med	PL	OU	28	79.4
13	Puar	*Amomum walang* (BL) Val.	Zingiberaceae	Lef	Con	SF	OU	27	79.4
14	Kayu gadis	*Cinnamomum porrectum* (Roxb.) Kosterm.	Lauraceae	Trk	Con, Frw	SF	SL, OU	27	64.7
15	Jarak	*Jatropha curcas* L.	Euphorbiaceae	Rot, Sap	Med, Fen	PL	OU	22	55.9
16	Kacang goreng	*Arachis hipogea* L.	Fabaceae (Leguminosae)	Tub	Fod	PL	SL, OU	17	50.0
17	Simpugh	*Dillenia excelsa* (Jack) Gilg.	Dilleniaceae	Trk	Con,Frw	SF	SL, OU	17	44.1
18	Pasang	*Quercus* sp.	Fagaceae	Trk	Frw	SF	OU	17	50.0
19	Kandis	*Garcinia parvifolia* Miq.	Clusiaceae	Flw	Fod	SF	OU	16	47.1
20	Petai	*Parkia speciosa* Hassk	Fabaceae (Leguminosae)	Frt	Fod	PL	SL, OU	16	47.1
21	Leban	*Vitex pinnata* L	Verbenaceae	Trk	Frw, Fen	SF	OU	16	47.1
22	Teghung	*Solanum melongena* L	Solanaceae	Frt	Fod	PL	SL, OU	15	73.5
23	Kacang panjang	*Vigna sinensis* L	Fabaceae (Leguminosae)	Frt	Fod	PL	SL, OU	15	73.5
24	Nangke	*Artocarpus hetero-phyllus* Lam	Malvaceae	Frt	Fod	PL	OU	14	41.2
25	Sangsile	*Carica papaya* L	Caricaceae	Frt	Fod,Med	PL	SL, OU	14	35.3

Lanjutan Tabel 1.

26	Paku	*Diplazium esculentum* Retz. Sw	Polypodiaceae	Lef, stem	Fod	SF	OU	14	41.2
27	Tebu	*Saccharum officinarum* L.	Poaceae (Graminae)	Stem	Fod	PL	OU	13	38.2
28	Kumis kucing	*Othosiphon aristatus* (Bl.) Miq.	Lamiaceae (Labiatae)	Lef	Med	PL	OU	10	29.4
29	Mbanglai	*Zingiber purpureum* Roxb.	Zingiberaceae	Riz	Med	PL	OU	10	29.4
30	Kenidai	*Bridelia monoica* Merr	Phyllantaceae	Trk	Fen	SF	OU	10	29.4
31	Jeghing	*Pithecellobium jiringa*	Fabaceae (Leguminosae)	Frt	Fod	PL	SL, OU	9	26.5
32	Cintuali	*Tinospora crispa* L.	Menisperma-ceae	Lef	Med	PL	OU	9	26.5
33	Pokat	*Persea americana* Mill	Lauraceae	Frt	Fod, Med	PL	SL, OU	8	23.5
34	Jambu Keghas	*Psidium guajava* L	Myrtaceae	Frt	Fod, Med	PL	OU	8	23.5
35	Damagh	*Agathis* sp	Araucariaceae	Trk	Con	SF	OU	7	20.6
36	Rumput belande	*Ageratum conyzoides* L.	Asteraceae	Lef	Med	SF	OU	7	20.6
37	Cabe	*Capsicum annum* L.	Solanaceae	Frt	Fod	PL	SL, OU	7	20.6
38	Kelinyu	*Cromolaena odorata*	Asteraceae	Lef, Riz	Med	PL	OU	7	20.6
39	Kunyit	*Curcuma domestica* Val.	Zingiberaceae	Tub	Med	PL	OU	7	20.6
40	Mangga	*Mangifera indica* L	Anacardiaceae	Frt	Fod	PL	SL, OU	7	20.6
41	Bekayu	*Manihot utilissima* Phol	Euphorbiaceae	Tub, Lf	Fod	PL	OU	7	20.6
42	Bayur	*Pterospermum javani-cum* Jungh		Trk	Con	SF	SL, OU	7	20.6
43	Plawi	*Alstonia scholaris* R.Br.	Apocynaceae	Trk	Con	SF	SL, OU	6	17.6
44	Limau nipis	*Citrus aurantifolia* Swingle.	Rutaceae	Frt	Med	PL	OU	6	17.7
45	Bunge raye	*Hibiscus rosa-sinensis* L.	Malvaceae	Lef	Med	PL	OU	6	17.7
46	Besile	*Ipomoea batatas* (L) Lam Descourt	Convolvolace-ae	Tub, Lef	Fod	PL	SL, OU	6	17.7
47	Peghie	*Momordica charantia* L	Cucurbitaceae	Frt	Fod	PL	SL, OU	6	17.7
48	Selasih	*Ocimum basilicum* L.	Lamiaceae (Labiatae)	Lef, Frt, Flw	Med	PL	OU	6	17.7
49	Sarkaye	*Annona squamosa* L	Annonaceae	Frt	Fod	PL	OU	5	14.7
50	Kebiul	*Caesalpinia bonduc* L.	Fabaceae (Leguminosae)	Frt	Med	SF	OU	5	14.7

Lanjutan Tabel 1.

51	Labu manis	*Cucurbita pepo* L.	Cucurbitaceae	Frt	Fod	PL	OU	5	14.7
52	Sighih	*Piper betle* L.	Piperaceae	Lef	Med	PL	OU	5	14.7
53	Tlusugh ughat	*Plantago asiatica* L.	Plantaginaceae	Lef	Med	PL	OU	5	14.7
54	Bebie	*Bauhinia* sp	Fabaceae (Leguminosae)	Trk	Med	SF	OU	4	11.8
55	Lepang	*Cucumis sativus* L	Cucurbitaceae	Frt	Fod	PL	SL, OU	4	11.8
56	Duku	*Lansium domesticum* Corr	Meliaceae	Frt	Fod	PL	SL, OU	4	11.8
57	Sungkai	*Peronema canescens* Jack	Verbenaceae	Trk	Con, Fen	PL	SL, OU	4	11.8
58	Seletup	*Physalis peruviana* L.	Solanaceae	Lef, Rot,stem	Med	SF	OU	4	11.8
59	Jambu ayik	*Syzygium aqueum* (Burm f) Alston	Myrtaceae	Frt	Fod	PL	OU	4	11.8
60	Dedap	*Erythrina variegata* L.	Fabaceae (Leguminosae)	Trk	Med	PL	OU	3	8.8
61	Seluai	*Hopea* spp	Dipterocar-paceae	Trk	Con	SF	SL, OU	3	8.8
62	Kandang ayam	*Lantana camara* L.	Verbenaceae	Lef	Med	SF	OU	3	8.8
63	Kepayang	*Pangium edule* Reindw	Salicaceae	Frt	Fod	SF	SL, OU	3	8.8
64	Meranti	*Shorea* spp	Dipterocar-paceae	Trk	Con	SF	SL, OU	3	8.8
65	Karas	*Aquilaria malaccensis* Lam.	Thymelaeaceae	Brk	Hcr	SF	OU	2	5.9
66	Nau	*Arenga pinnata* Merr	Arecaceae	Frt, Sap	Fod	PL	SL, OU	2	5.9
67	Kapuk	*Ceiba pentandra* (L) Gaertn	Malvaceae	Trk	Fen	PL	OU	2	5.9
68	Kecubung	*Datura mete* L.	Solanaceae	Lef	Med	PL	OU	2	5.9
69	Ubar	*Gymnacranthera ocellata* R.T.A. Schouten. Blume.	Myristicaceae	Brk	Col	SF	OU	2	5.9
70	Waru	*Hibiscus tiliaceus* L	Malvaceae	Brk	Hcr	SF	OU	2	5.9
71	Kederat	*Mirabilis jalapa* L.	Nyctaginaceae	Rot	Med	PL	OU	2	5.9
72	Remunggai	*Moringa pterygosperma* Gaernt	Moringaceae	Trk	Fen	PL	OU	2	5.9
73	Rambutan	*Nephelium lappaceum* L	Sapindaceae	Frt	Fod	PL	SL, OU	2	5.9
74	Purun	*Scirpus grossus* L.	Cyperaceae	Lef	Hcr	PL	OU	2	5.9
75	Gelinggang	*Senna alata* (L) Roxb.	Fabaceae (Leguminosae)	Lef	Med	SF	OU	2	5.9

Lanjutan Tabel 1.

76	Pedas padi	*Zingiber officinale* Rosc	Zingiberaceae	Riz	Med	PL	OU	2	5.9
77	Rumbai	*Rhynchospora corymbosa* (L.) Britt	Cyperaceae	Lef	Hcr	PL	OU	2	5.9
78	Belimbing	*Averrhoa carambola* L	Oxalidaceae	Frt	Fod	PL	OU	1	2.9
79	Jelutung	*Dyera costulata* Hook.f.	Apocynaceae	Trk	Con	SF	SL, OU	1	2.9
80	Manggus	*Garcinia mangostana* L.	Guttiferae (Clusiaceae)	Frt	Fod	PL	SL, OU	1	2.9
81	Pecah beling	*Strobilanthes crispus* Blume.	Acanthaceae	Lef	Med	PL	OU	1	2.9
82	Tuba	*Derris eliptica* Benth	Fabaceae (Leguminosae)	Rot, stem	Psn	SF	OU	1	2.9
83	Beringin	*Ficus benyamina* L.	Moraceae	Brk	Hcr	SF	OU		

Abbreviation:

Lef = leaf Frt = fruit Trk = trunk Rot = root Brk = bark Sht = shoot Sdl = seedling

Riz = Rizome Tub = Tuber Flw = flower OU = for own use SL = for sale SF = state forest PL = private land

Med = medicine Psn = poison Hcr = handycraft Fod = food Con = construction Frw = fire wood Col = coloring agent

Fen = fence and hedge

Note: Stem and sap are abbreviation