

Bulungan Ethnobiology Handbook

Rajindra K. Puri



THE BULUNGAN ETHNOBIOLOGY HANDBOOK

A FIELD MANUAL FOR BIOLOGICAL AND SOCIAL SCIENCE RESEARCH ON THE
KNOWLEDGE AND USE OF PLANTS AND ANIMALS AMONG 18 INDIGENOUS
GROUPS IN NORTHERN EAST KALIMANTAN, INDONESIA

Rajindra K. Puri

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Front cover photo: R.K. Puri.
Eugeissona utilis, hill sago, growing on a ridge overlooking the Lurah valley in
Kayan Mentarang National Park.

Back cover photos: Francis Ng and R.K. Puri.
Metroxylon sagu, Kenyah fishermen, Bahau river forest, children at Long Peliran,
Penan hunter with hornbill and *Dimocarpus longan* fruit for market.

Dividers: LBN-LIPI 1978: 15 and Payne *et al.* 1985: Pl. 51, ©Karen Phillipps

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1	<i>Gendarussa vulgaris</i> Nees.	PROSEA Vol. 12: 330
2	<i>Amaranthus hybridus</i> L.	Sastrapradja, S. <i>et al.</i> 1977b: 8
3	<i>Celosia cristata</i> L.	Ochse 1980: 29
4	<i>Buchanania sessifolia</i> Bl.	Kessler & Sidiyasa 1994: 245 ©Tropenbos Foundation
5	<i>Mangifera quadrafida</i> Jack.	A. Santoso
6	<i>Mangifera odorata</i> Griff.	PROSEA Vol. 5(2): 336
7	<i>Mangifera pajang</i> Kostermans	Herwasono Soedjito
8	<i>Semecarpus glaucus</i> Engl.	A. Santoso
9	<i>Annona muricata</i> L.	PROSEA Vol. 2: 75
10	<i>Eryngium foetidum</i> L.	PROSEA Vol. 13: 122
11	<i>Acorus calamus</i> L.	PROSEA Vol. 12: 84
12	<i>Amydrium medium</i> (Z. & M.) Nichols.	Koorders Vol 3: 172
13	<i>Colocasia esculentum</i> (L.) Schott	PROSEA Vol. 9: 70
14	<i>Holochlamis beccarii</i> (Engl.) Engl.	Koorders Vol 3: 182
15	<i>Homalomena cordata</i> Schott.	A. Santoso
16	<i>Agathis borneensis</i> Warb.	Soepadmo & Wong 1995: 31 ©FRIM, Sabah Forestry Dept., Sarawak Forestry Dept.
17	<i>Ageratum conyzoides</i> L.	PROSEA Vol. 12: 93
18	<i>Blumea balsamifera</i> (L.) DC.	PROSEA Vol. 19: 69
19	<i>Synedrella nodiflora</i> (L.) Gaertn.	Backer & van Slooten 1924: 227
20	<i>Basella alba</i> L.	PROSEA Vol. 8: 94
21	<i>Bixa orellana</i> L.	PROSEA Vol. 3: 50
22	<i>Ceiba pentandra</i> (L.) Gaertn.	Ochse 1980: 80
23	<i>Durio kutejensis</i> (Hassk.) Becc.	Valkenburg 1997: 75
24	<i>Durio oxleyanus</i> Griff.	Kessler & Sidiyasa 1994: 264 ©Tropenbos Foundation
25	<i>Durio zibethinus</i> Murr.	PROSEA Vol. 2: 157
26	<i>Ananas comosus</i> (L.) Merr.	PROSEA Vol. 2: 66
27	<i>Canarium odontophyllum</i> Miq.	Cockburn 1976: Fig. 7
28	<i>Dacryodes rostrata</i> (Blume) H.J. Lam	Kessler & Sidiyasa 1994: 270 ©Tropenbos Foundation
29	<i>Koompassia excelsa</i> (Becc.) Taubert	Kraemer 1951: 127
30	<i>Carica papaya</i> L. (2 varieties)	PROSEA Vol. 2: 108
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36	<i>Cucurbita moschata</i> (Duch.) Poir.	PROSEA Vol. 8: 162
37	<i>Diplazium esculentum</i> (Retz.) Swartz.	Ochse 1980: 599
38	<i>Dipterocarpus oblongifolius</i> Blume	Kraemer 1951: 279
39	<i>Dryobalanops lanceolata</i> Burck	PROSEA Vol. 5(1): 192
40	<i>Shorea macrophylla</i> (de Vriese) Ashton	LBN 3-SDE 36: 103
41	<i>Diospyros borneensis</i> Hiern	Kessler & Sidiyasa 1994: 333 ©Tropenbos Foundation
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46	<i>Baccaurea parviflora</i> (M.A.) M.A.	Kochummen 1997: 438
47	<i>Baccaurea pyriformis</i> Gage	Valkenburg 1997: 71
48	<i>Hevea brasiliensis</i> (Willd. ex A. Juss) M.A.	PROSEA Vol. 5(2): 262
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52	<i>Sauropus androgynus</i> (L.) Merr.	Ochse 1927: 69
53	<i>Sumbaviopsis albicans</i> (BL.) J.J.S.	Flora Sinicae 44(2): 4
54	<i>Albizia chinensis</i> (Osbeck) Merr.	PROSEA Vol. 11: 64
55	<i>Bauhinia semibifida</i> Roxb.	A. Santoso
56	<i>Leucaena leucocephala</i> Bth.	PROSEA Vol. 11: 177
57	<i>Milletia sericea</i> Wight. et Arn.	Ochse 1981: 395
58	<i>Parkia speciosa</i> Hassk.	PROSEA Vol. 8: 223
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60	<i>Vigna unguiculata</i> (L.) Walp.	PROSEA Vol. 1: 77
61	<i>Castanopsis argentea</i> (Blume) A. DC.	PROSEA Vol. 5(2): 113
62	<i>Lithocarpus conocarpus</i> (Oudem.) Rehd.	Koorders & Valetton 1913: Fig. 40
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70	<i>Imperata cylindrica</i> (L.) Beauv.	PROSEA Vol. 12: 310
71	<i>Oryza sativa</i> L.	PROSEA Vol. 10: 108
72	<i>Saccharum officinarum</i> L.	PROSEA Vol. 9: 144
73	<i>Setaria palmifolia</i> (Willd.) Stapf.	A. Santoso
74	<i>Garcinia forbesii</i> King	Corner & Watanabe 1969: 188
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76	<i>Garcinia mangostana</i> L.	PROSEA Vol. 2: 177
77	<i>Garcinia parvifolia</i> (Miq.) Miq.	Kessler & Sidiyasa 1994: 360 ©Tropenbos Foundation
78	<i>Eleutherine americana</i> (Aubl.) Merr.	R. K. Puri
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98	<i>Artocarpus nitidus</i> Trec	Ahern 1901: 35
99	<i>Artocarpus odoratissimus</i> Blanco	PROSEA Vol. 2: 94
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142	<i>Nephelium juglandifolium</i> Bl.	A. Santoso
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149	<i>Capsicum annuum</i> L. var. <i>abbreviata</i> Fingerhuth.	Ochse 1980: 668
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208	<i>Lophura ignita</i>	MacKinnon and Phillipps 1993: Pl. 16 ©John MacKinnon and Karen Phillipps
208	<i>Treron curvirostra</i>	MacKinnon and Phillipps 1993: Pl. 31 ©John MacKinnon and Karen Phillipps
209	<i>Loriculus galgulus</i>	MacKinnon and Phillipps 1993: Pl. 35 ©John MacKinnon and Karen Phillipps
209	<i>Collocalia fuciphaga</i> subsp. <i>vestita</i>	MacKinnon and Phillipps 1993: Pl. 42 ©John MacKinnon and Karen Phillipps
210	<i>Harpactes duvaucelii</i>	MacKinnon and Phillipps 1993: Pl. 43 ©John MacKinnon and Karen Phillipps
210	<i>Pelargopsis capensis</i>	MacKinnon and Phillipps 1993: Pl. 44 ©John MacKinnon and Karen Phillipps
211	<i>Buceros rhinoceros</i>	MacKinnon and Phillipps 1993: Pl. 47 ©John MacKinnon and Karen Phillipps
211	<i>Buceros vigil</i>	MacKinnon and Phillipps 1993: Pl. 47 ©John MacKinnon and Karen Phillipps
212	<i>Anorrhinus galeritus</i>	MacKinnon and Phillipps 1993: Pl. 47 ©John MacKinnon and Karen Phillipps
212	<i>Anthracoceros malayanus</i>	MacKinnon and Phillipps 1993: Pl. 47 ©John MacKinnon and Karen Phillipps
213	<i>Aceros corrugatus</i>	MacKinnon and Phillipps 1993: Pl. 47 ©John MacKinnon and Karen Phillipps
213	<i>Sasia abnormis</i>	MacKinnon and Phillipps 1993: Pl. 50 ©John MacKinnon and Karen Phillipps
214	<i>Blythipicus rubiginosus</i>	MacKinnon and Phillipps 1993: Pl. 50 ©John MacKinnon and Karen Phillipps

Page No.	Genus Species	Drawing Reference and Copyright
214	<i>Pycnonotus zeylanicus</i>	MacKinnon and Phillipps 1993: Pl. 58 ©John MacKinnon and Karen Phillipps
215	<i>Platylophus galericulatus</i>	MacKinnon and Phillipps 1993: Pl. 63 ©John MacKinnon and Karen Phillipps
215	<i>Copsychus malabaricus</i>	MacKinnon and Phillipps 1993: Pl. 70 ©John MacKinnon and Karen Phillipps
216	<i>Gracula religiosa</i>	MacKinnon and Phillipps 1993: Pl. 82 ©John MacKinnon and Karen Phillipps
216	<i>Arachnothera longirostra</i>	MacKinnon and Phillipps 1993: Pl. 84 ©John MacKinnon and Karen Phillipps
217	<i>Lonchura malacca</i>	MacKinnon and Phillipps 1993: Pl. 87 ©John MacKinnon and Karen Phillipps
217	<i>Crocodylus porosus</i>	Glasby <i>et al.</i> 1993: 326, ©Commonwealth of Australia
218	<i>Varanus salvator</i>	Bennett 1998: 243
218	<i>Varanus rudicollis</i>	Inger and Tan 1996: Fig. 24, ©R.F. Inger
219	<i>Varanus dumerilii</i>	Bennett 1998: 103
219	<i>Gonocephalus doriae</i>	Inger and Tan 1996: Fig. 22, ©R.F. Inger
220	<i>Gonocephalus liogaster</i>	Inger and Tan 1996: Fig. 48b, ©R.B. Stuebing
220	<i>Mabuya rudis</i>	Inger and Tan 1996: Fig. 56, ©C.L. Chan
221	<i>Python curtus</i>	Inger and Tan 1996: Fig. 95, ©S. Von Peltz
221	<i>Python reticulatus</i>	Tweedie and Harrison 1954: 44
222	<i>Ophiophagus hannah</i>	Inger and Tan 1996: Fig. 30, ©S. Von Peltz
222	<i>Tropidolaemus wagleri</i>	Inger and Tan 1996: Fig. 29, ©P. Hans Hazebroek
223	<i>Ahaetulla prasina</i>	Inger and Tan 1996: Fig. 90, ©C.L. Chan
223	<i>Maticora bivirgata</i>	Inger and Tan 1996: Fig. 91, ©R.F. Inger
224	<i>Dogania subplana</i>	Inger and Tan 1996: Fig. 19, ©R.F. Inger
224	<i>Cyclemys dentata</i>	Inger and Tan 1996: Fig. 52, ©W.M. Poon
225	<i>Notochelys platynota</i>	Inger and Tan 1996: Fig. 104, ©W.M. Poon
225	<i>Rhacophorus reinwardti</i>	Inger and Tan 1996: Fig. 15, ©R.F. Inger
226	<i>Rhacophorus nigropalmatus</i>	Inger and Tan 1996: Fig. 60, ©R.F. Inger
226	<i>Polypedates macrotis</i>	Inger and Tan 1996: Fig. 62, ©R.F. Inger
227	<i>Kaloula baleata</i>	Glasby <i>et al.</i> 1993, ©Commonwealth of Australia
227	<i>Rana ingeri</i>	Inger and Tan 1996: Fig. 75, ©R.F. Inger
228	<i>Hemibagrus wyckii</i>	Kottelar <i>et al.</i> 1993: Pl. 32
228	<i>Barbodes balleroides</i>	Kottelar <i>et al.</i> 1993: Pl. 8
229	<i>Lobocheilos</i> sp.	Kottelar <i>et al.</i> 1993: Pl. 10
229	<i>Tor tambra</i>	Ike Rachmatika 1999
230	<i>Pangasius</i> sp.	Roberts and Vidthayanon 1991: 124

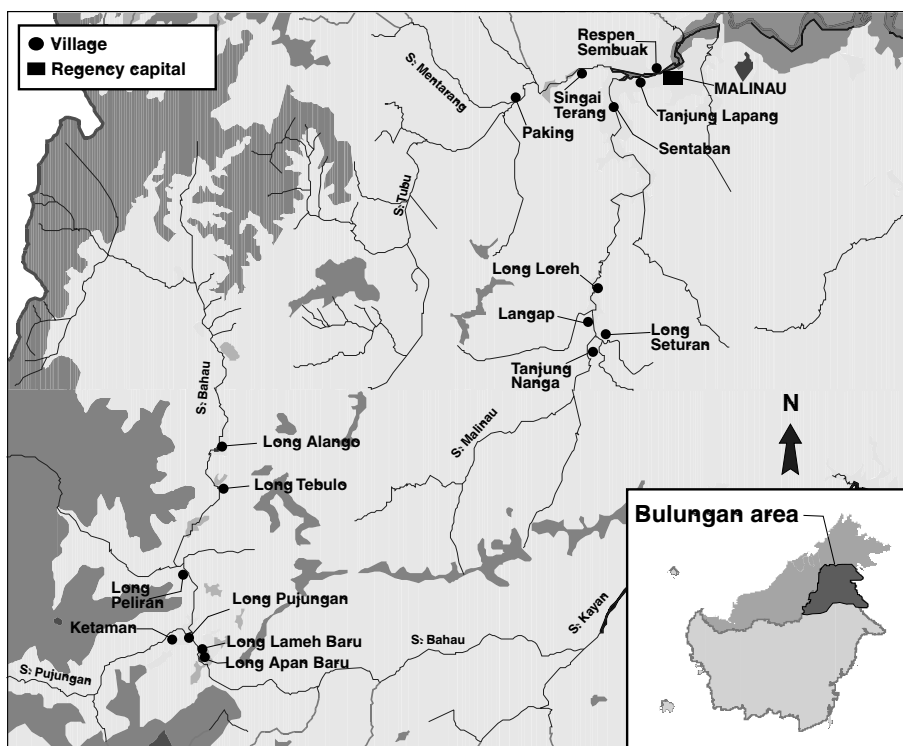
Page No.	Genus Species	Drawing Reference and Copyright
230		Holthuis 1979: Pl. 2.
231	<i>Macrobrachium</i> sp.	Farfante and Kensley 1997: Titlepage
231	<i>Cipangopaludina</i> sp.	Tweedie and Harrison 1954: 204
232		Pinhey 1974: 7
232		British Natural History Museum
233		Tweedie and Harrison 1954: 147
233	<i>Mantis</i> sp.	Little 1963: 137
234		Pinhey 1974: 8
234	<i>Phyllium</i> sp.	Imms 1957: 337
235	<i>Gerris remigis</i>	Tweedie and Harrison 1954: 150
235	<i>Tibicen</i> sp.	Little 1963: 137
236	<i>Lucanus</i> sp.	Imms 1957: 784
236	<i>Rhynchophorus ferrugineus</i>	Tweedie and Harrison 1954: 141
237	<i>Tenebroides</i> sp.	Imms 1957: 798
237	<i>Apis dorsata</i>	Butler 1962: 66
238		Imms 1957: 734
238		British Natural History Museum
239		Imms 1957: 563
239	<i>Attacus atlas</i>	Imms 1957: 552
240	<i>Anopheles</i> sp.	Pinhey 1974: 15
240	<i>Musca domestica</i>	Pinhey 1974: 15

INTRODUCTION

Objectives

This handbook presents both biological and ethno-biological data for 164 plant species and 111 animal taxa found in the rainforests, mountains, streams and cultivated areas of the Bulungan area in northern East Kalimantan, Indonesian Borneo (see Figure 1). While the actual number of plants and animals found in this area may be orders of magnitude greater, this book profiles those taxa most likely to be encountered in villages, markets, or in discussion with residents, traders, and local government officials. These taxa have been and mostly likely will continue to be prime subjects for scientific investigation, economic development, conservation initiatives, and government policy.

Figure 1. Map of the surveyed villages in the Bulungan area, East Kalimantan, Indonesia



Intended as a resource for researchers working in the Bulungan area, including the Kayan Mentarang National Park (KM) and the Bulungan Research Forest (BRF), this handbook serves as both a field guide to common plants and animals, and a dictionary of their vernacular terms from 18 different linguistic/cultural groups. Also included is a vernacular glossary of related environmental vocabulary, such as terms for inclusive categories of plants and animals, geological, hydrological, and ecological features, and descriptive adjectives that often appear in the local names of plants and animals. A second aim in producing this book, and the dictionary in particular, is to facilitate communication about familiar flora and fauna among residents of the Bulungan. Indeed, many residents were quite excited to have their knowledge of plants and animals recorded for future generations as well as to promote cross-cultural communication. Finally, this book provides the basis for future analyses of regional patterns of resource use, ethnobiological classification, and comparative and historical linguistics. The author does not intend to present the complete ethnobiology of any of the surveyed groups, and thus one should be careful about using this material for comparative studies outside the data set presented here. The reasons for this result from the methodology used to collect the data.

How to use this handbook

The handbook is divided into several sections containing a variety of formats and types of data. The first two sections present profiles of 164 plants and 111 animal taxa. Each profile page consists of an entry with a photograph or illustration and both biological and ethnobiological data. In some profiles, data for some categories were not available, or found to be questionable, and therefore excluded. The absence of data should not be taken as evidence that a vernacular name or local use does not exist, rather, among the limited number of informants interviewed no information was forthcoming. The rationale for choosing the survey methods is explained in the section DOCUMENTING REGIONAL ETHNOBIOLOGY.

Biological data

Biological data include scientific names in the first line and common English and then Indonesian names in the second line. Next to a photograph or drawing of the taxa are descriptions of morphology (DESCRIPTION), habitat preference (HABITAT), geographical origin (ORIGINS), general uses (USES), and current protection status. Where uses were specific to one group, the code for that group is given next to the use. Most of this data has been abstracted from the published literature (REFERENCES). Full citations for this literature is in REFERENCES CITED. Profiles

for most of the invertebrates are not of particular species, but instead of more inclusive categories at the rank of family or order, such as ‘ants’ or ‘grasshoppers’.

Ethnobiological data: Vernacular names

Ethnobiological data for each profile are contained in a table below the biological data. The table contains information collected from 18 linguistic groups, identified by a three-letter language code (CODE). For each language, all the elicited vernacular names for each taxon are listed and can be assumed to be synonyms of names in use. The author does not claim to have elicited the “correct” vernacular name for any of the taxa investigated, and one should question the validity of such claims, especially in an area such as the Bulungan, where languages and isolects are closely related, where there is high intergenerational variability in vocabulary, and where people speak many languages. Researchers will have to determine which term is used among the people they stay with, and space is provided for revisions at the bottom of each profile. The meaning of some of these names can be translated by consulting the ENVIRONMENTAL GLOSSARY. For help in pronouncing the names please refer to NOTES ON LINGUISTICS AND ORTHOGRAPHY.

Ethnobiological data: Uses and ecological information

For the plant and mammal profiles, the table of local names also includes informants’ responses to questions about uses (USE), common habitats and local abundance (HAB-AB). The use categories are explained in Table 1; multiple uses were recorded. Where informants differed over habitat preferences and local abundance, all responses are included. No attempt was made to quantify informant variability. Readers should be clear that informants’ responses might provide supporting or contradictory information to that derived from the scientific literature. Some taxa are well known, but seldom used today, so informants were also asked how recently the taxon in question had been used in their household (Recent Use or RU). A “v” indicates that a taxon was used by at least one informant’s household during the past year. An “x” indicates that it was not used. Blank indicates no information.

Icons

A set of icons on the outer margins of each page summarizes the data presented for that taxon (Figure 2). The top icon identifies the lifeform of the taxon. The uses, habitat, and abundance icons, on the lower half of the page, represent an assessment of the ethnobiological data from all of the surveyed villages in the Bulungan area, and not the conditions found in any one location.

Table 1. Explanation of plant and animal use categories

PLANT USE CATEGORIES		
1.	Food	Plant parts consumed raw or cooked for food.
2.	Medicine	Plant parts used in a medicine or medical treatment.
3.	Heavy construction	Timber for house posts, beams, floors, walls, and roof shingles.
4.	Light construction	Timber, poles, leafy roofing material for swidden field huts and temporary forest shelters.
5.	Boat construction	Wood and resins used for wooden canoes, but not accessories.
6.	Household tools	Paddles, punting poles, blowpipes, spear shafts, furniture, handles for axes and farming tools, tools for processing rice and sago palms; parts for storage of food.
7.	Firewood/fuel	Wood and resins burned for cooking, light or heat.
8.	Cordage/basketry:	Vines, cane, bark or other material used as rope to tie and bind, or used in the manufacture of baskets, backpacks, and mats.
9.	Cloth/dye	Plant parts used to make traditional cloth or dyes for both cloth and other materials.
10.	Hunting function	Plants providing fish poison, dart poison, gums to entrap, or bait for either terrestrial or aquatic animals; includes honey trees.
11.	Sold	Plants or plant parts that are exchanged for cash.
ANIMAL USE CATEGORIES		
1.	Food	Animal parts cooked for food, including cooking fat.
2.	Medicine	Animal parts used in a medicine or medical treatment.
3.	Tool	Animal parts used for tool handles, mats, packs, needles, and rope.
4.	Cloth	Animal parts used in traditional loincloth, hats, skirts, and vests.
5.	Ritual	Animal parts used in traditional religious ceremonies, rites, costumes; includes charms for good fortune and protection from ghosts.
6.	Decoration	Animals and animal parts used as trophies, jewellery, and ornamentation.
7.	Bait	Animals and animal parts used to hunt terrestrial or aquatic animals.
8.	Sold	Animals or animal parts that are exchanged for cash.
9.	Pet	Wild and domesticated animals that are kept for amusement or companionship, including those raised for eventual consumption or sale.

Figure 2. Icons used in this handbook



Environmental glossary

This section contains word lists for 120 environment-related terms, including all 18 language groups and Bahasa Indonesia. Included here are terms for features of the landscape (topographical, geological, hydrological and ecological), terms for more inclusive categories in animal and plant taxonomies, terms for plant and animal parts, and adjectives commonly found in plant or animal names. Blank spaces do not mean that a term does not exist for that language, rather, among the informants interviewed, no term has yet been discovered.

Indexes

The last section of the book is a series of indexes to scientific and vernacular names for the profiled plants and animals. The indexes allow researchers to discover whether a vernacular name is specific to a language and species, or refers to different scientific taxa within the same language or in other languages.

Documenting regional ethnobiology

The methods used to collect the information for this book derive from standard survey and interview techniques used in anthropology and ethnobiology (e.g., Bernard 1994; Martin 1995), and were in part inspired by Brent Berlin's vision of the comparative ethnobiologist hauling a portable museum of specimens, photographs, and other paraphernalia from village to village across the Amazon Basin (Berlin 1992: 267). Thus the principal methodology adopted here was to use a common set of stimuli to elicit names, uses and other information from a sample of residents representing all the large linguistic/cultural groups across the Bulungan area. The two critical decisions concerned which plants and animals to sample and who to interview.

It was not possible to sample all habitats and all taxonomic groups. Instead, the study concentrated on cultivated areas and forests close to villages, and those plants and animals with some documented salience for people in Bulungan. Published and unpublished materials from previous research in the area were reviewed to construct an initial list of plants and animals. Previous research by the author among several of these groups (Penan Benalui, Kenyah Badeng, Punan Tubu⁷) provided the initial materials and data to design and conduct the research and assess its results (Puri 1997a, 1998a). Lists compiled by de Beer and McDermott (1996), Chin (1985), Kaskija (1991), Saccheri and Walker (1991),

TAD (1981), and Wollenberg *et al.* (1999) were also consulted. Museum specimens, photos, and pictures of plants and animals on an initial list were collected.

Duplicate voucher specimens collected by staff at the Lalut Birai Forest Station in Kayan Mentarang National Park were borrowed. Pictures, especially of fruit, flowers or other colorful parts of identified specimens were included to aid in identification. Additional botanical specimens were collected or photographed, and the survey questionnaire pre-tested in several villages in the Pujungan and Malinau districts.

The plants thus chosen for this handbook are common, wild and cultivated species found in human settlements, cultivated areas, and nearby secondary and primary forest. There are species from all habitat types and most common lifeforms (see Figure 2). The profiled animals are those most commonly hunted, collected for sale, or recognized as important in some way by residents. However, there is a bias toward terrestrial animals and especially mammals, which are endangered because of their importance in local diets and their high market value. Fish species are undoubtedly as important as mammals for most people in Bulungan, but are under-represented in this study. The biological and ethnobiological literature for fish and fishing in Kalimantan was too poor to provide photographs or drawings, scientific identifications, and background information on more than a few common species. In fact, for all domains, the sample presented here is tiny compared to what might be encountered in even a few hectares of Bornean mature forest (see Table 2).

Table 2. Representativeness of the Bornean flora and fauna surveyed in this handbook

	Estimated Species Richness in Borneo	Species in this Handbook
Plants	10,000-15,000	164
Mammals	222	41
Birds	420	23
Lizards (Crocodiles incl.)	74	7
Snakes (Land/Freshwater)	104	6
Turtles (Land/Freshwater)	13	3
Amphibians	100	5
Fish (Freshwater)	394	5
Arthropods (non-insects)	Not available	5 families
Insects	600+ families	16 families

(Sources: MacKinnon *et al.* 1996: 47, Inger and Tan 1996.)

Interviewing and fieldwork were conducted intermittently between February and August 1998, in three districts of the Bulungan (see Figure 1): Pujungan (in the mountainous western and inland side of the BRF), Malinau (on the south-eastern and more coastal lowland side of the BRF) and Mentarang (a lowland area encompassing most of the BRF). The 18 language groups chosen for the survey are a sample of the total number of local languages spoken in the interior of this part of East Kalimantan (see Table 3). Priority was given to groups inhabiting current or future research areas surrounding the Bulungan Research Forest (BRF). Excluded were some populous linguistic groups such as the Kayan, the Berusu, the Tidung, most of the Kerayan languages, and several Kenyah sub-groups, including the Leppo' Tau, Uma' Kulit, Uma' Baka and Uma' Jalan. Arabic, Chinese, Javanese, Buginese, Banjarese and languages from the Tana Toraja in Sulawesi are also spoken in the Bulungan area but are not included here.

Table 3. Villages in Bulungan Regency surveyed for this handbook

ID No.	Lang. Code	Language	Original Village	Original District	Current Village	Current District
1	PUT	Punan Tubu'	Menabur Besar	Mentarang	Respen Sembuak	Malinau
1	PUT	Punan Tubu'	Bila Bekayuk	Mentarang	Long Loreh	Malinau
2	PUB	Punan Beketan	Long Lakeh	Malinau	Long Loreh	Malinau
2	PUB	Punan Beketan	Pelancau	Malinau	Long Loreh	Malinau
3	PUD	Punan Derian	Sungai Rian	Malinau	Long Seturan	Malinau
4	PUM	Punan Mentarang	Long Iman	Mentarang	Paking	Mentarang
5	ALS	Abai	Sentaban	Malinau	Sentaban	Malinau
6	LDY	Lun Daye	Long Sulit	Mentarang	Singai Terang	Mentarang
6	LDY	Lun Daye	Long Gafit	Mentarang	Singai Terang	Mentarang
7	LIT	Lengilu'	Lg. Sepayang	Kerayan	Tanjung Lapang	Malinau
8	BRU	Berau	Long Bila	Malinau	Sentaban	Malinau
9	MRP	Merap	Sengayan	Malinau	Long Loreh	Malinau
9	MRP	Merap	Langap	Malinau	Langap	Malinau
10	PTN	Pua'	Tanjung Nanga	Malinau	Tanjung Nanga	Malinau
11	KLK	Leppo' Ké	Long Lat	Pujungan	Long Loreh	Malinau
11	KLK	Leppo' Ké	Long Lat	Pujungan	Long Tebulo	Pujungan
12	KLM	Leppo' Ma'ut	Long Alango	Pujungan	Long Alango	Pujungan
13	KLO	Uma' Long	Long Sa'an	Pujungan	Long Pujungan	Pujungan
14	KLA	Uma' Lasan	Long Pujungan	Pujungan	Long Pujungan	Pujungan
15	KAL	Uma' Alim	Ketaman	Pujungan	Ketaman	Pujungan
16	KBD	Uma' Badeng	Long Peliran	Pujungan	Long Peliran	Pujungan
17	KBK	Uma' Bakung	Long Apan	Pujungan	Long Apan Baru	Pujungan
18	PEB	Penan Benalui	Long Lameh	Pujungan	Long Apan Baru	Pujungan

Even with such a small sample of the region's biota, the survey questionnaire was still too time consuming to interview many informants separately, so it was decided to conduct interviews with groups of men and women (usually no more than three or four). Throughout the Bulungan area, residents expressed concerns that the "correct" answers and pronunciations, as far as could be known, be recorded for posterity. Rather than attempt to survey all age sets, only elders considered by the local residents to be experts in various domains were consulted. The only drawback to this approach was that many of these elders no longer hunt or travel far from their villages, making them questionable sources for information on present day use of these taxa. As it turns out, interviews with elders were seldom uninterrupted by curious spectators adding or correcting information about current use or recent hunting captures.

The groups were separated, one being interviewed about animals and the other about plants. The informants provided all known vernacular names, uses (by plant and animal part), habitat preferences, local assessment of abundance and distribution, and self-reports on how recently the item had been used. At least one group was asked to provide basic environment-related vocabulary. After a lunch break, the groups switched topics from plants to animals or vice versa. Depending on the informants, each interview session could last from three to six hours. Assuming all the arrangements for the interviews were made the night before, the two groups could be interviewed in one day. This was rarely achieved, however, and it usually took two to three days to finish interviews in one village.

One weakness in this survey method was the limited sample of informants (albeit elders of both sexes) that could be interviewed for each language group. As a result, there is a good probability that some synonyms were missed, and that some of those terms elicited are not widely known or scarcely used anymore. A second weakness was not being able to observe the daily use of resources in the surveyed villages in order to corroborate informants' reports. Both of these weaknesses are consequences of the rapid and extensive nature of the survey method. For additional information, recent studies of resource use practices in this part of the Bulungan area can be found in de Beer and McDermott (1996), Kaskija (1995), Puri (1997a, 1998a), Sorensen and Morris (1997), and Wollenberg *et al.* (1999).

Environment and people of the Bulungan area

The Bulungan area, at roughly 64 000 sq. km with a 1996 population of 288 499 (Badan Pusat Statistik 1997), stretches from the islands of Tarakan, Bunyu, Nunukan, and Sebatik in the Straits of Makassar, more than 200 km to the mountainous spine that separates Sarawak from East Kalimantan. To the north is the mountainous border with Sabah, while the southern border follows the mountains separating the Kayan River valley from the Berau River and upper Mahakam River valleys (Figure 1). This area encompasses three major river systems, the Kayan, Sesayap, and Sembakung, that flow from the mountainous interior, converge and empty into the muddy delta surrounding the above mentioned islands. This coastal area of mangrove, peat swamps, and heath forests gives way to lowland plain with tropical dipterocarp forest and cultivated lands. Roughly 50 km from the coast, the steep hills and mountains rise up to between 1000 m - 1,500 m with several peaks above 2000 m. The mountains have a mix of moist to wet hill dipterocarp and oak-laurel forests, with some montane forests on the isolated peaks. Cultivated areas, including gardens, orchards, and rice swiddens, and old fallow and secondary forests are abundant along large rivers, on mountain plateaux, and wherever there is relatively level ground.

The area's main towns are located in the lowlands close to the coast: Tanjung Selor on the Kayan River, and Malinau on the Sesayap River. Ships and ferries link these towns with the populous island centres of trade and industry, Tarakan and Nunukan. Tanjung Selor and Malinau are gateway towns to the interior of Bulungan, and were in fact the seats of sultanates that controlled the trade in forest products from the interior until the 20th century (Magenda 1991; Peluso 1983; Warren 1981). Even today their strategic importance has not been lost, as they remain centres of trade and seats of local government. Both of these towns can receive moderately large ships carrying oil, large machinery, vehicles, and other goods and materials. Upriver travel is primarily by small river taxis and speedboats. River travel and trade with the far interior is dependent on regular flooding which enable the large longboats to pass over the many rapids. With average travel conditions most inhabited areas can be reached in three to four days from Tanjung Selor or Malinau. Prolonged drought periods can result in these interior areas being nearly cut off from the coast.

Only in the last few years has road construction reached Bulungan. An unpaved road now runs from Tanjung Selor to Tanjung Redeb (on the Berau River) and on to Samarinda, the provincial capital of East Kalimantan. Another road,

requiring the construction of bridges over the Kayan and Malinau Rivers, will link Tanjung Selor, Malinau, and Lumbis (close to the border with Sabah). There are former logging roads that are being transformed into public roads, such as the one linking the upriver towns of the Malinau and mining and logging camps with the urban and administrative centre in the town of Malinau. Logging roads extend all the way up the Kayan River to the inland towns of Long Peso and Long Pujungan. The villages on the two high altitude plateaux of the area, the Apo Kayan and the Kerayan, are each internally linked by walking paths, but remain cut off from the eastern lowlands. Small aircraft now service these areas, but the flight costs are so high that it is cheaper for residents to walk into neighbouring Sarawak to buy supplies and trade forest products.

The indigenous Dayak groups of Bulungan practice agriculture and use forest resources in a wide variety of ways, including the cultivation of irrigated rice fields, mixed crop swiddens, tuber gardens and small plantations of such cash crops as banana, coffee, cacao, and cinnamon. They manage and harvest forest-grown fruit trees, sago palms, rattan, and aromatic woods for trade. Food, materials, and trade items are also obtained by fishing, hunting, trapping, and gathering (Puri 1997a). In a survey of five villages, Wollenberg *et al.* (1999) conservatively estimate between 139 and 214 wild and cultivated taxa per village were harvested and used in a one-year period. In a biodiversity assessment survey with Punan Tubu', 330 plant taxa were reported to have uses (Puri 1998a). The diversity of subsistence practices is found not only on a regional scale, but even within single communities, where people often combine or switch between different forms of resource use. The population in the interior is decreasing as families and even whole communities move down-river toward the larger towns on the coast such as Malinau and Tanjung Selor. The primary reasons for the migration appear to be a desire to be near cheaper and larger markets, higher education, better healthcare, and a livelier social atmosphere.

Notes on linguistics and orthography

The ethnobiological data was collected from informants representing 18 different indigenous ethnic groups of the Bulungan area. However, these groups do not represent 18 distinct languages. There are seven subgroups of the Dayak Kenyah language. The Pua' language appears to be a Kenyah-Kayan variant, as it shares elements of both groups. The Punan of the Malinau, Tubu', and Mentarang can be considered subgroups of the same Punan language. Abai, Merap, Berau,

Lengilu', Lun Daye, and Penan Benalui are distinct enough to warrant status as separate languages, although all share vocabulary with past and present neighboring groups. A long history of migration, intermarriage, and political and economic alliance building have led to constant interaction among these groups with the result that words have been borrowed and languages have come to be shared and even hybridized in some cases. For instance, Merap shows evidence of Ngorek, Kayan, Kenyah, and Punan Tubu' influences. The Ngorek people inhabited the Pujungan district before the arrival of the Kayan in the 18th century. Their language is now extinct in East Kalimantan, although its descendants are recognized in the Hueng Bau language of the Kayan River and the Murik language of the Baram River in Sarawak.

All of the languages surveyed for this book belong to the Western branch of the Malayo Polynesian language family known as Austronesian. In particular they belong to the Kayan-Kenyah group in Central Borneo, and share similarities in phonology, vocabulary, and grammar. However, each subgroup or language contains characteristic phonemes that often identify and distinguish it from others. Some of these phonemes are difficult to write without resorting to the complicated diacritical marks of the International Phonetic Alphabet. Since this book is meant to be used by scientists and local people in the field, rather than as a source for study in regional or historical linguistics, some linguistic accuracy has been sacrificed in favor of a user-friendly format. Vernacular terms are written in the well-known orthography used to write Malay dialects, such as Bahasa Indonesia, the national language. A few vowels have varying pronunciation across the region, but most terms are written as spoken using the orthography presented below. This makes it possible for local people and others not trained in linguistics to read and speak the terms presented here, although non-native speakers will have to learn local variants in pronunciation. The following letter characters are used to represent phonemes seldom encountered by an English speaker:

- ʔ : glottal stop, as in 'oʔoh'
- c : 'ch'
- e : schwa or a collapsed vowel between consonants 'apricot'
- ai : 'kay' in final position only
- i : 'beet' (and not 'bite')
- a : 'palm' is a long vowel
- ô : 'all'
- œ : 'world' usually found in prefixes
- o : 'chauffeur' (may also be written as eu)

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