

# PROCEEDING

**THE 2<sup>nd</sup> INTERNATIONAL SYMPOSIUM FOR SUSTAINABLE HUMANOSPHERE**

*" Balancing Efforts on Environment Usage  
in Economy and Ecology "*



**August 29, 2012  
Auditorium LAPAN,  
Bandung, INDONESIA**

**Organized by**

Research and Development Unit for Biomaterials – LIPI  
Research Institute for Sustainable Humanosphere – Kyoto University

**Supported by**

Center for South East Asian Studies (CSEAS) – Kyoto University  
International Center for Interdisciplinary and Advanced Research (ICIAR)-LIPI  
National Institute of Aeronautics and Space (LAPAN)  
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## PREFACE

The 2<sup>nd</sup> International Symposium for Sustainable Humanosphere 2012 attracted the interest of scientists from Indonesia and Japan. The symposium covered the disciplines of atmospheric science (equatorial atmosphere; space environment, radar observations; space weather), biosphere science (animal ecology; empowerment of local communities), geosphere science (land resource management option for global warming mitigations; water management system), marine science (development of marine ecosystem, fishery products processing), wood science and technology (wood cell wall formation; cellulose; wood biochemistry; wood deteriorating organisms; wood preservation; timber structure; wooden construction; wood-based material; carbonized wood based composites; wood adhesives; chemical, physical and mechanical properties of wood; biomass conversion; bio-composites; wood for energy; termites for new energy options), and forest science (biodiversity in tropical plantation forests; peat swamp forest ecosystem; forest biomass). The technical program consisted of 12 oral presentations under 4 sessions and 15 poster presentations.

This publication is a compilation of presented papers. Every effort has been carried out to retain the original meaning and views of authors during the editing processes. All claims on trade products and processes and views expressed do not necessarily imply endorsement by the editors.

We believe that this publication will be a useful source of information and achieved its primary objective of disseminating new experiences and information to researchers, academics, policy makers and students.

The organization of this international gathering and compilation of the proceedings could not have been achieved without the combined effort of all members of the organizing committee and the supports of Research Institute for Sustainable Humanosphere (RISH), Center for South East Asian Studies (CSEAS) Kyoto University, International Center for Interdisciplinary and Advanced Research (ICIAR)-LIPI, National Institute of Aeronautics and Space (LAPAN) and Sumitomo Chemical. The editors hereby wish to acknowledge the contributions of all parties.

Editors

February 18, 2013

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Symposium Schedule

# CULTURAL AND PRACTICAL USE OF FOREST PLANT RESOURCES IN DAYAK TUNJUNG COMMUNITY AT KELEKAT VILLAGE, EAST KALIMANTAN

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## Abstract

The function of forest for the society is not only ecological, but also economic and cultural. Traditional knowledge is inherently linked to use and management of natural resources. This study aimed to investigate the traditional knowledge of use and the factual use of forest plant resources of Dayak Tunjung community in Kelekat Village, East Kalimantan. This ethnobotany study was conducted in February - April 2011, and Oktober 2011. To obtain information on the plant local names and the knowledge of people on plant use, 32 respondents were randomly selected for interview. To asses the actual uses of plants by the people, scan observation was conducted in 43 families. Sampled plants were brought for species identification in *Herbarium Bandungense*, ITB. This study found that 151 ethno-species were used by people in Kelekat Village; according to interviews, 18 ethno-species were used as medicine, 20 ethno-species were used as firewood, 54 ethno-species were used as building material, 42 ethno-species were used as tools material, 73 ethno-species were used as foods, and 31 ethno-species were used for others. According to scan observation data, we found that 6 ethno-species were used as medicine, 4 ethno-species were used as firewood, 15 were used as building materials, 15 were used as tools materials, 11 were used as foods, and 5 were used for others. This study suggests that Dayak Tunjung people have high number of forest plants in their traditional knowledge of use, however the number of forest plants species in factual use was lower than number of forest plant species in traditional knowledge.

**Keyword:** Ethno-botany, forest-plant, Dayak Tunjung

## Introduction

Borneo (or Kalimantan) is one of the largest islands in Indonesia. It is known as one of the centers of plant diversity in the world, with estimated 10,000-12,000 species of flowering plants, with a huge number of endemic species. The cultural diversity of Borneo is as distinct and varied as the plant life which exists on the islands.

It is generally accepted that human has a close interaction with the environment around. Human ecology is one of disciplinary that discusses this interaction. Information in human ecologically scope is interpreted and translated into applied values and knowledge in either local or universal social system. Traditional knowledge is an accumulation of practical knowledge and believes which change adaptively through time<sup>[1]</sup>. Specific discipline in

human ecology studying the interaction between human and plants are called ethno-botany.

The early people of Borneo were hunter-gatherers and later they have settled down as shifting cultivators. The indigenous population practising shifting cultivation in Borneo is usually referred collectively as "Dayak". However, hunting and gathering of forest produce continue to be an indispensable part of life for Dayak people, and through many generations they have accumulated extensive knowledge on the usage of plants. Harvest and gatherer plants forest product activity is important for indigenous people who live near and in the forest. These activities become the limited action which is contributed the biggest source revenue<sup>[2]</sup>.

Shifting cultivation is still being practised by the Dayaks although only in limited extent. However, forest plant gathering activity by indigenous people tends to decrease rapidly.



Among the reasons causing such trend are deforestation and limited access to forests by indigenous people. The decrease in the activity to collect forest products becomes a serious concern as it may lead to loss of traditional knowledge, especially on the local plant use. Therefore, it is important that the traditional knowledge of local plant use currently being practised is documented and this study is an effort in that direction. This study was conducted to investigate the traditional knowledge of use and the factual use of forest plant resources of Dayak Tunjung community in Kelekat Village, East Kalimantan.

### **Method**

This study was conducted at Kelekat village in Kutai Kertanegara, East Kalimantan. Geographically, Kelekat village are situated at 00° 12' 55" S and 116° 18' 32" W. The ecosystem found in the study area are swamp forest, riparian forest, and rice field. Field works were conducted in early February 2011 until April 2011, and October 2011.

### **The people**

Dayak Tunjung is one of tribal communities in Kalimantan that mostly lives in Kutai districts. Dayak Tunjung has relationship with Dayak Benuaq<sup>[3]</sup>. Both of Benuaq and Tunjung are part of Luangan Ethnic Group<sup>[4]</sup>. Because of the long term cultural acculturation, now Tunjung people in Kelekat have many believe systems. Most of Tunjung people are Christian and the rest are Muslims and Animism. Like others Dayaks, shifting cultivation, hunting, and gathering forest plants are still practised by Dayak Tunjung people. They still rely on these activities to meet the family daily needs. However, nowadays most of young Tunjung people work in industries near the village to fulfill their daily needs.

### **Free listing method**

Free listing involves asking participants to spontaneously list the name of all the useful forest plants they knew and all the uses of each plant in their list<sup>[5]</sup>. The free listing method was used to reveal the knowledge of plant use representing cultural data. The number of respondents involved in freelisting were 32 randomly selected consisting of 13 men, and 19 women. We have asked several questions to the respondents, to get information about the plant

use in their traditional knowledge. We categorized the use of plant into 6 groups : food, firewood, medicine, tools, construction, and others.

### **Scan observation method**

Scan observation method was intended to reveal the actual use of plant representing the practical data. It was conducted by visiting the house of respondents and recording the plant-based materials currently being used in the visited household. As many as 43 households were selected randomly. We asked to them about plants species that they brought to their household<sup>[6]</sup>. We categorized the use of plants into 6 groups: food, firewood, medicine, tools, construction, and others.

### **Specimen Identification**

The initial specimen identification was conducted in REAKON's library, using some literature as Dransfield<sup>[7]</sup>, and Wee<sup>[8]</sup>. Then, the next identification continued in *Herbarium Bandungense* ITB, using some plant systematic literature as Munawaroh and Purwanto<sup>[9]</sup>, Rao<sup>[10]</sup>, Setyowati<sup>[11]</sup>, Newman<sup>[12]</sup>, van Balgooy<sup>[13]</sup> and identification website<sup>[14]</sup>. For the validity name we checked the plants name in the official site<sup>[15]</sup>. During the field work, not all plants that were mentioned by the respondents can be found while sampling. In such a case, we present the respondents with the picture of plants from an identification book to confirm and facilitate translation from local name to scientific name.

## **Result and Discussion**

### **Dayak Tunjung Tradition**

The forest for Dayak Tunjung people not only provide land for farming, but also supply them with various daily needs. They usually go to Gunung Anggi, or forest around Belayan river to search for firewood, foods, medicines, materials for construction and making tools. Dayak Tunjung still practice rituals inherited from their ancestors, for example marriage ceremony, ritual for opening forest for farming and ritual for expressing gratitude for good harvest. Another ritual still widely practised was traditional healing ceremony called *Belian*. The word *belian* is taken from the word *beli*, which means evil spirit. They believe that this ceremony can send away the evil from a sick person. They use some plants to fulfill the needs

of the ceremony, which are taken from forest or their own garden. Some plant species that are used for *belian* are ron jélo (*Musa acuminata* Colla.), kelapa (*Cocos nucifera* L.), teli'an (*Eusideroxylon zwageri* Teijsm. & Binn.), benda'a (*Arenga pinnata* (Wurmb) Merr.), sirih (*Piper betle* L.), tembakau (*Nicotiana tabacum* L.), and pulut (*Oriza sativa* L.).

In spite of that, there are still a lot of other Dayak Tunjung's heritage that still be practiced up to the present. Every their tradition from their ancestors, represent human interaction and relation with nature. In other words, they show us the tradition is not only to explore natural resources, but also as a lesson to live with nature mutually.

### Cultural and Practical Analysis

Various uses of forest plants have been found from traditional knowledge, and factual use. Overall, 151 ethnospecies were listed by respondent in interview, and 36 ethnospecies were brought to household by scan observation respondent. In Figure 1, we show the comparison between ethnospecies that represent the traditional knowledge (free listing data), and factual use ethnospecies (scan observation data).

For all categories, the number of uses reported was higher than the number of uses observed. For example, informants cited 18 different ethno-species for medicine, but we only observed 6 ethno-species being used as medicine. Food is significantly different among other categories, which informants cited 73 different ethno-species are edible, but we only observed 11 ethno-species being home as food. It is likely because of observation period not coinciding within fruit season. Free listing method captured Tunjung's local knowledge of plant use. This local knowledge is collected inherently from long term knowledge by the time. Tunjung people know the uses of a plant species from their ancestor and parents, and it inherited through generations. They know the use of a plant although in present forest can not be found anymore. This explains why number of ethno-species that cited by informants during interview is more than number of ethno-species that observed.

Figure 2 shows ten highest cultural ethno-species. From 151 total cited ethno-species, we found 10 ethno-species that have high value in cultural analysis. There are kayu teli'an (*Eusideroxylon zwageri* Teijsm & Binn), belaa'ng (*Borassodendron borneense* J.

Dransf.), merembu'ng (*Shorea bracteolate* Dyer.), ron biru (*Licuala grandis* H. Wendl.), lotong (*Durio oxleyanus* Griff.), kayu kapur (*Shorea* sp.), naka'a talun (*Artocarpus integer* (Thunb) Mer.), gaay sega (*Calamus caesius* Blume.), kayu kenikara (*Dillenia excelsa* (Jack) Gilg in Engl. & Pr.), and gaay kotok (*Daemonorops fissa* Blume.).

Teli'an wood (*Eusideroxylon zwageri*), merembu'ng (*Shorea* sp.) and keni kara (*Dillenia excelsa*) are common plants that are used as building construction and foundation. But people in Kelekat prefer Teli'an (*Eusideroxylon zwageri*) for construction because of the Kelekat village location is in riparian area, and usually flooded if the rain comes. Teli'an is chosen because of its hard and sturdy wood structure. The wood has low permeability and thick cell wall that makes it binds lots of water in hydroxyl cluster. Thus, in under water, Teli'an wood will be tighter than the normal one<sup>[16]</sup>. Belaa'ng (*Borassodendron borneense*), and ron biru (*Licuala grandis*) are two plants that frequently used to make *serawung*, one of Dayak's handicraft. Both species are dispersed in wide range of Borneo, especially east Kalimantan forest<sup>[17]</sup>. Lotong (*Durio oxleyanus*) and naka'a talun (*Artocarpus integer*) are used as food, while gaay sega (*Calamus ceasius*) and gaay kotok (*Daemonorops fissa*) are used as tools basic material.

Figure 3 shows proportion of plant forest used divided by 6 categories. The most uses plant forest as for food. The second is uses for building and tools.

Ethno-species cited for firewood is relatively low. This is because the plentitude of prime stock firewood species, leheban (*Vitex pinnata*), in the forest. Almost all of respondent cited this species for firewood that make this percentage of number species rated low. Unfortunately, uses for medicine are the lowest cite by informant. This is because of the plentiful number of chemically medicines that are sold at store around the village.

Figure 4 shows ten highest practical ethno-species. From 36 total observed ethnospecies, we found 10 ethno-species that have high value in practical analysis. There are gaay sega (*Calamus caesius* Blume.), gaay jahap (*Calamus trachycoleus* Becc.), preng bambu (*Dendrocalamus asper* (Schantz) Backer.), teli'an (*Eusideroxylon zwageri* Teijsm. & Binn.), ron biru (*Licuala grandis* H.Wendl.),

rumbia (*Nypha* sp.), ron bengkuang (*Pandanus kaida* Kurz.), gaay kotok (*Daemonorops fissa* Blume.), merembu'ng (*Shorea bracteolate* Dyer.), and gaay jepung (*Daemonorops crinita* Blume).

In the other hand, free listing result shows that uses category in scan observation result

mostly used as building and tools material. Both of uses category are durables, thus can be found during observation period in their house. The percentage of using forest plant as building material is 41.67%, while food is about 30.56%, medicine 16.67%, 13.89% for other uses, and 11.11% for firewood.

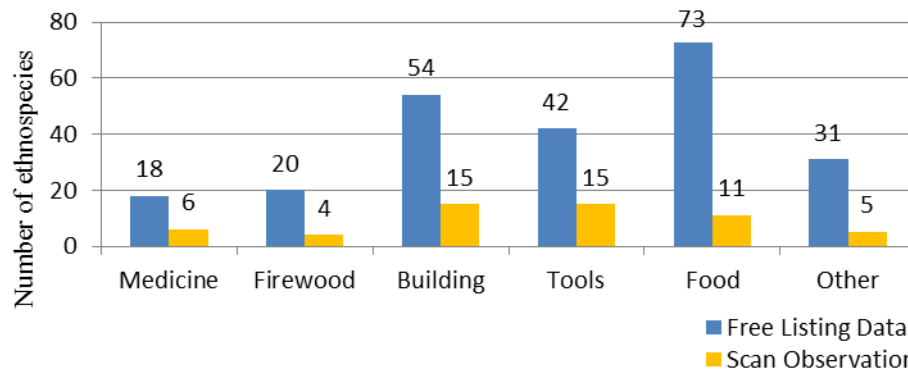


Figure 1. Local knowledge of plant use data from free listing method (n=151) compare with the plant factual use with scan observation method (n=36).

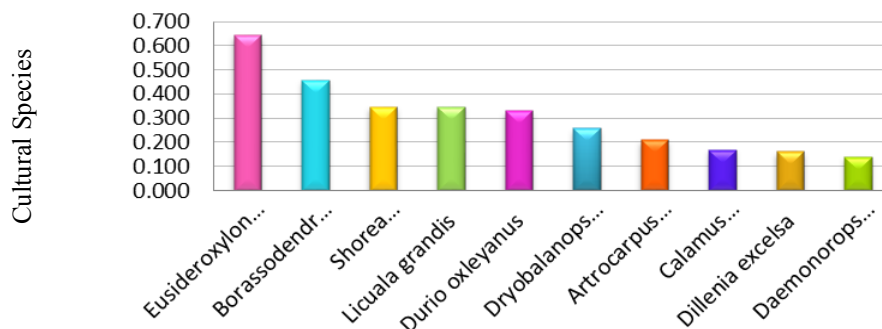


Figure 2. Ten highest cultural ethnospecies.

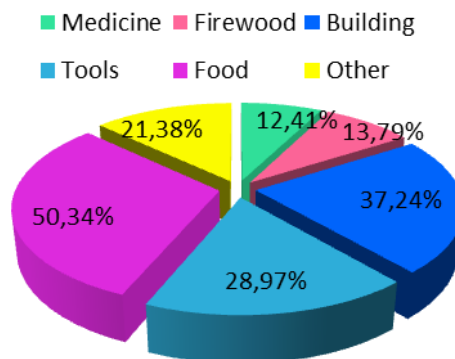


Figure 3. Ethno-species uses (in %) from total 151 cultural ethno-species cited by respondent.

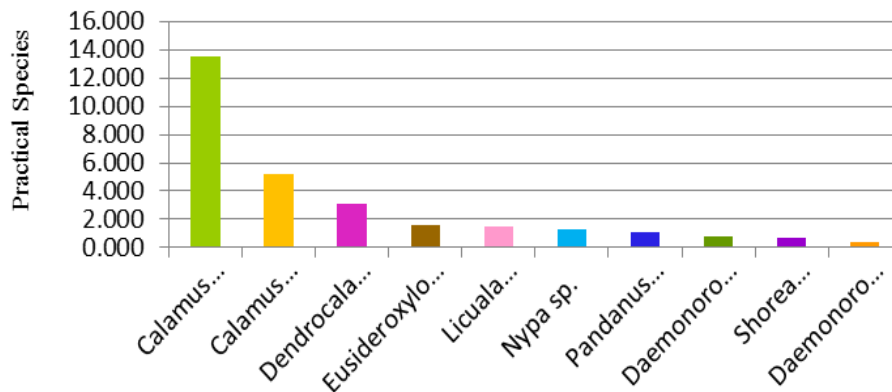


Figure 4. The ten highest practical ethno-species.

### Conclusion

This study suggests that Dayak Tunjung people have high number of forest plants in their traditional knowledge of use, however the number of forest plants species in factual use was lower than number of forest plant species in traditional knowledge.

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