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The Implementation of a Community-based Transboundary Management Plan for the Betung Kerihun National Park, West Kalimantan, Indonesia, Phase II

Workshop on park boundary toward effective management of the Betung Kerihun National Park

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TRADITIONAL KNOWLEDGE

Traditional Knowledge and Utilization of Biodiversity by Local Communities in and around Betung Kerihun National Park (BKNP)

A. Introduction

The traditional knowledge meant here is the Dayak community's knowledge. The community depends greatly on the natural resources in the surroundings. To traditional community, forest is the source of living as well as the means of survival. Forest, therefore, is essential for the community's economy, social, and culture. It is also common that traditional community has an extensive knowledge of the sustainable utilization and management of the existing natural resources (Zakaria, 1994). Regarding the utilization of biodiversity, especially plants, there are two criteria, i.e., 1) utilization, for example, as building materials, food, trade, and medicine; and 2) technology.

In general, per capita income in developing tropical countries, including Indonesia is relatively low. By the estimate of the potential natural resources, however, these countries are very rich, especially in biodiversity. On the other hand, the wealth is vulnerable to both global and regional threats. The global threats include the rapid growth of the population, the decrease in land tenure, and air, water, and soil pollution. While, the regional threats, for example, are: the exploitation of the flora and fauna, the increasing use of toxic chemicals, the desertification caused by forest conversion, the decrease in ecosystem, the introduction of exotic species, and the conversion of conservation area to farming, housing, and industrial areas. Judging by the complexity of the optimal and sustainable biodiversity management, a strategy is, therefore, needed; and the strategy should cover these 3 related aspects, i.e., 1) save it, 2) study it, and 3) use it.

National park is a system which is currently being considered effective on the in-situ management of natural resources due to its main function as the natural resource protection and conservation area; and generally, the available resources can be utilized by the community, especially the local traditional community.

According to Mering Ngo (1998), viewed from the structures of the society and means of living, which are generally gained from the available natural resources, the Dayak community at the TNBK, typologically, represents three of the four Dayak ethnic groups existing throughout Kalimantan, or Borneo.

First, the people of Punan and Bukat community living along the kapuas River represents the typology of the Dayaks with hunting and gathering (non-wood forest products) backgrounds. Their character shows individualism, pragmatism, and also opportunism due to the custom to live in small, independent, and mobile groups in order to gather non-wood forest products.

Second, The Iban and Kantu' community inhabiting the upstream of the Embaloh dan the Sibau represents the typology of a community with backgrounds in arable land agriculture and gardening. The community holds the principles of egalitarianism, frankness, and democracy, which are based on two chief values, i.e., teamwork (*gerempung penemu*) and person-to-person healthy competition (*bepaket*). Their dynamic and pragmatic character spices up many aspects in their daily life, for example, the tradition to travel or go away from home for some time (*bejalai*) to get new experiences while earning money from non-farming sector.

Third, The Tamambaloh people living at the lower course of the Embaloh and Kayan along the Mendalam river represents the typology whose backgrounds are in wet and dry arable land agriculture and gardening. Apparently the entering of religion, modern education since the early of 20th century, and also the influence of nationalism have eroded the structures of a stratified society. The old administration system, however, still exists in communal life, for instance, during a traditional ceremony and decision-making process of the traditional law and the natural resource utilization allocation.

B. Work Sites

River-area approach is used in collecting information on the local community's knowledge and utilization of biodiversity around the TNBK. The community organizers (CO) are the spearheads of this campaign, each which is stationed in a particular river-area and responsible for its latest issues and development. A CO also has charge of the documentary account of the local traditional knowledge.

The locations used for data collection are as follows:

1. Sadap Hamlet, Embaloh Hulu sub-District, Kapuas Hulu District.
   It is the last hamlet at the upstream of the Embaloh River, in which Dayak Iban people live. CO stationed in this village is Aloysius Kasim.
2. Sungai Ulu' Palin Hamlet, Nanga Nyabau Village, Embaloh Hilir sub-District, Kapuas Hulu District.
   This hamlet is located outside the national park, by the Nyabau River – Palin sub-River. Here live the Dayak Tamambaloh people; and this area is under the charge of CO Stefanus.
3. Nanga Potan Hamlet, Sibau Hulu II Village, Putussibau sub-District, Kapuas Hulu District.
   This hamlet is situated at the upper course of the Sibau , and populated by Dayak Kantu' people. CO working in this area is Zulkifli.
4. Nanga Hovat Hamlet, Tanjung Durian Village, Putussibau sub-District, Kapuas Hulu District.
   Dayak Bukat community lives in this hamlet which is situated at the upstream of the Mendalam. CO Rita is responsible for this site.
5. Nanga Bungan Hamlet, Bungan Jaya Village, Kedamin sub-District, Kapuas Hulu District.

This hamlet, situated at the Kapuas and the Bungan, is inhabited by Punan people. CO assigned here is Hermas Rintik Maring.

C. Data Collection Methods

Exploratory approach and direct interviews with the community are used to collect data. The respondents vary from common villagers to local key figures, like the regent, village elders, and the medicine man who surely masters the knowledge of plants and the traditional medicine. Furthermore, the specimens of the plants familiarly useful in daily life are collected. Those which have not had scientific names are grouped in proof specimens for further identification. The identification takes place at the Herbarium Bogoriense, Badan Penelitian Pengembangan Botani, and the Lembaga Ilmu Pengetahuan Indonesia (Indonesian Institute of Science). The botanical names were referred to the *Checklist of Generic Names In Malesian Botany*, by C.G.G.J Van Steenis. Besides the scientific names, local names and common uses are also recorded.

D. Analysis

Researched data are grouped, according to the plant utilization in each ethnic group, into the following categories: food, medicine, clothing, building materials, traditional ceremonial equipment, and other uses.

E. Study Results

The Dayak community at the upper part of the TNBK still embraces their cultural values and ecological wisdom. They have a wide knowledge of plants related to their daily needs. The knowledge is used to be to sustainably manage the existing natural resources.

Based on the inventory of the diversity of plants in 5 work locations, there are **319** species and **186** genera, including **73** families collected and documented, 88 of which have been cultivated while 258 are wild plants taken from their natural habitats. In detail, the diversity of plants in each village is shown in the following table.

Table 1. Resources & Biodiversity utilized in 5 villages

Village	Resources			Biodiversity		
	Wild	Cultivation	Wild/Cultivation	Species	Genus	Family
Sadap	136	56	20	222	152	63
Ulu' Palin	109	50	23	182	122	55
Ng Potan	116	54	26	196	130	57
Ng Hovat	113	42	23	178	127	60
Ng Bungan	86	40	16	142	103	52

From the data collected, it was evident that the community does not fully depend on forest products. Some of the plants regarded as essential and easy to cultivate have been planted in local house yards, fruit/vegetable gardens, or arable fields the community has realized that plants intensively utilized will decrease in number or even be extinct if they are not cultivated. This pattern shows that the community has developed species conservation naturally in accordance with their own interests in the utilization of particular plants.

The villages vary in the diversity of plants, especially in which the Iban, Tamambaloh, and Kantu' community lives. The dynamic and pragmatic character of the Ibans, Tamambalohs, and Kantu's is shown in many aspects of the daily life. The tradition of traveling (*bejalai*) to get new experiences as well as income from farming and non-farming sectors, affects their ability to access information. For example, they have received the information on some cultivable plants, economically potential for the industrial supply, such as: rubber, pepper, and cocoa, earlier than the community in Nanga Hovat and Nanga Bungan does. In addition, the available access road has promoted the cultural intermixture in the community.

The cultural backgrounds of the Punans and the Bukats, in which are hunting and gathering (non-wood forest products), on the other hand, have made them reluctant to cultivate plants. They are individualistic, opportunistic, and pragmatic due to the custom of living in small, highly independent, and mobile groups in order to gather non-wood forest products. Besides, in providing the daily needs, they are involved in other activities, like gold mining, aloe-wood and bird-nest gathering.

Among the eight categories, the utilization of plants as food falls into the largest group, other which are building materials, medicine, ceremonial equipment, ropes/weaving materials, clothing, colorings, and other uses.

1. Plants as food

In daily activity, the Dayak communities at the TNBK mostly cultivate fruit/vegetable gardens and arable fields to obtain the staple and additional diet. The data show that no fewer than 129 species, 94 genera, 42 families including 104 varieties of rice and glutinous rice can be utilized as food in general and also beverages.

Regarding plants as food resources found in each village, it appears that the Dayak Ibans in Sadap Village have utilized 92 kinds of plants, 60 of which have already been cultivated while 50 others are taken from the wild. Moreover, in Sungai Ulu' Palin Village inhabited by the Tamambalohs, there are 70 kinds of plants, 50 of which have been cultivated and 49 others still grow in the wild. The Dayak Kantu' community in Nanga Potan Village has utilized 82 kinds, including 51 cultivated and 48 wild plants. The Punan community in Nanga Bungan, on the other hand, utilizes only 62 kinds and cultivates 44, while other 30 still grow in the wild.

Although the community has cultivated most of the plants utilized as food resources, they still rely on the wild ones. for example: 'ingan' (*Saurauia* sp.), 'asam kalimantan' (*Mangifera* sp.), 'ijuk' (*Arenga pinnata*), rattan (*Calamus* sp.), 'tekalong' (*Artocarpus elasticus*), and 'kelindang' (*Helmintostachys zeylanicum*).

Plants that produce carbohydrates commonly used by the community, among others, are: rice (*Oryza sativa*), glutinous rice (*Oryza glutinosa*), 'ubi raung' (*Dioscorea alata*), 'ubi besar/ubi bakaran' (*D. hispida*), sweet potato (*Amorphophallus variabilis*), 'keladi' (*Colocasia esculenta* & *Alocasia indica*), corn (*Zea mays*), 'engkuliset' (*Coix lachryama-jobi*), banana (*Musa acuminata x balbisiana*), cassava (*Manihot esculenta*), and sagu (*Metroxylon sagu*); and which, especially vegetables, produce vitamins and minerals are: spinach (*Amaranthus blitum*), 'kelindang' (*Blechnum orientalis*), 'rampou' (*Cucumis sativus*), 'ganouk' (*Lagenaria siceraria*), 'petai' (*Parkia speciosa*), 'kecipir' (*Psophocarpus tetragonolobus*), bamboo shoot (*Dendrocalamus* sp.), and 'cangkuk' (*Sauropus albicans*); and then, the fruits are: 'mawang' (*Mangifera pajang*), mango (*Mangifera indica*), 'sersat' (*Annona muricata*), mangosteen (*Garcinia mangostana*), and durians (*Durio zibethinus*).

Besides foods, the community have some traditional drinks, such as *brem*, fermented glutinous rice (*O. glutinosa*) and *saguer/tuak*, the sap of the *ijuk* tree (*Arenga pinnata*) and fermented by the peelings of *laruk* (*Cotylelobium burckii*).

No less than 77 varieties of local dry-field rice and 27 glutinous rice are commonly planted by the community in the 5 villages. (See more detailed data in Appendix 2). The Kantu' community, however, has greater knowledge of the cultivation of the varieties of the local rice and glutinous rice compared to the community in the other four villlages. It is curious how they manage to distinguish a variety from the other ones.

By name-giving system and classification, every local varietiy can, certainly, be identified. In general, the name-giving of the local varieties is based on the location or character of paricular seeds; for example, *ase salon* (*salon*: beauty parlour) has smooth husks; *ase kuning* (*kuning*: yellow) has yelowish husks; *padi paya* (*paya*: marsh) grows on marshy ground; *padi gunung* (*gunung*: mountain) especiall grows on hilly or sloping area; and *padi pulut sayap* (*sayap:* wing) has flattened husks with wings on both sides.

The Dayaks' life is still bound to the cultural traditions, of which is reflected in the farming pattern. They remain faithful to the keeping of the local primary cultivator seeds. The Ibans and Kantu's, for instance, have **padi pun** as the primary cultivator, the Ibans ***padi sanking***; and the Tamambalohs ***padi tutuk***. They have chosen those varieties, as a preliminary inquiry, because of their physiological character, ie very tolerant of wet, dry, flat, or sloping area. Viewd from the ability to grow in any kinds of environment, the community believes that those varieties are the primary cultivators. One of the positive factors of the diversity of rice being cultivated is food salvation. Besides, any of the local varieties may serve as the prime of cross-variety in order to generate new superior varieties.

2. Plants as building materials and other instruments

Dayak people at TNBK have a great knowledge of the type of wood, which is hard, durable, strong, and suitable for building materials and other things (***Appendix 3***). There are 63 species (21 genera & 14 families) listed, of which are suitable for building materials. While, the number of plants used for other particular instruments, including the household, transportation, and farming, is 23 species belonging to 13 genera and 9 families.

Regarding the chief building materials for *rumah betang* (long house), they usually use 'belian' (*Eusideroxylon zwageri*) wood as pillars, 'meranti' (*Shorea* sp.) wood as walls, and 'gerunggang' (*Cratoxylon arborescens*) shingles as roofs. Having realized the scarsity of the 'belian', in addition, the community agrees with the forbidden forest, locally known as *galau* forest; the selection of which is based on the number of the available 'belian' trees. Moreover, they have also taken the initiative in cultivating this particular plant to increase the supply in nature. The community has required WWF's assistance and, so far, succeeded in cultivating the 'belian' in Sadap Village (the Ibans), Tanjung Karang (the Kayans), Potan (the Kantu's), and Tanjung Lasa (the Tamans).

To build a single house, the community is free to use any other kinds of wood. Some utilize ' kelansau' (*Shorea balangeran*) wood or ' buluh betung suri' (*Dendrocalamus* sp.) wattle as walls; while the pillars can be made from other kinds of wood regarded as strong.

Considering the *rumah betang* as the Dayaks' cultural root, the community generally approve of its sustainability. It is a place to socialize with the members of the extended family and to teach and develop their traditions and manners. *Rumah betang,* in addition, has a few other names. The Ibans, for example, call it *"rumah panjae"*, while the Tamambalohs *"sao langke"*, the Kenyahs *"lamin"*, and the Dayak Kanayatn's *"radakng"*.

Apart from building materials, the Dayaks also use wood for making boats, the important means of transportation in daily activity. Almost every family owns a rowing boat and also a motor boat using 2-40 HP engine. The types of wood usually used to make the boats, among others, are 'tekam padi' (*Shorea asahi*), 'penyauh' (*S. laevifolia* and *Upuna borneensis*), and 'loam' (*S. leprosula*).

The Dayaks spend almost their entire lives in farming or gardening; it runs in their blood as well as becomes their cultural background. In order to support their activities, they use tools, such as hoe, axe, hatchet, *lanjik*, and mat, which are also, or partly, made from plants, like wood, rattan, bamboo, and 'perupuk'.

3. Plants as medicine

The modern medicine has grown rapidly. At the same time, the traditional medicine using plants as the raw materials is still gaining respect in daily life. The Dayaks on the upperland are well known as the experts in medicinal- plant preparations for various diseases. The efficacy of the traditional preparations made by a medicine man (*manang)* in the inland of Kalimantan, such as *pasak bumi/tongkat ali, akar kayu kuning,* and *pelai'* is very competitive with that of other regions. The lack of cadres, on the other hand, has become the main concern about the decreasing or even the extinction of such medicinal

knowledge. The medicians, usually elderly men, are reluctant to pass their knowledge to the younger generation. They will transfer the knowledge only to those for whom they consider suitable.

Mainly, the process of curing the diseases considered as ghostly generated diseases should go through a *'balian'* or *'bumok'* ceremony, and be transformed through the *manang'.* Besides, common illnesses, such as: fever, malaria, dysentery, diarrhea, and skin problems are easy to cure by using medicinal plant preparations, or occasionally a single type of plant.

Here, 67 kinds of medicinal plants have been recorded, approximately 10% of the total estimated medicinal plants all over Kalimantan reported by Perry (1980). In general, they still gather the medicinal plants from the wild. Only few people have cultivated plants in their own house yards or gardens, of which are familiar kinds, such as: papaya, *kepayang, kandis, dadap, kabu-kabu, lansat,* guava, *sireh, mengkudu, limau nipis, lengkuas,* and *liak.*

4. Plants and the traditional ceremony & social activity

Every aspect of the Dayak life is firmly rooted to their culture and tradition; regardless of that most of the Tamans, Ibans, Kantuks, Bukats, and Tamambalohs have converted to Christianity (either Catholicism or Protestantism). Interestingly, the cultural traditions still flourish alongside the religious perception, for example, the *dange* festival, also called *Dange Inkulturasi* (inkulturasi: intermixture of cultures), a traditional harvest festival. This proves that the cultural heritage has greatly contributed beliefs and values to the communal living.

The traditional ceremonies and other social activities certainly require some materials and equipment, which are usually made from plants. Plants, like 'sirih' (*Piper betle*), 'pinang' (*Areca catecu*), 'sabang/niwang' (*Cordyline fruticosa*), 'pelai' (*Alstonia scholaris*) are always present in many social activities and also as offerings at the traditional ritual. It is believed that these plants can serve as the mediums for communicating with the spirits. 'Pelai' wood, for example, is very special for the Ibans, out of which can be carved into 'kenyalang' bird used at the 'Gawa Kenyalang' ceremony. In addition, it forbidden to bring 'buan' (*Dillenia suffruticosa*) to the rumah betang, of which is regarded as an extinguisher of traditional medicine and powerful poisons.

Farming year-end (The Ibans: *tucung taun*; The Tamambalohs: *pamole beo*), rice-planting (*nike ka benih*), and burial (*buang pantang*) ceremonies are also familiarly performed in the Dayak community. Traditional foods and drinks surely made from plants are always being prepared on those occasions, for instance, 'brem' (fermented glutinous rice), 'saguer' (from sugar palm), and various pastries (from rice and glutinous rice). There is always a dance performance to complete a traditional ceremony. The performance, of course, needs many accessories made from plants, and so does the interior decorations.

Based on the available data, approximately 46 species belonging to 19 genera and 17 families have been utilized as the equipment of the traditional ceremonies and social activities.

5. Plants as clothing

Some wild plants, mostly the barks or the fruit, produce long and fine fibers meet the need for clothing, the community has long known and used such fibers which then are woven into cloth.

Barks, mainly of 'tekalong' (*Artocarpus elasticus*), are still utilized as he material to make a "vest" worn during the dance at a ceremony. The cloth making process is very simple; first, the barks are soaked in water, beaten down, and finally, dried in the sun. Afterwards, they turn into soft and flexible material, easy to cut and shape according to the designs.

Thera are 7 species belonging to 6 genera and 5 families utilized in 5 villages.

6. Plants as ropes and weaving materials

Woven articles are commonly used in Dayak communal living. Women, girls, and even elderly women are skilful in weaving many kinds of household apparatus, like mat, basket, sieve, and winnow. Some plants, as the raw materials, are spun into ropes or cut into strips, and then woven into things they want. They mainly utilize various kinds of rattans (*Calamus* spp.), bambooes (*Gigantochloa* spp., *Bambusa* spp.), pandans (*Pandanus* spp.), 'Tekalong' (*Artocarpus elasticus*), and 'bemban' (*Donax* arundastrum).

The data gathered from the five villages show an estimated 27 species, including 14 genera and 9 families have been utilized as weaving materials.

A long-time utilization of plants as weaving materials has been made, accordingly, so has the the effort to cultivate them, especially rattans. According to Heyne (1950), rattan cultivation, 'sega' and 'irit' rattans, has established on Kalimantan since 1850. In the eastern part of the island, i.e., Kutai, experiments in cultivation of the same types were conducted in 1929 and 1930. Since then on, a mass cultivation of rattans by the community has been a great success, particularly in South and Central Kalimantan. Unfortunately, this achievement has not been followed by the community in West Kalimantan.

7. Plants for colorings

The Dayak community has long been familiar with natural colorings to decorate their hand-made products, such as woven fabric, fishing net, basket, mat, or farming instruments. The leaves of 'engkudu' (*Morinda citrifolia*), for example, produce colors ranging from blue to dark purple, and 'engkerebai' (*Psychotria aruntica*) from red to black.

As time passes, these natural colorings have gradually been replaced with synthetic chemicals. In this case, practicality, availability, and reasonable price have become the considerations. Besides, the productivity has also improved by using synthetic colorings. Due to this situation, the traditional knowledge of natural colorings will likely fade away. Woven fabrics and articles using natural colorings have better selling price and are highly saleable, however.

Another challenge facing the utilization of plants as colorings is the availability of the plants. There are 7 species, belonging to 7 genera and 6

families, commonly utilized, and only 2 of which have been cultivated so far, i.e., 'engkudu' and 'sibau'. If the community only depends on what is available from the nature, in the future they will have great difficulty in finding particular plants.

As an instance of this, the Betang Sintang community has already been under threat of finding raw materials for their famous traditionally woven fabrics. In addition, 'durian hantu' trees (*Coelostegia griffithii*), the barks of which produce red coloring (the dominant color), are harder to find now, and they grow far up the hills.

Were there an effort to cultivate these color-generating plants, the future scarcity of them would not happen.

8. Plants for other purposes

On a smaller scale, plants are also used for some purposes other than those mentioned above, namely: energy resources (firewood), decorations (flowers, etc), and hunting device. Plants as firewood have still dominated the purposes. No less than 19 species, including 11 genera and 9 families, have been identified.

The existence of plants in house yards is actually a socio-cultural development due to the interaction with other communities. Apart from being decorations, some plants may also be utilized as vegetables, seasonings, medicine, or ceremonial accessories. There are 7 species (6 genera and 5 families) categorized into decorative plants. The five villages, however, show variations in the number and type of the plants they have.

The Dayak community, especially the Punans and the Bukats, who are hunters and gatherers, has great knowledge of poisonous plants. They usually put poison on the tips of arrows and spears they use for hunting wild animals. Any animals shot by these poisoned weapons will die soon. Furthermore, when they are fishing a river, they spread poisonous roots of 'tubae antu' (*Derris elliptica*) causing the fish intoxicated and, therefore, easy to catch.

The Iban, Kantuk, Tamambaloh, and Kayan people with arable farming backgrounds also have a wide knowledge about poisonous plants. To survive, it is necessary for them to recognize plants which are edible and which should be avoided. In this way, they have already known 4 species of poisonous plants, namely: 'kara nandung' (*Tabernaemontana* sp. dan *T. macrocarpa*), 'tubae' (*Derris elliptica*), and 'beregantung' (*Fordia brachybotrys*).

Smoking is inseparable from the upper land life. As tobacco wrappers, the community often uses leaves of plants, such as 'isap-isap' (*Saurauia arborescens*) and 'selemurob;'(*Saurauia nudiflora*), both of which belong to the same genus and family, and 'daun rokok' (*Spatholobus* sp.).

F. Gender role in the plant identification and utilization

Often has the relationship between hunting and gathering activity been under discussion in the anthropological circle, regarding the relation between ecosystem and other elements, especially in the surroundings (Vetchera & Komne, 1976; Rambo, 1983; and Brown, 1986).

Most societies assume that a man is the main provider in the family, in other words, the prominently productive worker. However, it is not so in reality. A man still considers himself as the breadwinner and the decision maker, regardless of the fact that he may be unemployed while a woman is actually the family's provider.

Despite that a man may be willing to help his wife do the household chores, such as baby-sitting, washing, cleaning, or cooking, each which he regards as a women's job, generally he has no definite limit of a productive role.

Based on the different social scope between men and women, in which a man's world is more public while a woman's is more private; differences, inevitably, occur when doing activities in the communal life. A man plays a role in leadership and decision making, on the other hand, a woman's exposing herself to the community is merely the extension of her domestic life. These gender roles have been passed down from generation to generation and well-blended with the social structures.

Men's domination of the economy as a manifestation of their authority has led women to their current position as second-class members of the society. In this way, women are more dependent, and have limited space. In spite of this, the Dayaks genealogically belong to a parental society, in which men and women have equal status (Sellato, 1989).

Supardiyono's research (1999) in five villages around five big rivers in TNBK shows that the knowledge of the identification and utilization of plants among the 5 ethnic groups varies; while, the proportion of men to women in one group regarding the knowledge is equal. The knowledge, between men and women, in The Iban, Tamambaloh dan Kantu' community is different-unreal ($p>0,05$) while among the Bukat and Punan is different-real ($p<0,05$), of which Bukat women know type of plant better than the men do, on the other hand, Punan men have greater knowledge.

Table 2. Proportion of men to women in 5 ethnic groups on the identification of plants in their surroundings

Ethnic group	Male		Female	
	Proportion	N	Proportion	N
Iban	0.77	340	0.80	340
Tamambaloh	0.68	289	0.69	288
Kantu'	0.74	289	0.75	289
Bukat	0.64	293	0.72	292
Punan	0.86	209	0.71	208

Source: Supardiyono, 1999

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