

Customary Forest Resource Management in Seram Island, Central Maluku: The “Seli Kaitahu” System

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ABSTRACT There is a customary regulation of forest use in Seram Island, Maluku, Eastern Indonesia, which is called *seli kaitahu*. This paper describes *seli kaitahu* forest management. The main findings of the field research in Manusela village, located in the interior forest of Central Seram, can be summarized in the following five points: 1) The major forest use pattern is the hunting of cuscus, timor deer, and wild boar. These game animals are indispensable for local people who are highly dependent on sago, which is mainly composed of pure starch. 2) In order to obtain wild meat, local people erect two kinds of traps in the forest: *sohe* for cuscus, and *hus panah* for timor deer and wild boar. 3) From the view point of land tenure, the forest as a hunting ground can be classified into household forest and kin-group forest. 4) Although the “ownership” of each forest lot belongs to a household or a group of joint owners, the actual patterns of forest use can be described as nonexclusive. If permission is given by the owner or the head of the joint ownership group, villagers are able to use the forest held by another owner/joint ownership group. 5) Based on the results of field research concerning the use of *seli kaitahu*, 104 (76%) forest lots out of 138 are preserved by *seli kaitahu*.

Although the ecological function of the *seli kaitahu* system is still not precisely clear, judging from the fact that hunting is banned in most forest lots, it may be reasonable to conclude that *seli kaitahu* plays an important role in sustaining game animal populations.

Key words: Seram Island, customary forest management, trapping, un-exclusive forest use, *seli kaitahu*

INTRODUCTION

In Maluku (Moluccas), eastern Indonesia, there is a community controlled natural resource management system called *sasi*. The word *sasi* is regarded as an Ambonese–Malay term that possibly derived from the Indonesian word “saksi” which means “to witness”(Zerner 1994). In practice, *sasi* signifies the prohibitions on the harvest, capture, or collection of particular resources that are of economic or subsistence value to the community (Nikijuluw 1995). *Sasi* is also described as a management system that is used to allocate the rights to natural resources and their benefits in sustainable ways (Putra 1995).

The *sasi* system has attracted attention not only among NGOs and administrators but also in academic circles as a “grass roots resource management system.” At present, a number of studies on *sasi* exist (Akimichi 1995; Antariksa 1993, 1995; Kisya 1993; Murai 1998; Rahail 1993, 1995; Salipi 1996). Most of them, however, illustrate *sasi* that regulates marine resources utilization (*sasi laut*). So far no intensive research on *sasi* that regulates forest resource utilization (*sasi hutan*) has been conducted.

This paper focuses on *sasi* that regulates forest resource utilization in a mountainous area of Seram Island, Maluku. This form of *sasi* is called *seli kaitahu*. The word *seli* is the local term meaning

sasi, while *kaitahu* is the local term for “forest”. Thus, “*seli kaitahu*” means “*sasi* for the forest”¹⁾.

The purpose of this study is to describe the livelihood of the mountain people who depend on forest resources and the customary forest use controlled by *seli kaitahu*.

STUDY AREA

Seram is the Moluccas’ largest island (18,410 square kilometers). It is located in the central administrative division of the eastern Indonesian province of Maluku. It falls within the Southeast Asian monsoon area with a rainy season from May to August, so ecologically it is part of the permanently humid tropics. The majority of the island is covered in mature rain forest, largely of the *Agathis* type.

The research site, Manusela village, is located in the forest interior, the so-called “highlands” of Central Seram (Fig. 1). In 1998, the population of Manusela was 337. Manusela National Park (189,000ha) is near the village, with the nearest boundary of the National Park being about four kilometers from the village.

Manusela village is one of the highland communities situated in the most remote area of Central Seram. Because there is no navigable roadway, it is necessary to walk the long distance to Manusela on trails. It is about 65 kilometers from Manusela Village to Wahi (population approximately 4,500 in 1998) on the north coast, the capital of North Seram district (Kecamatan Seram Utara). This journey takes two or three days on foot. It is about 20 kilometers from Manusela Village to Hatumete (population 997 in 1993) on the south coast, and this journey takes one day or two days on foot.

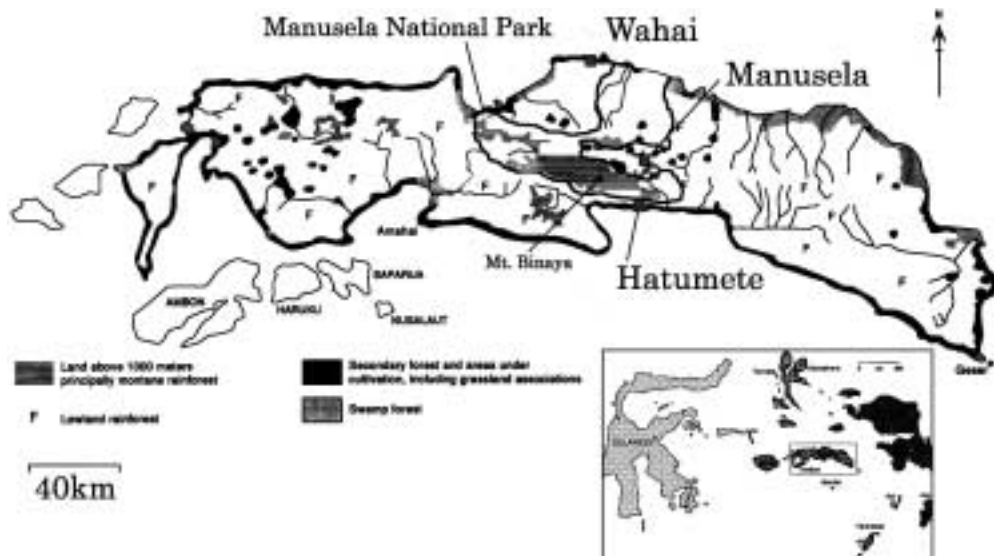


Fig. 1. Seram Island

1) A distinctive type of Sasi is found in the Moluccas, on virtually all the islands in the Maluku and North Maluku province. On some islands, Sasi is known by alternative names, such as “Yot” on Kei Besar, “Yutut” on Kei Kecil, “Datahun” on Aru, and “Huso” on Ternate.

Since access to the local markets on the coastal areas is very difficult, local people directly depend on the natural resources around the village, especially the forest resources, for their livelihood.

Unlike coastal villages that are more ethnically diverse, the ethnic composition in Manusela is homogeneous; all of the villagers are indigenous people belonging to an ethnic group known as "Alifuru"²⁾. The coastal area is dotted with both Muslims, including indigenous people and transmigrants originating from Jawa, South Sulawesi, Maluku Utara, and other islands, and Christians. However, most of the people inhabiting the mountainous area are Christian, although some are animist. In Manusela, almost all of the villagers are Christian. The ethnic and cultural homogeneity of Manusela means that the customary law, *Hukum Adat*, still has a great influence in local people's lives.

METHODOLOGY

I stayed at Manusela village to conduct research for one month from September 7th, 1998 to October 8th, 1998. The research methods I adopted are as follows:

- a) **The Making of a "Resource Catalog"**³⁾: In a walking interview I asked an elderly villager to point out natural resources usually used by villagers. I took pictures of each resource using a Polaroid camera and recorded the local and Indonesian name of the resource on a card. After returning to the village, I collected data about the use of the resources, the harvesting/gathering place (the land category provided for each resource) and so on in order to make a resource catalog. I tried to obtain data about the resources that could not be recorded in the field.
- b) **Investigation of Food Habits**: I selected four married women as informants and asked them to record the names of all the foods that they ate for 20 days.
- c) **Investigation of Forest Utilization**: I selected five men as informants and asked them to record forest utilization (the location of utilized forest, the kinds of gathered forest resources, the number of animals obtained when hunting, and so on) during a period of 30 days.
- d) **Formal Interviews with Heads of Households**: I held interviews with 33 heads of households to collect data concerning the composition of the family and economic conditions (incomes and expenses). Among the 33 households, three households included extended families composed of two nuclear families. Hence there were 36 heads of families (Kepala Keluarga or KK) in the households studied. Since every head of family had his own forest, I interviewed all 36 KK in order to collect data concerning forest tenure and the use of forest regulation. The total number of KK in Manusela village is 77.

In this research I directly interviewed villagers in Indonesian (*Bahasa Indonesia*). When I held interviews with elder villagers who were not fluent in Indonesian, a young villager assisted me as an interpreter. During the research I tried to participate in such activities as hunting, farm work, and extracting sago starches in order to get supplemental data.

2) "Alifuru" or "Alifuros" is a generic name for indigenous people who traditionally inhabit the interior in Buru, Seram and Halmahera.
 3) Normally, the "Resource catalog method" is as follows. (1) Researcher select[s] key informants composed of a man and a woman and asks them to point out resources used by villagers. (2) In a "walking interview" the researcher take pictures of each resource one by one using a Polaroid camera and records the local name on cards. (3) After coming back from the field, the researcher interviews informants, showing them the cards, and asks them about the methods of harvesting or collecting, using, marketing and distributing those products, and so on. In this method much information concerning agricultural and forest products can be collected by making use of those cards as "meta-language," and gender bias in data collection can be avoided by performing separate interviews. See Tomita (1995).

LAND USE PATTERN IN MANUSELA

According to the folk taxonomy in Manusela, land is classified into 7 categories as follows:

- **Kaitahu (Primary Forest/ Hunting and Gathering Reserves):** This type of area is classified as a hunting/ gathering zone where there is a range of non-timber forest products (NTFPs). These products are regularly collected by the villagers and include: rattans, forest foods, nuts, and traditional medicines. Hunting and trapping in these areas are designed to meet subsistence needs. A range of different traps are constructed in the forest and regularly checked for the following types of animals: wild boar (*Cervus timorensis*), timor deer (*Cervum timorensis*), gray cuscus (*Phalanger maculatus*), spotted cuscus (*Phalanger orientalis*), and others. Several parrot species are also captured with traps in the forest.
- **Soma (Sago Groves):** This type of area occurs regularly throughout the region in a “patchy” distribution. In highlands, such as where Manusela village is located, sago groves do not grow naturally and must be cultivated. Sago groves supply sago starch, which is the staple food of the villagers and main materials for folk handicrafts.
- **Dusun Bamboo (Bamboo Groves):** This type of area is also studded throughout the region in a “patchy” distribution. The bamboo species found in the region are used in a multitude of ways to make cooking implements, storage containers, traps, and buildings as well as firewood.
- **Lawa (Fruit Gardens):** These areas are extended fruit gardens providing local people with a variety of different fruits including: durian (*Durio sp.*), jackfruit (*Artocarpus integer*), langsung (*Lansium domesticum*), mango (*Mangifera indica/ Mangifera foetida*), pineapple (*Annanas comosus*), coffee (*Cofee sp.*), cacao (*Theobrama cacao*) and others.
- **Lukapi (Fallow Lands):** According to a villager’s explanation, “Lukapi” is “the cleared land where the roots of a tree have already decayed and therefore can be cultivated”. This type of area is located close to the village and along the river. This zone provides local people with the following crops: chayote (*Sechum edule*), “loku”(local term; *Euphorbia antiquorum*), cassava (*Manihot esculenta*) and others.
- **Lela (Root-Crop Gardens/Semi-intensive Agricultural Zone):** This zone is distributed in “Lukapi.” The following crops are typical in these gardens: cassava, taro (*Colocasia esculenta*), potato (*Solanum tuberosum*), sweet potato (*Ipomoea batatas*), tobacco (*Nicotiana tabacuum*), peanut (*Arachis hypogea*), red shallot (*Allium sepa v. ascalonicum*) and a range of vegetable crops such as cabbage (*Brassia sp.*) and cucumber (*cucumis sp.*), a variety of banana (*Musa sp.*), papaya (*Carica papaya*) and so on. These gardens provide important food crops as well as cash crops.
- **Amani (Home Gardens):** This type of area is made up of small gardens beside residences and residential land. A range of medical plants, spices, tobacco and ornamental plants are cultivated in these small gardens.

In the investigation using the "Resource Catalog Method" described above, 191 natural resource species were recorded. Local people use these resources for various purposes. For the sake of convenience I divided the types of use into 8 categories: food, medicine, construction materials, handicrafts materials, luxuries, materials for ritual activities, market goods, and others. I will summarize the use of those resources in accordance with land types.

Table 1 shows the sum of number of different ways, according to the above categorization scheme, that the resources are used in each land category. Out of the 191 resource species, 78 resource species (about 40 %) derive from primary forest (*kaitahu*). Of all the land categories, the primary forest contains the largest number of resource species, and, along with those in fruit gardens (*lawa*), the greatest variety of usage. The resource use diversity index of primary forest is also the highest of any of the land categories. Thus, primary forest plays a significant role in providing the diverse natural resources that are necessary for local people’s livelihood.

VILLAGE ECONOMY

Subsistence-based Economy

Table 1 shows the annual income of the households interviewed in the survey. The potential for income generation is considerably restricted, and the village economy in Manusela can be described as a subsistence-based economy.

Villagers who receive income from wage labor and other sources make up a small portion of the population. The main income source is the trade of agricultural products, forest products and processed goods. The staple agricultural products sold by villagers are red shallots, potatoes, sago cakes, “*tutupola*” and peanuts. Those products are sold in Manusela or nearby villages and in the south and north coast villages of Central Seram. However, the greatest source of income from forest products (85% of the total income from forest products) is the trade in parrots. Parrots are principally traded in coastal villages. The other forest products, namely smoked wild boar, timor deer meat and honey, are sold in Manusela. The main processed good is traditional liquor made from the sap of the sugar palm, known as “*sopi*” (representing 86% of the total income from processed goods). Other processed goods include coconut palm oil, handicrafts and others. These processed goods are sold in Manusela and nearby villages.

The trading activities in Manusela are considerably restricted by the difficulty in accessing local markets. Even though the income generated from trading is very low, it is necessary so that villagers can purchase necessities such as salt, kerosene, soap, and clothes at general stores, known as “*kios*,” in coastal villages.

Table 1. Use points in terms of land categories

Types of Use	Food	Medicine	Materials of construction	Materials of handicrafts	Luxuries	Materials used in ritual activities	Market goods	Others	Number of species	Total of use points (N)*1	Resource use diversity index *2
Kaitahu	26	6	30	19	1	1	6	6	78	95	0.77
Soma	10	2	12	6	0	0	0	6	12	36	0.75
Dusun Bamboo	0	0	1	6	0	0	0	1	6	8	0.41
Lawa	49	10	1	8	7	3	5	12	66	95	0.69
Lukapi	32	8	0	2	0	1	0	11	31	54	0.58
Lela	56	10	0	0	4	3	0	8	55	81	0.49
Amani	39	11	0	2	4	4	0	10	43	70	0.64
Wae (river)	6	0	0	0	0	0	0	0	6	6	0.00
	218	47	44	43	16	12	11	54	191	–	–

Note 1: N= Total use points of all of the use categories. Use points were counted in the following way: For example, cassava has 2 use points for food since the roots as well as the leaves of cassava can be eaten.

Note 2: Resource use diversity index = $1 - \sum (ni/N)^2$; ni = use points of each use category, N = Total use points of all the use category.

Source: Field research

Importance of the Parrot Trade

As Table 2 shows, the parrot trade in Manusela village is an important component of the village economy. The parrot trade accounts for 23% of the total income generated by the village economy (this figure is for total village activities and does not refer to individual incomes) and also accounts for 55% of the income generated by trade with coastal villages (Fig. 2). Parrots can be described as the main commodity of inter-regional trade between the highlands and lowlands.

Table 2. Income (Rp) at 1997

Household No.	Trade			Wage earning	Others	Totals		
	Agricultural products	Forest products					Processed goods	
		Parrot	Others					Sub total
17	460000	0	0	0	0	460000		
2	24500	337500	0	337500	0	362000		
9	0	0	0	0	360000	360000		
1	12500	345000	0	345000	0	357500		
28	52500	162000	20000	182000	10000	269500		
27	31750	0	2000	2000	223000	256750		
3	5000	0	0	0	10000	249000		
19	23750	30000	125000	155000	60000	238750		
23	40000	-	0	-	180000	220000		
15	32500	30000	35000	65000	115000	212500		
22	120400	75000	0	75000	0	195400		
21	119500	0	0	0	19900	139400		
12	0	0	0	0	135000	135000		
32	119600	0	0	0	0	119600		
8	115000	0	0	0	0	115000		
30	0	0	0	0	0	100000		
24	99000	0	0	0	0	99000		
13	21000	77500	0	77500	0	98500		
10	20000	0	0	0	75000	95000		
26	52500	0	0	0	0	40000		
33	0	0	0	0	90000	90000		
31	77500	0	0	0	7500	85000		
25	47500	0	0	0	10000	57500		
18	40500	0	0	0	0	40500		
29	0	0	0	0	0	34000		
11	21000	0	12500	12500	0	33500		
14	29000	0	0	0	0	29000		
20	20500	0	0	0	0	20500		
7	20000	0	0	0	0	20000		
4	7500	0	0	0	0	7500		
6	5000	0	0	0	0	5000		
16	0	-	0	-	0	0		
5	0	0	0	0	0	0		
Average income per household (Rp.)	49030	32030	5894	37924	28346	7091	16939	139330
	35.2%	23.0%	4.2%	27.2%	20.3%	5.1%	12.2%	100.0%

Note 1: The others include money provided by a family member living out of the village and income generated by the sale of necessities of life such as salt in the village.

Note 2: Household No 17 owns a coconut palm farm in Wahai. The agricultural products income of Household No 17 was generated by selling Copra, which was made from coconuts harvested at the farm in Wahai.

Note 3: The head of household No. 9 is the village head. The income of the others is an official allowance paid by the government.

Note 4: The wage of household no. 3 derived from working in a cacao plantation in Siatele, northern coastal area.

Note 5: In 1997 the villagers were not able to earn wages by picking clove because the price of clove slumped.

Source: Field Research

In Manusela village, six species of parrots are caught in the forest strictly for the purpose of trade (Table 3).

The main reasons for the villagers’ preference of the parrot trade is that parrots are easily transported to markets in coastal areas, because of their lightness, and the income generated from the sale of parrots is greater than that from other commodities.

Table 3. Parrot Species collected to trade in Manusela village

Local Name (Common Name)	Latin Name	Prices (Rp.)	Note
Mana Isa Koi (Purple- Naped Lory)	<i>Lorius domicella</i>	30000-75000	Endemic species in Seram and Ambon with CITES 1 status.
Laka (Salmon crested Cockatoo)	<i>Cacatua moluccensis</i>	25000-30000	Endemic species in Seram, Ambon, Haruku and Saparua with CITES 1 status.
Si sai (Moluccan King Parrot)	<i>Alisterus amboinensis</i>	10000	Endemic species in Seram and Ambon. This species is seldom caught.
Tesi Musunua (Red Lory)	<i>Eos bornea</i>	2500-5000	Red Lory has a broad distribution and the population is large. This species extensively caught.
Tesi Sila Hoia (Rainbow Lorikeet)	<i>Trichoglossus haemathodus</i>	2500	This species is common in Central Maluku. This species is regularly caught by villagers but not to the same extent as Red Lory.
Sinau (Blue Eared Lory)	<i>Eos semilarvata</i>	2500	Endemic species inhabiting only Central Seram. This species is seldom caught.

Source: Field Research and Monk et al. (1997).

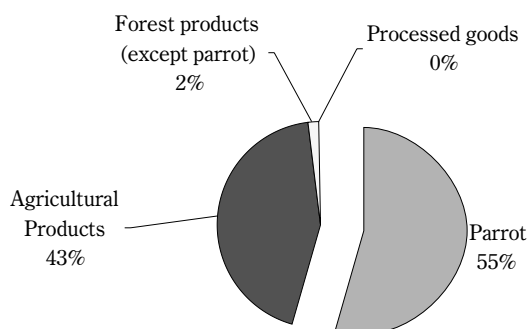


Fig. 2. Origin of income generated by trade with coastal villages



Fig. 3. Captured parrot (*Lorius domicella*)

CUSTOMARY FOREST USE IN MANUSELA

Hunting as a Major Forest Use Pattern in Manusela

In addition to the importance of the forest as the source of diverse resources which are utilized for various subsistence uses, and as the habitat of parrots which are used as an important income source for villagers, primary forests also provide game animals, such as cuscus (gray cuscus and spotted cuscus), timor deer, and wild boar.

The results of the food habit investigation show that sago, with a frequency of 0.70, appears most frequently of all plant foods in terms of dietary intake. Thus, sago is the staple food in Manusela. On the other hand, cuscus (with a frequency of 0.36)⁴⁾, timor deer (0.23) and wild boar (0.11) appear most frequently among animal foods as the main protein sources (Table 4).

Because of the overwhelming dietary significance of sago, which is composed of mainly of pure starch(which in turn contains only about 0.2 grams of protein per 100g (Ellen 1996)), the intake of vegetable protein in Manusela seems to be very low. Hence, it appears that local people need to obtain a comparatively large amount of animal protein in order to compensate for the low vegetable protein intake. Since it is difficult for people living in highlands such as Manusela to get meat or fish through the local markets in coastal areas, and fishing in the river is not intensive, hunting plays a vital role in supplying local people with protein.

The major hunting style is trapping. There are two kinds of traps, *sohe* and *hus panah*. *Sohe* is a weighted noose trap made of rattan that is used for trapping cuscus. *Hus panah* is a spear trap used for deer or wild boar. Local people set many traps in demarcated forest lots and regularly check their traps (the local term for the checking of traps is *tanila*) about two or three times a week. The wild meat of deer and wild boar is widely distributed among relatives and neighbors.

Table 4. Frequency of dietary intake

Common Name	Local Name	Scientific name	Number of Times (A)	Frequency *1 (A/240)
Plant Foods				
Sago	Luli-luli etc	<i>Metroxylon spp.</i>	167	0.70
Taro	Kalatuni etc	<i>Colocasia sp.</i>	71	0.30
Potatoes	Patate	<i>Ipomea batatas</i>	54	0.23
Cassava	Pangkara	<i>Manihot esculenta</i>	54	0.23
Banana	Dewaka etc	<i>Musa spp.</i>	56	0.23
-	Loku	<i>Euphorbia antiquorum</i>	57	0.24
Chayote	Buah Labu Siana	<i>Sechum edule</i>	46	0.19
Leaf of chayote	Daun Labu Siana	<i>Sechum edule</i>	39	0.16
Leaf of cassava	Daun Pangkara	<i>Manihot esculenta</i>	31	0.13
Eggplant	Torino	<i>Solanum melongena</i>	12	0.05
Katuk	Kartoa	<i>Sauropus androgynus</i>	11	0.05
Pumpkin	Lapina	<i>Cucurbita pepo</i>	11	0.05
-	Fou	<i>Diplazium esculenta</i>	11	0.05
Flower of papaya	Bunga Palake	<i>Carica papaya</i>	11	0.05
-	Payano etc	<i>Alternanthera sp.</i>	11	0.05
Others	-	-	57	0.24
Animal Foods				
Cuscus	Moli etc	<i>Phalanger maculatus, P.orientalis</i>	86	0.36
Timor deer	Manyaka	<i>Cervum timorensi</i>	54	0.23
Wild boar	Hahu	<i>Sus celebensis</i>	26	0.11
Crawfish	Okomaka, Okoseana	?	14	0.06
Sago worm	Ape	<i>Rhynchophorus sp.</i>	10	0.04
Honey	Wohu	?	2	0.01
Others	-	-	5	0.02

Note 1: The total number of times of dietary intake is 240 times(= 3 times/day × 20days × 4 informants).

*Frequency" = A/240.

Source: Field Research

4) Islam prohibits the eating of cuscus meat. The habit of eating cuscus meat in the highlands seems to be an object of contempt for Muslims living in coastal areas.

Based on a data series covering the hunting trips of five adult males in Manusela between September 8, 1998 and October 7, 1998 (30 days), the number of carcasses per trapper day were as follows (weight of the game estimated in kilogram): 2.10 cuscus (7.35 kg), 0.15 timor deer (9.45 kg), and 0.07 wild boar (3.33kg)(Table 6). The total weight of game (cuscus, timor deer, and wild boar) per man trip was 20.13 kg.

Table 5. Number of carcasses and estimates of raw weight (kg)

Informant (age)	Number of days of trip spent checking traps		Total input (man*day)	Number of carcasses and estimates of raw weight (kg)						Total raw weight (kg)	Total raw weight (kg) per man per day
	Individual	Group (No. of members)		cuscus		timor deer		wild boar			
				(kg)	(kg)	(kg)	(kg)				
A (38)	7	0	7	33	115.5	3	189	3	150	454.5	64.9
B (35)	3	6(2)	15	17	59.5	0	0	1	50	109.5	7.3
C (28)	7	0	7	24	84.0	3	189	0	0	273	39.0
D (57)	3	5(2)	13	20	70.0	1	63	0	0	133	10.2
E (57)	0	9(2)	18	32	112.0	2	126	0	0	238	13.2

Note 1: Data for the number of days and carcasses are based on the data for the hunting trips of five adult males in Manusela between September 8, 1998 and October 7, 1998 (30 days).

Note 2: Based on the data given by Ellen (1996), estimates of weight per animal are as follows: Cuscus 3.5kg, timor deer 63kg, and wild boar 50 kg.

Source: Field Research

Table 6. Efficiency of hunting in terms of game species

Game species	Number of carcasses per trapper per day	Raw weight (kg) per trapper per day
Cuscus	2.10	7.35
Timor Deer	0.15	9.45
Wild Boar	0.07	3.33
Total	-	20.13

Source: Field Research



Fig. 4. Cuscus hunted by weighted noose trap, *sohe*



Fig. 5. Spear trap for deer or wild boar, *hus panah*

The average number of days that a trapper devoted to checking traps was 8 days over a 30 day period. Therefore, I assume here that the total raw weight of the animals harvested by a trapper in 30

days was about 161 kg (=20.13 kg ×8). Assuming that 55% of the raw weight is edible meat⁵, the weight of edible meat per trapper per day was 2.95kg. If the number of trappers per household is one, and if each household consists of five people on average⁶, then each person will consume about 0.6 kg of meat per day. There is a possibility that I have overestimated the weight of the meat by not considering the loss of meat due to distribution. However, granted that 50% of wild meat is distributed, the per capita consumption of wild meat will be about 0.3kg/person/day, which is high in comparison with the figure for the Nual in lowland Central Seram, which is only 0.07 kg/person/day (Ellen 1978)⁷. Judging by the data on wild meat consumption per capita of several subsistence communities including the Yanomamo in Venezuela–Brazil (0.25 kg/person/day; Chagnon & Hames 1979), the Efe in Congo–Zaire (0.16 kg/person/day; Bailey & Peacock 1988), and the Gidra in Papua New Guinea (0.12–0.13 kg kg/person/day; Ohtsuka 1983), it appears that wild meat consumption per capita in Manusela is relatively high.

Traditional Forest Tenure System

Local communities in Central and Southeast Maluku have village territories (*petuanan*). At the local level communities are aware of their customary land boundaries. Under the *petuanan* system, outsiders can not use the customary land of other villages village without permission of the village head, “*Raja*.”

Petuanan of Manusela, which is mostly covered with forest, is demarcated into more than 200 forest lots. The boundaries of these forest lots are trails as well as natural landmarks such as a river and ridge. Each lot was named for its topographical characteristics. For example, there is forest lot named *Hilili kule–kule*. The word *hilili* is the name of a tree, and *kule–kule* means “many hollows in the trunk of a tree.”

From the view point of tenure forms, forest lots can be classified into two types: kin–group forest, which is collectively “owned” by the members of a kin–group, and household forest, which is privately “owned” by a household⁸. The “ownership” of forest land is inherited through the paternal line.

Although forest lands in Manusela are divided into kin–group forest and household forest, and “ownership” of each forest lot belongs to a household or a group of joint owners, the actual patterns of forest use can be described as nonexclusive. If permission is given by the owner or head of the joint owners group, villagers are able to use the forest held by another owner or another joint owners group. In fact, 24 KK, out of the 36 KK whom I interviewed, conducted hunting during the field research, and 10 KK, out of 24 KK, used the forest (i.e. erected traps) “owned” by another owner or another joint owner’s group (Table 7).

Some of the above–mentioned 10 KK utilized the forest “owned” by another owner or another joint owner’s group, as they temporarily stopped forest use in all of their own forest plot through *seli kaitahu*, the customary regulation of forest use, which I will discuss below.

In Manusela, a forest user/ forest user group does not necessarily correspond to the forest owner/

5) The figure for the proportion of edible meat is based on Ellen (1978)

6) On the basis of a survey about family structure in Manusela, the average number of members of a household is 4.0 persons (assuming children below 15 years to be half–consumers in accordance with Ellen (1978))

7) On the basis of dietary surveys conducted by Ellen (1976) in Rohua, a north coast Nual community between early 1970 and mid–1971, the mean weight of the major sources of animal protein consumed per head per day is 74.26g, which include snake, cassowary and so on, in addition to the wild meat of cuscus, timor deer and wild boar.

8) The Joint owners group of kin–group forest varies in size and range from the group composed of only two households, which has a close relation to a group composed of all households belonging to the same clan (Marga) in the village.

joint owners group. The traditional forest tenure arrangements in Manusela allow un-exclusive forest use, and access to the forest is open to villagers who have not “ownership” of the forest. In other words, the forest actually can be described as “communal property”⁹⁾.

Table 7. Nonexclusive forest use

	Number
Kepala Keluarga (KK) who were engaging in hunting	24
KK using their own forest (Household forest/Kin-group forest)	14
KK using forest owned by another owner/another joint owners group	10
KK who were not engaging in hunting	12
Total	36

Source: Field Research

Table 8. Forest lots preserved by the regulation of *seli kaitahu*

	N	Forest lots closed by the regulation of <i>seli kaitahu</i>	%
Kin-group Forests	71	54	76%
Household Forests	56	43	78%
Unknown	11	7	64%
Total	138	104	76%

Source: Field Research

CUSTOMARY FOREST RESOURCE MANAGEMENT: *SELI KAITAHU*

Trapping can be stopped temporarily by the imposition of *seli kaitahu* when the number of carcasses, cuscus excrement, and deer and wild boar tracks decrease. The owner or head of the joint owners group has the right to decide to impose *seli kaitahu*. Taking into consideration the fact that forest is nonexclusively used, it may be appropriate to regard the ownership of forest land as the “right to manage forest land” rather than total ownership of forest land.

Before *seli kaitahu* is imposed, all of the traps from the forest area that is subject to *seli kaitahu* have to be removed. After that the person who imposes of *seli kaitahu* (usually the owner) sets a sign of *seli kaitahu* in the forest and then lays tobacco, betel nuts, and betel vines below the sign as offerings. Then he prays to the spirits of the ancestors for the restoration of the game populations of cuscus, timor deer and wild boar. When the game populations have increased, the



Fig. 6. The sign of *seli kaitahu*

9) Under communal property, the resource is held by an identifiable community of interdependent users. These users exclude outsiders while regulating use by the members of the local community. Within the community, rights to the resources are unlikely to be either exclusive or transferable. See Feeny et al (1990).

regulation of *seli kaitahu* is lifted and hunting is re-opened. According to the results of field research, *seli kaitahu* can be imposed on both kin-group forests and household forests.

All the informants whom I interviewed asserted that no one tries to violate *seli kaitahu* regulations, because the villagers believe that the violator of any Adat Law, *Hukum Adat*, such as *seli kaitahu*, will surely meet with an unexpected calamity or misfortune. There is no institutional arrangement for imposing a social sanction on the violator because of this unwavering belief in the spiritual power of *seli kaitahu*. However, villagers said that if the *seli kaitahu* regulation is infringed upon, the Adat Law organization, which consists of *Latu nusa* (the head of the Adat Law organization) and *Tua-tua Adat* (the older clan members) will try to decide upon a punishment of the infringer¹⁰.

The results of the investigation concerning the imposition of *seli kaitahu* show that 104 (76%) forest lots out of 138 were preserved by *seli kaitahu*. The imposition period of *seli kaitahu* on average was about four years.

CONCLUSION

According to the villagers, the goal of *seli kaitahu* is the restoration of populations of game such as cuscus, timor deer and wild boar. Wildlife is a migratory resource, and thus regulating the access of potential users to it is problematic. Over-hunting can cause wildlife populations to crash. Because of the physical nature of wildlife mentioned above, it can be described as CPRs (Common-pool Resources)¹¹ sharing two important characteristics, excludability (it is difficult to regulate access by potential users) and subtractability (each user is capable of subtracting from the welfare of other users).

Based on these characteristics, if (1) the community excludes other potential users from CPRs utilization, and if (2) the community regulates the use and users in order to ameliorate the problems associated with subtractability, it is possible to say that the CPRs are “managed” (Feeny, Berkes, McCay, and Acheson, 1990). By examining the case of forest resources (game animals) in Manusela in terms of points (1) and (2) given above, it could be concluded that the *petuanan* system is successful in excluding users from outside the village, and that *seli kaitahu* regulates forest use within the village, so that the diminished game animal populations can recover. Based on these points, surely, game animals as CPRs are “managed” in Manusela.

Because of lack of data concerning natural replacement rates and estimations of population density of the harvested game animals, it is still not precisely clear what ecological function *seli kaitahu* performs or how it contributes to the recovery of game populations in Manusela.

However, judging by the fact that hunting is banned in more than 70 % of forest lots, I think it may be reasonable to conclude that *seli kaitahu* plays an important role in securing the sustainability of game animals, which are indispensable for the life of the local people.

Seli kaitahu is not implemented scientifically. But such traditional systems should not be disregarded because they are non-scientific management systems; they should be regarded as one of

10) *Latu nusa* is “king of land” who has a deep knowledge of village history, land tenure arrangements, and cultural ceremonies. With his understanding of Adat law and culture, *Latu nusa* plays a key role in village decision-making regarding resource use, land tenure issues and village and inter-village disputes. Older clan members who understand the land tenure arrangement for their respective families are called *Tua-tua Adat*. *Tua-tua Adat* represent village clans and give advice to *latu nusa* in village meetings.

11) CPRs is a resource for which there are multiple owners (or a number of people who have nonexclusive rights to use the resources) and where one user or a set of users can have adverse effects on the interests of other users. This includes resources such as forest, agricultural land, inshore fisheries, marshes, rivers and so on. See Ostrom (1996).

the alternatives in participatory resource management.

Finally, I would like to make two points related to the vulnerability of *seli kaitahu* due to the influence of external factors promoting changes in village life.

First, *seli kaitahu* has no obvious mechanism for imposing a social sanction on the violator. Local people obey the rules of *seli kaitahu* because of their strong faith in the super natural powers of *seli kaitahu*. Since there is no special management organization to monitor and punish violations of *seli kaitahu*'s rules, it could be said that the forest resource appears to be used and managed in an orderly way with low cost. However, it is possible that a decline of cultural homogeneity and the breakdown of the belief system caused by an increased interaction with the outer world can lead to drastic changes in such resource management.

Second, the success of forest management by *seli kaitahu* appears to have a close relationship to the custom of wild meat distribution. If many animals are caught, the wild meat has to be distributed to relatives and neighbors. Owing to this custom, the forest user (trapper) appears to have no incentive to produce surplus wild meat. In other words, the leveling system of distributing wild meat appears to prevent over hunting. Thus, if the distribution practice of wild meat gradually declines and the incentive to produce wild meat is intensified in the future because of involvement in a market economy and/or because of population growth, there is a possibility that, not only the un-exclusive forest use pattern will disappear, but also the period of the implementation of *seli kaitahu* will be shortened, and the offenses against the rules of *seli kaitahu* will increase in number.

It is necessary to investigate how the external factors promoting change in village life affect forest use and management practices in highland communities, taking into account the vulnerability of *seli kaitahu*. Future studies are necessary to investigate the process of change.

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