
Indigenous Resource Management Practices and the Local Social-Cultural Context: An Insight towards Self-Directed Resource Management by People who ‘Coexist’ with Supernatural Agents

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Additional information is available at the end of the chapter

<http://dx.doi.org/10.5772/intechopen.70104>

Abstract

In recent arguments in the governance of natural resource management, effectiveness and desirability of collaborative management among various stakeholder including indigenous people has been recognized. In the context of Indonesia, the reformation movement has stimulated the growth of a new perception of indigenous people's rights to their land in the country. This recent transition presents a growing opportunity for indigenous people who live in nature-rich areas (national parks, etc.) to collaborate with 'outside stakeholders' such as governmental agencies, scholars and environmental NGOs in natural resource management. In such situations, it is necessary to deeply understand the value of indigenous resource management (IRM) practices to promote self-directed and effective resource management. This chapter focuses on local forest resource management and its suitability in the local social-cultural context in central Seram, east Indonesia. First, I describe how the well-structured forest resource use is constructed and maintained through the indigenous resource management practices based on 'supernatural enforce mechanism'. After that, I investigate what social-ecological roles the IRM in Amanioho has, and how IRM practices relate to the social-cultural context of an upland community in central Seram. Then, I discuss the possible future applications for achieving self-directed resource management by people who 'coexist' with supernatural agents.

Keywords: indigenous resource management, local social-cultural context, Seram, supernatural enforcement mechanism

1. Introduction

Many indigenous societies that directly depend on natural resources have developed norms (e.g. values, beliefs, customs and institutions) that control the use of resources. Such norms include various resource use regulations such as a temporal ban on access to a certain area, a ban on using certain resources, rules restricting the amount of resources that can be harvested and rules regarding harvesting methods. The roles of these norms that local people regard (i.e. roles of the norms in an emic sense) vary from site to site, and they include the prevention of resource degradation, enhancing efficiency in resource harvests, avoiding conflicts among resource users, and soothing and reposing supernatural agents such as ancestors' spirits, natural spirits and deities [1]. Mechanisms that enforce people to obey the norms are also diverse. Some resource management practices are based on a social enforcement mechanism, where people living in the real world monitor other peoples' conducts and apply sanctions (e.g. punishment and moral blame) against those who break the rules, and the others are based on a supernatural enforcement mechanism, whereby people believe that supernatural agents such as ancestor spirits and natural spirits monitor human conduct and impose punishments on violators, promoting compliance with the rules [1].

In this paper, we use the term 'indigenous resource management (IRM)' for practices based on indigenous norms for establishing and maintaining order in the relationships among resource users, as well as between humans and resources for certain purposes such as that mentioned earlier.

Environmental sociological and anthropological studies on natural resource management have thematized IRM practices based on supernatural enforcement mechanisms. For example, an extensive literature review by Colding and Folke about social taboos guiding human behaviour to the natural environment compared resource and habitat taboos (RHTs) in many places around the world to contemporary measures of conservation [2]. It shows that some RHTs supported by supernatural enforcement mechanisms have functions similar to those of formal institutions for nature conservation. Hamilton classifies the cases where forest areas and certain trees are protected because those are believed to be sacred or have evil powers, and discusses how supernatural restrictions are important in biodiversity and local culture conservation [3]. Bhagwat and Rutte also show examples of traditional conservation practices at natural sacred sites in various parts of the world, and suggest that incorporating natural sacred sites into existing protected area networks is needed, focusing on current threats to sacred sites including legal ownership denying customary rights, population growth, increasing immigration and so on [4]. Verschuuren et al. compiled case studies on sacred natural sites covering a wide spread of both iconic and lesser known examples in the various parts of the world to make the case that sacred natural sites support high biodiversity values, document the losses of sacred natural sites and draw attention to the threats and pressures that many still face [5].

Several case studies of local resource management supported by the supernatural enforcement mechanism have also been published. For example, Byers et al. examined the role of traditional religious beliefs in conserving remnant patches of a unique type of dry forest in the northern part of Zimbabwe [6]. Virtanen studies the social-cultural backgrounds of sacred

forest institutions which are continuously functioning at the juncture of changing state laws and customary laws based on a case study in Mozambique [7]. Saj et al. investigated how local taboos against hunting on monkeys contribute to complementing the formal conservation agenda [8]. Etiendem et al. who investigated the local beliefs related to the Cross-River gorilla and taboos of hunting and eating the gorilla in Cameroon discussed how effective it is to integrate such beliefs and practices into the conservation of the species [9].

In Indonesia, some case studies focus on the interrelations between local belief in supernatural agents and wildlife and land protection such as given in Refs. [10, 11, 12].

In recent arguments in the governance of natural resource management, effectiveness and desirability of collaborative management among local people including indigenous people, state actors, NGOs, scholars and corporations has been recognized. In the context of Indonesia, the reformation movement, which has been taking place since the late 1998 after then-President Soeharto's fall, has stimulated the growth of a new perception of indigenous people's rights to their land in the country. Forestry Law 41/1999, which replaced the Basic Forestry Law in 1999, created a new forest category, hutan Adat or customary forests, defined as 'state forests located in traditional jurisdiction areas' [13]. This made an advance for recognition of indigenous rights to forest lands but Indonesian NGOs and indigenous communities have challenged the law, arguing that it failed to adequately recognize, secure and protect indigenous land rights, as required by articles in the Indonesian constitution.¹ Reflecting on the arguments, in May 2013, the Indonesian Constitutional Court issued Decision 35/PUU-X/2012 which invalidated provisions of the Forestry Law under which the Indonesian central government had assumed ownership over forest land that indigenous communities had occupied and used for generations. Following the Constitutional Court Decision, governmental agencies issued regulations for resolving land claims and recognizing community land rights.²

Even though the land handed back to indigenous communities is still very small, and there are several challenges for promoting the recognition and protection of indigenous land rights, the recent transition presents a growing opportunity for indigenous people who live in nature-rich areas (national parks, etc.) to collaborate with 'outside stakeholders' such as governmental agencies, scholars and environmental NGOs in natural resource management.

In such situations, it is necessary to deeply understand the value of indigenous resource management practices to promote self-directed and effective resource management.

This chapter focuses on local forest resource management and its suitability in the local social-cultural context in central Seram, east Indonesia. Indigenous resource management practises

¹For example, article 18B (2) in the constitution (the second amendment) states that 'The state recognizes and respects indigenous people and their traditional rights providing these still exist and are in accordance with the development of the people and the principles of the Unitary State of the Republic of Indonesia, which shall be regulated by law' [14].

²The minister of environment and forestry (KLHK) signed a Joint Ministerial Regulation 79/2014 which spells out the procedures Indonesian National land agency and several related ministries including KLHK will use in a joint effort to resolve land claims and provide secure forms within the forest zone. The minister of agrarian affairs and spatial planning and the head of the national land agency signed Regulation 9/2015 on Procedure for the Determination of Communal Rights on Customary Land and the Land of Communities in Special Regions, which is regarded as an important legal breakthrough in putting indigenous communities in a position to secure collective legal rights over their territories [14].

are closely related to and embedded in the social-cultural context of local communities [15]. However, few intensive case studies in Indonesia have addressed the relationship between the indigenous resource management practices based on supernatural enforce mechanism and the social-cultural context.

Therefore, we illustrate how the well-structured use of forest resources (wild games) is established and maintained through the indigenous resource management practices based on supernatural enforce mechanism. After that, we investigate what social-ecological roles the IRM in Amanioho has, and how IRM practices relate to the social-cultural context of an upland community in central Seram. Then, we discuss the possible future applications for achieving self-directed resource management by people who 'coexist' with supernatural agents.

There are a few precedent ethnographic studies referring to the indigenous resource use of the Seramese. Ellen carried out a descriptive analysis of land use and settlement patterns, seeking to uncover their socio-ecological processes and decision-making sequences [16]. He also analysed the relationship between animal words and animal categories, how these categories were constructed and the language of the classification [17]. Valeri re-examined the anthropological interpretation of taboo based on his intensive study of customary prohibition, *makquwoli*, in the Hualulu language of central Seram [18]. These studies, however, did not address the issue related to natural resource management. This chapter also aims to fill the current gap in the ethnographic literature on indigenous forest resource management in Seram.

2. Methods: study site and data collection

Seram island is the largest island in the Moluccas (18,410 km²), east Indonesia. The island is located at the north of Ambon, the provincial capital. This study was conducted in an upland community (given the fictitious name of Amanioho) in the interior mountain area on central Seram (**Figure 1**). In 2012, the population of Amanioho was approximately 320 (60 households).

There is no navigable roadway connecting the village to the coastal areas. Therefore, the villagers need to walk to the coastal areas where markets are situated. It takes 2–3 days to go to the north coast from Amanioho on foot, whereas it takes 1 day to go to the south coast.

The main economic activities include sago (starch extracted from the sago palm, *Metroxylon sagu*) extraction [19], banana and root crop cultivation, collecting non-timber forest products (edible wild plants, honey, etc.), hunting and trapping. The villagers engage in these activities for mainly subsistence purpose. The Amanioho people also engage in money-earning activities such as seasonal migrant work (clove harvest) and selling parrots and honey in coastal villages [20].

The staple food of Amanioho people is sago. It is rich in carbohydrate but contains little protein.³ Therefore, forest game resources are essential sources of protein. The main games that local people hunt and trap are cuscus (*Phalanger orientalis*, *Spilocuscus maculatus*), Timor deer (*Cervus timorensis*) and Celebes wild boar (*Sus celebensis*) [21].

³Field research conducted by Sasaoka suggests that the energy gained from sago is over 70% of the total energy derived from staple foods (sago, banana, sweet potato, yam and taro) [19, 20].

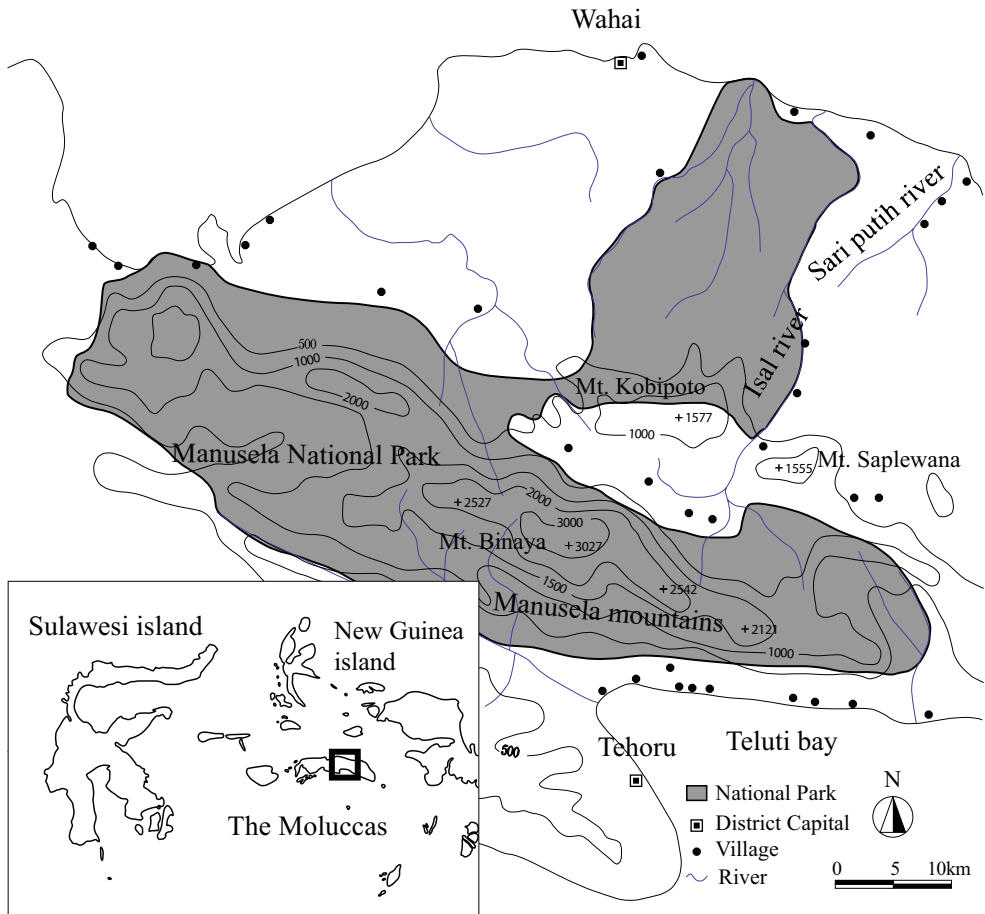


Figure 1. Study area.

The village settlement of Amanioho is situated approximately 2–3 km from the nearest boundary of the Manusela National Park which was formally established in 1997 to conserve an area of 1890 km², covering about 11% of the terrestrial area of Seram island.

Several upland communities are situated in a peninsula-shaped enclave in the Manusela valley on central Seram. Amanioho is one of those communities. Almost half of the village territory of Amanioho and most of their hunting and trapping grounds are situated inside the park. Existing Indonesian laws forbid hunting and trapping inside national parks. However, the law enforcement is very weak. The local people continue hunting and trapping the game animals inside the park.

The data collection methods I used are (1) key informant interviews on norms relating forest tenure and use, (2) participatory forest mapping, (3) focus group interviews on historical

trajectory of forest right inheritance and transfer, and (4) household interviews on forest use and tenure, and imposition of temporary forest use ban. All interviews were conducted by Masatoshi Sasaoka using Bahasa (a common Indonesian language) mixed with the local language, *Sou upa*.

In the key informant interviews, I conducted in-depth interviews intermittently during 2003–2010 with the village head, the village council members and customary law leaders to gather data about forest tenure system, norms for controlling forest use and local people's view of the supernatural world.

In the participatory forest mapping, 34 villagers draw a forest map by marking the location of each forest lot in 2003 (as I explain later, forest area in Amanioho is divided into more than 250 forest lots).

In the focus group interviews, I interviewed with village elders from 10 of the 11 soa (patrilineal descent groups) in 2003 and 2004 to clarify the tenure status of all forest lots and historical trajectory of forest right inheritance and transfer.

In the household interviews, in 2004, I asked all heads of households in Amanioho about the tenure status of each forest lot, temporary hunting and trapping bans, actual forest use and its historical trajectories.

3. Forest use and interactions between humans and supernatural agents

3.1. Hunting and trapping methods

Cuscus, Celebes wild boar and Timor deer are very important to Amanioho, accounting for almost 90% of the wild animal food resources consumed by villagers in terms of the amount of protein (**Figure 2**). Hunters sometimes use dogs for hunting wild boar and deer, but in many cases, these animals are caught by using a spear trap, *hus pana*. On the other hand, local people hunt cuscus by spear hunting when cuscus are resting in a tree hollow or a lair made inside the accumulated moss on a branch. However, these arboreal marsupials are primarily trapped using a weighted noose made of rattan, *sohe* [21] (**Figure 3**).

Trapping is usually conducted in *kaitahu*, a primary and mature secondary forest situated far from the village settlement and thought of as a ground primarily used for hunting and trapping. As mentioned earlier, *kaitahu* area has been divided into many small forest lots based on trails and natural landmarks such as rivers, ridges and large stones. Each forest lot (*kaitahu*) belongs to a specified individual or a group called the *kaitahu kua*. The villagers set *hus pana* or *sohe* in one forest lot of *kaitahu* or two adjoining lots of *kaitahu* and regularly check their traps approximately two times a week. They continue trapping in this manner in a certain *kaitahu* until the number of animal decreases. If the number of caught game animals decreases, the *kaitahu kua* imposes a temporary prohibition on forest use, *seli kaitahu*, as we will mention later.



Figure 2. Cuscus (*Phalanger orientalis*).



Figure 3. Left: a weighted noose trap, *sohe*. Right: a spear trap, *hus pana*.

3.2. Interactions with supernatural agents

Amanioho people think of primary forest as a hunting and trapping ground (locally called *kaitahu*) as a place where supernatural agencies such as spirits of ancestors and various natural spirits live. They believe there are natural spirits called *sira tana* that raise and protect the Celebes wild boar and Timor deer. The natural spirits that bring up and protect cuscus are called *awa*. Each forest lot has these natural spirits. It is also believed that ancestor spirits, *mutuaila*, dwell the *kaitahu* where they used before.

After practicing the ritual to remove *seli kaitahu*, the trapper usually remains in the forest for several days and sets traps intensively. Each forest lot has a *liakika*, a camping site usually formed at the foot of a protruding precipice, for the trapper to stay when he comes to a forest that is far from the village to check traps and to produce smoked meat if numerous games are caught (**Figure 4**).

Trappers and hunters offer jewels or/and ornaments such as earrings, rings, beads, gold necklaces and dolls as offerings to *sira tana* and *awa* at *liakika* (**Figure 5**). Then they pray to them for success in their trapping or hunting endeavours. In the local people's perceptions, obtaining game animals means receiving a gift (game animals) from *sira tana* and *awa*. They believe that *mutuaila* delivers these offerings to the natural spirits and then receives game animals given by *sira tana* and/or *awa* in return for the offerings. Next, *mutuaila* bring the game animals to the villagers (*mutuaila* make the animals be caught in the traps).

Some of the *awa* or *sira tana* are good spirits (*alowa oho*), while others are evil (*alowa kina*). Natural spirits who inform the villagers of their names in their dreams are good. The villagers



Figure 4. A man who cuts a Timor deer at his *liakika*.



Figure 5. Offerings to *sira tana* and *awa*.

believe that if a trapper intones the names when offering or setting traps, he or she succeeds in trapping. On the other hand, there are evil natural spirits such as the *awa kina*, who try to make hunters fall from trees or get injured by machetes. Then there is the evil *sira tana* that makes villagers get lost in the forest. A forest where a villager once disappeared or a villager lost his/her way is considered as a place in which evil natural spirits have been dwelling. These forests have not been used for a long time by the imposition of *seli kaitahu*.

4. Norms in regulating forest use and their social-ecological functions

4.1. Forest tenure

In central and southeast Maluku, the customary land traditionally occupied by the *negeri* (*adat* community⁴ in Maluku) is called the *petuanan negeri* [22]. According to the group interviews conducted with 34 villagers from 10 of the total 11 *soas* (patrilineal descent group) in Amanioho⁵ and participatory mapping, the forest area in Amanioho which covers most of the *petuanan*, is divided into more than 257 forest lots (*kaitahu*).

Each lot has a specific name based on its topographic characteristics and belongs to a certain individual or a group as shown in **Table 1**. 'Ownership' here does not mean absolute and exclusive total rights, but non-exclusive ones (I will explain later). The forest land ownership is inherited through the paternal line.

Forest lots can be classified into four categories as shown in **Table 2**. In collective forest such as *lohuno*, *soa* and kin-group forest, members of the ownership group can use their forests by turn with an interval of several years while the forest is closed by the imposition of *seli kaitahu* for hunting and trapping.

⁴The *adat* community is a traditional community bound together in an association, having *adat* institutions, a customary law that is still adhered to, a territory defined by the customary law, and existence affirmed by the community itself, together with the government.

⁵Villagers from a *soa* (*Ilela poto*), where there is a total of 11 *soas*, who recently immigrated from the neighbouring community do not own *kaitahu* within the territory of Amanioho. Therefore, these people were not involved in the group interviews.

Code	Name	TS ²	HN ³	ITH ⁴	Code	Name ⁵	TS	HN	ITH	Code	Name	TS	HN	ITH
E1a0					A33	Mamuhona	KP	1	KH	Ms4	Sottai	KP	1	KNN
E1	Halulohu	KK	6	KH	A34	Teneha	KK	5	KM	Ms5	Anania	KP	1	KM
E2	Kukutotui	KS	16	KM	A35	Sinuhapoto	KK	5	KM	Ms6	Masalakesu	KK	2	KNN
E3	Aimusunuhata	KK	6	KH	A36	Topokosu	KS	3	KTu	Ms7	Marilakahata	KP	1	KM
E4	Kaipu	KK	6	KH	A37	Omasu	KS	11	KTu	Ms8	Omakopa	KK	3	KM
E5	Haluhari	KS	16	KM	A38	Ulenokawa	KK	2	KM	Ms9	Hathuni	KK	3	KM
E6	Liapoto	KS	16	KM	A39	Lialaitu	KP	1	KM	Ms11	Wekela	KK	3	KM
E7	Sahua	KP	1	KF	A40	Lehahari	KK	4	KM	Ms12	Silahunu	KK	3	KM
E8	Kasife	KK	2	KH	A41	Aiumehari	KK	8	KM	Ms13	Kokania (2)	KK	3	KM
E9	Siahata	KS	16	KF	A42	Wae Uhu Uhue [†]	KK	5	KKa	Ms14	Haluhata	KK	3	KM
E10	Mapaue	KS	16	KM	A43	Ulihari	KK	2	KM	Ms15	Atamana Sana	KK	3	KM
E11	Liamumusi	KP	1	KM	A44	Aimakata	KK	2	KM	Ms16	Malilu Mata Sese Meleka	KK	3	KM
E12	Liapihitan	KS	16	KT	A45	Malaka Sisa	KK	3	KM	Ms17	Fouthua	KK	3	KM
E13	Salapika	KP	1	KM	A46	Mutula (1)	KP	1	KNN	Ms18	Hatu Totoloe	KK	4	KM
E14	Patate	KP	1	KH	A47	Akalou Totua	KK	3	KM	Ms19	Limilohu (Panaula)	KP	1	KM
E15	Halulohu Tapu	KP	1	KH	A48	Selwolina	KK	2	KT	Ms20	Haturaohi [†]	KP	1	KM
E16	Liahautu Ana	Dis	?	Dis	A49	Aimoto	KK	4	KM	Ms21	Hiauana [†]	KP	1	KM
E17	Lehae	KK	3	KM	A50	Lia Fali-fali [†]	KK	5	KM	Ms22	Iteli	KK	2	KM
E18	Halule	KK	3	KM	A51	Iiawa Haha [†]	KK	5	KM	Ms23	Mananeu Haha	KP	1	KM
E19	Enamasaie	KK	3	KM	A52	Wasa (2) [†]	KK	5	KM	Ms24	Pulatamu	KK	4	KM
E20	Manusela Ana	KS	16	KM	A53	Tiapohuhu	KK	5	KM	Ms25	Milisoi	KK	4	KM

Code	Name	TS ²	HN ³	ITH ⁴	Code	Name ⁵	TS	HN	ITH	Code	Name	TS	HN	ITH
E21	Manusela Potoa	KL	7	KM	A54	Hatuoto	KK	5	KR	Ms26	Lohie Paki Paki	KP	1	KM
E22	Ailulahari	KS	1	KM	A55	Mulua Haha	KK	5	KM	Ms27	Wana Lailai	KP	1	KM
E23	Awoua	KS	16	KM	A56	Utalohu	KK	5	KM	Ms28	Malitu Hakika (1)	KP	1	KM
E24	Hoale Ana [†]	KL	41	KM	A57	Atauhata	KK	5	KR	Ms29	Tala (1)	KP	1	KM
E25	Pahohi	KS	16	KM	A58	Lilihalahari	KK	5	KM	Ms30	Sautapu	KS	4	KM
E26	Totumie Paki-paki	KK	5	KM	A59	Ramauhena [†]	KK	3	KM	Ms31	Ena Masaie	KL	7	KM
E27	Makalasia	KP	1	KM	A60	Nisaispateia [†]	KK	3	KM	Ms32	Seina Haha	KK	4	KM
E28	Lusilala	KS	16	KM	A61	Waeula [†]	KK	3	KM	Ms33	Sehito	KK	4	KM
E29	Awasana	KK	2	KM	A62	Malilukola	KK	3	KM	Ms34	Ulai Katale [†]	KL	7	KM
E30	Katouhata	KS	16	KM	A63	Suhula Sana Kete Kete [†]	KK	3	KM	Ms35	Omepaka (2)	KK	4	KM
E31	Kasusu Mau Hata	KK	2	KT	A64	Koriwahatae [†]	KK	3	KM	Ilela				
E32	Tepio [†]	KS	14	KM	A65	Hatutuhuh [†]	KK	3	KM	I1	Wae Hataue	KK	2	KT
E33	Seipaki Tai	KS	16	KM	A66	Kohaha [†]	KK	3	KM	I2	Sonihasa	KP	1	KNN
E34	Wae Musumu Ulu	KS	16	KM	A67	Matakaitupa [†]	KK	3	KM	I3	Wae Wasa	KP	1	KNN
E35	Soiya	KP	1	KF	A68	Lumu Panu Panu [†]	KK	4	KM	I4	Aiwaya	KP	1	KM
E36	Sauanae	KP	1	KF	A69	Kahupe Hatukesu [†]	KK	4	KM	I5	Hunasiulu	KP	1	KM
E37	Ihulae	KS	16	KM	A70	Uwaela [†]	KK	4	KM	I6	Ulaipoto (2)	KP	1	KM
E38	Mutula (2)	KS	16	KM	A71	Kaulata Rahe Koria [†]	KK	3	KM	I7	Atauhari	KP	1	KM
E39	? [†]	KS	16	KM	A72	Lianahu Hatu [†]	KK	3	KM	I8	Pasalei	KP	1	KM

Code	Name	TS ²	HN ³	ITH ⁴	Code	Name ⁵	TS	HN	ITH	Code	Name	TS	HN	ITH
E40	?	KS	16	KM	A73	Hatusuha	KK	3	?	19	Ihisi Poto	KP	1	KM
E41	?	KS	16	KM	A74	Kalae Pola-pola	KK	8	KM	I10	Makola Hutu [†]	KP	1	KM
E42	Matapulae [†]	KK	2	KM	A75	Taumusunue	KS	11	KM	I11	Tanahai	KP	1	KM
E43	Pupuhutu	KK	2	KM	A76	Korie Waihitu	KS	11	KM	I12	Lekamahua (2)	KP	1	KM
E44	Lumsiwa	KK	2	KM	A77	Aimakasana [†]	KS	3	KM	I13	Funasi Limamani	KP	1	KM
E45	Lekamahua	KK	2	KM	A78	Keilekesana Kete-kete [†]	KS	3	KM	I14	Manu Wai Hora [†]	KP	1	KM
E46	Manualo	KK	2	KM	A79	Wekeia (1)	KP	1	KM	Latumutuany				
E47	Sinapulounia	KK	2	KM	A80	Mileu Kori Tupe	KK	5	KH	La1	Koatotu	KL	6	KT
E48	Luku Luku Humani	KK	2	KM	A81	Kesitamu	KK	3	KM	La2	Asauhari	KS	3	KM
E49	Kileke	KK	2	KM	A82	Kimuehata	KK	3	KM	La3	Holu	KS	3	KF
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E52	Pahuhi Tapu	KK	2	KM	A85	Hakialelohu	KK	3	KM	La6	Hinehali	KS	3	KM
E53	Walala Ana	KK	2	KM	A86	Palaloa	KK	8	KM	La7	Totulai	KS	3	KM
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E55	Sama Sama Lea	KK	2	KM	A88	Hatu Koho	KK	4	KF	La9	Malihihu	KP	1	KM
	Amanukuany				A89	Wae Kasusu Hata	KK	3	KM	La10	Liaholu	KP	1	KNN
A1	Wasa (1)	KP	1	KM	A90	Alaina Hari	KP	1	KNN	La11	Tululuti [†]	KS	3	KM
A2	Soa	KP	1	KM	A91	Kakopi Hari	KK	3	KM	Eyale				

Code	Name	TS ²	HN ³	ITH ⁴	Code	Name ⁵	TS	HN	ITH	Code	Name	TS	HN	ITH
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A5	Koaku	KK	4	KT	Li1	Wasiahari	KP	1	KH	Ey3	Malitusole	KK	2	KM
A6	Pakalula	KK	4	KT	Li2	Liahautu	KK	2	KNN	Ey4	Tala (2)	KP	1	KR
A7	Sufeli	KK	4	KR	Li3	Himehari	KK	2	KKa	Ey5	Alasia ⁶	KK	2	KM
A8	Kasisu Haha	KK	4	KM	Li4	Kokania (1)	KK	3	KT	Ey6	Kenena	KK	2	KM
A9	Tomoe ⁷	KK	4	KM	Li5	Kailelea	KK	2	KT	Ey7	Haila	KS	3	KM
A10	Sisoy Hata	KK	8	KM	Li6	Hoitakesu	KK	2	KT	Ey8	Fouhata	Dis	?	Dis
A11	Sesehutu	KK	8	KM	Li7	Laheutu	KP	1	KNN	Ey9	Malilu Hakika (2)	KP	1	KM
A12	Hanahata	KK	8	KM	Li8	Hisahata	KK	2	KT	Ey10	Hererue	KP	1	KM
A13	Ahahae	KS	11	KNN	Li9	Nasa Hata Hatae (2)	KL	13	KT	Ey11	Muraleana	KP	1	KM
A14	Ulaipoto (1)	KK	4	KM	Li10	Masehi	Dis	?	KT	Ey12	Suluie	KP	1	KH
A15	Pahita Sia Tue tue (1)	KK	4	KR	Li11	Kaiyofilekea	KL	13	KNN	Ey13	Loaharie	KK	3	KM
A16	Manuelala	KP	1	KM	Li12	Tapianarue	KP	1	KNN	Mahua				
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A18	Lumah Ulai	KK	2	KM	Li14	Melute	KK	2	KT	Mh2	Silisanae	KS	2	KNN
A19	Liolepe Hani	KK	2	KKa	Li15	Tuahatan	Dis	?	Dis	Mh3	Pahuhi	KP	1	KM
A20	Kutulisa	KK	2	KM	Li16	Kahiyama	KP	1	KNN	Mh4	Leia	KP	1	KM
A21	Unenehutu	KK	2	KM	Maloy					Mh5	Malaloaki	KP	1	KM
A22	Lulakala	KK	2	KM	My1	Kikulihata	KS	7	KT	Mh6	Wae Lakaulu	KP	1	KM
A23	Sapatue	KK	2	KNN	My2	Tapuana	KS	7	Un	Mh7	Mihahata	KP	1	KM

Code	Name	TS ²	HN ³	ITH ⁴	Code	Name ⁵	TS	HN	ITH	Code	Name	TS	HN	ITH
A24	Maliluhata	KK	2	KM	My3	Atauhu	KS	7	KT	Mh8	Hatu Koho	KS	2	KM
A25	Aipaki	KK	2	KNN	My4	Marohata	KS	7	KM	Paai				
A26	Tehio	KK	8	KF	My5	Mamara	KL	13	KNN	P1	Luhahata	KS	1	KNN
A27	Kasusumahata (2)	KK	2	KM	My6	Tifu	Dis	?	Dis	P2	Kahaka	KS	1	KNN
A28	Nasa Hata Hatae (1)	KK	8	KM	My7	Lemai	KK	4	KT	P3	Masilah	KS	1	KNN
A29	Nasae	KK	5	KM	Masauna					P4	Sihite	KS	1	KM
A30	Notaharie	KK	4	KT	Ms1	Amanihaha	KK	2	KM	P5	Wahau Potoa	KS	1	KM
A31	Tihulatan	KK	5	KT	Ms2	Waeseina	KK	2	KNN	P6	Mararoi Haha [†]	KS	1	KM
A32	Pahita Sia Tue tue (2)	KK	5	KKa	Ms3	Haimama (1)	KP	1	KM					

Source: Field research (July 2003).

Note 1: This list is based on the results of four group interviews (total number of participants was 34 persons) held in July 2003. The *kaitahu* owned by villagers who immigrated temporarily to the coastal areas is not listed in the Table 1. indicates lack of data.

Note 2: TS is a category of the *kaitahu* according to the scale of the *kaitahu kua* and their numbers. The meanings of the abbreviations are as follows: KL: *Lohuno* forest, KS: *soa* forest, KK: kin-group forest, KP: private forest, Dis: the forest lots, the recognition of whose tenure status was discrepant, and Un: Forest, whose tenure status is unclear because I could not interview the *kaitahu kua*.

Note 3: HN is the number of households composing the *kaitahu kua*.

Note 4: ITH is a forest lot category according to forest rights inheritance and transfer history. The meanings of the abbreviations are as follows: KM: *kaitahu mutuani*, KNN: *kaitahu nahunahui*, Kka: *kaitahu katupeu*, KH: *kaitahu helia*, KF: *kaitahu fanunui*, KT: *kaitahu tohutuhu*, KR: *kaitahu rela*, KTU: *kaitahu tukar* (for information on folk category of the *kaitahu*, see Table 3). 'Dis' and 'Un' stand for the forest whose recognition of tenure status is discrepant and the forest whose tenure status is unclear because I could not interview the *kaitahu kua*.

Note 5: Forest lots with the mark "†" have been not used for more than 20 years because these forests were thought of as a place in which evil natural spirits have been dwelling or the person who imposed *sei kaitahu* on the forest immigrated outside the village without removing the ban.

Table 1. List of *Kaitahu* in Amanioho¹.

Type of forest lot	Lohuno forest (kaitahu lohuno)	Soa forest (kaitahu soa)	Kin-group forest (kaitahu keluarga)	Private forest (kaitahu perorangan)	Discrepant	Total
Number of forest lots	8	48	133	63	5	257
Percentage	3.1	18.7	51.8	24.5	1.9	100

Source: Field research.

Note 1: Besides forest lots listed up in the table, there were three village forests owned communally by all the villagers and a village Church forest owned by village church. These forests are *Agathis damara*—dominated forest which have been maintained for the resin extraction.

Note 2: ‘Discrepant’ stands for the forest lots are those with disputed tenure status.

Table 2. Forest lot categories.

Each collective forest has a custodian, *maka saka*. *Maka saka* is a person who is expected to coordinate forest use. He is also regarded as a person who has deep understanding of the history of forest rights inheritance and transfer and is eligible to talk about the history. Others strongly avoid talking about the history of inheritance and transfer of forest rights since the locals believe that if their account is not correct, it will arouse the anger of ancestor spirits and hasten their death.

As **Table 3** illustrates, the forest is classified into eight categories based on the history of forest rights inheritance and transfer.

The *maka saka* (custodian of *kaitahu*) and *kaitahu kua* of a private forest leave *itinau*, a message concerning how the *kaitahu* should be inherited and who should inherit it when they become

Type of forest lot	Description	Number of forest lots
<i>Kaitahu mutuani</i>	Forest inherited through patrilineal lines from generation to generation	180
<i>Kaitahu nahunahui</i>	Forest given gratuitously by the right-holding individual or a group that obtained some support or aid in return for it	22
<i>Kaitahu katupeu</i>	Forest given by a person who was injured or came down with an illness in a forest, or by the relatives of a person who died in the forest to the person or people who carried the injured or sick person or the dead body to the village	4
<i>Kaitahu helia</i>	Forest gifted by the bride’s side to the groom’s side as a return gift for a majority of the bride’s price	10
<i>Kaitahu fununui</i>	Forest given gratuitously by the bride’s father, brother or relatives to the bride	7
<i>Kaitahu tohutohu</i>	Forest purchased with old ceramic dishes, textiles and money	21
<i>Kaitahu alasihata/rela</i>	Forest confiscated from a man who commits adultery with a married woman, or from his father, brother or relatives, as a fine. The confiscated forest right is granted to the husband of the women.	5
<i>Kaitahu tukar</i>	Forest exchanged between two forest ownership groups	2
		251

Source: Field research.

Note: Of the 257 forest lots that were listed in the field research, the tenure of 1 remained unclear because we were not able to interview the ownership group, and five forest lots had disputed status.

Table 3. Forest lot categories according to forest rights inheritance and transfer history.

	Number	Percentage
Households using only their own forest		
Kin-group forest	10	
<i>Soa</i> forest	7	
Private forest	6	
Kin-group forest and private forest	1	
<i>Lohuno</i> forest and <i>soa</i> forest	1	
<i>Soa</i> forest and kin-group forest	1	
Subtotal	26	59
Households using only the forest of others		
Private forest	5	
Kin-group forest	4	
<i>Soa</i> forest	3	
Subtotal	12	27
Households using their own forest and the forest of others		
Their own kin-group forest and the <i>soa</i> forest of others	1	
Their own <i>soa</i> forest and the private forest of others	1	
Subtotal	2	5
Total	40	

Source: Field research.

Table 4. Nonexclusive forest use.

aware that they are approaching their time of death. In the case that the *maka saka* or the *kaitahu kua* of a private forest cannot leave an *itinau* because of sudden death, it is regarded as appropriate that the *kaitahu* is inherited by the owner's male descendants (son or nephews). *Itinau* is not only a message to people who live in the real world but also a message or declaration to the ancestors (*mutuaila*). When forest rights are transferred from one *kaitahu kua* to another for reasons such as the forest is gifted or offered as *kaitahu nahuhahui* or *kaitahu helia*, the *maka saka* or *kaitahu kua* announce to *mutuaila* in a ritual who the *kaitahu* is transferred to and for what reason.

4.2. Non-exclusive forest use

Villagers can conduct hunting or trapping in the forest they do not own if they obtain permission from the owner. If a forest owner is asked to allow someone to use his forest, he seldom rejects such requests because such rejection is considered shameful. Such feeling is locally called *mukae*. Furthermore, the owner may receive retributive misfortunes from the ancestor spirits, such as causing his hunting and trapping to fail, or making him or his family to fall ill [21]. If the forest is under *seli kaitahu*, however, the owner can ask the requester to refrain from using the forest for the time being; this gentle rejection is socially acceptable. Rights to forests thus do not involve exclusive total ownership restricted to non-right holders.

Table 4 shows the results of the one-to-one interviews on forest use. Among 59 households I interviewed, 40 households (68%) engaged in hunting and trapping in their own forests, and 14 households (35%) used the forest of others. The results of the research on the history of forest use indicate that most people frequently used the forest of others because they did not have their own forest (**Table 5**). Among 14 households who used the forest of others, three households conducted hunting and trapping in forests owned by distantly related relatives or nonrelatives. The others (11 households) used forest owned by relatives who were tied by blood relationships to the maternal line or other conjugal relationships.

4.3. *Seli kaitahu*: a temporary ban on hunting and trapping

When the number of cuscus, Celebes wild boar and Timor deer trapped or hunted declines, a temporary ban on hunting and trapping, *seli kaitahu*, is imposed to make the numbers recover. All traps are removed from the forest, and a sign is set up made of stakes of wood. This is locally called *seli amu holu holu*. It is an object that supernatural argents such as *sira tana*, *awa* and ancestors' spirits, *mutuaila*, are drawn or summoned to temporarily.

After setting up the *seli amu holu holu*, the person who imposes the *seli kaitahu* lays tobacco as offerings at the base of the sign and calls the spirits by murmuring their names. He informs them of the imposition of *seli kaitahu* and asks them not to give game animals to anyone who enters the forest to hunt in violation of the *seli kaitahu* (**Figure 6**). In this ritual, he also prays for any violator to receive misfortune and for the game populations to recover.

Household	Forest Tenure Index ¹	Use of the forest of others ²
A. E	8.8	+
Ym. A.	7.9	-
D. A.	6.6	+
P. A.	6.4	-
T. Mh.	5.5	-
Yp. A.	3.7	-
M. E.	3.3	+
Y. Li.	2.8	+
E. Li.	2.7	+
B. La.	2.3	-
F. E.	2.0	+
A. My.	1.5	+
D. My.	1.3	+
L. Li.	1.3	+
F. Li.	1.0	+

Source: Field research.

Note 1: Forest tenure index is defined as $\Sigma(1/\text{number of households composing a forest ownership group})$.

Note 2: Households that had used others' forest for the past 10 years (+); households that had never used others' forest (-).

Table 5. Differences in the scale of forest tenure.



Figure 6. A man who conducts a ritual to impose *seli kaitahu*.

After the ritual is completed, nobody including the person who imposed the *seli kaitahu* and the forest owner can trap or hunt in that area until the populations of forest games recover. That if one violates *seli kaitahu*, he or his family members will surely meet with misfortune such as falling from a tree, getting injured with a machete, suffering from illness, and so on, because of the sanctions imposed by the spirits.

Several years later, the person who wants to use the forest for trapping or hunting and/or imposed the *seli kaitahu* visits the area to judge if the game resources have recovered based on the number of animal tracks, droppings and feeding marks. If the number of game animals

Tenure form	Lohuno forest	Soa forest	Kin-group forest	Private forest	Discrepant	Total	
Forest under ban	7	32	111	48	5	203	79%
Forest used as a trapping/hunting site	1	12	13	14	0	40	16%
Forest not used and not subject to the ban	0	3	0	0	0	3	1%
Unknown	0	1	9	1	0	11	4%
Total	8	48	133	63	5	257	100%

Source: Field research.

Note: 'Discrepant' stands for the forest lots that are those with disputed tenure status.

Table 6. Forest lots closed by the imposition of *seli kaitahu*.

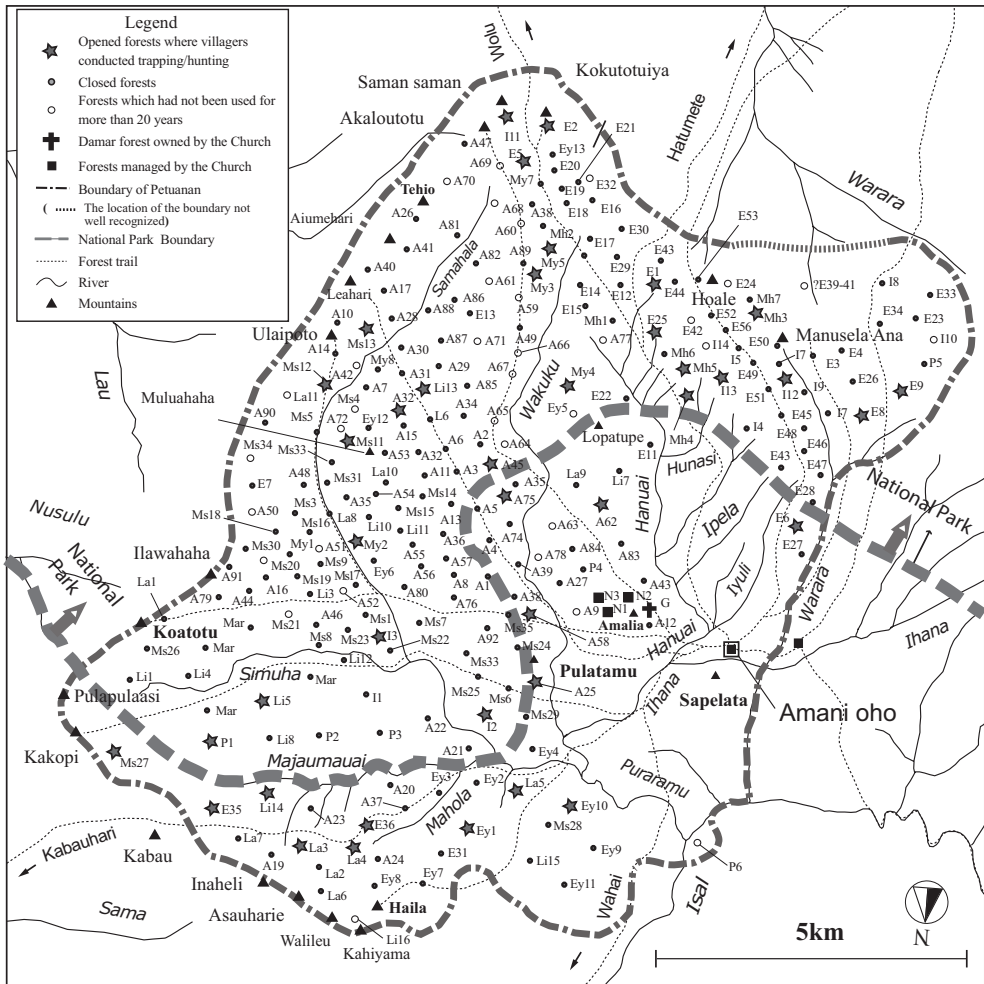


Figure 7. Forest lots used for hunting and trapping in Amanioho territory. Source: Field research. Note 1: The map of *kaitahu* was drawn through participatory mapping (number of participants: 34 persons) in July 2003. In this study, Sasaoka prepared large blank maps in which the locations of mountains and rivers were written based on the original map created by the Nederland's (Schtskaart van Ceram Blad VIII, Topografische Inrichting, Batavia 1922). In the participatory mapping, informants wrote the location of each *kaitahu* on a blank map through a group discussion. *Kaitahu* owned by villagers who immigrated temporarily to the coastal areas were not written on the map. Note 2: Alphabets in the codes on the map (e.g. A27) represent soas (patrilineal descent groups) to which *kaitahu* *kua* (owners/right holder groups) belongs (E: Etalo, A: Amanukuany, Li: Lilihata, My: Maloy, Ms: Masauna, I: Ilela, La: Latumutuan, Ey: Eyale, Mh: Mahua, P: Paai). Mar stands for *kaitahu* owned by the villagers of the adjoining village. Note 3: N is *kaitahu* owned by the village. N1 and N2 are forests having old graveyards. N3 is regarded as a tabooed forest where the villagers are prohibited to enter, because there was a hamlet and many people died there a long time ago. N2 are forests having old graveyards. N3 is regarded as a tabooed forest where the villagers are prohibited to enter, because there was a hamlet and many people died there a long time ago.

seems to have recovered, the *seli kaitahu* is lifted through praying to the spirits in front of *seli amu holu holu*, and trapping/hunting is reopened.

As **Table 6** and **Figure 7** indicate, almost 80% of total forest lots (203 out of 257 lots) were closed by the prohibition of *seli kaitahu* at the time I collected the data. Forty forest lots were used as hunting and/or trapping grounds at that time. Among the forest lots under *seli kaitahu* ban, 34 lots had been closed entirely for more than 20 years. These areas appear to be functioning as de facto sanctuaries. In most cases, these long prohibitions were based on the belief that there are evil spirits who try to bring misfortune to hunters in the forest.

5. Supernatural enforcement mechanisms and its transition

5.1. Narratives concerning violations of *seli kaitahu*

We now focus on the supernatural enforcement mechanism of *seli kaitahu*. Through narratives about *seli kaitahu* violation, we explore how the reality of supernatural agents and their power is socially constructed.

Judging from the results of informal interviews and field observations, most villagers seem to have a strong belief in the power of supernatural agent (ancestor spirits and natural spirits). They have complied with the regulation of *seli kaitahu*. As illustrated in the following case stories, however, these beliefs do not mean that the ban of *seli kaitahu* was never violated.

Case 1: One day in 2006, D. A. (initials of the informant) set *sohe* in a forest after lifting the ban of *seli kaitahu* on the forest. The forest was a collectively owned forest, owned by D. A. and his two cousins (sons of his father's brother). They closed the forest for about 5 years by imposing *seli kaitahu*. While setting *sohe*, D. A. found many new *totoi*—incisions made in a trunk of a tree used as steps to climb the tree—in several trees with a tree hollow or a lair made inside the accumulated moss on a branch used by the cuscus as a shelter and/or a nest. This apparently indicated that there was someone who conducted spear hunting, thus violating *seli kaitahu*. Half a year before lifting the ban of *seli kaitahu*, a male villager (D. A. declined to state his name) had engaged in hunting in a forest adjoining the forest. D. A. assumed that the man crossed the forest border and stole forest game animals in the forest. D. A. did not report the infringement to the head of the adat law organization (*tua tua adat*), responsible for the resolution of adat law infringement, with the reasons that no one can identify the poacher and if we try to find out the infringer, relationships among villagers will worsen. D. A. said that 'even though we don't know when it will happen, the time (when supernatural agencies bring about the infringer a misfortune) will surely come, so we should only wait for it'. About 6 months later, the wife of that man had extremely hard labour when she gave birth to a baby. D. A. thought of it as *akeake*, a sanction imposed by *mutuaila*, *awa* and *sira tana*.⁶

This case illustrates that in Amanioho the agents expected to monitor forest use and punish the violators of *seli kaitahu* ban are not people but supernatural agents such as ancestor and forest spirits.

⁶Interview with D. A., a 33-year-old male, in February 2007.

I heard from the villagers other narratives about violations of *seli kaitahu* having a similar structure in which the violation of *seli kaitahu* was connected to misfortune experienced by the violator or his families. Among those narratives, the following story was frequently told by the villagers as an example of severe consequence of the violation of the ban.

Case 2: One day, in 1986, A. Li and Z. A. (a brother of A. Li's wife) went hunting together to Akalautotu, a forest collectively owned by the sub-clan of Amanukuany (Amanukuany Susataun) that Z. A. belonged to. After hunting in the forest, they entered Aimoto, another forest collectively owned by the Amanukuany Susataun, to spear hunt cuscus. However, *seli kaitahu* had been imposed on the forest. A. Li found cuscus hiding in a deep tree hollow. To catch the cuscus, he cut down the tree at the root. Since arboreal vines were twined around the trunk of the tree as well as the next tree, just as the tree was cut down, the next tree was pulled by the vines and fell to the ground. A. Li was crushed to death under it. Concerning this accident, the village head of Amanioho, Ym. A., and a village elder (a member of the adat council, tua tua adat), F. Li., said that if they had asked *maka kohoi seli* to remove *seli kaitahu* in Aimoto, he would have never met with such an accident.⁷

In the local interpretation of the causes of misfortune, the conducts of supernatural agents play a crucial role. Every time someone encountered a misfortune such as machete injuries, sickness, the sudden death of a young man, the villages constructed a narrative about the conduct of him/her or his/her families that would have incurred the displeasure or anger of supernatural agents. In this way, the reality of the supernatural agencies for the villagers appears to be socially constructed and reinforced.

5.2. Recent transformation in indigenous forest resource management

Judging by the fact that infringement of *seli kaitahu* has rarely happened, the locals strongly believe the power of supernatural agents, and that belief heavily influences on forest resource management in Amanioho. However, we observed recent transformations in forest resource management such as the application of *sasi gereja* (church prohibitions) on forest resource use.

Sasi is a customary ban for regulating land and resource use in east Indonesia. It includes spatial and temporal prohibitions on harvesting crops, cutting wood and gathering other products from the forest, tidal zone or marine territory of a village [23]. In *sasi gereja*, the church plays the most important role in imposing the prohibition. A village clergyman publicly declares the closing and opening of a certain area or a resource. In Maluku, this type of sasi has become widespread among the local communities of Christians [23–25].

Christianity (Protestantism) was introduced to the mountain areas of the Central Seram at the end of the nineteenth century. In Amanioho, almost all the villagers embrace Christianity. Their animistic belief, however, was not extinguished and it coexists with their Christian beliefs.

⁷Interviews with Ym. A., a 63-year-old male; F. Li., a 71-year-old male; and Ad. Li, a 50-year-old male, in January 2004.

In Amanioho, around the year 2000, some villagers started to ask the village church council to implement *sasi gereja* to protect their agricultural crops (coconuts, sago palm, betel nuts, etc.) from other villagers who might harvest them. The person who wants to implement *sasi gereja* must request its implementation from the council with donation to the church, and inform the crops subject to the *sasi* and their location. The preacher announces the imposition of *sasi gereja* and prays for a good harvest at Sunday worship. He also counsels the villagers not to violate the *sasi* and prays that the Christian God will inflict a punishment on the violator.

The local people believe that the Christian God will punish the persons who infringe upon the *seli kaitahu* ban. *Sasi gereja* is supported by such faith of the local people. In regard to resource management based on a supernatural enforcement mechanism, both *seli kaitahu* and *sasi gereja* have a common characteristic.

Recently, instead of *seli kaitahu*, a few villagers started to impose *sasi gereja* for prohibiting forest resource use as shown in Case 3.

Case 3: Sewatinueni is a private forest owned by Ym. A. Its adjoining forest, the Ahahae, is soa forest collectively owned by all members of the soa Amanukuany that Ym. A. belonged to. Both Sewatinueni and Ahahae had been used and managed by Ym. A. Both forest lots had been closed under *seli kaitahu* by Ym. A. However, it has been recognized that someone is engaging in trapping/hunting in these forests for several years. Therefore, Ym. A. imposed a *sasi gereja* on these forests and put up a notice board stating that both forests are under *sasi gereja*. This board was placed at the side of the forest trail near these forests in October 2005. It was the first *sasi gereja* against forest use (trapping and hunting) placed in Amanioho.

The imposition of *sasi gereja* on the forest use was not because Ym. A. no longer believed in the effectiveness of the supernatural power of *seli kaitahu*. According to the explanations by Ym. A., *mutuaila* and natural spirits (*awa* and *sira tana*) sometimes inflict *akeake* (punishment) on the offender shortly after *seli kaitahu* is broken, but sometimes they inflict the *akeake* long afterwards. However, in the case of *sasi gereja*, the Christian God punishes the *sasi* breaker shortly after the infringement. Ym. A. imposed *sasi gereja* on these forests because he wanted to have the poachers meet with some punishment (misfortune) as soon as possible.

In December 2006, a half year after placing the *sasi gereja*, Ym. A. requested opening the *sasi* in Sewatinueni and Ahahae to the village church council. After the announcement of the removal of the *sasi* in the Sunday service, his son-in-law (his daughter's husband), living with him, went trapping in the forest. The son-in-law found several new *totoi* (incisions made by machete in a tree trunk to climb the tree). This indicated that someone had conducted spear hunting for cuscus, thus violating the *sasi gereja*. The son-in-law returned to the village and reported it to his father-in-law.

Ym. A. suspected X, who was known as the master of tree climbing, of poaching in the forests, since many *totoi* had been made in huge trees, which ordinary people hesitated to climb. In addition, X had caught many cuscuses and had sold them in the village. X had also suffered from terrible malaria and hovered closely between life and death in October 2006. In addition,

X's wife also had suffered from serious malaria, and a brother of X had been seriously wounded in his knee by his machete a while before the *sasi* was opened. The villagers interpreted all misfortunes of X and X's family members as punishments brought by the Christian God because of his violation of the *sasi gereja*.⁸

6. Discussion

6.1. Social-ecological roles of IRM in Amanioho

Seli kaitahu is a customary ban to temporarily prohibit forest use (hunting/trapping) in certain forest lots, where supernatural agencies such as ancestors' and natural spirits play important roles in monitoring resource use and imposing sanctions on the violator. In Amanioho, hunters/trappers usually distribute the meat of animals to their relatives and neighbours. However, most village men intend to engage in hunting/trapping themselves, rather than continuing to only depend on the distribution of meat from others, because gifting some part of the game animal's meat that they caught themselves is a socially and culturally valued practice for them. Consequently, they prefer not to continue receiving gifts of meat from others unilaterally, but intend to build mutual reciprocal relationships with others. If they catch their own game, they obtain more meat, even though some of their catch must be shared with others when they succeed in hunting/trapping. Furthermore, a dinner in the forest is usually held shortly after chopping down the carcasses of Timor deer and wild boar, and this is of great enjoyment to them [21].

Considering these points, it can be thought that if there was no temporal ban of *seli kaitahu*, forest use without the permission of *kaitahu kua* (poaching) would increase, and such situations, consequently, could lead to the collapse of the well-structured rotational forest use, where people alternate concentrated trapping with the imposition of temporal prohibition on forest use. The increase in poaching is likely to give rise to an incentive to catch before others do, and to cause the intensification of hunting/trapping before the numbers of forest game animals sufficiently recover. In addition, such competition in hunting/trapping and its consequent increase in the harvesting pressure have a risk of occurrence of resource conflicts and discord in the community. In Amanioho, these situations appear to have been avoided since the ban of *seli kaitahu* has been effectively enforced through the supernatural enforcement mechanism.

Although more detailed data on the hunting pressure and dynamics of the resources would be needed to specify something more precise, it seems reasonable to suppose that, to some extent, the norms to control forest use in Amanioho, characterized by gently opened territoriality of the forest and the temporal prohibition of forest use, have contributed to levelling access to the forest, the increase in harvesting pressure caused by competition in catching and avoiding resource conflicts within the community.

⁸Interviews with Ym. A., a 63-year-old male; Hs. Li., a 28-year-old male; and Yh. Li., a 36-year-old male, in February 2007.

6.2. Suitability to the local social-cultural contexts

As seen till now, supernatural agents, rather than people, are expected to monitor resource use and inflict punishment on violators, which is the essential characteristic of the local forest resource management practiced in Amanioho.

As commons studies have suggested, the cost of monitoring behaviour of resource user and enforcing rules have significant effects on the sustainability of resource use [26]. Formal institutions for resource management depend on a third-party legal structure where a regulatory agency often hires its own monitors (e.g. forest wardens, police and park guards) and mediators (e.g. lawyers). Thus, such a regulatory structure may require high costs charged to the society [2].

By contrast, the forest resource management in Amanioho does not burden the community with the high cost of monitoring human conducts and enforcing the rules. In Amanioho, as described in the previous section, there are more than 250 forest lots in the village territory. Thus, it would be difficult to monitor resource user's behaviour in huge forested areas. Under such situations, the resource management based on a supernatural enforcement mechanism is very practical.

Furthermore, this resource management system is suitable to the local socio-cultural context. As I illustrate in another paper, in Amanioho, the locals have a strong fear of sorcery. Sorcery is regarded as an expression of the jealousy and discontent of others. Consequently, they avoid social discord and friction within the village [21]. 'The fear of sorcery' here means not only the fear that someone put a curse on him/her but also the fear that someone suspect him/her of casting sorcery on them. If some friction and discord happen among villagers, they are tormented with a fear of sorcery. This is one of the main reasons for them to be inclined to detest friction and discord with others. Thus, the local people dislike pointing out errors of other people such as violations of *seli kaitahu* in face-to-face situations and avoid directly inflicting punishment on those who break the rules.

This disposition was also observed when I conducted household interview about forest tenure. Through the interviews, it turned out that several villagers have contradictory accounts of the history of forest rights inheritance and transfer. Where such differing accounts arose, they bitterly resented those who have the contradictory understanding of the forest tenure status to their own version. However, they showed no intention to resolve the discrepancy through direct dialogue and negotiation. All they can do is complain to their families and relatives. By no means do they try to assert the legitimacy of the recognition to the opponent under a face-to-face situation. Such a conduct must be accompanied with *mukae* (strong shame).

Under the social-cultural context I described earlier, if there is an infringement of *seli kaitahu*, it is unlikely that the forest owner tries to find out and punishes the violator. The IRM, which is based on the supernatural enforcement mechanism, can prevent friction and discord among the villagers which may be caused by a social enforcement process. Thus, the IRM based on supernatural enforcement mechanism in Amanioho is a high suitability for the social-cultural context in which people have a strong disposition towards avoiding social friction and discord.

As described in the previous section, a few villagers started to apply *sasi gereja* to forest management in the mid-2000s. Ym. A. was the first villager to impose a *sasi gereja* on a forest in Amanioho. As the head of the village, he was in a position to take the initiative in formulating a new forest resource management action against a series of *seli kaitahu* violations. However, he did not try to identify the violator. He did not try to make a new forest resource management system based on social enforcement mechanism. In *sasi gereja*, the Christian God took the place of the ancestor and forest spirits. Despite such a change, this management method is similar to *seli kaitahu* because supernatural agents are expected to monitor people's forest use and inflict punishments on the rule breakers. Ym. A. made an effort to reinstate the orderly, well-structured forest use by applying a new management system, *sasi gereja*, which is based on a supernatural enforcement mechanism instead of creating a more 'rational' management system with a social enforcement mechanism. The imposition of *sasi gereja* did not require the locals to be directly involved in the enforcement process. Therefore, it was quite suitable to the local social-cultural context.

The idea that if one violates *seli kaitahu*, then the violator and/or his/her family members will surely meet with misfortune, is widely shared in Amanioho. Thus, it is still uncertain that *seli kaitahu* will be replaced by the *sasi gereja*. However, if this system is not degraded by outsiders who have different social-cultural backgrounds, the local people are likely to maintain their orderly forest use depending on supernatural agencies, even as the management system transforms. The case of Ym. A. appears to imply their tendencies to establish and maintain the order in forest resource use depending on the forces of supernatural agencies.

7. Conclusion

Supernatural agents (e.g. *mutuaila*, *awa* and *sira tana*) are certainly realities in the lived world of the local people in Amanioho. The local faith in these agents has had a significant influence in the arena where the norms to control local forest use have worked. The indigenous resource management based on the supernatural enforcement mechanism appears to contribute, to some extent, to the levelling of accesses to the forest, the prevention of the increase in harvesting pressure and the avoidance of resource conflicts. In addition, it is also heavily suitable to the local socio-cultural context where the local people have a strong tendency to avoid accusing someone's errors in face-to-face situation and directly inflicting punishment on violators. Therefore, to promote self-directed resource management by people who 'coexist' with supernatural agents, it is necessary to not only reconsider the intervention of outside agencies (NGOs and governments), which may break up the interrelationships between people and supernatural agents, but also construct a new model for resource management compatible with the local people's view of the supernatural world, taking cultural resilience into consideration.

Acknowledgements

We wrote this chapter by revising a paper we published on Ecology and Society [27]. The Japan Society for the Promotion of Sciences funded field research for this project. Grant

assistance by the Japanese Ministry of Foreign Affairs in 2010 and support from the Bureau of International Partnership, Forestry and Forest Products Research Institute (FFPRI) and the Collaborative Land Use Planning and Sustainable Institutional Arrangements for Strengthening Land Tenure, Forest and Community Rights in Indonesia (CoLUPSIA) project funded by the European Union also made this publication possible. We wish to acknowledge the supports from these institutions and the project.

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