

How do the Customary Forest and Protected Forest Management Principles Affect Ambon City Protected Forest Management between the Government and Indigenous Peoples? (Case in the Mount Sirimau Protection Forest Group, Ambon City, Maluku Province)

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Abstract

Protection forests are state forests that are authorized by the government to be managed, but on the other hand, indigenous peoples already exist and manage forests that are claimed as customary forest. How is the management of protection forests between the government and indigenous peoples? The purpose of this study is to examine the management of protection forests between the government and indigenous peoples and the collaboration in the management of protection forests between the two. The results showed that the management of protection forests by the government was not optimal at the site level based on the principles of protection forest management that had only been done with boundaries: only area boundaries, not blocks and plots, forest protection such as area patrols, installation of prohibition boards and appeals) and land rehabilitation (planting with woody plant species and multi-purpose trees. Protected forest management by indigenous peoples has touched the site level on several aspects of protected forest management principles. Protected management activities by indigenous peoples following the principles of protected forest management are the cultivation of fruit plants, land use with dusung/traditional agroforestry cropping patterns, forest protection is prohibited from cutting trees at water sources, along riverbanks, replanting if cutting fruit trees that are not productive, utilizing non-timber forest products. The government as the planner but implementing it in the field is the indigenous people who are accompanied by the government and joint monitoring and evaluation. Protected forest management based on the principle of protected forest management is more optimally carried out in a collaborative and complementary manner between the government and indigenous peoples.

Keywords: utilization, complementary, traditional agroforestry, collaborative

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Introduction

Various managers can lead to conflicts over natural resource management which is a common phenomenon that occurs in the world (Ayling & Kelly, 1997; Hellstrom, 2001; Yasmi et al., 2006; Gritten & Mola-Yudego, 2011; Fisher et al., 2017). This conflict also occurs in Indonesia in the forestry sector, at the national and regional levels where the government clashes with local communities for their livelihood needs in the application of regulations and competition (Koning et al., 2007; Harwell, 2010; Yasmi et al., 2012; Fisher et al., 2017). Conflict can occur because the community claims the forest as their own because it has existed for generations, especially if it is related to indigenous peoples, they claim the forest they have managed from generation to generation as their customary forest.

Communities around forests have a high dependence on forest resources but limited access so that people demand access to state forests in Indonesia (Edmunds & Wollenberg,

2003; Muhajir et al., 2011; Soepijanto et al., 2013; Maryudi et al., 2015; Tajuddin et al., 2019). Communities that have existed since before the forest was established based on function have a dependence on the forest. Therefore, when a forest is determined by the government based on its characteristics as production forest, protection forest, or conservation forest, the community feels that their activities are limited in accessing the forest.

The Mount Sirimau Protection Forest Group is part of the protected forest in Ambon Island, administratively included in Ambon City. Ambon Island has only 803.9 km² and is classified as a small island ecosystem as stipulated in Law Number 27 of 2007 that a small island is an island with an area smaller than or equal to 2,000 km² and its ecosystem unity. The characteristics of small island ecosystems require a protected area to support life. Therefore, the Minister of Forestry established a protected forest area on Ambon Island with the Decree of the Minister of Forestry Number

192/Kpts-II/93 including the Mount Sirimau Forest Group covering an area of 3,449 ha. The Mount Sirimau Protection Forest Group has a strategy, because it is located in the upper reaches of Ambon City. If the extreme conditions of the protected forest are disturbed, namely the rainy season with high rainfall, water overflows in the river flow, flooding occurs so that it disrupts activities in the center of Ambon City and its surroundings. If the dry season is long, there is a shortage of clean water in several places around the protected forest so that it is supplied by the Ambon City Disaster Management Agency.

The Mount Sirimau Protection Forest Group was taken as an example of a protected forest management case because it was strategic and population pressure was high, but indigenous peoples were very obedient in managing protected forests because they contained customary forests. This condition will provide an overview of how to manage protected forests based on the principles of protected forests which are supported by customary forest management by indigenous peoples.

Forest management is a forestry activity that includes planning, using, utilizing, protecting, rehabilitating, and restoring forest ecosystems based on the function and status of a forest area. Based on Forestry Law Number 41 of 1999, a protection forest is a forest area that has the main function of protecting life support systems to regulate water systems, prevent flooding, control erosion, prevent seawater intrusion, and maintain soil fertility. The government as an organization has the power to make and implement laws and regulations in certain areas that are given authority by the state as promulgated by the 1945 Constitution article 33. Based on this, the government has full authority in the management of existing resources in the Republic of Indonesia, including forests protection.

The government, with the authority to establish protection forests, takes into account the characteristics of the forest and its impact on the local and global environment. On the other hand, there are communities around protection forests, hereinafter referred to as customary communities, which existed before the forest was designated as protection forest, hereinafter referred to as customary forest which had been managed for generations. *Ulayat* land is land that is jointly owned by customary law communities which is believed to be a gift or gift from their ancestors that existed

before establishment of the Indonesian nation. Indigenous peoples manage forests by developing local practices and management systems to maintain forests that provide both individual and group benefits (Bong et al., 2019).

Since its establishment, however protection forests have not been managed optimally based on applicable regulations to support the main functions of protection forests as protection of life support systems to regulate water systems, prevent flooding, control erosion, prevent seawater intrusion, and maintain soil fertility. This can be seen spatially in the condition of the Ambon City protection forest in the Mount Sirimau Protection Forest Group (Figure 1).

The change in land cover can illustrate that the Ambon City protection forest, especially the Mount Sirimau Protection Forest Group, experienced a significant change in land cover from four land cover classes (1990–1996), six classes in 2006–2011, and seven classes in 2015–2019 (Parera et al., 2021). Land cover class in 1990, 1996, 2000, consisted of primary dryland forest, secondary dryland forest and shrub bush. In 2000, 2006, 2011, 2015, and 2019 there was a land cover class, namely dry land agriculture. Residential land cover classes existed in 2015 and 2019 and savanna in 2019. So that by 2019 there were 7 land cover classes in the Mount Sirimau Protection Forest Group. The most extensive land cover class was shrubs with a cover change of 48.01% (1990), 48.00% (1996), 48.18% (2000), 48.10% (2006), 48.14% (2011), 48.48% (2015), and 40.45% (2019). Secondary dryland forest cover class from 1990–2019 percentage of area for each period 26.90% (1990), 26.91% (1996), 17.59% (2000), 17.66 % (2006), 17.61% (2011), 16.44% (2015), and 22.77% (2019). Coverage class of mixed shrub dryland agriculture with an area percentage of 15.11% (1996), 15.12% (1996), 22, 56% (2000, 2006, and 2011), 22.58% (2015), and 21.09 (2019). Dryland agriculture cover class in 2000 with an area percentage of 1.82% (2000), 1.72% (2006), 1.77% (2011, 2015, and 2019). Savana land cover class with an area of 3.71% (2019). The percentage of settlement area is 0.47% (2015) and 0.61% (2019) (Parera et al., 2021).

The condition of land cover changes in protected forests from 1996–2019 was quite significant. This provides a little overview of the management that has been carried out so far. Before being designated as a protected forest, the forest was managed by indigenous peoples who claimed to be

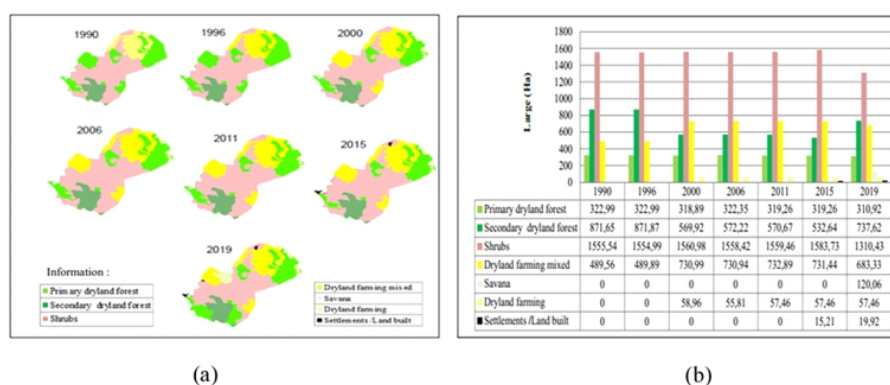


Figure 1 Map (a) and graph (b) changes in land cover in the Mount Sirimau Protection Forest Group (Source: <https://geoportala.menlhk.go.id/webgis/index.php/en/map>)

customary forests. After the establishment of protected forest in 1996, it was managed by the government. The management of protected forests by the government undergoes a shift of authority from one agency to another. This has an impact on the management of protected forests by the government. On the other hand, the community continues to manage the protected forest which is claimed as customary forest.

Therefore, this paper examines how the management of protected forests by the government and indigenous peoples is based on the principles of protected forest management. The end of this paper will provide recommendations for protected forest management in Ambon City.

Methods

Study area and respondent This study was conducted on the Mount Sirimau Protected Forest Group, Ambon City, Maluku Province between January and March of 2020. The sample villages are Soya, Hutumuri, and Hukurila Villages. The three villages are located around the Mount Sirimau Protection Forest Group and manage the Mount Sirimau Protected Forest Group forest from generation to generation until now. These three villages are customary lands that have *petuanan* (*ulayat* rights) (Figure 2). Total number of respondents key informants were 13 peoples (Table 1) and 194 indigenous peoples (Table 2). The sampling method used in this research is purposive sampling. The size of the social

research sample depends on the existing population, if the population is less than one hundred then it should be taken entirely and if the population is more than one hundred, the sample taken is between 10%–20% (Senoaji, 2011; Arikunto, 2013).

Data collection method The research method used in this study is a survey method. Research using questionnaires as a research tool is carried out on large and small populations, but the data studied are data from samples taken from that population, so that relative incidence, distribution, and relationships between variables, sociological and psychological are found (Sugiyono, 2018). The data was collected by interview using questionnaires and in-depth interviews, observation, and focus group discussion (FGD). The questionnaire used in this study was in the form of open-ended questions. The questionnaire contains questions about the identity of the respondents, the management of protected forests carried out by the government and indigenous peoples following the principles of protected forest management based on Government Regulation Number 3 of 2008 concerning Amendments to Government Regulation Number 6 of 2007 (articles 2526) (APPENDIX 1).

Analysis method The analytical method used is the descriptive analysis method namely providing information about the data owned and not intending to test the hypothesis

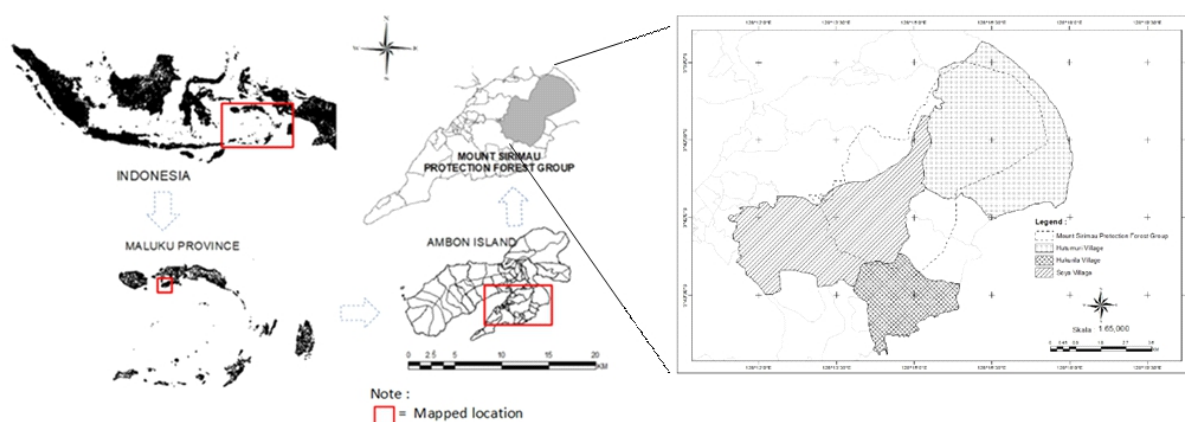


Figure 2 Research locations: Soya Village, Hutumuri Village, and Hukurila Village in Mount Sirimau Protection Forest Group, Ambon City, Maluku Province, Indonesia.

Table 1 Number of key informant samples

Respondent	Number (person)
Regional Technical Implementation Units, Ambon Island Forest Management Units and Lease Islands	1
Maluku Provincial Forestry Service	1
Technical Implementation Unit of Wae Apu Batu Merah Watershed and Protected Forest Management Center, Maluku Province	1
Maluku Province Social Forestry and Environmental Partnership Technical Implementation Unit	1
Soya Village's Traditional Leaders	3
Hutumuri Village Traditional Leader	3
Hukurila Land's Traditional Leader	3

(Ghozali, 2011). The data were collected, identified and tabulated based on the principles of protected forest management and described descriptively (Figure 3). The data is tabulated as in APPENDIX 2.

Results and Discussion

Management of the Ambon City protection forest by the government The management of the Ambon City protected forest is authorized to the Regional Technical Implementation Unit, the Ambon Island Forest Management Unit, and the Lease Islands. In addition, some agencies intervene in activities according to their main duties and functions. Protection forest management agencies have changed, since their establishment in 1993 and 1996, they were managed by the Maluku Provincial Forestry Regional Office until 2004. The regional autonomy era was managed until 2014 by Ambon City and Central Maluku Regency Forestry Services. Some protection forests are included in the administrative area of the Central Maluku Regency. In the era of regional autonomy, protected forests were managed until 2014 by the Ambon City Forestry Service and Central Maluku District Forestry Service because there were several protected forests included in the administrative area of the Central Maluku Regency. The Ambon City Forestry Service manages protected forests in the Ambon City area, namely the Mount Sirimau Protection Forest Group, Mount Nona Protection Forest Group and part of the Leihitu Protected Forest Group, while the Maluku District Forestry Service manages part of the Leihitu Protected Forest Group and the Salahutu Protection Forest Group. (Figure 4). This study describes the protected forest management activities

by the Ambon City Forestry Service because the Mount Sirimau Protection Forest Group was under its authority before being authorized to the Regional Technical Implementation Unit for the Ambon Island Forest Management Unit and the Lease Islands (Figure 5).

In 2015 the management was authorized to Regional Technical Implementation Units for Forest Management Units on Ambon Island and Lease Islands until now and the protection forest of the City of Ambon changed the status to the Protection Forest Management Unit of the City of Ambon. The activity carried out by the Maluku Provincial Forestry Regional Office is the demarcation of the Mount Sirimau Protection Forest Group. Activities carried out by the Ambon City Forestry Service are planting, construction of control towers, installation of warning and prohibition boards. Activities carried out by Regional Technical Implementation Units for Forest Management Units on Ambon Island and Lease Islands, namely the socialization and security and protection of the Ambon City Protection Forest Management Unit area.

Protection forest management is not optimal at the site level as a whole and continuously. The government as the manager admits that there are limited, planning is still integrated with the Forestry Service coordination with related Technical Implementing Units (statement from the Head of the Regional Technical Management Unit for Forest Management Units on Ambon Island and Lease Islands), discontinuous funds (statement from Commitment Making Officer of the Ambon City Forestry Service), and even the lack of competent human resources regarding Forest Management Unit management, due to the merger of agencies from the Ambon City Forestry Service and the District Forestry Service who have not received knowledge about the management of forest management units (a statement from the Head of Planning Maluku Provincial Forestry Service).

Forest management activities carried out by authorized agencies and intervening activities in the Mount Sirimau protected forest group is as follows: 1) The Regional Technical Implementation Unit of the Mount Sirimau Protection Forest Management Unit only carries out area monitoring and protection activities; Coordinate with

Table 2 Number of sample houses dated by sample village

Village	Total population*) (household)	Number of samples
Soya	186	50
Hutumuri	964	96
Hukurila	480	48
Total		194

Source: Village Profile (2020). *) Farmer's occupation

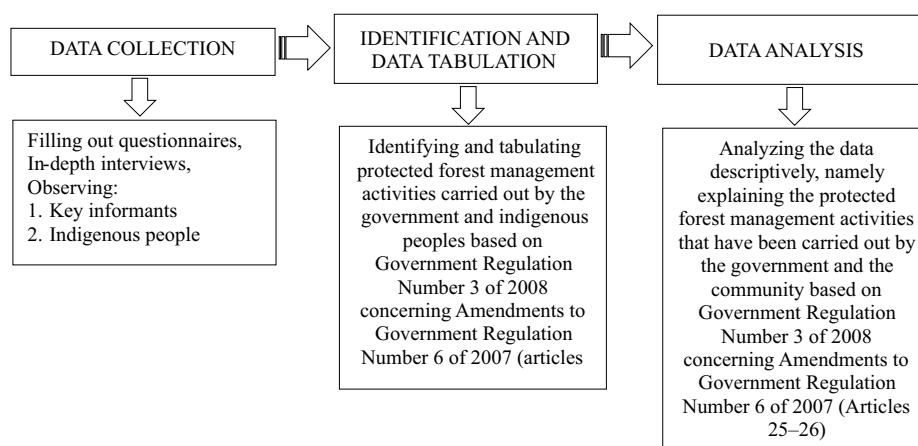


Figure 3 Diagram of the analytical framework.

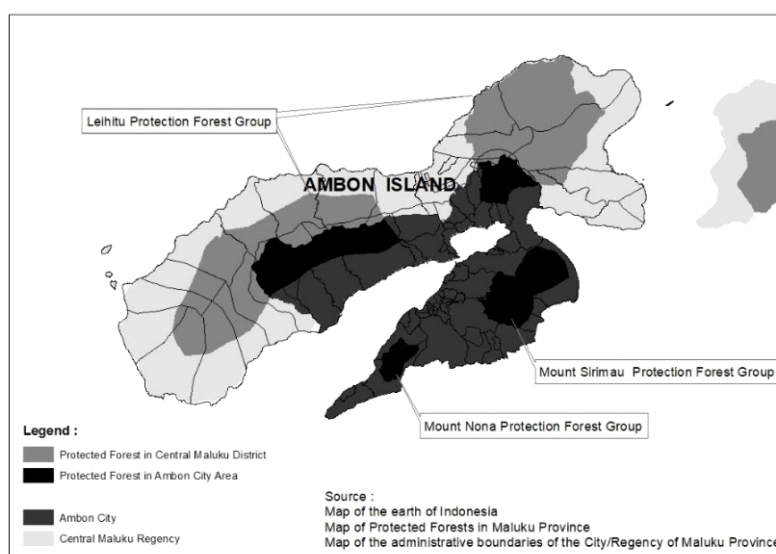


Figure 4 Map of protected forests on Ambon Island and the authority of protected forest management by administrative area.

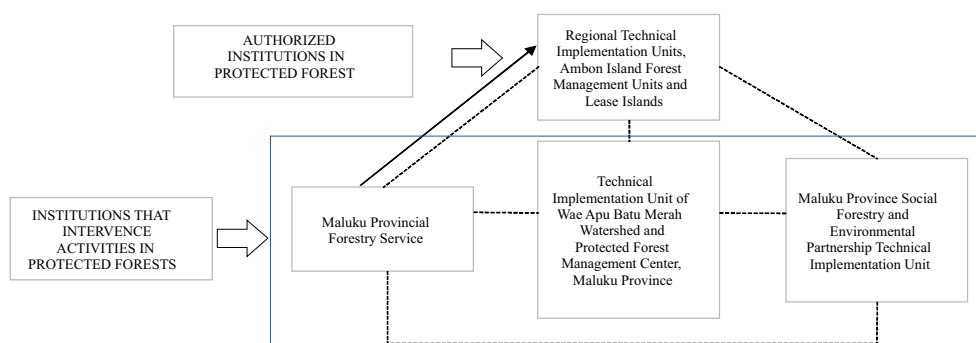


Figure 5 Relations between agencies in protected forest management.

relevant agencies that intervene in activities in protected forest areas, 2) Since 2020 c.q Section for Conservation of Biological Natural Resources and Ecosystems has been in process with the people of Soya village in the use of *damar* (*Agathis* spp.), 3) The activities carried out are the rehabilitation of protection forests by planting trees that produce only wood and multipurpose tree species (MPTs). Types of trees that produce only wood such as mahogany (*Swietenia mahagoni*) while MPTs such as mango (*Mangifera indica*), durian (*Durio zibethinus* Murr), and cashew (*Anacardium occidentale*). The activity was carried out by the Maluku Provincial Forestry Service and the Wae Apu Batu Merah Watershed and Protection Forest Management Center but was carried out partially, and 4) Since 2020 Center for Social Forestry and Environmental Partnership has proceeded with indigenous peoples in a participatory manner with indigenous peoples around the Mount Sirimau Protection Forest Group as sample villages, namely Negeri Hutumuri and Hukurila to propose customary forests. Since its establishment, the management of protected forests has not covered all aspects of protected forest management that are mandated by the regulation of protected

forest management. The principle of protected forest management is based on Government Regulation Number 3 of 2008 concerning Amendments to Government Regulation Number 6 of 2007 (articles 25–26), namely the use of environmental services: a) utilization of water flow; b) water utilization; c) natural tourism; d) protection of biodiversity; e) environmental rescue and protection; f) carbon sequestration and/or storage. Business activities for the use of environmental services in protected forests shall be carried out with the following provisions: a) not reduce, change or eliminate its main function; b) does not change the landscape; c) does not damage the balance of environmental elements. Collection of non-timber forest products in the form of a) rattan; b) honey; c) fruit; e) mould; f) Swift's nest. Collection of non-timber forest products in protected forests: a) the non-timber forest products are the result of reforestation and/or are available naturally; b) do not damage the environment; c) reduce, change or eliminate its main function; d) only carried out by people living around the forest, not outsiders; e) does not exceed its sustainable production capacity; f) does not collect certain types of forest products that are protected by law.

Based on the principles of protected forest management, the management of protected forests carried out by the government has not been carried out optimally. Protected forest management activities carried out by the government are the protection of protected forest areas, not yet utilizing environmental services and non-timber forest products.

Management of protection forests by indigenous peoples

Indigenous peoples in Maluku manage their land in the form of *soa* as well as indigenous peoples around the protected forest of Ambon City. However, what distinguishes land management from other indigenous peoples is the land they claim is in a protected forest. Forests that have been claimed by the surrounding community as customary forests have been traditionally managed from generation to generation in the form of *dusung* (traditional agroforestry). The results of the interview with Izak Pattiasina the head of *Soa* Mokihutung stated that forests that have been claimed by the surrounding community as customary forests have been traditionally managed from generation to generation in the form of *dusung* (traditional agroforestry). Indigenous peoples manage *dusung* (traditional agroforestry) from generation to generation, so indigenous peoples continue to manage *dusung* (traditional agroforestry) not starting from the initial process. The types of plants in the *dusung* (traditional agroforestry) are dominated by fruit trees in addition to other tree species and non-timber trees that grow naturally and crops such as sweet potatoes and horticulture.

Dusung management (traditional agroforestry) is based on local wisdom, namely: a) Indigenous peoples plant short-lived plants, do not clear land widely but are planted in empty areas between fruit trees or other trees, b) Protection of crops with *sasi*. *Sasi* is a prohibition to harvest before harvest time. *Sasi*'s goal is to get maximum results with good quality, c) People are prohibited from cutting down trees at water sources and along riverbanks, even though they are on their land. If the wood is needed for household needs, it can be replaced with trees from other *soa* lands with the mutual agreement or from state-owned land, d) Indigenous people cut down trees by skinning the tree and allowing them to fall on their own so as not to damage the surrounding trees, e) Indigenous peoples are very obedient to the rules that apply in the management of hamlets (traditional agroforestry), because it is believed that if they violate these rules, supernatural things will happen that interfere with their lives and those of their children and grandchildren, f) The security agency that oversees the management of hamlets (traditional agroforestry) and other natural resources is the *kewang*. *Kewang* (customary police) is a traditional institution that functions as a guardian of environmental security from the sea to the forest. Therefore, the management of *dusung* (traditional agroforestry) by indigenous peoples, even though it is on their land, is still under the supervision of the *kewang* to avoid environmental damage. Management of protection forest which is claimed as customary forest by the community around the protection forest based on *soa* can be studied from several aspects, namely: 1) land ownership and 2) land use.

Land ownership by indigenous peoples In general, forest-dwelling indigenous communities in Indonesia view that humans are part of nature who must care for each other and maintain balance and harmony (Nababan, 2008). As of 2018, the area of customary land is 24,000 ha with a total of 26 indigenous peoples who have successfully obtained their customary land rights from the Indonesian government (MoEF, 2018). This figure is very small compared to the 37 million hectares of concessions issued by the government to plantation and timber companies (Astri et al., 2018). Land or land ownership is the formal control that a person has over land or land, namely the legal right to use, process, sell and utilize it which can be obtained from inheritance or buying and selling transactions (Iriani, 2008).

The form of land ownership by indigenous peoples around the Mount Sirimau Protection Forest Group is in the form of *Soa*. *Soa* is a genetic territorial association. In the administration of government, *Soa* is an area that is part of the *petuanan* or village, in *Soa* is sheltered by several *mataruma* who come from different descendants who coincidentally occupy the same area. Land ownership with a patrilineal system so that only male descendants are given the right to own land, while women can only enjoy the results if given the opportunity by their male relatives under the “*night part*” system. This part of the night applies during the fruit season and alternates if the *mataruma* has more than one sister. In addition, if a sister is married to an outsider and her husband wants to cultivate the land, then only the right to use the land is given to cultivating crops with short-lived types of plants. Some were also allowed to collect non-timber forest products such as palm trees (*Arenga pinnata*) to be used as ingredients for making cakes (*sageru*) or *arak* (*sopi*). This land ownership system is different from the one prevailing in Riau, especially the Gajah Bertalut community, which adheres to a matrilineal ownership system. The matrilineal system makes women have the right to inherit *pusako* assets from their parents, both assets obtained from generation to generation (high *pusako*) or assets obtained through buying and selling transactions (low *pusako*) (Astri et al., 2020).

Map of land ownership by indigenous peoples around Mount Sirimau Protection Forest Group (Soya Village, Hutumuri Village, Hukurila Village) can be seen in Figure 6 and Table 3. The land ownership based on *soa* consisting of clans can be seen in Table 3. Table 3 shows that Soya Village has two *soa* namely *Soa* Pera which consists of four clans; *Soa* Erang consists of one clan and a group of immigrant clans. The village of Hutumuri consists of five *soa* namely Mokihutung (four clans); *Soa* Puasel (five clans and all immigrant clans); *Soa* Lapaut (five clans); *Soa* Pattihutung (nine clans), and *Soa* Tutupasar (eight clans). The land of Hukurila consists of two *soa* namely *Soa* Toupea-Peimahu (eight clans) and *Soa* Mony (eight clans). Each is led by a head of *soa* who is appointed by each *soa* and inaugurated by custom by the state government. Ownership in the form of a *soa* is highly respected by indigenous peoples, although it is only limited by natural signs such as *lembat*, rivers or artificial boundaries such as planting *gadihu* (*Codiaeum variegatum*) on *soa* boundaries.

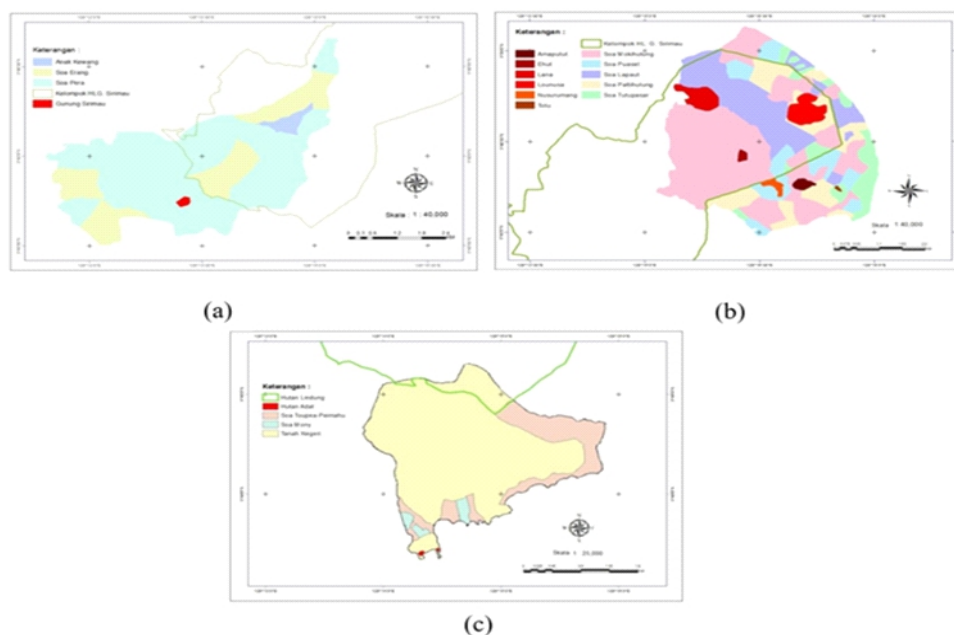


Figure 6 Map of land ownership by indigenous peoples around the Mount Sirimau Protection Forest Group (a) Soya Village; (b) Hutumuri Village; (c) Hukurila Village.

Table 3 *Soa* and clan groups in *soa*

Village	<i>Soa</i>	Clan
Soya	Pera	<ul style="list-style-type: none"> • Rehatta • Tamtelahitu • Pesulima • Huwaa
	Erang	<ul style="list-style-type: none"> • Soplanit
Hutumuri	Mokihutung	<ul style="list-style-type: none"> • <i>Marga pendatang</i> • Pattiaapon • Tehupeiori • Souripet • Kappuw • Pattiasina • Arlawelang
	Puasel	<ul style="list-style-type: none"> • Horhoruw • MoniharApun • Matuahitimahu • Rehatalanit- Hursepuny • Pattinasarany
	Lapaut	<ul style="list-style-type: none"> • <i>Marga pendatang</i> • Sameaputty • Souhuwat • Keiluhu • Patalala • Lilipory

Land use by indigenous peoples Land use is any form of human intervention (interference) on land to meet their material and spiritual needs (Arsyad, 1989), including use for agriculture to residential houses, to restaurants, hospitals to cemeteries (Lindgren, 1985; Sillia et al., 2017), the activity of using a plot of land at a time (Jayadinata, 1999; Sillia et al., 2017), a continuous process in the use of land for development purposes optimally and efficiently (Sugandhy, 1999; Fatikawati & Muktiali, 2015).

The multidimensional meaning of land for the community, according to (Nugroho, 2002; Malaka, 2018), is as follows: a) From an economic point of view, the land is a means of production that can bring prosperity; b) Politically land can determine a person's position in community decision-making; c) As a culture that can determine the high and low social status of the owner; d) Land is sacred because it deals with inheritance and transcendental issues.

Indigenous communities around protection forests utilize

land with a traditional agroforestry system known as dusung. The types of plants planted are dominantly fruit trees that have been planted by previous parents and managed for generations in addition to tree species that grow naturally. Types of woody vegetation that grow naturally and fruit plants identified based on the results of the Ambon City Protection Forest Management Unit Biophysical Inventory and FGD on land owned by *soa* group (Table 4).

Types of short-lived plants planted were banana (*Musa spp.*), cassava (*Manihot esculenta*), taro sweet potato

(*Colocasia esculenta* L.), pineapple (*Ananas comosus*) in gape planted with fruit trees. The types of plants in the Hukurila village are not many when compared to the Soya and Hukurila countries, because the soil types are not supported. The type of soil in Hukurila Village which is in the protected forest group of Mount Sirimau is Dystropepts including Inceptisols soil type, suborder Tropept, and great group Dystropepts means soil type that does not have sulfidic material at a depth of less than 50 cm from the mineral soil surface, soil temperature regime isonesic or hotter base

Table 4 Types of plantations forestry plantation, agriculture, and fruits

Village	Soa	Plant type				
		Forestry [*]		Fruit plants ^{**}	Plantation ^{**}	Agriculture ^{**}
Wood		Non wood				
Soya	Pera	<ul style="list-style-type: none"> • <i>Becang</i> (<i>Mangifera foetida</i> Lour) • <i>Cempeda</i> (<i>Artocarpus integer</i> Merr) • <i>Ganemo hutan</i> (<i>Gnetum gnemon</i> L) • <i>Halaor</i> (<i>Litsea firma</i> Hook.f) • <i>Ketapang hutan</i> (<i>Terminalia catappa</i> L) • <i>Kayu burung</i> (<i>Elaeocarpus sphaericus</i> K.Schum) • <i>Kayu merah</i> (<i>Eugenia</i> sp.) • <i>Palala</i> (<i>Knema tomentella</i> Warb) • <i>Pule air</i> (<i>Alstonia scholaris</i> R.Br) • <i>Reha</i> (<i>Symplocos</i> sp.) • <i>Safar</i> (<i>Alphitonia zizyphoides</i> A.Gray) 	<ul style="list-style-type: none"> • <i>Bambu</i> (<i>Bambusa</i> spp.) • <i>Enau</i> (<i>Arenga pinnata</i>) • <i>Sagu</i> (<i>Metroxylon</i> sp.) • <i>Damar</i> (<i>Agathis dammara</i>) 	<ul style="list-style-type: none"> • <i>Durian</i> (<i>Durio</i> spp.) • <i>Manggis</i> (<i>Garcinia mangostana</i>) • <i>Salak</i> (<i>Salacca zalacca</i>) 	<ul style="list-style-type: none"> • <i>Cengkih</i> (<i>Syzygium aromaticum</i>) • <i>Pala</i> (<i>Myristica fragrans</i>) • <i>Kelapa</i> (<i>Cocos nucifera</i>) 	<ul style="list-style-type: none"> • <i>Pisang</i> (<i>Musa</i> spp.) • <i>Singkong</i> (<i>Manihot esculenta</i>) • <i>Nanas</i> (<i>Ananas comosus</i>)
		Erang	Erang	<ul style="list-style-type: none"> • <i>Cengkeh hutan</i> (<i>Eugenia aromatica</i>) • <i>Coklat hutan</i> (<i>Sterculia treubii</i> Hochr) • <i>Damar</i> (<i>Agathis alba</i> Foxw) • <i>Husor</i> (<i>Garcinia cornea</i> Merr) • <i>Ikora</i> (<i>Diploknema oligomera</i> H.J.L) • <i>Halaor</i> (<i>Litsea firma</i> Hook.f) • <i>Kasuari</i> (<i>Casuariana rumphiana</i> Miq) • <i>Ketapang hutan</i> (<i>Terminalia catappa</i> L) • <i>Kayu Merah</i> (<i>Eugenia</i> sp.) • <i>Lahuung</i> (<i>Compnasperma</i>) • <i>Leset</i> (<i>Annona</i> spp.) • <i>Mamina</i> (<i>Pimeleodendron ambo inicum</i> Hassk) • <i>Pule air Nanari</i> (<i>Canarium sylvestre</i> Gaerth) • <i>Nani batu</i> (<i>Metrosideros vera</i> Roxb) • <i>Palala</i> (<i>Knema tomentella</i> Warb) (<i>Alstonia scholaris</i> R.Br) • <i>Safar</i> (<i>Iphitonia zizyphoides</i> A.Gray) • <i>Kayu Burung</i> (<i>Elaeocarpus sphaericus</i> K.Schum) • <i>Patikewa</i> • <i>Tawang</i> (<i>Pometia</i> spp.) 	<ul style="list-style-type: none"> • <i>Bambu</i> (<i>Bambusa</i> spp.) • <i>Enau</i> (<i>Arenga pinnata</i>) • <i>Sagu</i> (<i>Metroxylon</i> sp.) • <i>Damar</i> (<i>Agathis dammara</i>) 	<ul style="list-style-type: none"> • <i>Durian</i> (<i>Durio</i> spp.) • <i>Manggis</i> (<i>Garcinia mangostana</i>) • <i>Salak</i> (<i>Salacca zalacca</i>)

Table 4 (continued)

Village	Soa	Plant type					
		Forestry ^{*)}		Fruit plants ^{**)}	Plantation ^{**)}	Agriculture ^{**)}	
Wood	Non wood						
Hutumuri	Lapaut	<ul style="list-style-type: none"> • <i>Ganemo hutan</i> (<i>Gnetum gnemon</i> L) • <i>Ketapang hutan</i> (<i>Terminalia catappa</i> L) • <i>Kayu Burung</i> (<i>Elaeocarpus sphaericus</i>) • <i>Kayu Merah</i> (<i>Eugenia</i> sp.) • <i>Pule</i> (<i>Alstonia scholaris</i> R.Br) • <i>Salawaku</i> (<i>Albizzia falcata</i> Back) 	<ul style="list-style-type: none"> • <i>Bambu</i> (<i>Bambusa</i> spp.) • <i>Enau</i> (<i>Arenga pinnata</i>) • <i>Sagu</i> (<i>Metroxylon</i> spp.) 	<ul style="list-style-type: none"> • <i>Durian</i> (<i>Durio</i> spp.) • <i>Duku</i> (<i>Lansium domesticum</i>) • <i>Cempedak</i> (<i>Artocarpus integer</i>) • <i>Langsat</i> (<i>Lansium domesticum</i> Correa) • <i>Manggis</i> (<i>Garcinia mangostana</i>) 	<ul style="list-style-type: none"> • <i>Cengkih</i> (<i>Syzygium aromaticum</i>) • <i>Pala</i> (<i>Myristica fragrans</i>) • <i>Kelapa</i> (<i>Cocos nucifera</i>) • <i>Cacao</i> (<i>Theobroma cacao</i>) 	<ul style="list-style-type: none"> • <i>Pisang</i> (<i>Musa</i> spp.) • <i>Singkong</i> (<i>Manihot esculenta</i>) • <i>Nanas</i> (<i>Ananas comosus</i>) 	
		Pattihutung	<ul style="list-style-type: none"> • <i>Beringin</i> (<i>Ficus bejamina</i>) • <i>Bintangur</i> (<i>Calophyllum soulattri</i> Burm.f) • <i>Husor</i> (<i>Garcinia cornea</i> Merr) • <i>Kasuari</i> (<i>Casuariana rumphiana</i> Miq) • <i>Ketapang hutan</i> (<i>Terminalia catappa</i> L) 	<ul style="list-style-type: none"> • <i>Bambu</i> (<i>Bambusa</i> spp) • <i>Enau</i> (<i>Arenga pinnata</i>) • <i>Sagu</i> (<i>Metroxylon</i> sp.) 	<ul style="list-style-type: none"> • <i>Durian</i> (<i>Durio</i> spp.) • <i>Duku</i> • <i>Langsat</i> 	<ul style="list-style-type: none"> • <i>Cengkih</i> (<i>Syzygium aromaticum</i>) • <i>Pala</i> (<i>Myristica fragrans</i>) • <i>Kelapa</i> (<i>Cocos nucifera</i>) 	<ul style="list-style-type: none"> • <i>Pisang</i> (<i>Musa</i> spp.) • <i>Singkong</i> (<i>Manihot esculenta</i>) • <i>Nanas</i> (<i>Ananas comosus</i>)
		Puasel	<ul style="list-style-type: none"> • <i>Kayu Merah</i> (<i>Eugenia</i> sp.) • <i>Mamina</i> (<i>Pimeleodendron amboinicum</i> Hassk) • <i>Nanari</i> (<i>Canarium sylvestre</i> Gaerth) • <i>Nani</i> (<i>Metrosideros vera</i> Roxb) • <i>Beringin</i> (<i>Ficus bejamina</i>) • <i>Bintangur</i> (<i>Calophyllum soulattri</i> Burm.f) • <i>Kasuari</i> (<i>Casuariana rumphiana</i> Miq) • <i>Ketapang hutan</i> (<i>Terminalia catappa</i> L) • <i>Kayu Merah</i> (<i>Eugenia</i> sp.) • <i>Nanari</i> (<i>Canarium sylvestre</i> Gaerth) • <i>Nani</i> (<i>Metrosideros vera</i> Roxb) • <i>Pule</i> (<i>Alstonia scholaris</i> R.Br) 	<ul style="list-style-type: none"> • <i>Bambu</i> (<i>Bambusa</i> spp.) • <i>Enau</i> (<i>Arenga pinnata</i>) • <i>Sagu</i> (<i>Metroxylon</i> sp.) 	<ul style="list-style-type: none"> • <i>Durian</i> (<i>Durio</i> spp.) • <i>Duku</i> (<i>Lansium domesticum</i>) • <i>Kenari</i> (<i>Canarium ovatum</i>) • <i>Manggis</i> (<i>Garcinia mangostana</i>) • <i>Langsat</i> (<i>Lansium domesticum</i> Correa) • <i>Gandaria</i> (<i>Bouea macrophylla</i>) • <i>Kecapi</i> (<i>Sandoricum koetjape</i>) 	<ul style="list-style-type: none"> • <i>Pala</i> (<i>Myristica fragrans</i>) • <i>Cengkih</i> (<i>Syzygium aromaticum</i>) 	<ul style="list-style-type: none"> • <i>Pisang</i> (<i>Musa</i> spp.) • <i>Singkong</i> (<i>Manihot esculenta</i>) • <i>Nanas</i> (<i>Ananas comosus</i>)

Table 4 (continued)

Village	Soa	Plant type				
		Forestry ^{*)}		Fruit plants ^{**)}	Plantation ^{**)}	Agriculture ^{**)}
Wood	Non wood					
Tutupasar		<ul style="list-style-type: none"> • <i>Bintanggur</i> (<i>Calophyllum soulattri</i> Burm.f) • <i>Kasuari</i> (<i>Casuariana rumphiana</i> Miq) • <i>Ketapang hutan</i> (<i>Terminalia catappa</i> L) • <i>Kayu merah</i> (<i>Eugenia</i> sp.) • <i>Nanari</i> (<i>Canarium sylvestre</i> Gaerth) • <i>Nani</i> (<i>Metrosideros vera</i> Roxb) • <i>Pule</i> (<i>Alstonia scholaris</i> R.Br) 	<ul style="list-style-type: none"> • <i>Bambu</i> (<i>Bambusa</i> spp.) • <i>Enau</i> (<i>Arenga pinnata</i>) • <i>Sagu</i> (<i>Metroxylon</i> sp.) 	<ul style="list-style-type: none"> • <i>Durian</i> (<i>Durio</i> spp.) • <i>Kenari</i> (<i>Canarium ovatum</i>) • <i>Duku</i> (<i>Lansium domesticum</i>) • <i>Langsat</i> (<i>Lansium domesticum</i> Correa) 	<ul style="list-style-type: none"> • <i>Pala</i> (<i>Myristica fragrans</i>) • <i>Cengkih</i> (<i>Syzygium aromaticum</i>) 	<ul style="list-style-type: none"> • <i>Pisang</i> (<i>Musa</i> spp.) • <i>Singkong</i> (<i>Manihot esculenta</i>) • <i>Nanas</i> (<i>Ananas comosus</i>)
		<ul style="list-style-type: none"> • <i>Linggua</i> (<i>Petrocarpus indicus</i>) • <i>Kasuari</i> (<i>Casuariana rumphiana</i> Miq) • <i>Pule</i> (<i>Alstonia scholaris</i> R.Br) • <i>Salawaku</i> (<i>Albizzia falcata</i> Back) 	<ul style="list-style-type: none"> • <i>Bambu</i> (<i>Bambusa</i> spp.) • <i>Enau</i> (<i>Arenga pinnata</i>) • <i>Sagu</i> (<i>Metroxylon</i> sp.) 	<ul style="list-style-type: none"> • <i>Durian</i> (<i>Durio</i> spp.) • <i>Nenas</i> (<i>Ananas comosus</i>) 	<ul style="list-style-type: none"> • <i>Kelapa</i> (<i>Cocos nucifera</i>) • <i>Cengkih</i> (<i>Syzygium aromaticum</i>) • <i>Pala</i> (<i>Myristica fragrans</i>) 	<ul style="list-style-type: none"> • <i>Pisang</i> (<i>Musa</i> spp.) • <i>Singkong</i> (<i>Manihot esculenta</i>) • <i>Nanas</i> (<i>Ananas comosus</i>) • <i>Ubi talas</i> (<i>Colocasia esculenta</i> L.)
Mony		<ul style="list-style-type: none"> • <i>Ketapang hutan</i> (<i>Terminalia catappa</i> L) • <i>Kasuari</i> (<i>Casuariana rumphiana</i> Miq) • <i>Pule</i> (<i>Alstonia scholaris</i> R.Br) • <i>Salawaku</i> (<i>Albizzia falcata</i> Back) 	<ul style="list-style-type: none"> • <i>Bambu</i> (<i>Bambusa</i> spp.) • <i>Enau</i> (<i>Arenga pinnata</i>) • <i>Sagu</i> (<i>Metroxylon</i> sp.) 	<ul style="list-style-type: none"> • <i>Durian</i> (<i>Durio</i> spp.) • <i>Nenas</i> (<i>Ananas comosus</i>) 	<ul style="list-style-type: none"> • <i>Kelapa</i> (<i>Cocos nucifera</i>) • <i>Cengkih</i> (<i>Syzygium aromaticum</i>) • <i>Pala</i> (<i>Myristica fragrans</i>) 	<ul style="list-style-type: none"> • <i>Pisang</i> (<i>Musa</i> spp.) • <i>Singkong</i> (<i>Manihot esculenta</i>) • <i>Nanas</i> (<i>Ananas comosus</i>)

Information: *) = Inventory Forest Area Consolidation Center (2015); **) = FGD (2020)

saturation < 50%. Sulphidic or acid sulfate materials are substances that when oxidized increase the acidity of the soil so that toxic elements are concentrated Hardjowigeno (2002). According to the experience of farmers, it is only suitable for planting with pineapple (*Ananas comosus*) and other types that do not require intensive maintenance. Types of fruit trees are planted on land close to settlements because the land is included in the protection forest is land owned by the state. The cropping pattern in the hamlet can be seen in Figure 7.

The condition of the management of the protection forest which is claimed as their customary forest illustrates that the indigenous peoples have divided the protection forest in the form of blocks and plots according to land ownership based on *soa*. Even without detailed planning and mapped out as a document, the indigenous peoples have adhered to it from generation to generation. Each *soa* is very familiar with

details at the site level, both boundaries and even forest, plantation, and agricultural products.

The observation results show that protection forest management by the community based on *soa* is going well so far which is stated by the community's perception of the condition of the protected forest as being quite good, and the community obeys the applicable customary law.

Protection forest management principles The description of these activities, if identified based on the principles of protection forest management, is present in Table 5. Table 5 shows that the government has not carried out optimal management of protected forests at the site level based on the principles of protected forest management. The government has just protected forests but has not utilized natural resources as referred to in the principles of protected forest management in Government Regulation Number 3 of



Figure 7 The planting pattern of the *dusung* system by indigenous peoples around the Mount Sirimau Protection Forest Group. (Source: Design based on interviews and observations, 2020).

2008 concerning Amendments to Government Regulation Number 6 of 2007 (articles 25–26).

Indigenous peoples manage protected forests from generation to generation with the concept of customary forests and have utilized natural resources as referred to in Government Regulation Number 3 of 2008 concerning Amendments to Government Regulation Number 6 of 2007 (articles 25–26) in the form of land use in the form of *dusung* (traditional agroforestry), the use of fruit trees, the use of non-timber forest products, namely the management of sugar palm as raw material for making cakes and traditional alcohol (*sopi*), bamboo for household furniture, fences for plant protection from pig pests. To date, the management of protected forests by indigenous peoples has not damaged or changed the landscape, because indigenous peoples are very obedient to the customary rules that apply to the management of customary forests that are included in protected forests.

The results of interviews and observations with key informants, namely authorized agencies or those that intervene in protected forest activities, show that the management of the Ambon City Protection Forest will continue to experience changes in both the status of the forest and the institutions that have the authority to manage it. The results of interviews and observations with indigenous peoples show that communities have managed protected forests from generation to generation using customary forest principles. Meanwhile, the community continues to manage the forest which has been claimed as their customary forest from generation to generation with local wisdom and will continue to manage it and will not be affected by the status of the forest or its management. Even the government that will intervene in protection forest activities must ask for permission from the land owner through a mechanism through the village government. It is stated by the state

government that the agency that will carry out activities in the protected forest, begins with coordination with the state government and the land owner (*soa*) in charge of the land that will be used as a place of activity, and then proceeds in a participatory and collaborative way to carry out activities in the protected forest.

Therefore, optimal management of the Ambon City protection forest can be carried out in collaboration between the government and indigenous peoples based on *soa*. *Soa* can be used as a protection forest management unit. This is expected to be more effective due to limited resources by the government in managing a fairly extensive protection forest. The government and the community complement each other in the management of protection forests.

Indigenous peoples are generally proven to be able to support their own lives and safety as a community and at the same time support natural socio-ecological services for the needs of all creatures (Mulyadi, 2013). In utilizing forests, indigenous peoples have the wisdom to manage forests with an order of rules or norms that have been applied for years which are obeyed and adhered to by community members, these norms are called *adat*. *Adat* it self is a habit that is maintained in maintaining their culture, especially their forest as an ecosystem area which is a habitat as a living space (Milunardi et al., 2014). Therefore, *soa*-based protection forest management is expected to be effective and optimal because 1) Protection forest has been completely divided into *soa* which can be used as protection forest management blocks and plots representing blocks and plots that have been designed by the government and 2) Availability of human resources at the site level to manage protection forests due to the presence of indigenous peoples in each *soa*.

Table 5 Identification of protection forest management based on management principles protection forest by the government and indigenous peoples

The principle of protected forest management *)	Government	Indigenous peoples
1. Area utilization:		
a. Medicinal plant cultivation	Not done	Not done
b. Ornamental plant cultivation	Not done	Not done
c. Mushroom cultivation	Not done	Not done
d. Beekeeping	Not done	Not done
e. Forage cultivation	Not done	Not done
f. Cultivation of fruits and seeds	Not done	Planting fruit crops from generation to generation
g. Essential plant cultivation	Not done	Not done
h. Sap plant cultivation	Not done	Not done
i. Wana mina (silvofishery)	Not done	Not done
j. Wana cattle (silvopastura)	Not done	Not done
k. Planting agroforestry (agroforestry)	Not done	The community manages the <i>dusung</i> as traditional agroforestry
l. Livestock farming (agrosilvopastura)	Not done	Not done
m. Wild animal captivity	Not done	Not done
n. Animal rehabilitation	Not done	Not done
2. Utilization of environmental services:		
a. Utilization of water flow	Not done	Not done
b. Water utilization	Not done	People use water for their daily needs
c. Natural tourism	Not done	Not done
d. Protection of biodiversity	Not done	Not done
e. Environmental restoration	Not done	Not done
f. Carbon sequestration and/or storage	Not done	Not done
3. Collection of non-timber forest products includes among others:		
a. Rattan;	Not done	Not done
b. Honey;	Not done	Not done
c. Sap;	Not done	Not done
d. Fruit;	Not done	Not done
e. Seed;	Not done	Not done
f. Mould;	Not done	Not done
g. Leaf;	Not done	Not done
h. Flower;	Not done	Not done
i. Swift's nest	Not done	Not done
j. Other non-timber forest products	Not done	Management of sap as an additional ingredient for making cakes, and traditional alcoholic beverages (<i>sopi</i>)

*) based on Government Regulation Number 3 of 2008 concerning amendments to Government Regulation Number 6 of 2007 (articles 25–26)

Conclusion

The government has not managed the protected forest optimally based on the principles of protected forest management. Activities carried out by the government include structuring protected forest areas, monitoring and protecting protected forest areas in the form of patrols, appeal boards and prohibitions. Construction of facilities and infrastructure such as monitoring towers and protected forest guard posts. Indigenous peoples manage protected forests on several aspects of protected forest management principles, namely the use of forest areas, utilization of water resources and utilization of non-timber forest products. Protected

forest management activities carried out by indigenous peoples are also not optimal due to the lack of technological innovation in management development such as non-timber forest products.

Recommendation

The government and indigenous peoples can collaborate in protected forest management to be more effective at the site level in applying the principles of protected forest management to the Mount Sirimau Protection Forest Group, Ambon City.

APPENDIX 1.

The questionnaire contains questions about the identity of the respondents, the management of protected forests carried out by the government and indigenous peoples following the principles of protected forest management based on Government Regulation Number 3 of 2008 concerning Amendments to Government Regulation Number 6 of 2007 (articles 25–26):

1. Is there any use of environmental services such as:
 - a. utilization of water flow;
 - b. water utilization;
 - c. natural tourism;
 - d. protection of biodiversity;
 - e. environmental rescue and protection;
 - f. carbon sequestration and/or storage.
2. Are business activities utilizing environmental services in protected forests carried out with the following provisions:
 - a. not reduce, change or eliminate its main function;
 - b. does not change the landscape;
 - c. does not damage the balance of environmental elements.
3. Is there a license holder, in carrying out business activities to use water flow and use water in protected forests?
4. If there is a water utilization permit holder and water flow:
 - a. Is the payment of fees following the provisions of the legislation?
 - b. Water flows utilization permits and water utilization permits in protected forests cannot be leased or transferred, either partially or completely.
5. Is the collection of non-timber forest products in the form of:
 - a. rattan;
 - b. honey;
 - c. fruit;
 - e. mould;
 - f. Swift's nest.
6. If the collection of non-timber forest products in a protected forest is carried out, whether:
 - a. the non-timber forest products are the result of reforestation and/or are available naturally;
 - b. damaging the environment;
 - c. reduce, change or eliminate its main function.
 - d. carried out by communities around the forest or by people from outside
 - e. beyond its sustainable productivity capabilities
 - f. collect certain types of forest products that are protected by law.

APPENDIX 2.

Questionnaire on protected forest management activities based on protected forest management principles

Management activities	It is already done	Not done
1. The business activities of using protected forest areas include: <ol style="list-style-type: none"> a. medicinal plant cultivation; b. ornamental plant cultivation; c. mushroom cultivation; d. beekeeping; e. forage cultivation for livestock; f. cultivation of fruits and seeds; g. cultivation of essential plants; h. cultivation of sap plants; i. wana mina (silvofishery); j. wana cattle (silvopastura); k. planting agroforestry (agroforestry); l. livestock farming (agrosilvopastoral); m. wild animal captivity; and/or n. animal rehabilitation 		
2. Service utilization business activities include: <ol style="list-style-type: none"> a. utilization of water flow; b. water utilization; c. natural tourism; d. protection of biodiversity; e. environmental restoration; f. carbon sequestration and/or storage. 		
3. Activities for collecting non-timber forest products in protected forests are in the form of: <ol style="list-style-type: none"> a. rattan; b. honey; c. sap; d. fruit; e. seed; f. mould; g. leaf; h. flower; i. Swift's nest; j. other non-timber forest products. 		

Source: Government Regulation Number 3 of 2008 concerning amendments to Government Regulation Number 6 of 2007 (articles 25–26)

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