

Local Wisdom Identification of Peatland Management in Inland Villages of Nunukan Regency, North Kalimantan, Indonesia

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Abstract. Peatlands have a central function in maintaining the balance of the world's ecosystem. Indonesia has 22.5 million hectares of peat land, the largest in the tropics, 38% of which is in Kalimantan. Nunukan Regency has peatlands with a depth of between 8-10 m which have been designated as protected forests that cannot be converted, some of which are in coastal areas. This article aims to identify the local wisdom of communities around remaining peatlands, which will be used as a basis for ecotourism development. The research was conducted in Atap Village, located in the center of the sub-district, the population is Muslim; and Pagar Village, whose residents are Catholic, is located far from the sub-district center. Data collection was carried out by observation, in-depth interviews with 15 people per village, Focus Group Interviews (FGI) and FGDs with representatives of community groups at the village hall. The research results show that differences in the influence of religion and geographical position determine differences in local community values and wisdom related to peat forests. The siege of monoculture plantation corporations and several coal mines is changing the environmental landscape and giving rise to potential conflicts over living space in two villages.

1 Introduction

Peat forests can accommodate 30% of the world's carbon, maintaining the balance of the earth's climate from various environmental disasters. Global Environment Center & Wetlands International (GEC WI, 2018), recorded a global peatland area of 400 million hectare (45.3% of the total global peatland area), spreading over Asia (36.7%), Europe (12.4%), South America (4.0%), Africa (1.4%), and Australasia (0.2%). Russia, Canada, US, and Indonesia.

FAO records that the area of tropical peatlands reaches 8% of the total global peatlands. Indonesia holds the largest tropical peatland in the world, reaching 22.5 million Ha (45%), spreading across Sumatra (41.1%), Kalimantan (33.8%), Papua (23.0%), Sulawesi (1.6%) and Halmahera and Seram (0.5%). Indonesia's peatlands absorb 55–57 billion tons of carbon, equivalent to nearly 2 years of global carbon emissions at current rates.

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Since 1700 AD, global wetlands are estimated to have lost 87% [1]. The direct causes of wetland loss and change include drainage and landfill, hydrological changes, degradation from pollutants and sediments, and conversion to agricultural, as well as urban and industrial uses. Communities around peatland develop agricultural cultures for peatlands.

The Directorate General of State Assets of the Republic of Indonesia interprets local wisdom as the view of life of people in an area regarding the local environment or living space. It contains a number of knowledges, values, life strategies that direct people's activities on how to relate to nature and the environment, in meeting their needs. For a long time, the people around Indonesian peat have had a variety of wisdom to conquer the peatlands in South Kalimantan, producing watermelon, *gembili* or nagara sweet potatoes, nagara beans, and various vegetables [2]. In Riau, people use traditional tools to maintain surface soil fertility [3,4]. Communities around peat in West Kalimantan have special irrigation techniques to keep acidic water from touching plant roots [5].

In the forest park "Taman Hutan Raya Orang Kayo Hitam" (Tahura OKH) in Jambi Province, local people usually hunt ten types of wild animal species, which have been used as medicine for generations. As many as 48% of the public admitted to deliberately accessing the area to look for wild animals, to meet their subsistence needs. The animal most widely recognized as useful by the people is bat (*Pteropus sp.*), which is often found in other ethnozoological studies [6]. But the coming of modern industry has become a massive destroyer of peatlands through massive land clearing, contributing to sedimentation and pollutants.

Many strategies have been adopted to save the remaining peatlands. The global community agrees that maintaining the peatlands is the effective way to curb the increase in greenhouse gases. The proposed eight agroforestry business models are designed according to their ability to attract smallholders and commercial investors, and their suitability for hydrological rehabilitation of peatlands [7]. There were many cases of trial and error, before finally finding a format that was more down-to-earth and did not alienate the local community. Between 1993 and 2015, the EU-LIFE nature program invested 167.6 million € in 80 projects, aimed at restoring more than 913 kilometers of peatland habitat in Western European countries, mostly in protected sites part of the EU's Natura 2000 network. This represents less than 2% of the total remaining peatland area in those countries, most of which have been affected by anthropogenic disturbance. Published evidence of restoration progress is limited to specific sites/areas, and in many cases lacks clear baselines and objectives, i.e., measurable targets or contemporary references. This case shows how important a monitoring standard is in saving peat projects [8,9].

In southeast Asia in recent years, a small amount of research has aimed at developing the 4R (Rewetting, Fire Reduction, Replanting, and Revitalization) peatland restoration process and approach to the 5R adding a Reporting and monitoring component (R5). This new approach emphasizes the importance of local community support for ecological restoration purposes [10].

There are many lessons from the failure to implement global initiative practices that neglect local cultural values, encounter many obstacles and failures, and even harm the local community. In Sumatra, the policy of reconfiguring land use rights in a formal peatland mitigation project weakened the ability of smallholders to benefit from their land. These projects ignore local perspectives on development, fail to deliver promised benefits, and through reconfiguring local land tenure, reduce the ability of smallholders to profit from their land.

In Riau, Indonesia, a bilateral partnership program resulting from a local initiative that was co-managed and internationally funded failed. Public, private, and civil society actors in each partnership actually exploit funding and political opportunities to advance agendas that are not directly related to the environment. The peatland hydrological unit administrative

category as an ecologically meaningful peatland governance scale is also underutilized by the partnerships studied [11,12].

The international conservation community continues to call for preserving intact peatlands as the best way to tackle climate change.” However, the construction of peatland drainage and land conversion continues in local communities around peatland [13,14]. Community-based peatland conservation and restoration, combining science with the legacy of local wisdom, is increasingly believed to produce mutually beneficial peat saving practices. Better understanding of stakeholder perceptions has the potential to give voice to marginalized communities, enable transparent mediation of multiple priorities, inform public education campaigns, and shape future governance policies and arrangements. [15]

The establishment of Masyarakat Peduli Api (MPA) or Fire Care Community, resulted in revegetation initiatives, canal blocking as a form of re-wetting, and livelihood revitalization in Pelalawan, Riau. [16] the CSR program in Bukit Batu, Bengkalis, Riau developed an environmental communication model using hospitality, deliberation and mutual cooperation methods to change understanding, perspectives, and influence the behavior of the community and visitors [16].

This article is the result of basic research conducted to explore the local wisdom of communities around peatlands in Nunukan Regency, North Kalimantan, Indonesia. Decree number 129/MENLHK/SETJEN/PKL.0/2/2017 of the Minister of Environment and Forestry concerning the determination of the national peat hydrologic unit map, states that North Kalimantan Province has 13 Peat Hydrological Areas (Kawasan Hidrologi Gambut/KHG) covering an area of 347,451 hectares, the largest in Nunukan Regency. The article will review the differences in the character of local wisdom in two villages around peatland with their cultural background and geographical position. It is hoped that the results of this analysis can become part of the basics of assisting peatland conservation efforts based on local wisdom in the region.

2 Method

2.1 The research sites

Like other areas in Kalimantan, the landscape of the North Kalimantan region has changed drastically due to the opening of monoculture plantations and coal mining companies. Plantation companies are turning forests into monoculture plantation areas, narrowing the space for farming, water sources are polluted with pesticides, high floods and migration of unskilled laborers from outside the area [17]. Mining changes the landscape of living space to be more extreme, in some places causing the death of residents in mine pit pools that are not closed [18].

The research was conducted in Atap Village and Pagar Village in Sembakung District, Nunukan Regency, North Kalimantan. Atap Village is inhabited by the Tidung ethnic community, the majority of whom are Muslim, and is the centre of the Sembakung District. The village is located on the banks of the Sembakung River connected to outside areas with good road infrastructure, and access via the Sembakung River by speedboats. Pagar Village is inhabited by the Dayak Agabag ethnic community, the majority of whom are Christians. Previously, it was adjacent to Atap Village, but in 2000 it was relocated to a mountainous location, far from the Sembakung River.

These two villages are in the vicinity of remaining peatlands which are actually part of the eucalyptus plantation company PT Adindo's concession area. However, now this peat area is declared a protected area and is being prepared as a green economy area.

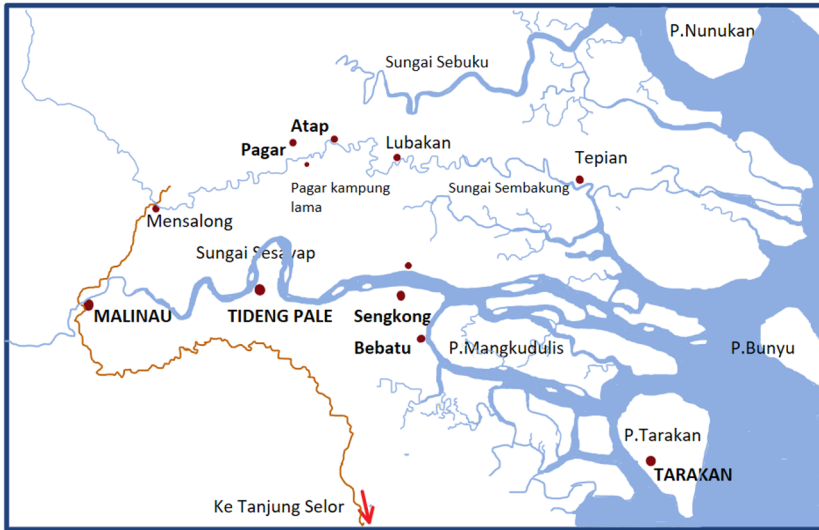


Fig. 1. Map showing the research sites in North Kalimantan (source: JAPSIKA)

2.2 Data gathering and analysis

Secondary data was collected from the village office, district office and the Nunukan Regency official website. Primary data was collected through observation, in-depth interviews, focus group discussions and focus group interviews (FGI) [19–21]. Field work was carried out for 12 days in October 2021, involving 3 researchers and 3 research assistants.

During the initial visit, an FGD was conducted with 25 selected residents to see the general views of the informants regarding peat. The FGD was also used to identify maps of interest groups and differences in initial views, including identifying which parties dominated the discussion. From the FGD, the informants were divided into groups according to their opinion [21–23].

From here the researcher got instructions to go deeper through FGI, targeting groups of informants with similar opinions [20,24,25]. Several selected informants who were considered to have good information were explored more deeply with in-depth interviews. A total of 25 informants were selected from each village consisting of women and men representing youth, farmers, plantation workers, bird nest entrepreneurs, officials and village leaders [23].

Analysis of the interview data was carried out by making a comparative taxonomic analysis of a number of local wisdom categories such as collective memory of peatland management in the past, knowledge and views about peatland, views on ideal peatland management, utilization of peatland biodiversity and expectations of land management peat in the future [24–26].

3 Result and Discussion

3.1 Result

Results of the study can be arranged into several points as follows:

- 1) The people of the two villages have cultural roots as farming communities, as Dayak people who are steeped in local wisdom live side by side with the forest. The people of

the two villages have cultural roots as farming communities, steeped in local wisdom, living side by side with the forest. However, geographical position and encounters with different religious influences have resulted in differences in the remaining local wisdom values.

- 2) The influence of Islam made the people of Pagar village abandon many old ritual practices because they were considered idolatrous. They no longer call themselves Dayak people, instead identifying as Tidung people who are closely linked to Muslim identity. The influence of Islam made the people of Pagar village abandon many old ritual practices because they were considered idolatrous. They no longer call themselves Dayak people, instead identifying as Tidung people who are closely linked to Muslim identity.
- 3) The Catholic religion adhered to by the residents of Pagar village does not completely prohibit local wisdom practices related to forests. Daily life is still very dependent on forests, traditional norms are still closely related to old cultural values typical of farming communities.

3.2 Discussion

The people in the interior of Kalimantan are steeped in local wisdom and live side by side with the forest [27]. The forest provides all the necessities of life, including clothing, shelter and food. The community forms a series of values, norms, and codes of conduct so that the forest is always protected [28]. Their lifestyle gives birth to a series of traditional values that are connected to shared arrangements about how to use the forest as a source of life. Certain places such as mountains, rivers and swamps in the forest are sacred so that they are protected from destructive exploitation [29,30].

The influence of religions, the presence of monoculture plantation industries and mining corporations are changing the landscape of inland Kalimantan communities. Religions such as Islam and Christianity prohibit all cultural practices that are considered contrary to the teachings of monotheism. Meanwhile, corporate invasions and the accompanying opening up of remote areas have brought in the values of modern life, leaving the values of local wisdom to live side by side with the forest.

There are a number of similar collective memory legacies between the people of the two villages regarding their ancestral local wisdom practices in coexisting with peat forests. The people of the two villages share an ancestral cultural identity as a farming community with spiritual rituals, culinary traditions and traditional medicine which are closely related to the maintenance and utilization of the biodiversity of the surrounding forests.

The difference in religious influence has made these two villages now have different styles of local wisdom regarding peatlands. Pagar Village, which received the influence from Christianity, still calls itself the Agabag Dayak people, abandoned the rituals of worshipping ancestral spirits, but their lives are still very dependent on the forest, especially for culinary needs (vegetables & animal protein) and herbal medicines. They still believe in certain places in the peat forest as sacred places, traditional leaders are still role models, customary laws are maintained. Meanwhile, Atap Village received Islamic influence and became an open area; no longer call themselves Dayak people, preferring to call themselves Tidung people. Their life is more modern, traditional figures no longer have a significant influence; customary law has long been abandoned. Forest-based culinary tourism, especially wild animals and reptiles which are prohibited/not recommended by Islamic teachings.

Atap Village, which has received mentoring interventions from Civil Society Organizations and the local regional government, has prepared itself to implement a community forestry program in an ecotourism format. Forest farmer groups have been formed, the administrators have sufficient knowledge of peat forest science, ready to become tour guides. Meanwhile, in Pagar Village, they have not received any assistance at all,

although their daily life still depends on the forest, they hope that investors will enter to open oil palm plantations. Having a traditional awareness of the importance of protecting the forest, but also hoping that the village will progress like other villages that accept oil palm plantations or coal mining corporations.

3.2.1 Comparison in topography, geography dan and social context of the two villages

Prior to the intervention of external agencies, Atap and Pagar were agricultural villages that had a long history of living dependent on forests. Their ancestors depended on forest products, had strong agricultural traditions, although the course of history shaped different cultural transformations.

Until 2010 the location of Pagar village was close to the Sembakung River. Due to frequent flooding the village was relocated to a new site far from the river. The fastest access to Atap village is approximately 4.5 hours by speedboat from Tarakan Island. The topography of Sembakung district is flat in the downstream (east) and slightly hilly in the upstream (west and north). Atap village is the center of the Sembakung District Administration.



Fig.2. Aerial view of Atap Village

From the coast there is only a footpath to enter the village, but from the mainland there is paved road access that connects this village to several other villages, as well as to the capital in the district and regency. In the lowlands next to the village flows the Sembakung river with a length of 278 kilometers, stretching from the border area in Sabah (Malaysia) to the sea with Tarakan Island. The river often overflows and causes flooding in low-lying areas along the river, including the villages of Atap and Pagar.

The topography of Pagar Village is lower, making it prone to flooding. Massive land clearing for plantations and mining since the 1960s has resulted in more frequent flooding in Pagar village. In 2010, the residents of Pagar village were relocated to a mountainous location far from the Sembakung River and can be reached from the District Center about a 1.5-hour drive by motorbike through PT Adindo's plantation area. In 2015, this new settlement was inaugurated by the Nunukan Regency government.

Religion has a different influence on the customary institutional system and places that are sacred to the people. The influence of the Javanese transmigrants made them learn a lot

about sedentary farming and increasingly leave a legacy of dry farming culture. Atap and Pagar both have had a lot of contact with assistance programs for forest conservation. Religion, geographical location and differences in access to infrastructure build differences between the two in terms of awareness of benefits and management models, as well as future aspirations for peatlands.



Fig. 3. Aerial view of Pagar Village

3.2.2 Comparison of local wisdom in peatland management of the two villages

Table 1. Comparison of peatland community and two villages

Category	Atap Village	Pagar Village
Religion/Tradition	Moslem majority; Ignoring Dayak most traditions.	Mostly Christians with strong Dayak traditions.
Geographical feature.	Strategic, center of district, good infrastructure, easy access to the outside world, mostly lowland (partly high).	Remote, far from district administration, poor infrastructure, difficult access to and from village, old residence slower than Atap, new residence located in hilly area.
Knowledge about peat.	More structured, less natural.	Less structured, natural, many local words for flora and fauna.
Livelihood.	Farmers; many changes to bird nest cultivation.	Farmers, changed to planting oil palm.
Closeness to forest.	Intense, forest is main source of life.	Intense, forest is main source of life.
Forest use.	Building material, fruits, fuelwood, herbal medicine, food source.	Building material, fruits, fuelwood, herbal medicine, food source, material for traditional rituals.
Future view about peatland.	Community forest, Forest farmers group “ <i>Seribu Temunung</i> ” (develop peat forest tourism).	Tree plantation (<i>eucalyptus</i>) and oil palm.

Two of the villages have a cultural background as farming communities in the past. Like the formation of most Dayak villages in Kalimantan, these two villages used to be farming, hunting and gathering places which later became residential areas. The surrounding forest is

a source of livelihood both for building purposes (timber), vegetables, medicinal plants and a source of animal protein. Religion, geographical conditions and different infrastructure access distinguish the local wisdom conditions of the two villages regarding peatlands as shown in Table 1.

Pagar Village, which received the influence of the Christianity, still faithfully carries out Dayak cultural traditions, still calls itself Dayak people. Customary law is upheld, traditional leaders are highly respected. Ancestral lineage of traditional elders is held by traditional elders, village history is taught by traditional elders to young people, collections of traditional objects are well preserved. Only rituals of ancestor worship are prohibited by the church, while customary law and customary traditions are still valid, there are no restrictions on traditional culinary types, traditional medicinal recipes from both forest plants and animals are preserved today.

The “closeness” of the Pagar village people to the peat forest is strong. They can identify and use various types of medicinal plants, vegetables, fruits, game and wood. However, residents were less enthusiastic about discussing efforts to conserve peatlands, because they were disappointed with assistance programs in the past that only came and went without any perceived benefits. The orientation of peatland management is to turn it into oil palm plantations or paddy fields. Being a forest is important to them, but it is not fair if they get starved in order to protect the forest, while the company is free to destroy it.

It was found that at least 14 types of edible plants which are still consumed by residents were obtained in and around peat forests as shown in Table.2.

Tabel 2. Edible plants/vegetables in Pagar Village

No	Vegetable Names	Processing
1	<i>Rumbia</i> seeds.	Processed into flour for ingredients to make cakes.
2	<i>Embut</i> (you stems) <i>Busion</i> (like coconut, but thorny).	Cooked with coconut oil.
3	<i>Bunu</i> of oil palm.	Cooked with coconut oil.
4	Jantung and Sangut stem (Forest Banana)	Sauteed with fish.
5	<i>Polod</i> /Bamboo.	Several ways to cook.
6	Taro.	Boiled, fried, the stems are vegetables.
7	Stem mushroom.	Sauteed mixed with <i>apa</i> leaves.
8	<i>Sundulit</i> (Mushrooms sticking to dead stems).	Sauteed mixed with <i>apa</i> leaves.
9	<i>Bungkulan</i> (Mushrooms sticking to dead stems).	Sauteed mixed with <i>apa</i> leaves.
10	<i>Bumbulu</i> (Mushrooms sticking to dead <i>gisok</i> stems).	Sauteed mixed with <i>apa</i> leaves.
11	<i>Ambulung</i> (soil fungus)	Sauteed mixed with <i>apa</i> leaves.
12	<i>Kodop</i> (Mushrooms sticking to small stems, branch, and twigs).	Sauteed mixed with <i>apa</i> leaves.
13	<i>Kuli Janju</i> (swamp plant).	Sauteed mixed with <i>apa</i> leaves; its roots are boiled for medicine.
14	<i>Pakis</i> (fern).	Boiled, sauteed.

As for animal sources of protein, residents still consume 12 types of game such as wild boar, fish, catfish/cork, brackish, deer, forest rabbits, bulrushes, monitor lizards, snakes, *bakala* (red monkeys), *bekukang* (small turtles), *bawang* (bear), *bolun* (partridge). There are 23 recipes for herbal medicines made from roots, leaves and wood to treat coughs, heartburn, boils, skin diseases, haemorrhoids, diabetes, lumbago, fever, etc. The types of plants used for medicine and the procedures for their treatment are shown in Table 3.

Tabel 3. Medicinal plants in Pagar Village

No.	Vegetable Names	Processing	Healing properties
1.	<i>Ladit fruit.</i>	Boil and drink the water.	Internal heat.
2.	<i>Bakaq Sarawak</i>	Boil and drink the water.	Cough and cold.
3.	<i>Lampun Belanda (Bajakah).</i>	The woody roots are dried, boiled, the water is drunk.	Gout and cancer.
4.	Soursop leaf.	Boil 7 leaves and drink the water.	Multiple diseases.
5.	Cherry fruits.	Eat the ripe ones.	High blood pressure.
6.	<i>Temu Nyaris. (similar to turmeric but white in color)</i>	Pounded, apply to the injured body.	Wound.
7.	Leaves of pineapple.	Pounded, apply to the injured body.	Wound.
8.	<i>Gampilung</i> (similar to Spinach, but the stems and leaves are a bit slimy).	Pounded, apply to the boil.	Boil.
9.	<i>Bayul wood</i>	The inner skin is scraped off, placed on the boil.	Boil.
10.	<i>Binuang wood</i>	The wood is dried, pounded to make powder. Or weathered wood pounded, affixed to the skin.	Watery skin disease.
11.	<i>Tamaka</i>	Boil and drink the water twice a day.	Hemorrhoid and diabetes.
12.	<i>Pucuk Muda</i>	Pounded, roasted over the fire covered with leaves, affixed to the anal hole.	Hemorrhoid.
13.	<i>Jarak.</i>	The leaves are heated dan beaten with fingers, smeared with coconut oil, and placed on the stomach or chest.	Bloating and heat reducer.
14.	<i>Sambiloto</i> leaves.	Drink water from boiled leaves.	High blood pressure.
15.	<i>Pare</i> leaves.	Drink water from boiled leaves.	Cough.
16.	<i>Ciplukan.</i>	Drink water from boiled roots.	High blood pressure.
17.	Turmeric and honey.	Turmeric is grated and honey, drink.	Cough.
18.	Young <i>jambu monyet</i> (guava) leaves.	Drink water from boiled leaves.	Stomachache.
19.	<i>Pare</i> (bitter gourd).	Boil and drink the water.	Shortness of breath.
20.	<i>Panabal</i> turmeric.	Boil and drink the water.	Backache.
21.	White turmeric.	Boil and drink the water.	Medicine for vaginal discharge and coughing up blood, taken 2 times a week.
22.	<i>Pariya</i> leaves.	Boil and drink the water.	Cough.
23.	<i>Apa</i> leaves.	Put in all kinds of food.	Flavoring while lowering sugar levels.

Atap Village inhabited by the Dayak Tidung ethnic community, accepted Islamic influence and began to abandon its traditional Dayak identity. They no longer call themselves Dayak people, but rather claim to be the Tidung. Dayak traditional rituals that are considered *musyrik* (unfaithful) are abandoned, culinary delights from wild animals/reptiles that are forbidden or not recommended by Islamic teachings are also no longer eaten. Atap people

stopped hunting wild boars, several wild animals such as snakes, monkeys, types of caterpillars, and preferably, although not forbidden but not recommended by religion, also started to be abandoned. Atap Village has long abandoned its customary systems and traditional rituals. Traditional rituals are the commemoration of the big days of the Islamic religion. The sacred places are the tombs of the spreaders of Islam.

Better land and river infrastructure makes Atap more flooded with food products and other manufactured commodities. The transmigrants taught the people of Atap to grow dry land vegetables such as long beans, spinach, kale etc. Culinary vegetables from the forest are increasingly being replaced with garden plant vegetables, instant noodle products or canned fish.

Currently, many residents are developing the cultivation of bird's nests, besides working as farmers, plantation company workers or small-scale oil palm farmers. These two villages have considerable potential for aquaculture, because they are close to the Sembakung river, but this potential has not been properly developed. Although it is no longer close to the Sembakung river, in the peat forest near Pagar Village there are three lakes that can be developed for aquaculture, which have not been cultivated at all.

Atap informants have a better awareness of the importance of protecting peatlands. For them forests are important to the earth. They know that the bird's nest business will not be able to survive if the forest is destroyed. The peat forest in the vicinity has been designated as a Community Forest (*Hutan Kemasyarakatan*) managed by forest farmer groups. Peat Forest will be managed as a peat forest tour. Training of local guides, inventory of herbal and culinary recipes typical of peatlands have been carried out to support the peat forest tourism program.

3.2.3 Changes in space structure and conflict potentials

In both villages there was a change in the spatial structure caused by the following external factors. The narrowing of living space caused by the operation of plantation companies equally hit two villages. The usufructuary rights of PT Adindo Hutani Lestari, which have controlled most of the areas of Roof Village and Pagar Village since 1999, reduce the rights of residents to natural resources, especially land and forests. The process of clearing the land, exterminating pests with drugs polluted the Sembakung river, their main water source. Multicultural crops with weeds cleaned cause floods to get higher and more unpredictable every year. The frequency of floods that are getting denser (can be up to 4 times a year) and the duration is getting longer (2 weeks) limit the daily activities and economic activities of the community. In particular, lowland rice will experience routine failures every year. Living space in terms of economic activity, especially agriculture, is felt to be narrower because the frequency and duration of floods are increasing.

The expansion of the village caused the village of Roof to lose important natural resources. The residents of Atap Village feel that the division of villages that used to be in the Atap village area is detrimental to them, because what is included in other village areas is an area that has high economic potential such as petroleum (Pertamina) and is directly adjacent to a coal company with a large CSR.

For the residents of Pagar Village, their living space as a daily space had to be moved to a new location due to the increasingly frequent and prolonged floods. Floods limit economic activity, especially farming and gardening. In the new settlement location, there is no more flooding. Residents have switched to oil palm plantations and are planning a hydroponic vegetable garden. They are far away from the gardens in the old village, the old houses are abandoned, and they need additional costs to manage the old assets. Social conflict is defined as a struggle for values or demands for status, power, and scarce resources, where the goal of the conflicting group is not only to obtain the desired value, but

also to neutralize, injure, or eliminate rivals. In order that not every difference is considered as a conflict, in this study the conflict is limited to contradictions that are classified as serious. The focus of conflict analysis in this study is on potential and open conflicts. The issues tracked in the research from the two villages can be condensed as follows:

- 1) The issue of making village regulations regarding birds' nest cultivation.
- 2) The dualism of the positions of the district customary stakeholders and the loose kinship function in decision-making.
- 3) Dispute district boundaries and village boundaries.
- 4) Various complaints against and conflicts with the company.
- 5) Ethnic sentiment because control of natural resources are not on local people.

4 Conclusion and Recommendation

4.1 Conclusion

There are three points of conclusion with a lot of details that can be presented in this section. These are:

- 1) In both villages there has been a narrowing of living space, both as a whole and sector ally (river fisheries sector), which has and may continue to harm the local population of humans, animals and plants. The narrowing of living space occurs mainly due to external factors in the form of land acquisition and conversion by companies (tree estates, oil palm, coal) and entrepreneurs (shrimp ponds). This narrowing has created a scarcity of resources for the residents of the two villages without exception.
- 2) The narrowing of living space affects internal dynamics, particularly in the economic and livelihood fields. In an effort to deal with the scarcity of natural resources, residents have developed new livelihood patterns from extraction to planting and nurturing. Changes in this pattern have been seen in practice (actions) and in village economic development ideas or plans. This shows that the main concerns in natural resource conservation campaigns must be accompanied by adequate economic development programs.
- 3) The adaptation of these livelihoods still relies on natural resources (birds nest cultivation, ponds, fishponds, oil palm plantations, fruit orchards, hybrid coconut plantations, *kelulut* honey cultivation, nature tourism). This means sustainable management of natural resources, with an adequate balance between meeting economic and ecological needs, must be the primary concern.

4.2 Recommendation

As a logical consequence of the research findings as shown in the conclusions, the following recommendations can be put forward.

- 1) The village spatial plan is very necessary to reinforce the boundaries of the rights and obligations of villagers and other parties to natural resources. This is important considering that almost all conflicts (and potential conflicts in the future) are caused by external factors, namely the extraction of village natural resources by companies and entrepreneurs.
- 2) In an effort to conserve peatlands, local perspectives and wisdom need to be enriched with scientific knowledge about peatland ecosystems and their benefits for all villages, even for the surrounding area as well. Concretely this means providing education which can be done in various ways. The idea of exploiting peatlands that already exists in the minds of village leaders (i.e. for gardens), needs to be confronted with this scientific

knowledge in order to minimize the negative impacts if this is implemented. But be careful too, because education and conservation that are not accompanied by economic development can cause deep disappointment among villagers.

- 3) Efforts should be made so that all the activities of companies and entrepreneurs in these villages bring benefits to all villagers. Sentiment as a victim (being victimized; being discriminated against) can be reduced or eliminated by providing significant benefits from the presence of companies and entrepreneurs in (around) the village area. This sentiment is quite strong and cannot be ignored. Concretely this means providing CSR assistance, partnerships, fees, and employment for local residents. If you look at the difficulties experienced by villages in dealing with outside parties, it is clear that they need certain parties who can bridge them with companies and entrepreneurs.

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