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Local Community Initiatives in Riau Peat Villages

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Abstract

This study recorded the local community initiatives in five-peat villages in Riau Province as a community adaptation effort to changes in the peat ecosystem. This study is a qualitative study conducted from January to April 2020. The data is presented and analysed descriptively. This study reports that the communities in the five-peat villages are very dynamic and able to adapt well to the zero-burn farming policy. The community took the initiative to change the types of plants and develop forestry and non-forest service businesses. The farming ecosystem has been formed in the village's studio with pineapple varieties, *kelulut* honey, and village tourism. The parties need to support these local community initiatives based on a partnership ecosystem.

Keywords: Adaptation, Local Initiatives, Peat, Ecosystems, and Partnership Ecosystems.

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Abstrak

Kajian ini bertujuan untuk mendata inisiatif-inisiatif komunitas lokal pada lima desa gambut di Provinsi Riau sebagai upaya adaptasi komunitas atas perubahan ekosistem gambut. Kajian ini merupakan kajian kualitatif yang dilaksanakan sejak bulan Januari hingga April 2020. Data ditampilkan dan dianalisis secara diskriptif. Kajian ini melaporkan bahwa komunitas di lima desa gambut sangat dinamis dan mampu beradaptasi dengan baik pada kebijakan petanian *zero-burn.* Masyarakat berinisiatif mengubah jenis tanaman, pengembangan usaha jasa kehutanan dan non hutan. Pada lima desa yang diteliti telah terbentuk ekosistem usaha tani dengan varetas nanas, usaha madu kelulut, dan wisata desa. Para pihak perlu mendukung inisiatif – inisiatif masyarakat lokal tersebut berbasis ekosistem kemitraan.

Kata Kunci : Adaptasi, Inisatif Lokal, Gambut, Ekosistem dan Ekosistem Kemitraan

INTRODUCTION

Peat ecosystems in Indonesia, including in Riau, have experienced very heavy ecological pressure since the 1980s. This pressure stems from government policies on the forestry and plantation industries, as well as giving permits for companies to operate in peat areas. Wibowo (2010) notes that since 1967 the area of oil palm plantations in Indonesia[1] has increased 35 times to around 5.6 million hectares in 2005 and around 7.8 million hectares in 2009. Peat cultivation areas (KBG) in Riau are controlled by 39 companies, 34 companies operate in the peat dome area which is a peat-protected area. Based on data released by the directorysawit.com in 2019 (BPS, 2020) 187 oil palm companies are operating in Riau operating in peat areas covering an area of 865,614 hectares in 135 villages.

Peat ecosystems in Indonesia have experienced significant subsidence. Based on data reported by Noor, Y.R. and J. Heyde (2007) there was a decrease in peat areas covering an area of 2.07 million hectares (51.1%) reaching 1.61 million hectares (39.7%) on deep peat, 1.32 million hectares (32.8%) to 0.952 million ha (23.5%) on medium or subsidence peat of around 372,000 hectares. Amady cites Erisman, (2015) that peat damage in Riau Province is already at a very severe level, out of 4,044 million hectares of peat in Riau, now only less than 1 million hectares remain. Deltrares (2015) reported that more than 70% of 294,227 hectares of acacia and oil palm plantation concession areas were drained, resulting in land subsidence and flooding. In the BRG annual report (2016), it was stated that 2,492,527 hectares of peat areas were degraded in Riau, as many as 1.4 million hectares of which were in company concession areas. The industrialization of the plantation sector and industrial timber plantations (HTI) has been an important factor in the subsidence of peat ecosystems in Riau. The subsidence of the peat ecosystem is triggering pressure for changes in the socio-economic ecosystem of the people in the peat area in Riau.

Communities have pressure on the culture of agricultural production because they are no longer allowed to burn for their farms. The government issued a zero burn policy, as stated in Article 56 paragraph (1) of law number 39 of 2014 concerning Plantations. Article 36 point 17 of the *Cipta Kerja* which amended Article 50 paragraph (2) letter b of law number 41 of 1999 concerning Forestry article 22 number 24 of law number 11 of 2020 concerning Job Creation which amended Article 69 paragraph (1) letter h law number 32 of 2009 concerning Environmental Protection and Management. Communities are prohibited from farming through burning, including farming on the remaining land in their yards. The government implements a ban on burning for agricultural activities using the police and army. People caught burning for agricultural activities are immediately arrested, undergo a judicial process, then put in imprisoned. Even though the community is very dependent on slash-and-burn agriculture to improve soil fertility.

In the peat community, there are two agricultural cultures, namely first, the culture of slash-and-burn farming and shifting agriculture based on mineral soil. This agricultural culture originates from the headwaters of the Kampar River and other rivers in Sumatra and Java. The crops cultivated are upland rice, corn, and grassy plants such as rubber and coconut. Second, the culture of paddy farming, fishermen, sago, and mangrove forests on alluvial soil. Suranny E L (2014) said that on mineral soil agricultural activities on dry land are in the form of field rice, tubers, nuts, fruits, corn, and vegetables. Meanwhile, in alluvial wetlands, paddy rice is planted.

Adaptation begins individually because they have sufficient information to modify agricultural businesses according to available resources. When individual adaptations begin to be duplicated, the next step is to modify the socio-ecological system (Barnet, 2001) to meet new ecosystems

[1] Since 1986 the government has applied a strategy of economics orientation export with development efforts in field forestry and agriculture to export (Amady, 2014). Since that happened exploration has been massive towards forest and plantation palm that Involves state investment, local investment, and foreign investment

due to environmental and climate changes. When adaptation has become community adaptation, the community adaptation process becomes planned both autonomously and is part of national and international programs.

The description above illustrates that biotic and abiotic ecosystems play an important role in encouraging community adaptation to changing peat ecosystems. Changes in the peat ecosystem affect socio-economic ecosystems including production culture, consumption culture, architecture, technology, transportation, water management, and human relations with nature in the people who live in peat ecosystems.

Communities living in peat villages do not have a choice but must adapt to changes in the peat ecosystem. Adaptation initiatives start with individuals triggered by changes in livelihood variations, changes in the type of farming business, changes in the planting season, technology, and marketing, including changes in land access from owners to tenants and to farm laborers. This research is intended to record the initiatives carried out by the community as a form of adaptation to the pressures of environmental change in the peat ecosystem area.

To obtain information about these adaptation options, more in-depth information is required. Therefore this research was conducted to answer the question of how people adapt to changes in the peat ecosystem. This question elaborates on the following questions:

1. How communities conduct their agricultural business in changing peatland ecosystems?

2. What are the efforts of communities to survive in changing peatland ecosystems?

LITERATURE REVIEW

This research built the hypothesis that changes in the peat ecosystem cause pressure changes in the socio-economic system of the community, which forces the community to adapt. Adaptation begins with the individual as a household unit and the household as a community unit. Adaptation by individuals is the gate to community adaptation. The approach in understanding adaptation is an ecosystem approach, that changes in peat ecosystems cause people to adapt to survive.

Steward (1955) defines adaptation as an effort made by humans to get around environmental conditions so that their lives are sustainable according to their cultural level. Adaptation is a way for individuals and communities to overcome environmental pressures to survive. Prasetijo (2008) stated that individuals and communities work actively to deal with certain environmental conditions. Communities also modify their behavior to maintain certain conditions and overcome certain risks by improvising existing conditions. Prasetijo also said that adaptation is an opportunity, the effect of social and cultural practices that unconsciously influence it. This adaptation refers to efforts to maintain a balance over changes in environmental structure in human ecosystems.

Adaptation contains four principles, namely *first*, self-adjustment, which is a process of aligning oneself or the individual's condition with an object or stimulus through learning activities; *Second*, the process of adjustment always occurs when there is an interaction between encouragement from within the individual and the stimuli or demands of the social environment; *Third,* self-adjustment requires a process of self-understanding with the environment so that harmony, conformity, compatibility, or harmonious interaction between oneself and the environment is realized; *Fourth*, self-adjustment always proceeds and develops dynamically, according to the dynamics of the environment and the development of individual desires (Soeparwoto, 2005).

These adaptation principles stem from environmental variables as independent variables that determine the direction of the adaptation process by individuals and society. Society and culture

passively contribute to adaptation, environmental changes are first followed by an adaptation process after which a new culture is formed. Changes in the environmental ecosystem encourage humans to adapt to maintain a balance to survive. Therefore, patterns of change always follow changes in biotic and abiotic, social, and political ecosystems. As a small example, the architectural technology of houses in the community is a house with high pillars with certain types of wood driven into the peat. The architecture of houses like this has changed due to the policy of prohibiting the use of wood, this condition is exacerbated by the loss of forest ecosystems[2]. Another example of cultural change for the indigenous *Talang* Mamak people. The expansion of oil palm in the *Tiga Balai* customary area caused the *Talang* Mamak tribe to lose the *puar* stem (etlingera sp) as a sign handing material for *gawai* celebrations, then the indigenous people replaced the *puar* stems with palm fronds as material for *gawai* celebrations due to the unavailability of *puar* trees in the forest ecosystem (Yazid & Amady, 2019)

Adaptation starts with individuals who have adequate environmental information and other information to modify according to available resources. Adaptability starts (Adger, 2004) from the individual's ability to access various resources, individuals who have much access have better adaptive capacity. Therefore, the adaptation process is not the same for every individual in one village and between villages. When individual adaptations begin to be duplicated by other individuals, the next step is to modify the socio-ecological system (Barnet, 2001) to meet the new ecosystem as a result of environmental and climate change. When adaptation has become community adaptation, the community adaptation process becomes planned both autonomously and as part of national and international programs.

The process of individual adaptation based on local values starts from changes in livelihoods.[3] In peat communities, there is not only one form of livelihood but there are several variations of livelihood according to the season, such as planting rice during the rainy season, and fishing during the low tide season[4]. Individual adaptation initiatives stem from changes in livelihood variations, changes in the type of farming business, changes in the planting season, technology, and marketing. Ecological changes change socio-economic systems such as from *toke* to middlemen, from land owners to tenants, and or to become laborers. This adaptation process itself according to Soekanto (2009) takes place over a course of time that cannot be calculated precisely, can be fast, slow and may end in failure.

The pressure for changes in the socio-economic ecosystem of the community that is most felt in the peat areas in Riau is on the culture of agricultural production. The farming culture of the people in the peat area is shifting farming and slash and burn. Since the expansion of the oil palm plantation industry and industrial timber plantations (HTI), there is no more shifting agricultural land available, and limited community land cannot be managed because of the prohibition on agricultural activities by burning. The pressure of this ecosystem change forces society to adapt uncertainly because the state has not yet provided a solution in which direction to change. Amady (2014) reports that the people of Pangkalan Kerinci have experienced a change from subsistence farming to service businesses, such as renting houses, to jobs left over from urban areas to become porters at the market and motorcycle taxis. In a study conducted by Amady (2014) in Pertiwi Village, Perawang City, Siak Riau Regency, it was found that people who lost their agricultural land due to the paper industry switched from the agricultural sector to the

[2] The house of architecture can reas at "Atmojo, Bambang Sakyi Wiku, 2008, Rumah Panggung dan Perahu Tradisional : Salah Satu Cara Mensiasati Kehidupan Lahan Basah Di Kalimantan Selatan. In Sutikno, (editor), 2008, Arkeologi Lahan Basa di Sumatera dan Kalimantan. Balai Arkeologi Palembang."

[3] Livelihood refers to activities carried out by themselves with the available resources around them without a definite schedule that is economically subsistence

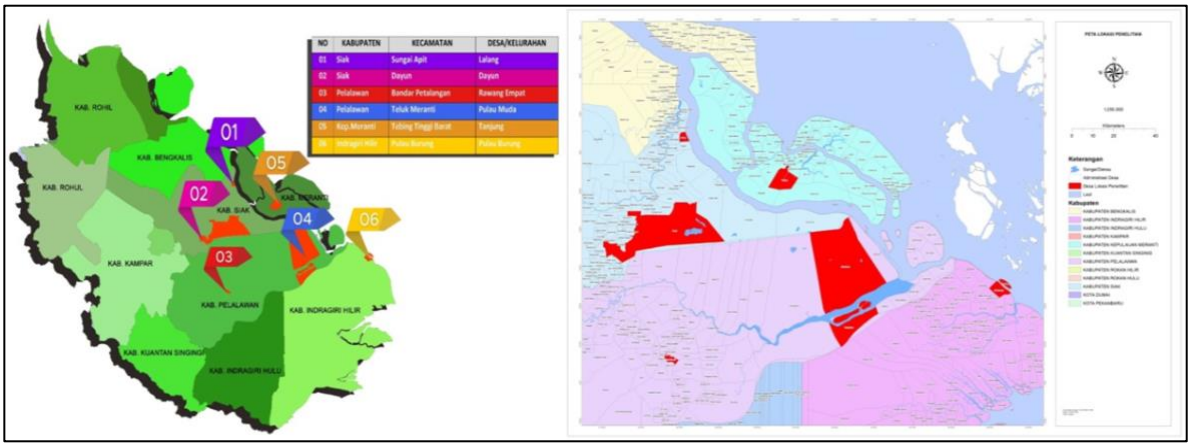
[4] Although not necessarily the same as the form presented by Scott (1993) that in adapting society optimizes all existing resources through multiple livelihoods

urban service sector, as daily laborers in shipyards, working odd jobs, working in the market as a porter, as well as services for transporting goods by boat, trading, renting houses for workers and boat transportation services from the bridge to Pertiwi village.

METHODOLOGY

The research was conducted in five villages designated by the Peatland Restoration Agency (BRG) as peat villages. The five villages are villages in the Kampar Peninsula area, namely Pulau Muda village, Teluk Meranti sub-district in Pelalawan district, which is on the coast of the Kampar River, Dayun Village, Dayun District, Siak Regency, which is on the coast of the Siak River, Lalang Village in Sungai Apit District, in the coast of the Malacca Strait, Tanjung Village in Tebing Tinggi Barat District, Meranti Islands Regency and Pulau Burung Village in Pulau Burung District, Indragiti Hilir Regency.

Map 1: Research Field



This research is qualitative that was carried out in early January-April 2020. The research process was carried out in two stages, the first stage was conducting a library study where the researcher conducted an internet-based study to obtain secondary data in the form of research results and community reports. The results of the internet study were written down as an initial draft to become knowledge and instructions for identifying deeper data. In February 2020, the researcher and two research assistants went down to five villages by observing the five villages, conducting in-depth interviews with selected informants based on an ethnohistorical approach consisting of village figures, and business actors in Pulau Muda village in Pelalawan Regency, Dayun and Lalang in Siak District, Tanjung in Meranti Islands District and Pulau Burung village in Indragiri Hilir District. The data obtained are village profiles, village history, changes in the village since it was founded until now, and types of new businesses that have been developed.

The snowball method is used to obtain informants both as the main data source and as validation of data that has been obtained from existing informants. The evening continued with in-depth interviews with village leaders and observations of the night atmosphere in the village. The next day, the research assistant continued to interview business actors while the researcher circled the entire village, and interacted with anyone they encountered in any prominent socio-economic activities, for example, jobs that were mostly engaged in, or new initiatives implemented by residents due to changes in the ecosystem. All activities during the research were recorded using a recorder, and video, and written down in the form of field notes. The implementation of in-depth interviews is provided with a guideline following the research questions and the objectives

of this study. Questionnaire material includes knowledge of peat ecosystem management, current conditions of peat ecosystems, and future management plans by the community.

Data validation is carried out in three stages, first is source validation, namely, information is only considered data if information is obtained from three different sources with different classifications. Then a focus group discussion was held to get the community's point of view on the themes encountered in the field. After that, it was discussed with adaptation theory to be analyzed and written descriptively.

RESULTS

This study found surface subsidence in peat soils that reached 1 meter (see photo 1). This land subsidence occurs due to dense economic activity and drought in peat areas. The peat in the village and agricultural areas of the residents does not get a water supply from the higher landscape, even the peat water in the village flows into the company's canals, resulting in a very high drought intensity and is flammable.

Photo 1: Land subsidence in peat village (Source: Field Findings, 2020)

Socially, the villages studied were villages based on, firstly, agriculture based on mineral soil culture brought from the upper reaches of the Kampar river and Java with the main crops being dryland paddy, rubber, corn, coconut, and areca nut, and other perennials; Second, an agricultural culture based on alluvial soil from the indigenous *Laut* and Malays with livelihoods as paddy fields, fishermen, cultivating sago and selling mangrove trees (grilled charcoal). At this time the community practices an agricultural culture of mineral soil and alluvial soil simultaneously in a peat ecosystem with a depth of one meter.

Communities in the five villages studied generally have something in common: all are peat villages, economically still subsistence with an economic base on rice, rubber, coconut, areca nut, pineapple, and oil palm farming. There are no oil palm plantations in Tanjung Village and Pulau Burung Village. While the villages of Dayun and Pulau Burung are villages with an industrial base. In Dayun village the mainstay of the industry is HTI, palm oil, and oil plantations. While on Bird Island the mainstay of the industry is coconut plantations, pineapple plantations and coconut processing factories, and organic fertilizers.

In response to ecological changes and the availability of individual resources, several residents have planted pineapples in the villages of Pulau Muda, Dayun, Lalang, Tanjung, and Pulau Burung since 2015. In 2020, this individual initiative has become a community initiative. Several individual initiatives that have developed into community initiatives in five villages are as follows;

First, commodity change. In the village of Pulau Muda, the community started by planting rice on the island which is alluvial soil, the threat of flooding and disease caused the community to move to the peat ecosystem. Likewise in Tanjung village, the community manages the peat ecosystem after alluvial soil on the riverbank is no longer available. Even the Pulau Burung village, which is all peat, first arrived on alluvial soil for planting sago in the mangrove forest. The same thing happened in Lalang village, starting from alluvial soil after alluvial soil had run out to enter the peat ecosystem. While the majority of Dayun villages are still on mineral soil, the peat ecosystem is managed by companies and newcomers to Dayun.

In five villages, pineapple was found to be the choice of a non-burning plant that can live on peatlands and is free of pests. In Pulau Muda, Dayun, Lalang, and Pulau Burung, pineapples have become an economic commodity that is sold and produced on a large scale, only in Tanjung, pineapples are still a tree plantation and are sold in limited quantities in traditional markets. In Lalang village, some people have even replaced palm oil with pineapple.

Pineapple development efforts found in all the villages studied were a response to local ecosystems, such as the need for pineapple caterpillars from swallow bird nests in Pulau Muda village, as well as the large market demand in Dayun village, Tanjung village, Lalang village, and Pulau Burung village. In Dayun village, the community has even replaced the oil palm plantations with pineapple plantations and or planted pineapples in the oil palm plantations. In Lalang village, the village government and private companies (HTI) for *kelulut* honey cultivation are still very limited to bee farmer training. In Dayun village, the village government has started to get involved in watermelon farming, while in Pulau Muda village it has been done individually in collaboration between pineapple farmers and industrial plantation forest companies (HTI).

Photo 2 :

New commodities in 5 research villages

The new commodity that is attracting attention is the highly developed swift's nest in Pulau Muda Village and the villages in Teluk Meranti District, Pelalawan Regency. In the villages of Dayun, Lalang, Tanjung, and Pulau Burung, swift nests are also found but in limited numbers. The swallow house is an economic venture that supports peat restoration efforts and is pro-environmental because it does not come into contact with peatlands and even the swift's nest on Pulau Muda is found as a pineapple ecosystem chain. It's just that to build a swift's nest, it requires a minimum fund of Rp. 80,000,000.- to Rp. 100,000,000.- million, so not everyone can build a swallow house, only those who have money or large land that can be sold to build a swift's nest.

In Tanjung village, the community tried dragon fruit and onion commodities as new commodity choices in the peat ecosystem. Cultivating onions without burning them is not profitable because the production value is higher than the yield, so the community does not continue. Meanwhile, dragon fruit cultivation, although profitable, is limited by its productive period, so the people who cultivate dragon fruit are very limited;

Second, intercropping efforts. Intercropping efforts were found in all research villages. Intercropping is found in Pulau Muda with the same perennials as coconut and oil palm, rubber and palm, and areca nut and oil palm. In addition, intercropping of oil palm with young plants such as pineapple palm, chili, and vegetables. Some have tried intercropping with livestock, namely cattle and buffalo, evenly intercropping rice with oil palm, buffalo, and cattle farming with companies. In Lalang village, the people intercropped palm oil with pineapple and areca nut with pineapple so that the pineapple and areca leaf covered the sunlight to the pineapple. In the

village of Dayun intercropping with cattle. This intercropping effort is an attempt to get around the limited land for agriculture.

Third, efforts to utilize yards and vacant land within the village. Encountered in all research villages, in the villages of Pulau Muda, Dayun, Lalang, Tanjung, and Pulau Burung, the community began to use their yard land to plant young plants such as chilies and vegetables, as well as to use vacant land to grow chilies, melons, watermelons, and corn. The produce from the yards and vacant land has been sold at village markets, such as the Pasar Selasa (market on Tuesday) in Pulau Muda and the Dayun market which is held every day, while in Lalang it is brought to the Sungai Apit market.

Fourth, the emergence of a new *kelulut* honey farm in Lalang village. Kelulut honey farm is managed by two households. One household already has 300 kelulut honeycombs and every two months produces 600 to 800 kilos of *kelulut* honey, another household is just getting started. Another initiative is developing durian and mangrove tourism as well as honey kelulut as tourist destinations.

Fifth, breakfast business. Efforts to open coffee shops and breakfast and children's snacks are evenly distributed on all roads in the village. Efforts like this are found in Pulau Muda, Dayun, Lalang, and Pulau Burung. Apart from breakfast businesses and coffee shops, you can also find grocery stores that provide daily necessities. Only in Tanjung Village, there is no breakfast and coffee shop business yet, while Pulau Burung has gone with the flow where people choose to work in factories, laborers, and gardens, or manage other people's gardens with a profit-sharing system.

Sixth, mutualism between the community and the company, one step forward has been taken by individuals in Pulau Muda, namely building partnerships with HTI companies, where the community's land where there is a lot of wood is cleared by the HTI company, the wood is taken without payment by the land company, the land can be directly Pineapple planted up to 70 thousand stems. In my opinion, the steps of this initiative need to be duplicated in many peat villages, to encourage a harmonious relationship between the company and the community.

Seventh, palm-based woven business. In Dayun village, it was found that people used palm leaves and fronds to be woven into handicrafts. The fronds of the palm are used as mats, and the dividing walls, while the sticks are used as places for fruit, placemats for plates, and bases for cauldrons.

The adaptation made by the community in five villages was individual as stated by Adger (2004) which was then duplicated by other individuals (Barnet, 2001) who appeared autonomously. Communities foster initiatives based on their experience and knowledge gained from elsewhere. The government and companies do not even know about the adaptation of this society.

PARTNERSHIP ECOSYSTEM

In the peat villages studied, there is potential for multi-stakeholder partnerships. In Pulau Muda village, Dayun, there are two industrial plantation forest companies, a palm oil company, the Peat Restoration Agency (BRG), district and provincial governments, and non-government organizations (NGOs). In Lalang village there are HTI companies, oil companies, BRG, and NGOs. In Tanjung village, there are HTI companies, oil companies, sago, BRG, and NGOs. Meanwhile, in Pulau Burung village there are coconut companies, pineapple companies, BRG, and NGOs.

The parties in this case the government, companies, NGOs, and the community have their way of responding to the environmental conditions around them. The basis for the value of the attitude of the parties is the practical interests of each, in which each chooses the safest attitude to

safeguard its interests. The interests of these parties are different and often conflict with each other, resulting in choices in responding to conflicting environmental conditions that give rise to potential conflicts. Even though these multi-stakeholders can collaborate in a partnership ecosystem, each interest works together to complement and support each other.

Table 1: Partnership Potential

NO	Village Name	Types of Commodities	Company Around the Village
1	Pulau Muda	Coconut, areca nut, pineapple and palm, fisherman	HTI and Palm Oil, and NGOs
2	Dayun	Pineapple, palm, melon	HTI, Palm Oil, Petroleum
3	Lalang	Pineapple, palm oil,	HTI, Palm Oil and Petroleum and NGOs
4	Tanjung	Pineapple, rice, sago	HTI and Oil, sago and NGO
5	Pulau Burung	Pineapple, coconut, and areca nut	Coconut Processing, Pineapple Processing and NGOs

Source: Field study results

The partnership ecosystem is a series of interrelated parties that equally prioritize each other's interests, rights, and obligations. This partnership ecosystem aims to regenerate social values, especially cooperation to improve peat ecosystems. The partnership ecosystem should be the job of the government by engaging politically and financially. The government is not only standing as a judge based on wrong or right but also taking the main burden so that the peat ecosystem crisis can be resolved. Companies also need to stand based on peat ecosystem sustainability as a responsibility, not as a lip service, avoiding market pressure and a conflict resolution tool. As the weakest position, the community should be given the right to choose with the FPIC principle (Free Prior Informed Consent).

Multi-stakeholder partnerships are carried out at two levels, namely the first level of policy between the government, companies, and community organizations at the district level. Its main task is to formulate the foundations of participatory policies so that interventions for peat ecosystem restoration are grounded from the bottom so that they can grow socio-economic ecosystems, especially community agricultural business ecosystems.

Second, the site level, namely the site community, companies, agencies, and companion organizations. Implement policies at the policy level that are adapted to building business and farming ecosystems in each village. Business ecosystems can be area-based, such as in the Teluk Meranti District area where the pineapple and swallow house ecosystems have started to form, so the intervention framework is to strengthen the pineapple and swallow house ecosystems. While the production of pineapples in the Sungai Apit Sub-District is high enough, the market demand is also quite high, but the ecosystem has not yet been formed. Prices are determined by buyers who are not tied to the community's pineapple production. If the buyer doesn't come, the pineapple will rot. The conditions in Tanjung village where rubber and sago ecosystems have already been formed, as well as coconut and pineapple on Bird Island where the ecosystem is already very strong, what is needed is to build more open access so that the prices of rubber, sago, pineapple and coconut can be better.

In addition to the parties' involvement, the partnership ecosystem needs to be supported by anthropologists (anthropology), microbiologists (biology), soil science, soil fertility, and other sciences. Apart from scientists, the presence of non-governmental organizations is very important to be involved, especially in assistance efforts for education, mitigation, and equity. Susmianto, et al (2017) revealed that the key to the successful restoration of the Citra Raja Nature Reserve area is the involvement of multiple parties, not only related parties but anthropological and

physical considerations to become a focused program and more focused and assisted by community institutions.

CONCLUSION

This study concludes that communities in 5 peat villages have adapted through various initiatives in their agricultural business by changing plant species and developing forestry and non-forest service businesses. Farming ecosystems have been formed in the village's studio with pineapple varieties, *kelulut* honey farm, and village tourism. The village community initiative needs to be developed collaboratively by building a partnership system. Community adaptation efforts in Lima have not yet received support from the government and companies.

The government needs to develop a sociocultural approach to implementing a zero-burn policy to avoid discriminatory perceptions by the public. One of the socio-cultural steps that need to be taken is to build a farming ecosystem that involves the parties. Communities should not be left alone to face policy pressure due to the presence of the forestry and plantation industries.

This research strengthens the theory of adaptation from Barnet and Adger, namely first, changes in ecosystems force humans to adapt to maintain their survival. Second, adaptation starts from an individual which is then duplicated by other individuals to become a community adaptation. Third, local resources and knowledge from outside the community are the initial impetus for individuals to adapt which are then duplicated into community adaptation.

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