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Stakeholder's movement on forest resource management: a study in Merangin, Jambi Province

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Abstract. This study investigates three critical issues related to forest resource management in Merangin District, Jambi Province. First, it emphasizes how forest land conversion from coffee plantations, palm oil, and mining resulted in deforestation. Second, it highlights how migrant tribes from South Sumatera establish coffee plantations in the National Park of Kerinci Sebelat in Merangin district. Third, it highlights the impact of deforestation due to encroachment, coffee plantations, and mining as well as the related ecological damage. Confronting these three issues requires considering stakeholders' movements and views on the role of government, private companies, NGOs, and participation of local communities. This research finds the role of government, represented by the Ministry of Environment and Forestry, as well as Forestry Agency Offices at the province and district levels, is important to the issue and regulation of sanctions for logging concession holders and migrant tribes from South Sumatera. Therefore, in order to implement sustainable forest management (SFM), the government invites logging concession holder and participation of local community on developing forest resource by planting trees which the scheme of social forestry and village forest. This livelihood strategy is an alternative to previous strategies that focused on paddy rice cultivation and coffee agroforestry. This livelihood change is especially notable for migrant tribes and members from local community. In contrast, the role of NGOs is very important in launching a critique concerning the impact of ecological damage, including soil erosion, flood and water contamination, which results from forest encroaching and mining.

1. Introduction

The forestry sector contributes timber and non-timber products that supply downstream industries (sawmill, furniture, plywood, pulp and paper), creating state and private revenue [1]. This finding is supported by logging Concession Holders Association (APHI) in the latest report study (2011-2016) that natural forest could produce 9.1 million cubic meters. In reality, however, forest management right (HPH)'s holders just produce reached 4 to 5 million cubic meters in 2014. Inefficiencies result from log export moratoria, land dispute between private company versus local community, and the lack of financial credit from state banks to develop logging concession (HPH), industrial timber plantation (HTI) and forestry industries. If the Indonesian state fails to develop sustainable forest management and timber certification, there will likely be effects on the competitiveness, access, and sustainable supply of Indonesian forest products [2][3].

Indonesia encompasses 130 million hectares of tropical forest; it contains the third largest tropical forest area after Brazil and Congo, and it contributes oxygen and removes carbon dioxide [4]. This



contextualizes the Indonesian commitment to the *United Nations Framework Convention on Climate Changes* to reduce greenhouse gas emissions through forest fire prevention and a moratorium on logging concessions on peat lands and in primary forest areas (see [5]). In the implementation of this policy forest squatters and forest fires persist in some districts. This research finds that Merangin Jambi Province is among these districts. Based on research findings from April–May 2016, Merangin contains 21,000 ha of land in forest conservation in National Park Kerinci Sebelat (TNKS) at the administrative sub district Jangkat, Sungai Tenang and Lembah Masurai; much of this area is affected by encroachment and fire.

Central, provincial and local government in Merangin implements law enforcement, sanctioning those who encroach on the national park. In addition to encroachment and land clearing, illegal gold mining occurs throughout Merangin. Exploration activities have occurred in Pangkalan Jambu, Tabir, Tabir Ulu, Tabir Barat, Tabir Ilir, Tabir Selatan sub-districts. As a result, forest areas is threatened by critical illegal activities on gold mining and forest squatters for coffee plantation which eventually affect the ecological damage for instance soil erosion, flood, and contamination.

[6][7][8] asks how do forest ecosystem changes eventually lead to forest degradation, and what is the correlation with social resilience for local communities who live in the forest and surrounding forest area.? There are some assumptions to answer this critical question. First, central, provincial and local government do not prevent forest encroachment and illegal gold mining that eventually threatens the economic and social rights of local communities. Second, the local government provides minimal economic incentives, through credit for financial aid, training, and marketing of primary subsistence (*paddy rice*) and agroforestry (*rubber, coconut, pepper, coffee*, and so forth) crops, in order to promote cash flow and local economic growth. Third, the provincial government has not yet implemented a spatial planning concept for the upstream areas, which include upstream catchment areas in Kerinci Sebelat National Park (TNKS) and downstream watershed resources of the Batanghari River. Responding to these three assumptions, this paper focuses analysis on four questions. First, does the forest ecosystem influence community life? Second, are the adaptation strategies of local communities addressing ecosystem changes? Third, do stakeholders empower economic and social aspects of the local community? And fourth, what recommendations come from these analyses?

2. Methodology

This study utilizes ‘political ecology’ as an analytical framework which emphasizes the stakeholder’s movement (the role of government, private sector, NGOs, academics and local community). [9] note that ‘political ecology is a framework to understand the complex interrelation between local people, national and global political economies and ecosystem’. Field work was carried out in April and May 2016 in Merangin district, Pangkalan Jambu, Lembah Masurai, Jangkat (figure 1). Key-informants in these locations were interviewed, including government officers, NGOs, academics, local community, and private company officer.

Merangin district was selected as a research site for two reasons. First, the district contains forest squatter settlements and illegal gold mining exploration that has led to forest degradation. Second, communities rely on primary and secondary subsistence cultivation that is connected to environmental conditions.

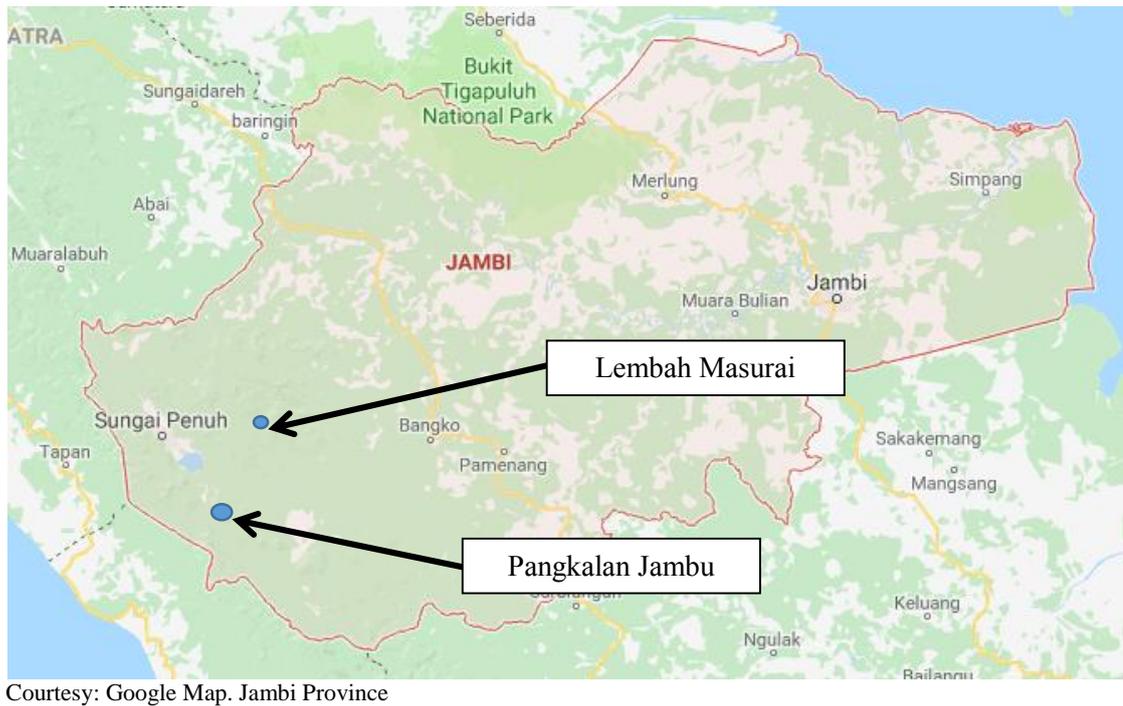


Figure 1. Map of field work

3. Results and Discussion

3.1. *The Influence of Forest Ecosystem Change toward Community Life*

The forest area in Merangin is 340,870 ha. This covers about 44.8 % of the total area in Merangin District [5]. This forest area is comprised of different land use categories. 110,710 ha for forest production, 33,706 ha for limited forest production, 35,892 ha for forest protection, and 66,297 ha for forest conservation [10]. Meanwhile, land outside the forest area is utilized for plantation, settlement, mixed agriculture, rice paddies, bush land, and open land.

Forests represent areas of community interaction between traditional and migrant peoples [11]. Traditional people usually use forest areas for their primary subsistence (paddy field) and agroforestry (rubber, coconut, pepper, rattan, etc.). Migrant peoples generally use forest area for coffee plantations. Many traditional people are starting to shift their farming activities from agroforestry into coffee plantation, due to economic consideration. However, forest as natural resources has strategic value, contributing hydrological and climatological function for local communities. The dependence of local community on forest resources includes timber production (log, sawn timber) and non-timber production (rattan, latex, honey, fruits, medicinal plants, veneer) (table 1).

Table 1. Forest Resource Production in Merangin District (2008-2011) (Ton)

Commodity Vary	2008	2009	2010	2011
Log (M ³)	24,716.27	10,385.97	8,672.25	44,020.47
Sawn Timber (M ³)	1,973.13	1,190.04	6,072.68	10,455.99
Rattan	9,500.00	20,000.00	-	1,000.00
Latex	-	-	-	56,514.00
Veneer	13,614.64	4,946.11	845.75	4,097.43

3.2. Forest Ecosystem Change

3.2.1. Forest squatter

In Merangin, there are two social factors that often effect forest degradation. First, is the migration of coffee farmers from South Sumatera has led to forest encroachment. Second, the practice of illegal gold exploration often leads to deforestation in riparian areas. Coffee plantation sites have been established in Lembah Masurai, Jangkat and Sungai Tenang sub-districts, despite the inclusion of forest area in these sub-districts within Kerinci Sebelat National Park (TNKS). Previously, these forest areas which are now covered in coffee plantations were part of a production forest, specifically a logging forest concession (HPH). This forest squatter location is followed by chronological events:

- 1) In the early 1990s, migrant communities originally came from South Sumatera (Pagar Alam, Lahat) to Merangin District. They established plantations and settlements in non-forest areas (APL) in Sungai Tebal and Nilo Dingin used for coffee plantation.
- 2) From 1996 to 2002, forest encroachment occurred in Batang Nilo and Nilo Dingin sub-districts, from Talang Asal to Sungai Lalang village.
- 3) In 2002, the logging operations within the concession managed by Serestra II and Injaspin companies concluded. After these companies left the HPH concession, local communities began occupying the concession area in Nilo Batang village.
- 4) In 2008, forest encroachment increased to cover 21,000 ha in Kerinci Sebelat National Park (TNKS) Sipurak Hook. Forest encroachment occurred in Sula Arah Birun village in Pangkalan Jambu sub-district.
- 5) From 2008 to 2010, forest encroachment expanded to include forest production (HPT) at the base of Gunung Sedingin in Koto Teguh village and Gedang village in the Sungai Tenang sub-district and Sungai Tenang, Pulau Tengah village in the Jangkat sub-district[12].

3.2.2. The Response from Local Government toward migrant

Encroachment within the non-forest area (APL), forest production, and forest conservation zones within TNKS poses a significant problem for government. Local government argues that due to forest encroachment within TNKS from illegal migrants, upstream flooding and soil erosion has occurred. This threatens local communities who live in the watershed of Batang Merangin, Batang Masurai, and Batanghari Rivers downstream. The forest encroachment area is located in Lembah Masurai subdistrict (Desa Tuo, Nilo Dingin, Tanjung Berugo, Talang Asal and Kotorami; Jangkat sub district (Pulau Tengah village), and Sungai Tenang sub-district (Tanjung Benuang village, Gedang village, Koto Teguh and Tanjung Mudo). The central government, represented by the Ministry of Environment and Forestry, holds that illegal migrants have no right to manage forest production, APL area, or participate in social forestry due to their status as illegal migrants.

The following actions were performed by the local government to reduce illegal immigration in Merangin:

- 1) Creating an investigation team to focus on encroachment in Lembah Masurai, Muara Siau, Jangkat, Sungai Tenang, Pangkalan Jambu and Sungai Manau sub-district, according to the head of Merangin district's decision No. 608/2008 on December 18 2008.
- 2) Implementation of law enforcement among stakeholders, including the Plantation and Forestry Agency, Social political Agency, Police of District Office (POLRES), and so forth. Operations were carried out from October 14 till November 11, 2010 in forest production areas at Batang Nilo, Nilo Dingin and limited forest production (HPT) in Gunung Sedingin and part of Kerinci Sebelat National Park (TNKS) in Jangkat and Sungai Tenang.
- 3) The Ministry of Environment and Forestry agreed to designate forestland for social forestry measuring 7,988 ha in Merangin district that should be registered and recognized by all members and participants through sub-district and village offices (Interview, April 26 2016).

3.2.3. *Illegal Gold Mining*

Merangin contains high-value resources, including gold, coal, copper, precious stones (granite, marble, etc.). Gold has been found in Pangkalan Jambu, Sungai Tenang, Sungai Manau, Tabir Barat, Tabir Ulu Tabir Timur, Tabir Selatan, etc. Those looking for gold in the Tabir Barat sub-district are searching the length of watershed of the river, including area within forest conservation areas. These artisanal mining activities lead to riparian degradation and increased flooding during the rainy session. In contrast, gold miners in Pangkalan Jambu sub-district operate mostly in paddy fields. This research focused on artisanal gold mining in the Pangkalan Jambu area.

Gold exploration originally came to the paddy fields from exploration in the forest. Although there is some exploration, most community members remain dependent on agroforestry. Gold exploration was initially performed by limited villager members, due to lack of capital, technology and market access. But, after several years the area for gold exploration expanded from 110 ha in 2008 to 350 ha in 2012. There are 1,200 ha of rice paddy in Pangkalan Jambu, which now excludes the 350 ha used for gold exploration. There are several reasons why gold exploration has spread in Pangkalan Jambu.

First, the rubber commodity prices fell to IDR 4,000/per kg in 2010, compared with IDR 14,000-15,000/per kg from 2007-2009 reached. Second, the price of gold was IDR 400,000-500,000/per gram in 2010-2014. Third, the owner of the excavation technology rented his machine to the farmers with a competitive price of IDR 130 million/annually. The excavation machine was used by farmers as a group, and they shared costs. The greatest amount of gold was obtained in July-August 2013, reaching 1 kg/ (1,000 gram). Farmers generally sold their gold when visiting larger cities, such as Bangko, Jambi City, Pekanbaru, and Padang.

3.2.4. *The impact of gold material exploration*

From 2007-2013, when gold prices were relatively high, farmers benefited from gold exploration. However, in the long run (2014-2016), the price of gold fell and the exploration site created a deep pool that led to soil erosion, flooding, and water contamination (figure 2). According to interview respondents, during the rainy session the highway flooded, creating traffic in front of the Pangkalan Jambu sub-district office, with water reaching 20-25 cm (29 April 2016). This condition invited local government to limit gold exploration and focus on river restoration through the following activities:

- 1) Officers of Pangkalan Jambu sub-district invited the owner of paddy rice fields, especially those whose plots were used in gold exploration, to restore their fields by making a new border with other owners. After restoration and new border line activities were complete, the district officer provided "Approval letter of Field Ownership" (*Surat Bukti Kepemilikan*) to pay land tax property (*Pajak Bumi dan Bangunan*) every year.
- 2) Restoring river flows and sedimentation, the local government officer of Merangin District sent an excavator to dig land and restore sedimentation of water along the Batang Merangin River. This program of river normalization is supported by local community and sub-district participation, in order to prevent soil erosion and flood within the threatened the paddy fields.
- 3) Inviting a head of customary forest rights and to campaign to hold a meeting about the dangers of illegal gold mining exploration. In contrast, the local government held campaigns to shift livelihood strategies from illegal gold mining exploration to develop agroforestry (rubber, pepper, rattan, sweet trees) and fishery breeding to supplement local livelihoods.
- 4) Officers of Pangkalan Jambu sub-district recommended re-establishing "Saudara" Cooperative Sector (*koperasi desa*) in the village as means of lending and saving money of local community members, in order to advocate their skill, knowledge, capital, training and market (Interview, April 29, 2016).



Figure 2. Gold exploration area, a currently become pool (Source: own photograph, April 2016)

3.3. Stakeholders launch Critiques

Severe flooding occurred in February 2016 in Pangkalan Jambu and in Tabir Barat in April 2016 [13], damaging 325 homes in addition to damaging a bridge, drainage, highway, and creating local traffic. According to Musri Nauli, Director of Walhi in Jambi, the flood crushed infrastructure and paddy rice field in some sub-districts in Jambi Province, especially in Pangkalan Jambu and Tabir sub-district. However, this flood occurred due to illegal gold exploration and forest squatter lead to ecological damage on forest ecosystem in the upstream [14]. The flood was a result of a downstream area that could not absorb water flow [15]. According to Fakhurrozi, a member of local parliament (DPRD) in Merangin District from Partai Kebangkitan Bangsa (PKB), illegal gold exploration and forest encroachment must be seriously punished with severe sanctions. In addition, the subsidy of solar energy from the government should not supplement excavating machine operations for gold exploration. This statement is totally supported by Zumi Zola, Governor of Jambi, after he and his team investigated the flood event in Merangin and Sarolangon district [15].

3.4. The adaptation strategy on Forest Ecosystem Change

[5]explains that there are two types of category for the people who live in Sungai Tebal village, Lembah Masurai sub-district. Sungai Tebal consists of two villages, namely Desa Tuo which is mostly occupied by local people, and the Nilo Dalam, mostly occupied by migrants. People within local communities tend to own local citizenship cards (KTP) and work as farmers. The local people develop their primary subsistence paddy rice for family needs. They develop their secondary subsistence for agroforestry commodity in rubber, kayu manis (*sweet tree*), pepper, coconut and rattan production. In contrast, migrants number 15,000-16,000 people, mostly from south Sumatera and Bengkulu province. Only approximately 20-30 % own a citizenship card (KTP) due to their difficulties in getting Surat Perpindahan Penduduk/Removal Letter of Citizenship (SPD) from their original village in South Sumatera. So their status as illegal migrant is due to their citizenship card identity (KTP), Interview was carried out with Jarun (27 April 2016) as a head of customary forest rights from migrant people. Jarun as original name Yaroni came from Pagar Alam, South Sumatera in 1993. He owns coffee plantation area 3 ha in 1993 with the price IDR 3 million. He is currently has local citizenship card issued by Nilo Dalam village in 2002. Hendri Putra, head of Lembah Masurai sub district indicated that Merangin district faces the following difficulties when dealing with migrants: 1) the cost to cover for migrants for administrative citizenship is high, demanding substantial human resources to perform individual checking; 2) in Lembah Masurai sub-district, over 60% of migrants do not have a card; 3) as a

consequence of their lack of citizenship card, illegal migrants are unable to manage forest production, APL and community forests; 4) forest and environmental degradation results, since migrants encroach into forest areas including TNKS, APL and forest production areas. This results in the flooding and soil erosion that occurred in January 2016, which eventually effect on ecological damage and infrastructure such as bridge, highway, drainage, etc., affect material lost. Therefore upstream of TNKS area must be conserved to promote watershed management for many rivers (Interview, 27 April 2016).

The migrants from South Sumatera initially encroached on land from APL (forest land for another utilization). These lands were converted to coffee plantations of *Robusta*, and were located around 450-500 ha within Nio Dingin and Sungai Tebal village. The annual production of coffee harvesting usually occurred from May till October. The whole production of coffee reaches 30,000-35,000 ton in Lembah Masurai sub district. In the Sungai Tebal market there are two coffee traders. The coffee market, which occurs between farmers and coffee trader (*cukong kopi*), is very crowded, especially in May-October. The price of coffee reaches IDR 19,000/per kg for low quality (still wet), but, for the mature coffee (dry) the price per kg reaches IDR 20,000. There is one machine for cleaning wet seed to be dry seed, and it costs IDR 1,000/per kg for service charge. One respondent told us that he owns 3 ha of coffee plantation and could produce 6 tons (1 ha produce 2 tons). He thus receives IDR 12,000,000 million/annually for coffee production.

The potential coffee production in Lembah Masurai District is 30,000 tons in harvesting time (May-October); the revenue, however, does not add value in Merangin due to lack bank facilities, infrastructure, incentives, and lack of storage facilities. Therefore, most coffee produced in Merangin is transported to South Sumatera (Palembang) and Bandar Lampung. This means that Jambi province, in addition to Merangin district, loses the opportunity to gain added value from coffee produced in Merangin.

3.5. *The Role of Stakeholder on empowering economic of local community*

To empower communities is important, due to their standard living in terms of economic income, infrastructure, education and health. Communities living near forest areas in Merangin, like forest proximate people across Indonesia, often lack basic amenities and are more likely to suffer from poverty [16]. The local government of Merangin District launched two programs for forest proximate people, namely agroforestry and community empowerment through spatial planning.

3.5.1. *Agroforestry Program*

Agroforestry has significant economic potential in Merangin. The local government provides a loan (IDR 7 million in 2014, IDR 9 million thereafter) for buying seedlings and fertilizer to every group of farmers that consists of 10 families. Responses within local communities was very positive. This economic empowerment led to economic growth, job absorption, and local cash flow.

The community agroforestry program, training, production, and marketing was supported by NGOs. Local government made collaborative management on agroforestry program and involved local NGOs including Walhi, Warsi Jambi, Pundi Sumatera, Setara, Gita Buana and so forth. This collaborative management on agroforestry program is widely known "*Poros Pendampingan Kehutanan Masyarakat*" (PPKM). The focus of PPKM project on agroforestry program as follows:

- 1) Initiating various program for community forestry based on agroforestry for leading commodities, including rubber, red ginger, pepper, vegetable, kayu manis (sweet tree), and coffee.
- 2) Improving spatial land use to be more productive through zonation, rehabilitation, protection and production.
- 3) Improving institutional capacity through man power training, intellectual discourse, utilization management, and marketing network (Interview, 26 April 2016).

There are two companies who focus on forest concession management, namely Jebus Maju, which manages HPH 15,012 ha in Baru Nalo village in Sungai Manau sub-district and Hijau Arta Nusa which manages an Industrial Timber Plantation (HTI) of 32,620 ha in Sungai Aur in Sungai Manau sub-district.

The local government as regulator and inspector has started to drive these companies to collaborate with local communities. The target is a win-win solution, where the company operates smoothly and productively within their HPH and HTI concession. Unfortunately, collaborative management has not yet been realized. As a consequence, the HPH and HTI concession in forest production areas are currently occupied and utilized for agro-forestry.

3.5.2. Village Community Forestry

Observing that most forest production area has occupied by local community, the role of Plantation and Estate Plantation Agency has decided to develop ‘village community forestry’ on 44,128 ha, in line with the agreement by Ministry of Forestry decision in (SK Menhut-II/2011). This program includes 17 villages and 4 sub-districts: Sungai Tenang, Lembah Masurai, Muara Siau and Pangkalan jambu (Interview, 25 April 2016). In this program, the central government provides funding for buying seedlings, training, and market networking by issuing a Special Allocation Fund (*Dana Alokasi Khusus/DAK*) of IDR 1.3 billion in 2015 and IDR 398 million in 2016. Funds support conservation through a multi-purpose tree planting scheme of rambutan, durian, duku, sukun, manggis, rubber, and so forth. In realizing the MPTS, the Forestry and Estate Plantation Agency of Merangin district is supported by Trade Agency, Cooperative Agency and NGOs for instance SSS Pundi, Walhi, Warsi, LTB, etc (as attached in table 2).

Table 2 List of Village Community Forestry in Merangin District

Village	Sub District	Ministry Letter	Width (ha)	Forest Areal	NGOs
Talang Tembago	Sungai Tenang	No.126	2,707	HPT	SSS Pundi
Pematang Pauh	Sungai Tenang	No.440	2,957	HPT	SSS Pundi
Kota Baru	Sungai Tenang	No. 443	762	HPT	Walhi
Gedang	Sungai Tenang	No. 442	1,766	HPT	Warsi
Jangkat	Sungai Tenang	No.125	4,467	HPT	Warsi
Beringin Tinggi	Sungai Tenang	No. 445	2,038	HPT	Warsi
Tanjung Mudo	Sungai Tenang	No. 444	1,058	HPT	Walhi
Tanjung Alam	Sungai Tenang	No. 42	912	HPT	Walhi
Tanjung Benuang	Sungai Tenang	No. 441	1,254	HPT	Walhi
Muara Madras	Jangkat	No.439	5,330	HPT	SSS Pundi
Tanjung Dalam	Lembah Masurai	No.437	2,160	HPT	LTB/FFI
Tuo	Lembah Masurai	No.438	2,235	HP	LTB/FFI
Koto Rami	Lembah Masurai	No. 436	1,855	HP	LTB/FFI
Lubuk Beringin	Muara Siau	No. 128	2,712	HP	LTB/FFI
Lubuk Birah	Muara Siau	No.359	4,638	HP	LTB/FFI
Durian Rambun	Muara Siau	No.361	4,484	HP	LTB/FFI
Birun	Pangkalan Jambu	No.127	2,788	HP	LTB/FFI

Nevertheless in realization of MPTS program, there are some constraints:

- 1) The reduction of Special Allocation Fund/Dana Alokasi Khusus (DAK) from IDR 1.33 in 2015 to IDR 398 million in 2016. The operational of program MPTS, training and cooperative management with local government, local community and some NGOs will suffer difficulties in the long run.
- 2) The regulation of Ministry Forestry No. 55/2012 showed that communities are banned from cutting trees in ‘village community forestry.’ But in the previous regulation issued by Ministry of Forestry No. 27/2011, communities are permitted to cut trees from reforestation. These regulations are inconsistently enforced, leading to difficulties in socialization and the drive to participate in the MPTS program (Interview, 28 April 2016).

3.6. Spatial Arrangement Issue

[17] states that the existence of spatial and development planning is important for promoting security, productivity, and sustainability. The aim of this arrangement is as follows:

- 1) To realize in harmony between natural environment and artificial environment;
- 2) To realize integrity on natural resource and man power management;
- 3) To realize protection on functional spatial arrangement and to prevent negative impact on environment.

In case of Merangin district related to spatial planning, according to Dedy, head of Master Regional Planning Agency (Badan Perencanaan Pembangunan Daerah), the constraint of spatial planning is primarily disagreements based on 'interest'. One external factor is related to the 'demographic challenge,' posed by migrants from South Sumatra (Pagar Alam, Lahat) and Bengkulu who establish coffee plantations in Merangin district (Jangkat, Lembah Masurai, Sungai Tenang), occupy forest conservation areas (Kerinci Sebelat National Park/TNKS), forest protection areas in Gunung Tungkut, Bukit Muncung Gunung Gamut and Gunung Masurai in Lembah Masurai, Jangkat and Sungai Tenang sub-district, and Non-Forest Another Allocation/Alokasi Penggunaan Lain/APL. Meanwhile internal constraints include the lack of 'synergetic coordination' among government agencies in Merangin district (Interview, 27 April 2016). In addition, the following factors influence farmers' decision to establish a coffee farm:

- 1) The price of rubber and oil palm have fallen since 2010;
- 2) The lack of inspection from government office leads to 'free land' in forest conservation, APL, and forest protection areas
- 3) The price of coffee increased from IDR 17,000 in 2008-2012 to IDR 20,000 in 2013-2016.

4. Conclusions

Land in Merangin district is 44% forest cover. This strategic landscape has two anthropogenic functions: forest and watershed conservation. Both forest and watershed conservation are primarily located in Kerinci Sebelat National Park (TNKS). Observing this potential landscape, local, provincial, and central government must collaborate to maintain this strategic landscape. However, the agroforestry sector (rubber, coffee, pepper, coconut, etc.) should be developed through financial support for credit to buy seedlings and fertilizer, train of man power, and market networks. Besides, MPTS program, such as aqua culture village community forestry, social forestry, etc. must be priority to be realized in the future.

In reality, forests in Merangin suffered degradation over 21,084 ha. This area has been degraded by migrants from South Sumatera in Jangkat, Lembah Masurai, Sungai Tenang, etc through forest encroachment and illegal gold exploration in Pangkalan Jambu, Tabir Barat, Tabir Ulu, Tabir Ilir, etc. The implication from both activities has led to flooding and soil erosion in the rainy season, drought in the dry session, and perpetual water contamination. This findings from this research suggest:

- 1) The central government, represented by Ministry of Environment and Forestry, must follow Forestry Law No. 41/1999, in order to implement law enforcement with regard to forest encroachment in conservation areas that has caused flooding, soil erosion and water contamination.
- 2) The role of local government in Merangin district should cooperate with provincial government to maintain and monitor illegal gold exploration. In addition, these two levels of government should continue to provide financial support on credit, training of man power, market, technical training on developing agroforestry, MPTS program, and village community forestry.
- 3) Spatial planning for the water catchment area in TNKS area should be implemented through multistakeholder processes and forest landscape restoration.

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