

Profile of Smallholder Oil-palm Plantation in Ketapang District, West Kalimantan



**Tropenbos Indonesia
2020**



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Executive Summary

Palm oil is Indonesia's main plantation commodity and it is the largest source of foreign exchange after petroleum and natural gas, reaching IDR 265 trillion (US\$16.9 billion) in 2018. Indonesia is the largest producer and exporter of palm oil in the world, with production exceeding 51 million tonnes in 2019 (83% crude palm oil, 17% palm kernel oil), from almost 15 million hectares, 55% being large private estates, 41% smallholder estates and 4% large government-owner estates. There has been a massive increase in smallholder estates from only 3,000 ha in 1979 to almost 6 million ha by 2019, shows that the success of oil palm in improving the Indonesian economy is in part thanks to independent smallholders. Unfortunately, the vast area of smallholder oil palm estate is not the most productive, with average oil palm production in smallholder plantations in Indonesia in 2019 being 3.2 t/ha and in Ketapang Regency only 2.1 t/ha, compared to 4.1 t/ha from private estates and 3.7 t/ha on government estates. Smallholder oil palm plantations are also very vulnerable to various environmental, social and legal issues that can limit access to international markets.

The purpose of study is to understand the general profile of smallholder plantation in Ketapang. In 2018 and August 2019, Tropenbos Indonesia conducted survey at nine villages which are located in sub landscape of Simpang Dua (which has predominantly mineral soils and indigenous populations) and Pematang Gadung (which covers large deep peat areas and has a large recent migrant population), Ketapang District, West Kalimantan Province. Semi-structure interviews were conducted to 145 farmers who representative of three groups of palm oil smallholder: (1) Pure independent smallholders (oil palm cultivation is carried out personally without assistance, sources of funds for cultivation from themselves or borrowed from financial institutions on their own efforts), (2) Cooperative-based independent smallholder (oil palm cultivation is accompanied by a plasma management organization, gets a loan from a cooperative/BUMDes), (3) Plasma farmer (palm cultivation is carried out by the company, gets a loan from the company). Qualitative descriptive analysis with frequency distribution tabulation was analyzed using SPSS program release 14.0.1.

The results of study showed that: (i) All respondents own oil palm land on privately owned land, (ii) Most farmers planted oil palm monoculture, (iii) The oil palm land tenure origin was occupied by four means (from buying, from grants/transmigration, from inheritance, and land is the distribution of plasma plantation from companies), (iv) Reasons for land use change into oil palm plantations are: higher price of oil

palm, following friends/other people who practice oil palm cultivation, and frequent fires, (v) Most respondents do not yet have knowledge about the characteristics of quality palm seedlings, (vi) Most of respondents carry out land clearing by cutting, slashing, burning, (vii) The results of Fresh Fruit Bunches (TBS) production of oil palm plantations aged 5 years and over are: (a) pure independent smallholder (8.3 tons/ha/year), (b) cooperative-based independent smallholder (13.2 tons/ha/year), and (c) plasma palm (20.9 tons/ha/year), (viii) Implementation of good agricultural practices is limited, as is smallholder support, (ix) Sales were made through middlemen, (x) Most respondents did not know about palm oil certification. (xi) Traditional communities generally do not possess land certificates, with full land titles more common in transmigration villages, (xii) The low price of oil palm meant that few farmers had expanded their plantations, (xiii) Funding sources for oil palm management were mostly from farmers' own capital, with only 6.6% from loan funds, (xiv) Limited number of farmers being members of farmer groups, (xv) General poor knowledge on pest and diseases control methods, (xvi) Most of farmers never received training on palm oil cultivation.

Foreword

Oil palm expansion has been considered major threats and highly responsible for the high rates of deforestation in Ketapang District, West Kalimantan. Oil palm is also said as a driver of 50% deforestation in Kalimantan. The vast expansion of oil palm plantations has given severe impact to the declining number of orangutan population and other wildlife, the fragmented forest area has created ecological traps, cut off the ecological connectivity and destroy forest biodiversity.

However, with the increasing global demand for palm oil products and contribution of this commodity to the national revenue, it becomes unavoidably very attractive to many investors. Not only large-scale companies but also smallholders pursue high yields and profitable financial gains from oil palm cultivation.

It is also the case in Gunung Tarak Landscape (GTL), in which since 2017 to date, Tropenbos Indonesia has facilitated Community Service Organizations (CSOs) for Lobby and Advocacy (L&A) under the Green Livelihoods Alliance Programme (GLA). Having in collaboration for conservation efforts with oil palm companies for many years, Tropenbos Indonesia has set eyes to also facilitate the improvement of sustainable practice of smallholder farmers.

Realizing the significant contribution of smallholder oil palm in the national production, while so far, government and private sector supports are still limited. It is so often that smallholder farmers are not part of the sustainable supply chain, link access to no mills of big plantations, and fragile to financial constraints, let alone implementing sustainable practice in its production.

Smallholder farmers need to receive information on good agricultural practices, have higher concern for sustainability, stronger link access to supply chain and trading, comply with regulation and required permit, obtain sustainable certification, receive intervention on alternative livelihoods which can be combined with oil palm cultivation, and receive facilitation on the establishment of farmer group to strengthen their bargaining power in dealing with market and sources of financing. Only then they will be less vulnerable for exploitation.

Considering the general low capacity of smallholder farmers and urgently need for facilitation and technical assistances, in 2019, Tropenbos Indonesia conducted semi structural survey in nine selected villages in Ketapang District both in peatland

and mineral soil, which covered three groups of smallholders respondents i.e., independent smallholders farmers, cooperative-based smallholders and plasma farmers.

This report might be used as a reference for government, private sectors and CSOs as a basis to develop interventions strategies to capacitate oil palm smallholders. With a forecast that over the next decade oil palm smallholders will double their production pie to the total share of oil palm production in Indonesia, the contribution of government, private sector and CSOs in capacity improvement will never be meaningless.

Dr. Edi Purwanto
Director of Tropenbos Indonesia

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Chapter 1. Introduction

1.1. Oil-palm sector in Indonesia

Palm oil is one of Indonesia's main plantation commodities that has an important role in economic activities as largest foreign exchange contributor besides oil and gas, reaching IDR265 trillion (BPS, 2018). Until now, Indonesia has been recognized as the largest producer and exporter of palm oil in the world. Data from the Directorate General of Plantations (2019) showed that oil palm production in 2019 reached 51.44 million tons consisting of 42.87 million tons (83.3%) Crude Palm Oil (CPO) and 8.57 million tons (16.7%) Palm Kernel Oil. The production of palm oil is exported to various countries, where India, the European Union, and China are the three largest importers of Indonesian palm oil. In addition, oil palm plantations in Indonesia until 2019 have involved $\pm 2,740,749$ farmers and absorbed a workforce of $\pm 4,526,713$ people.

The high production of palm oil in Indonesia is in line with the increasing need for domestic vegetable oil and the large potential export of CPO. Palm oil is highly preferred as an industrial raw material because it is available in large quantities and at lower prices compared to other vegetable oils, such as soybean oil, sunflower oil, and corn oil (Manggempuani, 2009; Teoh, 2012). This condition has triggered the rapid growth of oil palm plantations area in Indonesia, where in 1970 the area of oil palm plantations was only 133,298 ha, then in 2019 a rapid increase reached 14,677,560 ha consisting of: (i) Private Large Estate (PBS) area of 8,085,134 ha (55.1%) with oil palm production of 25,927,589 tons (60.5%), (ii) Smallholder Estate (PR) covering 5,958,502 ha (40.6%) with oil palm production of 14,846,112 tons (34.6%), and (iii) State Large Estate (PBN) covering 633,924 ha (4.3%) with oil palm production of 2,095,457 tons (4.9%) (Directorate General of Plantations, 2019).

Around 71.8% of oil palm production in Indonesia comes from the six provinces of largest palm oil producers, namely: (1) Riau at 8,864,883 tons (20.7%), (2) Central Kalimantan at 6,279,857 tons (14.6%), (3) North Sumatra 5,623,054 tons (13.1%), (4) South Sumatra 3,767,108 tons (8.8%), (5) East Kalimantan 3,164,793 tons (7.4%), and (6) West Kalimantan at 3,095,601 tons (7.2%), while the remaining 28.2% is obtained from other provinces.

Private Large Estate (PBS) and State Large Estate (PBN) of oil palm started to be established in 1970, whereas Smallholder Estates (PR) began to be built

in 1979 with an area of only 3,125 ha and began to develop in the 1980s marked by the existence of a nucleus estate and smallholder scheme (PIR) which subsequently developed into various forms of partnership patterns, including: Primary Cooperative Credit for Members (KKPA), partnership through plantation revitalization program, and partnership developed by Private Large Estates for oil palm (IFC, 2013).

As time goes by, smallholder oil palm estates expanded to reach 5,958,502 ha or 40.6% of the total oil palm area in Indonesia in 2019; during the last two decades smallholder estates have a larger share of up to 70% of the total area of oil palm smallholder plantations. This shows that the success of oil palm in improving Indonesian economy cannot be separated from the independent smallholder contribution in increasing oil palm production. Unfortunately, the vast area of smallholder oil palm estate has not been in line with its productivity. Statistic Data on Palm Oil 2017-2019 showed that the average production of oil palm in smallholder plantations in Indonesia in 2019 was only 3.2 tons/ha lower than the yield of oil palm from private estates (4.1 tons/ha) and state estates (3.7 tons/ha). The low productivity of smallholder oil palm plantations was evenly distributed in various places in Indonesia. The result of the International Finance Corporation (IFC) study in 2013 showed that independent smallholder oil palm plantations had a productivity of 40% lower than the Good Agricultural Practices (GAP) scenario for smallholders and 116% lower than the corporate GAP scenario. Meanwhile, farmers who partnered with companies had productivity 6% lower than the GAP scenario for smallholder plantations and 46% lower than the company GAP scenario (Daemeter, 2015).

On the other hand, smallholder oil palm plantations are very vulnerable to various environmental, social and legal issues that can hamper access to international market. Haryadi (2019) mentioned, among the occurred environmental issues were: (i) the existence of a negative campaign, (ii) the European Union Delegation Act concerning the ban on palm oil for biofuel in 2030 which would be replaced by environmentally friendly renewable energy, and (iii) deforestation of forest area. These issues have caused discrimination and barriers related to tariff and non-tariff from the European Union, such as environmental taxes and sustainable palm certification that require environmentally friendly and socially friendly products as a guarantee to consumers that the palm oil products are produced sustainably. Specifically for the issue of sustainable palm oil, since 2011 the Indonesian government has issued the certification of Indonesia Sustainable Palm Oil (ISPO), although this certification has not been declared sufficient to be recognized by the European Union (EU). The EU implement certification system of Roundtable on Sustainable Palm Oil (RSPO) for food and non-food products from palm oil distributed for European markets.

Ketapang Regency is one of the districts in Kalimantan Province where the development of oil palm takes place. In this district there are only national private oil palm plantations and smallholder oil palm plantations. Data 2017 showed that the total area of smallholder oil palm in Ketapang District was around 87,522 ha and CPO production was 157,095 tons involving 22,647 farmers. As was the case with smallholder oil palm estate, the productivity of CPO of smallholders in Ketapang Regency also showed a low yield of 2.1 tons/ha, lower than the production of smallholder oil palm plantations in West Kalimantan Province (2.2 tons/ha), especially compared to the productivity of smallholder oil palm plantations at the national level (3.2 tons/ha) (Directorate General of Plantations, 2019).

1.2. Objective of the study

The Green Livelihoods Alliance (GLA) program is a collaborative program between Civil Society Organizations in partnership with the Ministry of Foreign Affairs in the Netherlands. This five year program (2016-2020) is carried out in nine countries around the world, including Indonesia where Yayasan Tropenbos Indonesia (TI) is one of the key program facilitator where the facilitation areas is located in Gunung Tarak Landscape, Ketapang and Kayong Utara Districts, West Kalimantan Province. Ketapang District have experienced considerable landscape changes over the last thirty years. Whereas economic activities boomed, these districts also suffered severe forest and land fire events and environmental degradation.

The GLA program set out 6 (six) **Outcomes**: (1) Spatial planning to become more equitable and sustainable; (2) Government, private sector, communities and CSOs coordinate interventions and investments at a landscape level; (3) Oil palm grower sustainably manage their concession, while traders/buyers conduct sustainable trade; (4) Communities protect and use the forest for sustainable local livelihoods; (5) Local communities have a greater involvement in sustainable forest and land management; (6) CSOs contribute towards green growth development and commit to implement collaborative actions.

To achieve **Outcome 3**, during the initial phase of GLA program (2016 and 2017), it was expected that the focus would be on oil palm supply chains and sustainable trade. However, it became clear that whereas plantation companies, national legislation and sustainability standards can be targeted, these generally are processes that are decided in offices in Jakarta and several other major cities around the globe. Sustainability initiatives can therefore not be decided upon by plantations in the project area only and decisions on supply chains are often business to business decisions, with limited opportunities for TI to have an impact there. With the 2018 oil palm moratorium in place it is unlikely that any new corporate oil palm plantations will be established in the area.

However, whereas companies have proper oversight on their own plantations and there appears limited space for TI to improve supply chains there, mills also purchase from independent smallholders. Independent oil palm smallholdings are often expanding once there is access to a mill and this expansion is much harder to control than corporate expansion due to the vast numbers of small plots and actors involved. Whereas per individual impacts are limited, huge numbers of oil palm smallholders have transformed landscapes throughout West Kalimantan Province. In order to improve sustainable land use in the project area and a current lack of support for independent smallholders, TI shifted its focus from company plantations towards the independent smallholder plantations. Although the target shifted and activities were therefore slightly postponed, the goal remained the same, improving sustainability of oil palm supply chains, inclusive development and environmental protection.

To understand the general profile of smallholder plantation in Ketapang, in 2018, TI conducted a study in Muara Jekak Village, Sandai Sub-district and Teluk Bayur Village, Sungai Laur Sub-district, the results has been published in Purwanto, E., Tjawikrama, D., 2019. *The role of village assemblies in overcoming barriers to smallholder inclusiveness: examples from Indonesia*, in: EFRN News 59, Exploring inclusive oil palm production, Wageningen. By the end of 2018, TI has firmly committed itself to improving sustainability and inclusivity of the independent smallholder oil palm sector and selected two sub-landscapes in Ketapang District where independent smallholder oil-palm plantations (ISP) have been expanding but with different environmental and social conditions.

The selected sub-landscapes (see **Figure 1.1.**) are located in the Simpang Dua Sub-district, which has predominantly mineral soils and indigenous populations, and the Pematang Gadung landscape which covers large deep peat areas and has a large recent migrant population. Subsequently a comprehensive study was conducted during 2019 in seven villages (Pematang Gadung, Sungai Pelang, Sungai Besar, Gema, Mekar Raya, Kemora and Batu Daya) as a basis to develop feasible interventions in two different sub-landscapes.

The report discusses key findings and insights on smallholder oil-palm plantation in nine villages in Ketapang District based on data processing and analysis of semi-structure interviews of 145 farmers.

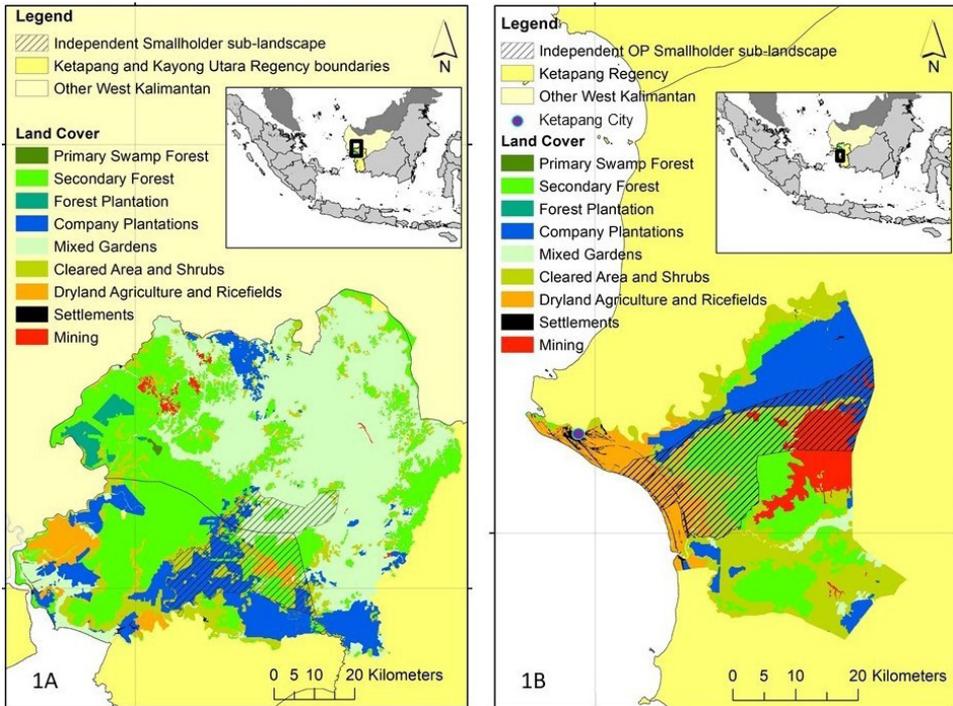


Figure 1.1. Simpang Dua (1A) and Pematang Gadung (1B) landscapes and focus areas of ISP landscapes (Purwanto and Jelsma, 2020)

Chapter 2. General Condition of the Study Villages

2.1. Sungai Pelang Village

Sungai Pelang Village, is the largest village in Matan Hilir Selatan Sub-District with an area of $\pm 150,000,000 \text{ m}^2$ (BPS 2018: 323.30 km^2) consisting of fields/rice fields (60%), smallholder oil palm plantations (2%), non-oil palm plantations (5%), shrubs (5%), settlements (5%), forest land (5%), and area of oil palm plantation companies (18%) (source: village data).

Sungai Pelang village is bordering with:

- a. Negeri Baru Village, Mekar Utama Village, Sungai Jawi Village in the North
- b. Sungai Besar Village in the South
- c. Sungai Melayu Rayak Village in the East
- d. Karimata Strait in the West

Sungai Pelang Village has 5 hamlets, namely: Segak, Parit Berdiri, Pelang Kecil, Kanalisasi, and Rawasari. The population of Sungai Pelang Village is 1,550 households with 5,283 people (BPS, 2018). The majority of the population (45%) is Malay ethnic and others are Javanese, Sundanese, Dayak, Bataknese and Chinese descent. Most of the inhabitants of Sungai Pelang Village work as farmers (both working on their own land and working on rented land): rice farmers (80%), crop farmers (10%), fishermen (5%), and other livelihoods (5%). Sungai Pelang Village fishermen are generally small-scale fishermen with simple traditional tools.

Agricultural activities

In general, Sungai Pelang villagers still use fire to clear land due to its lower cost. The use of fire is done by using firebreak system or by collecting straw, twigs, or leaves to a certain spot to be burned. The majority of the community's agricultural land is private property rights. Some land ownership was obtained from generation to generation, while others were allocated by the government through the transmigration program. Average rice production is 5 tons/ha. The obstacle in rice farming is the difficulty to get water. In addition to rice, the community also grows vegetables, and cultivates pineapple and dragon fruit (mainly done by the transmigration community).

There is no term "**tembawang**" in Sungai Pelang village community's structure. There is a Village Forest with an area of approximately 600 ha. The forest potential is wood.



Figure 2.1. Spatial distribution of the studied villages in Ketapang District

Construction of “ Pematang Gadung-Negeri Baru Canal”

Pematang Gadung-Negeri Baru Canal connects Pawan River and Pesaguan River, passes through 4 villages, namely Negeri Baru, Sungai Pelang, Sungai Besar, and Pematang Gadung. This canal was the main transportation access and was very influential on the economy of the surrounding community.

Roads access and electricity

Road access began to receive government attention in the 1980s. Electricity began to enter the village in the 1990s.

Village history

Sungai Pelang Village was estimated to have been existing since the reign of the Kingdom of Matan. At that time the village was called “Kampung”, headed by a village head called “Kebayan”. The name Sungai Pelang originated from a ship owned by Sultan Matan Tanjung Pura named Lancang Pelang.

Transmigration program

In the 1970s the government conducted the first phase of transmigration program in Sungai Pelang Village. This affected the situation of the population, customs and opening of new land for residents of transmigration. The transmigration program also affected the agricultural sector, the types of commodities planted, and agricultural technology. The second phase of the transmigration program was implemented in 2012, this had an effect on: (i) massive peatland clearance by the government as a new settlement area for transmigrants, (ii) access to peat areas, (iii) community activities in peat areas, (iv) settlement and transmigrant plantations in peat areas.

A big fire occurred in 2015 burnt almost all peat near the Pelang-Tumbang Titi road. The fire destroyed the community plantations and caused big losses. From 2015 to 2018, almost every year fires took place in the peat area of Sungai Pelang.

History of oil palm plantation opening in the village

Oil palm plantations began to enter Sungai Pelang Village in 1997. There are 2 oil palm plantation companies in Sungai Pelang Village now, namely PT ARTU Plantation and PT Limpah Sejahtera. PT Limpah Sejahtera holds a 6,000 ha HGU in Sungai Pelang Village which is a peat area and has built a 1,200 ha plasma estates for the people of Sungai Pelang Village. The management of plasma plantations is carried out by Pelang Sejahtera Cooperative which has 1,401 members. Conflicts still often occur between the community and the company. The community began to plant oil palm independently in the 2000s. The types of variety planted are generally Marihat and Longsum.

Traditional values are still maintained

The culture of mutual cooperation is still well preserved, this can be seen from togetherness in wedding ceremonies, mournings, recitals, and in other social activities. Community leaders and religious leaders still play the role of motivator in the community.

Land conflict

Land conflicts once occurred between communities but could be resolved by deliberation for consensus at village level. Conflicts that occurred were conflicts between communities and companies related to land compensation.

2.2. Sungai Besar Village

Village basic information

Sungai Besar Village is located in Matan Hilir Selatan Sub-District, with a total area of 116,728 ha (BPS data 2018: 28.20 km²). This village has a population of 4,013 people from 1,127 households spread across 5 hamlets and 22 RTs (neighbourhood associations). The five hamlets are Kalimas, Sawah Rendam, Sungai Sirih, Kanalisasi, dan Transmigrasi. The village center is located in Kalimas. The population consist of various ethnic groups: 45% Madurese, 35% Malay, 11% Chinese, 8% Javanese, and less than 1% Dayak, Bugis and Banjar. The composition of the population based on livelihoods is 80% farmers, 5% traders, 3% fishermen, 2% civil servants. The education level of the population is 5% bachelor, 35% high school, 30% junior high, 20% elementary and 10% uneducated. The main commodity in the village is rice, the other commodities are palm, vegetables, rubber, and coconut.

Agricultural activities

Most people of Sungai Besar Village still use fire to clear land, clean up remaining trees, remnants of twigs, leaves and weeds in hopes of getting ash; the use of fire is also considered effective to repel pests and reduce soil acidity. They burn on a small scale at a certain spot; local people often call it “manduk” or “mungguk”, which is burning the collected branches, leaves, or straw.

The land of Sungai Besar community is privately owned, some lands have been certified and some others are still in the process of certification. For majority of the residents, the agricultural land ownership has been inherited for generations. Some were obtained by buying to other residents and there are those who got lands from the government through the transmigration program (2 ha/HH). These lands are used for agriculture and plantations. The commodities cultivated include oil palm, rubber, chili, pineapple, cassava, beans, and rice. The cropping patterns used by the community are polyculture system (mixed and intercropping patterns) such as rubber-pineapple, oil palm-pineapple, chilli-nuts-cassava.

Most people started planting oil palm since 2012/2013 with varieties planted Marihat and Longsum. Current average palm production ranges from 0.5-0.8 tons/ha/harvest. The average oil palm is harvested twice a month. The price of oil palms ranges from IDR550-IDR1,100/kg. Palm is bought directly by traders or collectors who come directly to the village.

Some villagers of Sungai Besar have also cultivated rubber with an average production of 10-13kg/ha/day. There are two types of processed latex products produced by farmers, namely beam shape and bowl shape. The selling price of latex ranges from IDR 5,000 to IDR 8,000/kg. Among the rubber plants, the

community also plants pineapple with intercropping system. Pineapple is a promising commodity for communities since planting or obtaining seedling is easy, the price of seedlings is also relatively cheap (IDR.1,000,-/seed) with a selling price of IDR 2,500 to IDR 3,000 per fruit. Farmers sell pineapple directly to “peraih” or traders who come directly to farmers.

The community also plants rice; rice planted outside peatlands. The types of rice planted by residents are superior varieties, namely Inpara 10 and Argo 70 which are planted 2-3 times a year, with a yield of approximately 4-5 tons/ha/growing season. In addition to superior types of rice, there are also farmers who plant local varieties of ‘Umbung Serai’ with a planting period of once a year. Rice farming products are sold in the form of rice with prices ranging from IDR 8,000 – IDR 10,000/kg. In addition to rice, the community also plants chilies, cassava and vegetables around the rice fields. Chili is sold at prices ranging from IDR 60,000- IDR 80,000/kg, while cassava is sold at prices ranging from IDR 550 to IDR 1,500/ kg. Other economic activities aside from the agriculture and plantation sectors are swallow nest business, food stalls or livestock (chicken, cattle, goat), and fishery. Facilities and infrastructure in this village are schools, namely elementary school (4 units), junior high school (1 unit), senior high school (2 units), and early childhood education programs (5 units), Public health center facility (1 unit), and auxiliary health center (1 unit). There is no market in this village.

Road access and electricity

Sungai Besar Village is traversed by the main road Ketapang-Pesaguan which is the main road for the surrounding community and the upstream community. The communities from the upper Pesaguan River such as from Tumbang Titi and surrounding areas use this road as the main road. They use water transportation from the Pesaguan River, then from Pesaguan Kanan they continue on foot through the Ketapang-Pesaguan road. This road is predicted to have been constructed since the Matan kingdom era. The road began to receive the attention of the government since the 1980s. The road condition is 70% paved and 30% soil. Electricity began to enter Sungai Besar Village since the 1990s. The community feels greatly helped by the existence of electricity which automatically influences the life and economy of local community. Money lending facilities available in the village are banks, savings and loan groups, traders/collectors, families, other farmers/neighbors and stalls.

Village history

The village was formed since the Dutch colonial era. Sungai Besar Village was estimated to have been established since 1938. Sungai Besar Village is not the expansion result of another village, but it has existed since the Kingdom of Matan era. In the past this village was called “*Kampung*” and was headed by a village

chief. The first tribe present in this village was Malay. The system of land ownership in this village is ownership rights. Land ownership comes from inheritance and then traded, there is also allotment from the village government by plotting. There are also people outside village who own land in this village by buying and selling privately and acknowledged by the village government. There is a clear boundary between forest area and land outside forest area.

Transmigration program

In the 1970s the government conducted the first transmigration program in Ketapang District. Sungai Besar Village is one of the destination villages. Of course this program also affects the situation of the population as well as the farming knowledge of local people. There is sharing knowledge from migrants to local residents related to agricultural technology; this also affects the types of commodities grown by local residents such as rice varieties, fruit crops, etc.

In 2012 the Government re-conducted the transmigration program in Sungai Besar. This program was the beginning of a massive peatland clearing by the Government. This was very impactful on the surrounding natural environment, where peat forests began to be cleared. The government massively built jumbo ditches in the peat area, and as a result the peat began to dry up. Likewise the community began to aggressively move in to the peat area. The patterns of land clearing by cutting, slashing and burning systems are often done by the community considered cheap and practical. The peak was in 2014-2015 where big fires occurred in several surrounding villages. The existence of the trans-community has brought some influences to the situation of the villagers as well as the patterns of agriculture/plantations and the types of commodities being cultivated.

History of oil palm plantation opening in the village

There are 400 families (HH) managing smallholder oil palm plantations in this village with a total area of 1,100 ha. The opening of the oil palm plantations occurred in 2014. People switched to oil palm believing that it could guarantee their life. No community built oil palm by clearing secondary forests of former HPH, but by converting their own land. Oil palm plantations in the village are managed individually. There are no oil palm farmer groups/cooperatives in this village. The oil palm plantations can be traded, there are no rules or regulation from local institutions. This village is not part of the oil palm concession area.

There are no oil palm company concessions in Sungai Besar Village. Existing plantations are independent and smallholder oil palm. Sungai Besar villagers have started to actively plant oil palm since 2012/2013 because they are tempted by its expensive and promising price. In majority, palm varieties planted by the community are of "Marehat" and "Longsum".

Firebreaks have been understood by the community as part of their tradition in burning land; there is no other prominent tradition. According to the respondents, the village has never heard the terms of ISPO/RSPO, but the village knows about NKT/HCV.

Maintaining traditional values

Sungai Besar village community maintains mutual cooperation culture as their traditional value. Mutual cooperation activities are still going on well, routinely carried out every Friday or adjusted to the needs. Activities carried out together include land clearing, trenches, houses of worship, tombs and others.

Mutual assistance in agricultural activities is known as “Jenjurokan”. It is a special characteristic of the local communities where the system is inherited from their ancestors. In this system, community will work collaboratively in rotation, for example today they will do the land clearing for A and the next day for B, and so on. Jenjurokan is usually done during land clearing, land opening, planting, and harvesting. Jenjurokan in oil palm farming is usually carried out in nurseries (such as filling in polybags), slashing, and planting.

Forest/tembawang products

Some people still harvest wood from forest for their own needs or sell it as building materials for homes, swift nests and other purposes. Sungai Besar Village has the potential of non-timber forest products in the form of rattan as raw material for handicrafts. According to residents, there had been a rattan handicraft business in the past, but the business was no longer running due to marketing difficulties, the produced products were not sold. Tembawang products such as durian, cempedak and other forest fruit products do not exist in Sungai Besar because the characteristics of Sungai Besar Village forest are on peat areas where these plants are not found.

Land conflict

Land conflicts occur in the border areas of Sungai Besar Village with its neighboring villages such as Sungai Bakau Village, Pelang River, Pematang Gadung and Sungai Melayu Raya. The conflicts happen between residents of Sungai Besar Village whose lands are located in the border area adjacent to neighboring villages. One resident who was reluctant to give his name told that one of the reasons behind the fires was land dispute on the border of Sungai Bakau Village. There have been conflicts/disagreements/disputes connected to land ownership since 2016 between communities and the dispute land area is \pm 500 ha. It has not been resolved until now. The reason for the conflict is the village boundary, and the involved parties are the community, LPHD and village government.

2.3. Pematang Gadung Village

Pematang Gadung Village is located in Matan Hilir Selatan Sub-District with an area of 138.20 km² (BPS, 2018). This village has 4 hamlets (Sungai Buluh, Sungai Dungun, Tanjung Pura, and Dayak Putus) and 16 RTs, where the village center is located in Sungai Dungun Hamlet. The population of Pematang Gadung Village is ± 800 families with 2,340 people. The village is dominated by Malay ethnic, and the others are Madurese, Chinese, Javanese and Dayak. The main commodity is rice, other commodities are palm, coconut, fish and gold mining. There are no transmigrants in Pematang Gadung Village. Facilities and infrastructure of this village are elementary and junior high schools, health facilities (Puskesmas and midwives), and paved road. There is no market in this village, but sometimes there are buyers who come or sell at Pesaguan market. There is no financial institution available in this village.

Village history

The village of Pematang Gadung was formed in 1981. The first ethnic group in this village was Malay. They stayed in this village due to its comfortable and abundant natural resources. The beginning of land clearing in this village was for cultivation and settlement area. The land ownership system in this village is privately owned/ownership rights. Land ownership originated from land clearing for agricultural areas. There are also people outside the village who own land in this village by buying and selling privately with the consent of the village government. Land boundaries of forest areas and land outside forest areas are not very clear.

History of oil palm plantation opening in the village

There are 14 families (HH) which open independent oil palm plantations in this village with a total area of ± 100 ha. The opening of oil palm plantations occurred in 2002. The community turned to oil palm because of the fast harvest and the tempting price of oil palm. There are no communities that develop oil palm by clearing secondary forests from ex-HPH, but they convert the existing plantations and shrubs. Ownership of oil palm plantations is private property. The palm oil plantations in the area are managed individually. There are no oil palm farmer groups/cooperatives in this village. Oil palm plantations can be traded, there are no rules or regulations from local institutions but the agreement of the parties with a sale and purchase letter. This village is not a concession area of oil palm plantation.

The “slash and burn” tradition is still alive. The community uses firebreaks in burning. The tradition that is still available today is “Jenjurokan” (see above). According to the respondents, people in Pematang Gadung Village have never heard the terms of ISPO/RSPO or HCV. There is also no corporate of oil palm in this village.

Land conflict

There were conflicts/disputes related to land ownership/land boundaries appearing on a small scale between communities and the disputed land area was no more than 2 ha. Conflict resolution was done by deliberation for consensus. The cause of the conflict was the different opinion on the boundary, the parties involved in the conflict were local communities.

2.4. Gema Village

Gema Village is located in Simpang Dua Sub-District, Ketapang District, West Kalimantan Province with an area of 178.18 km² (BPS, 2018). Gema Village has 3 hamlets and 22 RTs, namely Gerai Kiri, Gerai Kanan, and Mantuk. The center of the village is in Gerai Kanan Hamlet. The main commodities are rubber, wood rice, honey, rattan, bamboo shoots, oil palm, and fruits. A side commodity is handicraft made of rattan and bamboo. Villagers grow rice only for their own consumption because the harvest capacity is only enough for self-consumption. In addition, there are also some residents who build swift house and trade swift nest as a commodity. Gema Village consists of ± 492 households with a population of 1,892 people. The ethnic groups living in this village are of the Dayak, Malay and Chinese. The indigenous ethnic group of this village is the Dayak who become the majority population, and the migrant groups are the Flores, Malay and Chinese. The Dayak in Gema is thought to come from Sukadana, known as Sukadana Dayak; they refused to convert to Islam and chose to move from Sukadana to 'dukuh-dukuh or dahas-dahas'. Eighty percent (80%) of the population are farmers, 10% are employees of companies, and 10% have uncertain livelihoods. The majority of education levels are dominated by elementary school graduates/equivalent (45%), junior high school/equivalent (25%), high school/equivalent (15%), bachelor (10%), and not graduating elementary school (5%).

Village facilities and infrastructure

Educational facilities in Gema Village are 1 unit of PAUD (Early Childhood Education), 1 kindergarten, 2 elementary schools and 1 junior high school. Health facilities in the village consist of 1 health center unit (village health center) with 5 medical personnel consist of 2 midwives and 3 nurses. Road infrastructure in the village: the asphalt road is the main road of Trans Kalimantan which is located in the middle of the village and is the border between Gerai Kiri and Mantuk hamlets, while 70% of the village road is cemented road and the rest is dirt road.

There is a financial institution called Pancur Dangeri Credit Union in Gema Village. CU is an alternative savings and loan institution for the local community. In addition to the Pancur Dangeri CU, several members of Gema Village are also members

of Semandang Jaya CU, but the Semandang Jaya CU does not have yet a branch office in Gema Village, so the community register and do the transactions at the Semandang Jaya CU branch office in Simpang Dua.

There are no market facilities in Gema Village, so people sell their commodities to collectors/ middlemen inside and outside of the village. Commodities from the community are rubber, fruits, palm, and handicrafts. The commodity which is hard to sell is tengkawang (fruit) because there are no buyers. The available financial institution is Pancur Dengeri CU. The available places to borrow money are cooperatives/CU, traders/collectors, families, other farmers/ neighbors and money lenders.

Village history

Gema Village was formed in 1970 as a unification of 2 villages Gerai and Mantuk. The first ethnic group present in this village was the Dayak, originated from Sukadana. The Dayak was attracted to live in this village due to its prosperous nature and abundant resources. The beginning of land clearing in this village was for farming areas or often known as 'Ladang' by the local community. The farming process is carried out by the community by clearing forests both primary and secondary forests with a system of slash, cut and burn using traditional tools such as machetes, axes, pickaxes, jungle, and other traditional tools. Former paddy fields are planted with other crops such as rubber, durian, cempedak, areca nut, lembawang, or other types of plants. The process of farming starts from land clearing, planting and harvesting done by the community using mutual cooperation system or "arisan" (the local community's term).

The culture of mutual cooperation is still common for the village community, this can be seen through the community's crowd when there are village's activities, for example: customary events or mournings. To support the mutual cooperation culture, the village government prepares inventory equipment such as tents, cooking utensils, etc. that are stored in the village office and can be used by anyone without having to rent if needed.

The land tenure system in Gema Village is ex-agricultural land which automatically becomes the property of the first people who did the land clearing and can be inherited by his children and grandchildren who will also inherit the customary rights. The history of land ownership in Gema Village begun with the process of clearing forests to turn into agricultural fields which then became plantations of rubber, durian, cempedak, mixed garden, oil palm plantation, and others. There are also lands owned by residents outside Gema Village, which the process of buying and selling activities were known by village officials. Related to the clarity of forest land area and residents' land outside forest area, the village considers that the boundaries are clear enough based on map review.

History of oil palm plantation opening in the village

There is no oil palm corporation in Gema Village. The village community still refuses the presence of plantation companies because the community believes that the operation of companies in their village will not give them profits. There are 30 families (HH) who open smallholder oil palm plantations in this village. The opening of oil palm plantations in this village occurred in 2012-2013. Communities cultivate oil palm traditionally using slash and burn system or by turning the land into field first. Actually, the technique of land clearing in oil palm plantation is similar to land clearing technique for rubber plantation or other crops, which turned into field first and then planted with other types of plants such as rubber, palm, and others. There are two types of land clearing for oil palm plantation, namely clearing secondary forest and converting rubber plantation to oil palm plantation by turning them into field first.

There are several reasons for the community to convert their land/forest into oil palm plantation: higher palm oil prices, their rubber plantation land that caught on fire, and went along with friends or others. The falling price of rubber, and the temptation of palm oil price are the reasons for some communities to convert their rubber plantations to oil palm. In addition, the rubber plantation area located in Lopor, the border area between Gema and Sinar Kuri villages, is always caught on fires with unknown causes in every dry season. This is also the reason they converted the rubber land into oil palm plantation. There are also some people who plant oil palm because they follow the footsteps of their family or neighbors who have planted oil palm first. Until now it is estimated that more than 100 families have planted oil palm, 26 of them have entered the harvest period.

Currently the availability of land has been limited. Oil palm plantations in this village are privately owned/owned by residents managed by themselves. There are no oil palm farmer groups/cooperatives in this village. The oil palm plantation can be traded with the witness of the village officials. This village is not a concession area for oil palm plantation. Hunting activities are still carried out in the forest area; fruits are still available because not all land is turned into oil palm.

The tradition of "slash and burn" is still alive in this village. The community tradition in burning land is carried out under a mutual cooperation system called 'arisan'. If fire causes a loss to another party, the perpetrator will be subject to sanction in the form of fines with an amount adjusted to the material loss. The people in this village have never heard the terms ISPO/RSPO and HCV.

Use of fire

Farming activities carried out by the community still use traditional method slash and burn system for land clearing of smallholder oil palm plantations. The opening

carried out by residents is first for rice field before for planting oil palm. Even weeding oil palm (in the last 2-3 years) is done by burning. When oil palm has been 1 year old, weeds in the plantation is cleared by cutting and burning, then used to plant paddy; the community considers that this method makes oil palm more healthy.

The activity of burning field called “*arisan*” or “*pengari*” is carried out in mutual cooperation involving more than 5 people. So far there has never been a large fire caused by their activities in the fields. Fires often occur every dry season in the Lobor area, an area located along the Trans Kalimantan road on the border of Gema Village and Sinar Kuri Village, but until now the cause of the fire is still unknown.

Land conflict

Land conflicts which occurred were only internal conflicts between fellow local communities, or even between relatives. Conflicts were triggered by parental inheritance. The lands in dispute were not extensive, around 1-2 ha. Conflict could be resolved through deliberation and consensus mediated by the village government.

2.5. Mekar Raya Village

The total area of Mekar Raya Village is 200.47 km² (BPS, 2018). Mekar Raya Village has 3 hamlets and 7 RTs, namely Gerai Kiri Hamlet, Gerai Kanan Hamlet, and Mantuk Hamlet. The village center is in the Banjar Hamlet. The population of Mekar Raya Village is 193 households with 852 inhabitants. The ethnic groups who live in this village are Dayak (99.4%), Chinese (0.2%), Bataknese (0.2%), and Madurese (0.1%). About 98% of the community’s livelihood is as farmer, and the rest is as civil servant (2%). The level of community education is dominated by middle school (58%), elementary school (25%), high school (8%), D3 (0.2%), Bachelor degree (0.71), not graduating from elementary school (7.51%), not graduating middle school (3.28%), never attended school (1.05%), and still in school (41.43%).

Commodities produced include: rice, rubber, wood, honey, rattan, bamboo shoots, durian, jengkol, cempedak, tengkawang, palm fruit, sugar palm, rattan wicker, bamboo mat. The people of Mekar Raya Village farm and grow rice to meet their needs and for self-consumption. The main commodity that becomes the source of livelihood is rubber. Up to now 65% of the community still taps rubber. During the fruit season (durian, jengkol, cempedak, kapul, pekawai) people who work as rubber tappers switch profession to become Tembawang forest fruit collectors because the price of the fruit they collect is more profitable than the price of rubber.

Village facilities and infrastructure

Educational facilities in the village of Mekar Raya are 1 PAUD (Early Childhood Education) unit, 1 kindergarten, 1 elementary school and 1 junior high school. Health facilities consist of 1 Pustu unit (village health center) 1 Posyandu building consist of 1 midwife, 1 nurse, and 2 women who help in child delivery (alternative). Religious facility: 1 unit Catholic Church. The road infrastructure in the village: the road in Mekar Raya Village has been paved until the border of Ketapang Regency and Kayong Utara Regency, and has become a connecting road between Ketapang Regency and Kayong Utara Regency. Financial institutions: Pancur Dangeri Credit Union and Semandang Jaya Credit Union. CU is an alternative saving and loan institution for local communities. In addition to the Pancur Dangeri CU, some people are also members of Semandang Jaya CU, but the Semandang Jaya CU does not yet have a branch office in Mekar Raya Village; the community manages the registration and transaction at the Semanjang Jaya CU branch office in Simpang Dua. Mekar Raya village does not have market facilities so people sell their commodities to collectors/middlemen from inside and outside the village.

Village history

The village was formed in 1996. Mekar Raya Village was once divided into five (5) hamlets namely Baya Keranji Hamlet (now Batu Daya Village), Kembra Hamlet (now Kemora Village, Merangin Hamlet (now Kampar Sebomban Village), Banjar Hamlet and Karab Hamlet. During the leadership of Absalon Nunai precisely in 2008, Mekar Raya Village began to split its village into two (2) villages. Baya Keranji Hamlet became Batu Daya Village and Merangin Hamlet became Kampar Sebomban Village. The division of the two villages was due to the use of the village budget (ADD) which was inadequate due to overly widespread distribution of fund every year. In 2015 Mekar Raya Village re-divided another hamlet to become a village, i.e. Kembara Hamlet which is now named Kemora Village.

The first ethnic group present in this village was the Dayak. In addition to historical factor, abundant natural resources become factor that make people feel at home in Mekar Raya Village as well as the availability of forest as a source of life and livelihoods for the Dayaks. Forest is the hunting ground, the place for farming, the place to get honey, the place to look for fruits, and others.

The beginning of land clearing activities in Mekar Raya Village

Land clearing always starts with agricultural activities or called farming. Farming activities at that time always began with clearing intact forests using traditional tools, then burnt to plant rice, other agricultural crops, and various types of fruit crops. Activities in land clearing like this are still carried out until now but no longer on intact forests, instead on unproductive rubber fields. The land clearing activity is

not only done by itself, but is carried out in mutual cooperation with the community around the village.

Mutual cooperation culture

The culture of mutual cooperation is still applied by the village community in farming activities, traditional events, or other events. The land ownership system in Mekar Raya Village is that a former agricultural land automatically becomes the ownership right of the first land clearer and can be passed down to his children and grandchildren with customary rights being recognized for generations. The history of land ownership in Mekar Raya Village began with the process of forest clearing to turn into agricultural fields which were then turned into plantations of rubber, durian, cempedak, jengkol, oil palm, mixed garden, or others. In Mekar Raya Village there are also lands owned by people who live outside the village. The process of ownership is through buying or selling activity witnessed by the village officials or inherited by the children from their parents but the children do not live in the village or have another house and business outside the village. The difference between forest and agricultural land or community plantation is very clear, by looking at the condition of the remaining forest meaning it has a forest status, that is protected forest.

History of oil palm plantation opening in the village

In Mekar Raya Village there are no corporate oil palm plantations; the village community still refuses the presence of plantation companies because they consider that the company may bring many problems such as social conflicts, inequality, environmental damage, and so forth as what happened in neighboring villages. They also rejected the company because they are afraid that their children and grandchildren could no longer diversify flora and fauna in their village if the company has entered and planted oil palm.

Communities cultivate oil palm independently and traditionally, by using slash and burn system or converting first the open areas into field. Actually, the technique to clear land for oil palm plantation is similar to land clearing technique for rubber plantation or other crops, which previously turned into fields before being planted with other types of plants such as rubber, palm, and others. There are two types of land clearing for oil palm plantation: clearing secondary forest and converting rubber plantation to oil palm plantation by at first turning them into field.

The opening of oil palm plantations has been started since 2013. There are several reasons for the community to convert their plantations/forests into oil palm plantations: (i) higher price of oil palm, (ii) declining rubber price, (iii) following family or neighbors who have planted oil palm. Until now it is estimated that around 40 families have planted oil palm, 30 of them have entered the harvest period with a total land area of 70 ha.

Use of fire

Slash and burn system of land clearing has always been done for generations. The land cleared is used to grow rice and other plants that land owners want to plant including oil palm. The reasons for land clearing using fire are: it can produce fertile soil, reduce logged litter so as to make it easier to grow rice, and low cost. The day before burning the field owner cleans around the field by making a path/way of 2 meters width, as well as cleaning litter on the way with the aims: (i) to prevent fires from spreading and (ii) to facilitate access in controlling fire from the edge of the field. The farm owner will tell the land owner of bordering farm to work together in guarding the fires to prevent from creeping into other people's garden. If the fires spread to someone else's garden or wither other people's rubber trees, the owner of the burning garden will receive customary law sanction: delivering 1 chick, 1 portion of rice and 2 plates/dishes.

Land conflict

Land conflicts in Mekar Raya Village occurred between local communities, but can be resolved by means of kinship and customary law which are witnessed by customary officials, village institutions, and community leaders.

2.6. Kemora Village

Kemora Village has 2 hamlets and 5 RTs, namely Kembera Hamlet and Dipah Stoku Hamlet with an area of 9,469.30 ha. The center of the village is in Dipah Stoku. The main commodities of the village are rubber, local rice, durian, jengkol, palm sugar, bamboo woven, and the side commodities are sahang (pepper) and oil palm. The population of Kemora Village is 172 families with 673 inhabitants. The dominant ethnic groups are Dayaks (96.9%), Javanese (0.6%), Malays (0.7%), and Chinese (1.8%). The majority of the people's livelihoods are farmers (82%), civil servants (1%), breeders (1%), private employees (13%), and village officials (3%). The education level of the community consists of: bachelor (0.59%), high school (8.32%), junior high school (4.16%), elementary school (7.7%), not complete (elementary school 7.7%). Facilities and infrastructure available in the village are 1 elementary school and 1 junior high school, 1 pustu health facility, 1 midwife. Road condition is not paved. There is no market in this village; people usually sell agricultural products to workers in the company. Commodities produced by the community are mustard green, prenggi, eggplant, vegetable, palm sugar, and jengkol. Hard to sell commodity is oil palm fruit because they are far from collectors. The available places to lend money are Pancur Dangeri CU, Semandang Jaya CU, and Lantang Tipo CU.

Village history

The village was formed on 19 August 2015. The first ethnic group present in this village is the Dayak tribe. The abundant natural resources have attracted ethnic groups/communities to inhabit this village. The ancestors started land clearing in this village by cutting down wood, then burned and turned into fields. The land ownership system in this village is bought from a neighbor and some is inherited from parents. The history of the village land ownership: their ancestors went to the forest to cut wood, then burned it down and turned it into fields. Whoever makes the first farm in that location, by growing coffee plants or fruits, that person becomes the owner. There are also people outside the village who own land in this village, those who are originally from the village but married and live in another village. The land is inherited from parents. There is a clear boundary between forest area and land outside forest area by the installation of boundary stakes.

History of oil palm plantation opening in the village

There are families who open smallholder oil palm and plasma palm plantations. The opening of oil palm plantations began in 1994 for PT CUS and in 2015 for PT MKS. The first opening was independent oil palm plantations, in the process for plasma. The community switched to oil palm because they saw their relatives also planting oil palm. No community developed oil palm by clearing secondary forest but by converting rubber plantation to oil palm. At present the availability of land is still quite extensive. Oil palm plantations in this village are privately owned and managed individually. There are no oil palm farmer groups/cooperatives in this village. Smallholder oil palm plantations can be traded with an agreement between seller and buyer.

This village is oil palm concession areas of PT CUS and PT MKS. The development process of the oil palm plantations has involved only some parts of the government and the community. There was no compensation in the process of land acquisition for PT CUS with the reason that the land they manage was state forest and not community forest, but PT MKS applied land compensation. The relationship between plasma farmers and companies: currently plasma is still in formulation process and there is no clarity regarding the distribution of plasma. There was a land conflict regarding the unpaid land by PT CUS resulting on the closing road access by the community and the company's camp was sealed.

The community continues to fulfill their basic needs such as hunting, searching for fruits, and so on, even after most of their land have been converted to oil palm by utilizing the remaining land located adjacent to Mekar Raya Village. There is still a tradition of slash and burn alive in the village. Community tradition in burning is by cleaning around the fields of about 1.5 m before burning. The tradition that is still alive until today is 'bebantan' and there is sacred land such as in 'Beruak Falls'. If

someone violates the customary rules, then the person is usually sick due to his own doing. In 2016 there was a fire from PT CUS. Most of the palm oil companies do not clear land using the slash and burn system. The village has never heard the terms of ISPO/RSPO and HCV, according to the interviewees. The oil palm corporate in this village has already allocated HCV areas.

Land conflict

There was a conflict between the community and PT CUS, in the form of sealing camp and access road portal in 2015-2016. The area of disputed land \pm 700 ha, and until now there has been no settlement. The main cause of the conflict is that the community land has not been paid by the company. The parties involved are the people who feel that their land has been wronged by the company. Mediation was once held with the Head of Ketapang District and several members of DPRD regarding the community land compensation issues that were occupied by PT CUS but to no avail. However the company is now prohibited to open new land.

2.7. Batu Daya Village

Batu Daya village has 2 hamlets and 4 RTs, namely Tunas Harapan and Karanji. The village center is in Karanji Hamlet. The total area is 93 km² (BPS, 2018). The village has never done mapping and calculation of land use, so the village does not have any land use map. Batu Daya village does not have any map or even a village sketch that can describe its natural resources. The main commodity in the village is rubber, and the other commodities are rice and oil palm. The population consists of 131 households with 524 people. The people's ethnic groups are Dayak, Javanese, Malay, Bataknesse and Chinese. The education level of the population consists of: bachelor (10%), high school (25%), junior high school (35%), elementary school (16%), and not graduating elementary school (4%).

Facilities and infrastructures in the village are: 1 elementary school, 1 pustu health facility, 1 midwife. The condition of the road is not paved, but hardened dirt road. There is no market in this village, people usually sell agricultural products through collectors from Simpang Dua Village and Sungai Laur Sub-District. Rubber commodity of the community is sold to local collectors, to be sold at Sungai Laur Sub-District. Almost all commodities are difficult to sell due to market inavailability and difficult access. The available financial institutions are Pancur Dengeri CU, Semandang Jaya CU, and Lantang Tipo CU. The available places to lend money are Credit Unions, cooperatives, families, other farmers/neighbors.

Village history

The village was formed in 2009 from the expansion of Mekar Raya Village, definitive in 2010. The first ethnic group present in this village was the Dayak. The

ethnic groups/communities live in this village because it is their ancestral land and it has abundant natural resources. The initial land clearing in this village was the result of people move from Sukadana (Tamak Rawang) and they settled by opening a field called 'pedukuhan'. The land tenure system in this village is by clearing forest into fields to plant paddy and fruits. The history of the land ownership of this village was when people opened forest into field before it became tembawang and then became rubber and fruit garden. There are also people outside the village who own land in this village by buying or by marrying a local person. There is a clear boundary between forest area and land outside the forest area with the installation of a stake in 1994.

History of oil palm plantation opening in the village

There are 30 households (8%) which open smallholder oil palm plantations in this village with a total land area of 31 ha and 130 households (50%) which open plasma oil palm plantations with a total land area of 252 ha. The opening of oil palm plantations began in 1994 for company; the beginning of the opening of oil palm plantations was plasma oil palm plantations. People switched to oil palm due to the falling price of rubber or they were following their neighbors. There were no communities that develop oil palm by clearing secondary forests but by converting their existing plantations. At present the availability of land is still quite extensive. The oil palm plantations in this village are privately owned and are owned by the company, with the management of: (a) plasma from PT SMP (Swadaya Multi Prakarsa) and (b) smallholder oil palm that is managed independently. There are no oil palm farmer groups/cooperatives in this village. Smallholder oil palm plantations can be traded and there are no rules or institutions that regulate them.

This village is a concession area of PT SMP (Swadaya Multi Prakarsa) oil palm plantation. The process of developing oil palm plantation involves the government, but not all communities are involved. The land acquisition for smallholdings was processed by giving compensation, but there is still a conflict until now related to the amount of compensation. The relationship between plasma farmers and the company has many problems related to land compensation. In 2014 there was a conflict with the company and was mediated by the Ketapang DPRD. The main cause of the conflict is the compensation issue that has not been paid and an additional price from IDR.70,000,-/person/month to IDR.550,000,-/person/month.

The village communities are increasingly difficult to meet their basic needs (such as hunting, looking for fruits and others), especially after most of their land has been converted to oil palm. There is a tradition of slash and burn activities. Slash and burn is the community tradition in burning, but most of the oil palm companies do not clear land using the slash and burn system. The tradition that still lives up to now is bebantan event when cleaning the village, offering to a sacred place

in Keranji River watershed. If someone violates customary rules, they are subject to the sanctions in customary law. In 2014 there was a fire at PT SMP. The village has never heard the terms of ISPO/RSPO and HCV, according to the interviewees. According to the respondents of the village community, oil palm corporate in this village has not yet allocated HCV areas.

Land conflict

There was a conflict related to land ownership between the community and the oil palm company related to land clearing (1994-2014) with a disputed area of $\pm 1,000$ ha. Problems that arise are unpaid land (compensation) and plasma demands (addition of plasma members). There is no solution to this problem. The parties involved are the community, the company, the Ketapang DPRD.

2.8. Muara Jekak Village

Muara Jekak Village is located in Sandai Sub-District, Ketapang Regency, possessing an area of 93.73 km² (BPS, 2018), consisting of 3 hamlets and 16 RTs. The total population of 822 households is 2,884 people, dominated by Malays. Muara Jekak Village is a village that is currently designated as an Independent Village by the government since it has been independent in generating Regional Original Income (PAD) from the Village Plasma Palm Plantation.

History of oil palm plantation opening in the village

In 1990, the company informed Muara Jekak villagers that they would establish oil palm plantation in partnership with the local community. After three years of negotiation, the agreement stated that the village would receive 150 ha of plasma plantations to benefit only 75 of the 783 households. This was further confusing because the company conducted land clearing based on the IUP plantation area permit rather than through negotiation with individual land owners. Realizing the problem, villagers met and agreed that their land would be managed collectively by the village government. Administrators would be rotated every two years through village general assemblies, with day-to-day management subcontracted to professionals.

Seeing the clear benefits, management by the village was well organized, allowing rapid repayment of the loan for plasma establishment, followed by annual net profit of IDR3-4 billion (US\$210,000– 280,000.) The labour who were needed to manage the plantations was drawn from men and women villagers paid in the government minimum wage. Women are generally involved in harvesting, receiving IDR600 (US\$0.04) per kg. The village sold all its harvest to the company, which is a RSPO member, but so far, the village itself has not yet applied for certification. The revenue was equitably used for enhancing community welfare. The village

council paid the health insurance of all villagers, and education fellowships of IDR100,000-500,000 (US\$7–35) per month to students from kindergarten until university. The village general assembly also decided to invest in selected infrastructure development, and part of the profits were deposited in a fund to cover the costs of replanting after 25 years. The remainder of the annual profit was shared equally among all households.

Since 2010, the village assembly has also provided individual loans for developing independent smallholder plantations. These were focused on those who had legally protected productive land but having limited resources to establish oil palm plantation. For the sake of equality, loan was limited to 1 ha per household. Knowledge of and experience in good agriculture practices obtained from nucleus plantations had been fully implemented without constraints. This had increased the monthly productivity of fresh fruit bunches to 2 ton/ha — nearly equal to that of nucleus plantations. According to village officials, there was scope to raise yields by a further 50% or more.

Smallholder in Muara Jekak Village

Establishment of independent plantations resembling Daemeter model (a) was funded by loans from the village government that covered the costs of land preparation and seedling procurement. Maintenance costs during establishment varied among farmers, so loan amounts varied from IDR6.5 million to IDR18 million (US\$451-US\$1,250) per ha. Repayments to the village were made through 30% deduction of total earnings from farmers who received at least IDR1 million (US\$70) per month.

In 2016, Muara Jekak village established BUMDes. Since that year, the number of BUMDes mushroomed, but most did not function optimally; the one in Muara Jekak is considered exceptional. It has been active in addressing poor pricing by intermediaries (middlemen), and in distributing high-quality oil palm planting materials and fertilizer, which are not easily obtained by smallholders. It also functions as a transportation service provider from plantations to collection points.

2.9. Teluk Bayur Village

Teluk Bayur Village is located in Sungai Laur Sub-District, Ketapang Regency, has an area of 57 km² (BPS, 2018) with a population of 3,070 (1,720 men, 1,350 women). The population is dominated by Dayaks and Malays. Teluk Bayur Village is the result of the division of the Sempurna Village which was stipulated by the Regulation of the Regent of Ketapang Number 26/2005, consisting of three hamlets, namely: Bayur Indah Hamlet, Sungai Putih Hamlet, and Tanjung Harapan Baru Hamlet.

History of oil palm plantation opening in the village

Based on an agreement between the company and the Teluk Bayur Village Council in 2000, an area of 490 ha of plasma was established. After four years of maintenance, management of the 2 hectares farm was handed over to 245 farmers. Here, plantations were managed by individual farmers who worked with companies through cooperatives and not collectively by villages. Farmers as individual owners were responsible for maintaining and able to choose on how to sell their fresh fruit bunches. Because all agricultural inputs (such as fertilizer, agrochemicals, and contract labor) were supplied by companies with loan payments reduced from sales, all farmers continued to sell their palm oil to the same company. The selling price was determined by the local government, but the company controlled the sorting and quality assessment and determines the weight of monthly sales.



Figure 2.2. Results of plasma farmers' oil palm harvesting

Chapter 3. Method

3.1. Sampling

The survey was conducted in August 2019 on 145 respondents from 9 villages (Gema, Mekar Raya, Pematang Gadung, Sungai Besar, Sungai Pelang, Muara Jekak, Teluk Bayur, Kemora, and Batu Daya villages) and 4 sub-districts (Sandai, Sungai Laur, Matan Hilir Selatan, and Simpang Dua) in Ketapang Regency, West Kalimantan Province. Sampling was carried out using the stratified random sampling method. The sample was stratified according to community groups and government officials. Respondents from community groups were randomly selected, while government officials were directly selected on the basis that respondents could provide input on oil palm plantations in their villages.

Table 3.1. Number of respondents in each village

Sub-District	Village	Number of Respondents (people)
Sandai	Muara Jekak	9
Sungai Laur	Teluk Bayur	9
Matan Hilir Selatan	Sungai Pelang	25
	Sungai Besar	30
	Pematang Gadung	16
Simpang Dua	Gema	17
	Mekar Raya	16
	Kemora	12
	Batu Daya	11
Total		145

Sources: Tropenbos Indonesia (2019)

3.2. Data types and sources sampling

Data needed in this survey included secondary and primary data. Primary data obtained through questionnaires/interviews with the respondent groups included: respondent data, types of land owned by respondents, characteristics of the use of independent smallholder oil palm plantation, management of oil palm plantation, marketing of oil palm product, assistance of smallholder oil palm plantation, training and guidance for smallholder oil palm plantation, capital

of smallholder oil palm plantation business, contribution of income from oil palm plantation, housing conditions, FFB sales, the presence of High Conservation Value Areas around oil palm plantation, knowledge of sustainable palm oil certification, replanting activities, oil palm farmer organizations, savings of oil palm farmers, future plans. In addition, field observations were also carried out to obtain data on: topography, soil conditions, implementation of plantation maintenance, soil conservation, irrigation management, nutrient deficiency status, status of pests and palm diseases, the level of ease of access. A complete list of questions for questionnaire is presented in **Annex 1**.

3.3. Data analysis

The results of observations and interviews were then tabulated according to categories or groups. The data analysis approach was used by the Qualitative Descriptive Analysis method with a frequency distribution tabulation. All data were analyzed using the statistical program SPSS release 14.0.1 (Statistical Product and Service Solution), an application program that has high enough statistical analysis capability and a system of data management in a graphical environment by using descriptive menus and simple dialog boxes to make it easy to understand on how to operate. Furthermore, the results of data analysis were interpreted and presented in a descriptive form by presenting facts that described the actual conditions at the observation site.

Chapter 4. Results

4.1. Respondent data

a. Pure Independent Smallholders

The total number of respondents interviewed in 7 villages was 127 respondents (95% men and 5% women). Most respondents were in the range of 41-50 years old (34.5%) and 31-40 years old (28.6%). The education level of respondents from Sungai Pelang, Sungai Besar, Kemora, and Batu Daya villages were between elementary – senior high schools, while for Pematang Gadung, Gema and Mekar Raya Villages, the respondents' education ranged from elementary-bachelor. The highest education level of Sungai Pelang Village respondents and Mekar Raya was dominated by high school level (35%), while Sungai Besar Village, Pematang Gadung, Gema, Kemora and Batu Daya were dominated by elementary school (45%).

The results of the study show that the tribes that dominate the study villages are: (1) Dayak tribe, there are four villages whose origins are dominated by Dayaks, namely Gema Village (88.2%), Mekar Raya (93.8%), Kemora (83%) and Batu Daya (83%), (2) Malays, found in Pematang Gadung Village (100%), (3) Javanese and Sundanese, found in Sungai Pelang (84%) and Sungai Besar (60%). In Sungai Besar the tribes who live are more diverse, both from China, Java, Malay, Sundanese, and Lampung. The percentage of ethnic origin of the respondents in each village is presented in the following table:

Table 4.1. Percentage of respondents' ethnic origin

Ethnic	Gema	Mekar Raya	Pematang Gadung	Sungai Pelang	Sungai Besar	Kemora	Batu Daya	A (%)
Chinese	5.9	0	0	0	13.3	0	0	3.8
Dayak	88.2	93.8	0	0	0	83	91	34.8
Javanese	5.9	0	0	52	40	17	0	21.8
Malay	0	0	100	4	16.7	0	0	24.1
Sundanese	0	0	0	32	20	0	0	10.4
Lampung	0	0	0	0	3.3	0	0	0.7

Sources: Data Analysis Results TI (2019)

Most of the respondents (76%) in Sungai Pelang and Sungai Besar Villages were residents who migrated from outside the village, while respondents in Pematang Gadung, Gema, Mekar Raya, Kemora, and Batu Daya Villages were mostly

(65.6%) from respondents born in the village. There are several driving factors that cause them to migrate to the village, including: joining families (18.1%), finding work (16.6%), obtaining land (32%) especially respondents in Sungai Pelang and Sungai Besar, and land eviction (6.7%). Factors that made them interested in moving to the village included: being able to obtain land, the existence of agriculture promised by the government, obtaining livelihoods, safe location, and arable land.

The respondents have a variety of main jobs where most are farmers (56.8%), Gema village is the village that has the lowest number of respondents living as farmers (29.4%) when compared with other villages. Some livelihoods of residents other than farmers include: trade, private employees, construction workers, teachers, civil servants, and entrepreneurs.

b. Cooperative-based independent smallholders

The total number of respondents interviewed in Muara Jekak Village was 9 people (78% men, 22% women), with the most frequent family members being 4 people. Age of respondents ranged from 29 to 60 years old; 89% of respondents were born in this village. The education levels of respondents were 33% bachelor, 44% senior high school, and 22% junior high school, with the main occupation mostly being oil palm farmers, with the most frequent secondary occupation being entrepreneur.

c. Plasma farmers

Total respondents interviewed in Teluk Bayur Village were 9 people (100% male), with the most frequent family members being 4 people. Age of respondents ranged from 27 to 65 years old; 89% of respondents were born in this village. The education levels of respondents were 78% elementary school and 11% high school, with the main occupation mostly being oil palm farmers.

4.2. Types of land ownership

a. Pure independent smallholder

The results of the study shows that all respondents (100%) own oil palm plantations, with varying widths on privately owned land that have been occupied and self-cultivated. In the villages of Gema and Mekar Raya apart from oil palm, the most widely owned by respondents is rubber. In Mekar Raya Village, Kemora Village, and Batu Daya Village all respondents (100%) own oil palm or rubber land. In Sungai Pelang and Pematang Gadung Villages, the most widely owned land after oil palm is paddy fields. In Mekar Raya Village more than 80% of respondents also own land in the form of rice fields, fields and shrubs. Whereas in Sungai Besar Village only 20-30% of the respondents own land besides oil palm in the form of rice fields, rubber, and shrubs. Data on the type of land use by respondents in seven study villages can be seen in the following table:

Table 4.2. Percentage of types of land use by respondents in seven study villages

Types of Land Use	Village						
	Sungai Pelang	Sungai Besar	Pematang Gadung	Gema	Mekar Raya	Kemora	Batu Daya
Oil Palm	100%	100%	100%	100%	100%	100%	100%
Rice fields	64.0%	20%	81.3%	17.7%	81.3%	58%	46%
Fields	4.0%	6.7%	31.3%	52.9%	81.3%	75%	82%
Ruber plantation	4.0%	20%	37.5%	64.7%	100%	100%	100%
Shurb	28.0%	30%	56.3%	5.9%	81.3%	25%	45%
Other	4.0%	0%	25%	5.9%	6.3%	0%	0%

Sources: Data Analysis Results TI (2019)

The area of oil palm owned by respondents from seven villages ranged from 0.5-25 ha, the average area of oil palm owned was 3.5 ha. Respondents from Gema Village have an average area of oil palm higher (5.6 ha) compared to other villages (ranging from 2-3.9 ha). The other types of land use besides oil palm are: (1) paddy fields, ranging from 0.5-4 ha, (2) fields, ranging from 0.1-15 ha, (3) rubber, ranging from 0.1-50 ha, (4) shrubs 1-13 ha. Specifically in the villages of Gema and Mekar Raya, they have rubber plantations of up to 30 ha and 50 ha respectively, while the largest ownership of oil palm is 25 ha. Data of land use area in seven villages are presented in the following table:

Table 4.3. Land use area data

Area (ha)	Village						
	Sungai Pelang	Sungai Besar	Pematang Gadung	Gema	Mekar Raya	Kemora	Batu Daya
Oil palm (range)	0.5-10	0.5-8	1-9	2-14	1-25	1-5	1-2.5
Average	2	2.4	3.5	5.6	3.9	2.25	1.75
Rice fields (range)	0.5-3	0.5-1.5	1-7	1-4	0.5-3	1-2	1-6
Average	1.5	1.5	3.4	1.5	1.6	4	4
Field (range)	1-4	1-1.5	0.1-4	0.25-15	0.5-2	1-2.5	1-2.5
Average	4	1.25	1.8	5.8	1.2	1.6	1.6
Rubber (range)	1	0.13-5	0.48-4	2-30	1-50	2-8	1-8
Average	1	1.9	1.5	10.4	7.4	4.7	3.3
Shurb (range)	1-5	1-13	1.3-8	1-3	1-8	1-3	1-10
Average	1.8	3	4	2	3.1	1.8	4.7
Other (range)	1	1	1-6	1.5	0.12	0	0
Average	1	1	2.6	1.5	0.12	0	0

Sources: Data Analysis Results TI (2019)

b. Cooperative-based independent smallholders

The number of palm plots owned by respondents was 1 (33%), 2 (56%) and 3 (11%) with the status of 89% being occupied and self-cultivated and 11% pawned from others. In addition to oil palm, land owned by respondents in the form of rubber is 89% with an area of 1-10 ha, rice field is 56% of respondents, field 22% and 33% still have shrubs area. All land is located on a private land location.

c. Plasma farmers

The total number of oil palm plots owned by all respondents is 1 plot each with an area of 2 ha, with the status of 67% occupied and self-cultivated and 33% work on other people's land (profit sharing). Apart from oil palm, the land that the respondents also owned was 89% paddy with an area of 0.4-2 ha, rubber 67% of respondents and 22% shrubs. All land is located in a private land location; 67% of respondents were land owners before the land was turned into plasma oil palm plantations by the company. There were no respondents who stated that before becoming a plasma plantation this plantation had already been a smallholder oil palm plantation. According to respondents, the acquisition process by a palm oil company:

- 1) Divided equally by all families (245 households), each family gets 2 ha
- 2) Negotiations between villages, landowners and companies, then felling, slashing, burning and land clearing.
- 3) The company replaced the plants on land used by the community before, in accordance with the government regulations in force at that time.
- 4) Management by the company in cooperation with the village, then the results are distributed to villages and farmers 20% and 80% company (KKPA).
- 5) The company worked on the land from land clearing to planting and maintenance for 3 years and then handed over to farmers with a share of 80:20, 80 for the company and 20 for farmers.
- 6) Large families get 6 plots of no compensated land by the company. The company credit of 17 million can be paid in 10 years from 30% of the harvest.
- 7) All respondents said they were happy after the conversion into a plasma oil palm plantation.

4.3. Characteristics of oil palm plantation use

a. Pure independent smallholder

Planting pattern of oil palm plantations in seven study villages was dominated by monoculture pattern, especially in Pematang Gadung and Gema villages. This was different from the villages of Sungai Besar, Sungai Pelang, Mekar Raya, Kemora, and Batu Daya, where respondents planted oil palm with mixed patterns; 20% of Sungai Pelang respondents planted oil palm mixed with pineapple, while 31% of

Mekar Raya Village respondents planted oil palm mixed with jengkol trees, so did 36% of Kemora Village respondents, 13% of Sungai Besar respondents and 9% of Batu Daya respondents planted oil palm with a variety of mixed plants.

Almost all respondents have flat land of oil palm plantations, except for a few respondents from several villages that have slopping to steep land, for example in Mekar Raya Village there are 31% of respondents, Kemora 25% and Batu Daya 9% who have land with sloping topography and in Gema 41% of respondents have sloping land and 18% of respondents have steep land.

The history of land tenure in each village is different: (1) Land originated from buying (i.e. in Pelang and Pematang Gadung villages), (2) Land originated from grants/transmigration (i.e. in Pelang Village and Sungai Besar), (3) Land originated from inheritance (i.e. in Gema Village, Mekar Raya, Kemora and Batu Daya). The history of land use before planting with oil palm shows that: (1) The land was originally shrubs area; this was found in Pelang Village, Sungai Besar, and Pematang Gadung, (2) The land was originally a rubber plantation; this was found in Gema, Mekar Raya, Kemora, and Batu Daya villages.

There are several reasons for the change in land use into oil palm plantations, including: (1) the price of palm oil is high so it is more profitable when compared to other products at that time; this is the opinion of most respondents from Sungai Besar, Pematang Gadung, Mekar Raya, and Batu Daya (2) following friends/others to cultivate oil palm, stated by the majority of respondents in Sungai Pelang Village and Kemora and (3) frequent fires, stated by the majority of Village Gema respondents. The most frequent changes in land use to oil palm plantations were in 2012-2014, although some respondents in Sungai Besar Village and Pematang Gadung had started planting oil palm in 2001-2002. Almost all respondents stated that in order to manage oil palm plantations in occupied and self-cultivated manner, few respondents pawned their land to other people or did a sharing profit system with others.

The number of palm plots owned by respondents varied from 1 to 9 plots, while the average number of palm plots owned by respondents ranged from 1-2 plots. The area of oil palm plantations ranged from 0.5-25 ha. In Sungai Pelang, Sungai Besar and Batu Daya villages, the most respondents had oil palm plantations with an area of 1 ha, while in Pematang Gadung, Mekar Raya and Kemora most respondents had an oil palm area of 2 ha. Unlike the four other villages, in Gema Village most respondents owned oil palm land with an area of 5 ha. Palm planted was 1-10 years old, most respondents owned oil palm that was 5 years old. The location of the oil palm plantation was between 0-17 km from the respondent's house, and most of the distance from the house to the palm plantation was 0.5-3 km.

Table 4.4. Data on number of plots, plantation area, age, and distance to oil palm plantation

Data category	Village						
	Sungai Pelang	Sungai Besar	Pematang Gadung	Gema	Mekar Raya	Kemora	Batu Daya
Number of plots	1-6 1&2	1-8 1	1-4 2	1-6 3	1-9 1	1-2 1	1-2 1
Large of area (Ha) the most frequently	1-10 ha 1 ha	0.5-25 ha 1 ha	1-9 ha 2 ha	2-14 ha 5 ha	1-25 ha 2 ha	1-5 ha 2 ha	1-4 ha 2 ha
Age (yr) the most frequently	1-6 yr 5 yr	1-7 yr 5 yr	1-6 yr 4 yr	1-10 yr 5 yr	3-7 yr	5-7yr 5 yr	5-6 yr 5 yr
Distance (km) the most frequently	0-10 km 0.5 km	0-10 km 3 km	0.1-4 km 1-2 km	1-17km	0-2 km 1 km	0-4 km < 1km	0-5 km < 1km

Sources: Data Analysis Results TI (2019)

b. Cooperative-based independent smallholder

The types of oil palm plantations owned by respondents in Muara Jekak Village were dominated by monocultures (89%) which were entirely on private land with a status of occupied and self-cultivated. The area of oil palm owned ranged from 2-10 ha, most often was 2 ha. The age of the palm was around 2-13 years, the most was 5 years; 56% of the respondents' oil palm plantation were in flat and 44% sloping land. The distance from the house to the garden was not too far, around 3-10 km.

Land tenure history; 57% of land was occupied by inheritance, 22% was obtained by buying and 11% was a grant/gift. The current land use is entirely oil palm plantation, but before being occupied 44% were rubber plantations, 22% were fields and 11% were already oil palm plantations. The conversion of land into oil palm plantations by respondents starting in 2005-2016, the most was in 2013. The most frequent reason for land changes was because of joining friends/other people (56%) and higher/profitable price (22%). The majority of oil palm lands currently do not have certificates, only 22% of respondents have certified land.

c. Plasma farmer

The number of plots owned by respondents in Teluk Bayur Village was 1 plot with an area of 2 ha, and all of them were on private land with a distance of 3-15 km to the garden. Palm age was also uniform, which was 22 years; 67% of respondents owned flat oil palm land, 22% sloping and 11% steep; 89% of respondents stated that they occupied the land through the distribution of plasma plantations from the company (56% in 2010, 33% occupied since 2000) and 1 respondent inherited from parents. The current land use is 100% oil palm plantations and began to be

converted into oil palm in 1997. Before occupied, 44% was secondary forest, 33% damar plantation, 11% rubber plantation and 11% shrubs; 89% of respondents said that oil palm land had a certificate.

The written/oral agreement from the manager of nucleus estate that had not been fulfilled according to respondents (89%) was the agreement on plasma land certificate owned by farmers. Earlier it was stated that the land certificate would be given after the plantation development credit had been fully paid by the farmers, after the credit being paid off (in 5-6 years), but until now the company has not yet given the certificate, due to overlapping with the HGU.

The 44% respondents said there was help from the government to facilitate communication between plasma farmers and companies. The Village Government had mediated the meeting between plasma and companies related to land certificates but until now there is no clear point obtained by plasma; information from BPN mentioned that the obstacle was the company's taxes during the permit has not been paid.

The results of this study indicate that there are two legal statuses of oil palm land, namely: (1) the certified land; this is stated by most respondents from Sungai Pelang (56.0%), Sungai Besar (73.3%), Pematang Gadung (68.8%), and Teluk Bayur Village (89%); (2) the uncertified land; this is stated by the majority of respondents from Gema Village (88.2%), Mekar Raya (93.8%), Kemora (92%), Batu Daya (91%), and Muara Jekak (78%). The certificate status of the oil palm estates in each village is presented as follows:

Table 4.5. Status of ownership certificates for oil palm plantations

Ownership certificates status (%)	Gema	Mekar Raya	Pematang Gadung	Sungai Pelang	Sungai Besar	Kemora	Batu Daya	Muara Jekak	Teluk Bayur	Average
Uncertified	88.2	93.8	31.2	40	26.7	92	91	78	11	61.3
Certified	0	6.2	68.8	56	73.3	8	0	22	89	35.9
Not answer	11.8	0	0	4	0	0	9	0	0	2.8

Sources: Data Analysis Results TI (2019)

4.4. Management of smallholder oil palm plantation

Funding Sources

a. Pure independent smallholder

To manage oil palm plantations the respondents obtained capital from various sources. The results of the study show that the source of funds for managing oil palm plantations was mostly obtained from own capital (independent funds), however some respondents also obtained capital from loan funds, including: (1) loans from Credit Union (respondents in Gema and Mekar Raya), (2) bank loans (respondents in Pematang Gadung Village, Sungai Pelang and Sungai Besar), (3) loans from families or other farmers (respondents in Sungai Pelang and Sungai Besar villages).

b. Cooperative-based independent smallholder

The 56% of respondents used their own source of funds for managing oil palm plantations, but another 44% of respondents used loan capital from village cooperatives, with an amount of IDR 8 million-10.5 million for each respondent.

c. Plasma farmer

All respondents stated that the source of funds for the management of plasma oil palm plantations came from loans; 89% of respondents stated that the initial fund for the development of plasma oil palm in the amount of IDR17 million was owned to the company, deducted by 30% from the sale of palm fruit every month; 11% of respondents stated that farmers did not know that all costs of the loan funds were charged to farmers. The agreement was the result of the core plantation negotiation of a unilateral agreement from the core company and the village elite (according to 78% of respondents); the rest said they did not know; 56% of respondents stated that they were involved in calculating the cost of investment in their plasma plantations, which was an explanation from the company regarding the costs of plantation development from land clearing to 48 months of age. From land clearing, road construction, seedlings, planting and maintenance costs until the plasma is handed over to farmers, notified of the amount; 89% of respondents stated there was a complaint/problem mechanism regarding plasma oil palm plantations where 44% of respondents stated complaints through cooperatives, 22% stated that if there were plasma problems farmers reported to the chair of the farmers group then the chairman could relate the plasma issues to the company.

Seedling sources

a. Pure independent smallholder

One of the first steps in the development of oil palm plantations is the provision of seedlings. The results of the study show that most respondents from all study villages obtained oil palm seeds by buying from other traders or farmers. In addition,

some of them also bought seeds from the company, or made their own seeds by germinating palm seeds collected from other farmers' oil palm plantations. The variety of seedlings most widely cultivated are Marihat, then followed by Lonsum, Sopim, Costarika, Sokpindo, Spindo, Tanera and Sriwijaya.

Some respondents bought seeds that were ready for planting or seeds that had been sprouted. The seeds were purchased at a price that varied depending on the type and size. Most respondents in Sungai Besar, Pematang Gadung and Mekar Raya bought oil palm seedlings at a price of <IDR 10,000/stem, while in Sungai Pelang and Gema villages the majority of respondents bought seedlings at a price of IDR 21,000-30,000/stem. Specifically in the Kemora Village, the most widely cultivated type was Socfindo, namely by 75% of respondents; 50% of whom bought from the company in the form of seeds at a price of IDR 1,200,000/500 seeds, the rest bought from other trader/farmers.

Table 4.6. List of prices for oil palm seeds in the field

Seedling price (IDR)	Village						
	Sungai Pelang	Sungai Besar	Pematang Gadung	Gema	Mekar Raya	Kemora	Batu Daya
Min	1,400	1,000	1,750	6,300	1,200	2,400	2,000
Maks	75,000	35,000	51,000	35,000	35,000	25,000	25,000
< 10.000	12%	40%	50%	5.9%	43.8%	50%	63%
10.000-20.000	16%	20%	6.3%	29%	0	8%	0
21.000-30.000	68%	16.6%	37.5%	52.9%	18.8%	8%	18%
31.000-40.000	0	3.3%	0	11.8%	6.3	0	0
>41.000	4%	0	6.3%	0	0	0	0

Sources: Data Analysis Results TI (2019)

Related to farmers' knowledge about the quality of seedlings planted, this study shows that in the villages of Pematang Gadung, Mekar Raya and Batu Daya, more than 50% of respondents knew the quality of seedlings, in the villages of Sungai Pelang, Sungai Besar and Kemora there were 40% of respondents knowing, while in Gema Village only 5.8% of respondents knew the quality of the seedlings planted. In addition, there were only 20% of respondents from all villages who had the knowledge of: a place to purchase quality seeds, the characteristics of quality seeds, and the oil palm planting system.

b. Cooperative-based independent smallholder

The 56% of respondents used their own source of funds for the management of oil palm plantations, 44% used loan capital from village cooperatives, with an amount of 8 million-10.5 million for each respondent.

Smallholder oil palm which used their own sources of funds purchased seedlings from seed traders at a price of IDR 35,000, while respondents with cooperative funding source stated that seedlings were provided by the village cooperative at a price of IDR 55,000.

The most widely used seed varieties are Marihat. This type was planted by all respondents. Other varieties are Sriwijaya (33% of respondents) and Lonsum (11% of respondents); 44% of respondents said they knew the quality of seedlings planted. Farmers who knew the effect of oil palm seedlings on the quality of production were 56% which stated that if the quality of seedlings was good, the yields were also good.

c. Plasma farmer

All respondents stated that: farmers were not involved in making decisions about seedlings, both seed sources, types of seedlings and the number of seedlings planted, but 11% of respondents said they were told that the number of seedlings planted was 260/2 ha or 130/ha. Oil palm seedlings were entirely from the company. All respondents stated that farmers were not involved in determining the type/quality of oil palm seedlings planted. Only 11% of respondents said they knew the quality of seedlings planted in plasma plantations, namely Marihat; 89% of respondents stated that the quality of seedlings in smallholdings was the same as core estate. There was no plasma farmer who claimed to know how much the price of oil palm seedlings planted in plasma garden because the seeds were prepared by the company.

Land Clearing

a. Pure independent smallholder

Starting the cultivation of oil palm plantations, the farmers carried out land clearing. The results of this study indicate that all respondents in the Kemora and Batu Daya Villages and more than 80% of respondents in the Gema and Mekar Raya Villages cleared their land by cutting, slashing, burning, where the cleared lands were originally planted with rice before converted to oil palm plantations. Land clearing in this way was also carried out in Pematang Gadung Village (by 68% of respondents) and in Sungai Pelang and Sungai Besar (by 40% of respondents). In addition to cutting, slashing, burning, there were also other alternatives to clearing land by using herbicides, this was mainly done on open land.

The reason for land clearing with cutting-slashing and burning systems was because this method considered easier and cheaper. The implementation of this land clearing system turned out to have a negative impact on the community, among others: the occurrence of forest and land fires, as stated by most respondents in Sungai Pelang,

Sungai Besar and Pematang Gadung villages. However, the negative impact was not felt by the majority of respondents in Gema and Mekar Raya. Land clearing could be carried out in a number of ways, as follows:

- (1) Through arisan or mutual cooperation of family members or other neighbors/farmers, this was done by the majority of respondents in the villages of Gema, Mekar Raya, Kemora and Batu Daya. Costs incurred for land clearing activities in this system were limited to consumption costs (food and drink). It took quite a long time to clear land depending on each village, for example in Mekar Raya Village, Kemora and Batu Daya, it took ½-1 month, while in Gema Village took 1-4 months.
- (2) Personally done by farmers, this was mostly done by respondents in Pematang Gadung Village and Sungai Pelang Village. Land clearing system did not require labor costs.
- (3) Using labor, through a contract (wholesale) system, with a cost of cutting trees IDR 6 million/ha and costs of clearing and cleaning IDR 1.8-3 million/ha. In addition to the wholesale system, a daily wage system was also applied at a cost of IDR 100,000 -150,000/day. This was mostly done by respondents in Sungai Pelang and Sungai Besar villages. The time needed for land clearing was ½-1 month.

Land clearing in Sungai Pelang and Sungai Besar villages required shorter time (1 day to 2 weeks) because their land was in the form of fields or shrubs so that most respondents (63%) did it by spraying herbicides; others (30%) used lawn mowers/tractors.

b. Cooperative-based independent smallholder

All respondents carried out land clearing using the cutting-slashing-and burning system. The reason for using the slash-burn technique according to 56% of respondents was for soil fertility and 44% said it was easy and inexpensive. The majority of respondents stated that they felt the negative impact of using fire for land clearing and cleaning, which was disturbing their health; 11% said it caused land fires. The land clearing activities carried out around 1-21 days at a cost of IDR 120,000-2 million/ha. According to respondents with funding from village cooperative loan, the cost of land clearing was included in the loan.

c. Plasma-pattern farmers

All respondents stated that farmers were not involved in decision making at the time of land clearing and preparation, but 11% of respondents said there was an MoU.

Palm Planting

a. Pure independent smallholder

After the land was available, and the rainy season arrived, the farmers planted oil palms. The commonly used spacing was 9.2 m x 9.2 m to obtain a plant population of 136 per hectare. However, in reality it was often inappropriate because of the topography and land conditions of the area. The number of population per hectare was thought to affect three production components: total plantation production, average long weight and productivity. In this study the respondents stated that the spacing used in planting oil palm was 6 m x 6 m to 9 m x 10 m, but the results of this study obtained information that most respondents applied planting spacing: 8 m x 8 m, 8 m x 9 m, and 9 m x 9 m or equivalent to the number of oil palm plants 100-125 stems/ha or 126-150 stems/ha. The data on oil palm planting are presented in the following table:

Table 4.7. Number of trees for planting oil palms

Number of seedlings planted / ha	Village						
	Sungai Pelang	Sungai Besar	Pematang Gadung	Gema	Mekar Raya	Kemora	Batu Daya
Min (stems)	100	78	67	70	56	80	85
Maks (stems)	230	179	235	250	220	187	160
Distribution (%)							
< 100 / ha	0	3.3	6	6	12.5	16	27
100-125/ ha	8	40	38	29	37.5	67	27
126-150/ ha	68	40	38	41	31.3	8	18
151-175/ ha	16	13	6	6	6.3	8	18
176-200/ ha	0	3	6	12	6.3	0	0
> 200/ ha	4	0	6	6	6.3	0	0

Sources: Data Analysis Results TI (2019)

The oil palm planting system was carried out in a number of ways: (i) planted personally; this was done by most respondents either individually or by involving the family. This method did not require planting costs, (ii) wholesale/contract planting per seedlings, which was IDR 3,000-10,000/seedlings, (iii) wholesale/contract planting per hectare, i.e. IDR 600,000-1,200,000/ha, (iv) daily wage system of IDR 65,000-120,000/day for 3-12 days.

b. Cooperative-based independent smallholder

All respondents stated using spacing in planting oil palms, the most frequently was 9m x 9m (89% of respondents) and 8m x 8m (11% of respondents). The number of oil palm planted 92-200 stems/ha. Planting costs according to respondents ranged from IDR 500,000-4.8 million, and for respondents with funding sources from village cooperatives the planting costs were included in the loan component.

c. Plasma farmer

All respondents stated that farmers were not involved in decision making when planted seedlings, but after 3 years the plantations were handed over to farmers for their management.

Treatment of oil palm plantations

a. Pure independent smallholder

After the seedlings were planted, the farmers would carry out planting treatment. Almost all respondents (more than 90%) carried out treatment of oil palm plantations by: (i) manually (in Sungai Besar and Mekar Raya, Kemora, and Batu Daya), and (ii) using herbicides (Sungai Pelang, Pematang Gadung, and Gema); the most commonly used herbicides were Gramoxon and Round up, in addition Herbatop and Gempur were also used. The price of the herbicide used also varied from village to village, ranging from IDR. 60,000-85,000/liter to IDR. 90,000-120,000/liter.

Treatment of oil palm plantations was carried out in several ways: (i) conducted alone by farmers involving workers from the family; this method was carried out by most respondents, (ii) daily wages, i.e. IDR 70,000-120,000/day, totaling 2-5 mandays, (iii) wholesale wages IDR 500,000-700,000/ha. In Pematang Gadung Village, there was 1 respondent who had a large enough area, so spraying work was given to high school students after school with a contract system of IDR 10,000/tank, where each person was able to work on 6 tanks.

b. Cooperative-based independent smallholder

Almost all respondents did treatment or weeding (89%), the majority of them carried out using a combination of herbicide and manual. The time needed for manual treatment was 1-24 days, at a cost of IDR 3,000-5,000/stem or IDR 1-1.8 million. The types of herbicides used were Gramoxon, Round up and Paratop.

c. Plasma farmer

Only 22% of respondents stated that farmers were involved in decision making of seedlings treatment, but after 3 years the plantation were handed over to farmers for their management.

Fertilization

a. Pure independent smallholder

In addition to oil palm plantations treatment by using herbicides, farmers also fertilized oil palm plants. Most respondents in each village carried out fertilizing activities for oil palm plants: Pematang Gadung (100%), Sungai Pelang (96%),

Sungai Besar (93%), Gema (76%), and Mekar Raya (63%) . However, in Kemora Village there were no respondents who fertilized their plantation, nor did 92% of respondents in Batu Daya Village, and only 8% of respondents did fertilizing. The most widely used fertilizers were NPK and Urea, and some respondents also used Borax, KCl, dolomite, TSP, SP36, and manure. Fertilization had been carried out since planting, age 1-3 months, or age 1-3 years. Fertilization was most often done on plants aged 3 months after being planted in the field. Fertilization frequency varied 1-4 times per year, but the most often done was fertilizing 1-2 times/year. The amount of fertilizer used was 1-1.5 kg per stem or 50-400 kg/ha. Fertilizers used were almost entirely obtained by buying at various prices. The majority of respondents stated that access to buy fertilizer was quite easy, but the constraints faced were limited capital, high fertilizer prices, and fertilizer scarcity according to several respondents. Comparison of types and prices of fertilizers for each village is presented in the following table:

Table 4.8. Prices of fertilizers

Types and prices of fertilizers/50 kg (IDR)	Village				
	Sungai Pelang	Sungai Besar	Pematang Gadung	Gema	Mekar Raya
Urea	135,000-160,000	135,000-160,000	130,000-330,000	200,000-250,000	100,000-260,000
NPK	75,000-160,000	140,000-300,000	49,000-200,000	150,000-310,000	100,000-600,000

Sources: Data Analysis Results TI (2019)

b. Cooperative-based independent smallholder

Almost all respondents in Muara Jekak Village carried out fertilization (89%), the fertilizers used were NPK, Urea, KCl and borax; 44% of respondents stated that they fertilized since the beginning of planting, 11% stated that they only fertilized after 3 months and 5 years. Fertilization frequency was 2 times per year and 3 times per year. The time needed for fertilizing was 1-9 days. The amount of fertilizer used was 250 -2,000 kg.

c. Plasma Farmer

The 44% of respondents in Teluk Bayur Village stated that farmers were involved in decision making on fertilization.

Pests and diseases control

a. Pure independent smallholder

In contrast to treatment of oil palm plants in the form of weeding or fertilizing, the results of the study show that the majority of respondents did not control pests and disease of oil palm plant, only a few respondents did such as respondent in

Pematang Gadung (44%), Sungai Besar (37%), Sungai Pelang (28%) and Gema (11%); even in Mekar Raya, Kemoran, and Batu Daya none of the respondents did pest and diseases control.

Disease control activities were carried out using pesticides but were not carried out routinely or only in the event of an attack. Pesticides used include Decis, Furadan and Regent. The price of pesticides used varied from IDR 30,000-500,000/ bottle depending on the type and size of the pesticide. The dosage used by the respondent followed the recommendations stated on the label. This activity was carried out by 1-2 mandays, came from within or outside the family.

b. Cooperative-based independent smallholder

The majority of respondents did not control pest diseases; only 33% of respondents stated that they controlled pest diseases. Control was carried out only if there was an attack using pesticides.

c. Plasma farmer

The 33% of respondents stated that farmers were involved in decision making when controlled pest diseases; the pest control was carried out by farmers.

Pruning/ trimming leaves

a. Pure independent smallholder

Almost all respondents in each village did pruning/trimming leaves, but the frequency varied 1-3 times/year, and most of them said they did not do it specifically, but pruning activities were generally carried out simultaneously with the harvest time.

In managing oil palm plantation, the respondents stated that there was no involvement of children, but they involved women especially for fertilizing and harvesting activities.

b. Plasma farmer

The 44% of respondents stated that farmers were involved in making decisions when pruning leaves.

c. Cooperative-based independent smallholder

The 78% of respondents did pruning/trimming leaves. This activity was carried out by several respondents in conjunction with harvesting activities, with a time required of 1-4 days.

Harvesting

a. Pure independent smallholder

The first harvesting activity ('sandy fruit') was generally carried out on oil palm plants aged between 2-4 years, but the first harvest most often done by respondents at the age of 3 years. The harvesting of palm fruits was done at most 2 times per month or 24 times per year, but there were also those who harvested 1 time/month or 12 times/year, or harvested 18 times/year or every 20 days. The results of the study also show that there were no activities carried out after harvesting except transportation to TPH. The data on harvesting of palm fruit are presented in the following table:

Table 4.9. Data of smallholder palm harvesting

Harvesting	Village						
	Sungai Pelang	Sungai Besar	Pematang Gadung	Gema	Mekar Raya	Kemora	Batu Daya
First harvesting							
Age (range) more often	2-4 3	2-4 3	2.5-4 3	2.5-4	2.5-4 3	2.5-5 3	3-4.5 3
Harvest yield (kg/ha/ year) range average	10-9600 1,369	8-8,000 1,810	17-71,667 5,492	240-4-800 1,364	50-2400 1,063	60-1,300 476	300-1,500 972
Price (IDR) more often	500-1,100 1,000	250-1,100 1,000	500-1,400 700	500-1200 1,200	600-1,300 1,000	500-700 500	500-750 500
Harvest cost (IDR)	Personally done and 200/kg	Personally done and 200/kg	Personally done and 200-250/ kg	Personally done and 150-500/ kg	Personally done and 200/kg	Personally done	Personally done
Harvesting for last year							
Age (range) more often	3-7 5	3-7 5	3-6 4	4-10 5	3-7 4	5-7 5	5-6 5
Harvest yield (kg/ha/ year) range average	100-48,000 8,601	120-24,000 6,901	174-21,667 4,179	750-16,800 5,621	50-15,360 3,942	400-3000 1,287	1,200-11,200 4,700
Price (IDR) more often	250-1,680 700	650-1,020 700	520-800 700	650-900 700	600-1,000 700	500-700 500	500 500
Harvest cost (IDR)	Personally done and 200/kg	Personally done and 200-250/kg	Personally done and 200-250/kg	Personally done and 150-300/kg	Personally done and 200/kg		

Sources: Data Analysis Results TI (2019)

b. Cooperative-based independent smallholder

The first age of harvesting/sand fruit according to respondents ranged from 3-5 years, but most often at the age of 3 years (67%). Harvesting was done at most 2 times per month or 24 times per year, but 22% of respondents only harvested 1 time per month or 12 times per year.

The first harvest was most often done at the age of 3 years (56%), 4 years (22%) and 2 years (11%), with a total yield of 78 -19,200 kg/year, most often was 3,600 kg/year. The price of palm fruit in the first harvest ranged from IDR 900-1,500. Whereas the last year's age of harvest was 4-13 years; age 4 years 33% and age 5 years 33%, with a total yield of 14,400 -240,000 kg/year or 1,250-24,000 kg/ha/year, an average of 13,193 kg/ha/year. The price of harvested palm fruit in the last one year was IDR 950-1,020, most often IDR 1,000 (67% of respondents).

c. Plasma farmer

The results of the study in Teluk Bayur Village show that 67% of respondents stated that farmers were involved in decision making on harvesting. The form of involvement was that the company determined the harvest date, farmers who harvested with a wage of IDR 1,400/kg FFB and a palm foreman visited at harvest; 67% of respondents also stated that they were notified by the company about the amount of FFB production, with a receipt from the company stated the amount of FFB which was 600-700 TBS at the age of 4-5 years old planting and usually farmers calculated personally.

Last year's harvest production (2017-2018) ranged from 12,000-30,000 kg/ha/year, the average was 20,895.6 kg/ha/year. According to 56% of the respondents, the company had already informed the price of FFB, or had it been determined before harvesting, only knew how many kilos of the crop were paid and the price of FFB was determined by the government. There were 56% said the company notified the calculation of the income of farmers by involving farmers while weighing, and 44% said the company informed the profit sharing mechanism; 67% of respondents stated that the condition/quality of land (for example slope, flood hazard, fire hazard/conflict with orangutans, fertility) of smallholdings was lower than the core estates.

Plasma plantations receive different treatment from core plantations according to 89% of respondents. And according to all respondents, the productivity of plasma farmer palm was lower than the core estate. Plasma farmer found out about these differences through: more fruit in core estate because oil palm growth was more healthy, while production in plasma was decreasing and palm leaves turn yellow. The core estate was managed by the company with proper treatment and fertilization, while the plasma plantation was managed by farmers who lack knowledge of proper oil palm cultivation. Less yields, smaller bunches, because maintenance was carried out by plasma farmer personally. Oil palm in the smallholding plantation was low maintenance, pruning and fertilizing due to cost constraints. Plasma farmer was the party who bore the risk if there was a crop failure or damage (89% of respondents) and 11% stated there was no agreement.

4.5. Palm oil marketing

a. Pure independent smallholder

Dissemination on policies related to the requirements of oil palm fruit that could be purchased was conveyed variously by respondents in the five villages: according to 69% of Mekar Raya Village respondents, the socialization had been carried out, but in Gema only 6% of respondents stated that there had been socialization, even in Sungai Pelang, Sungai Besar, and Pematang Gadung respondent said that the socialization had never been done.

This study also informs that there were collectors/middlemen in all villages; even in Sungai Pelang, according to respondents, there are 6 collectors, while in Sungai Besar there are 3 collectors, but in Kemora Village, respondents stated there were no middlemen in the village; middlemen only existed in the Simpang Dua and did not routinely come to Kemora Village. There was a mill/factory but the factory was outside the village. Even though there were factories, farmers could not sell palm oil directly to mills, but through middlemen holding SPK. According to respondents, the distance from the village to the mills/factories ranged from 20-220 km. Some of the mills/factories known by respondents as the places to sell FFB were as follows: (i) Sungai Pelang Village: PT Limpah Sejahtera mill, (ii) Mekar Raya Village: PT CUS, Sinas Mas and PT MBK mill-a distance of 25-80 km from the village, (iii) Gema Village, PT Sinas Mas mill, 30 km from the village, (iv) Pematang Gadung Village: PT Metro, PT KAL, and PT BGA with a distance of 100 km from the village, (v) Sungai Besar PT Metro, PT KAL, PT BGA, and PT Limpah Sejahtera with a distance of 45-160 km.

The majority of farmers sold oil palm to collectors/middlemen. The selling method used was the farmer transporting the harvest to his house and the collector would come to pick up the fruit directly to his house/garden; some farmers would collect the harvest on the side of the road to be taken by the subordinates of the collectors or the farmer would sell it at the Collection Site (TPH) and transportation cost from TPH would be charged to the collector. Respondents in Sungai Pelang village all said that they did not know Delivery Order holders or the difference in FFB prices, while according to respondents in Sungai Besar and Mekar Raya there was a difference of IDR 400-500 between the price at the village and at the factory.

The survey results show respondents of several villages that directly sold FFB to the factory: (i) Pematang Gadung Village, there was 1 respondent who had a Delivery Order (DO) to sell FFB directly to PT KAL but no assistance from the factory, (ii) Sungai Pelang, there were farmers who directly sold to PT Limpah Sejahtera but did not have a DO so that it was still through an intermediary, (iii) Mekar Raya, there was 1 respondent, a palm fruit collector, who sold to PT Sinas Mas, but due

to not having DO the sale was done through other middlemen as SPK holders. As a note, the palm fruit had to be processed within 48 hours after it was harvested otherwise it would have an impact on the increasingly damaged quality of crude palm oil (CPO).

Most respondents stated that the determinants of the price and source of information on the price of oil palm were collectors/middlemen, while the determinants of the price of middlemen are middlemen who have SPK from mills. The transaction between farmers and collectors was done in cash, paid directly after weighing the FFB. In addition, there were also transactions through the 'ijon system' or future contract as conveyed by 16% of respondents in Sungai Besar Village.

b. Cooperative-based independent smallholder

All respondents stated that there was an oil palm farmer group, namely 'Karya Bersama' and all respondents were in the group. The objectives of the farmer group according to respondents were:

- For village loan requirements (44%)
- Capital development of smallholder gardens, support fertilizers supply, herbicides and buy FFB (22%)
- Facilitate the sale of FFB yields and facilitate the purchase of fertilizer (11%)
- To increase togetherness (11%)

In the sale of oil palm, 56% of respondents stated that the transportation costs had been deducted by the cooperative at the selling price, 11% stated the cost of 150/kg.

All respondents stated that there were middlemen and there were mills. The distance from the village to the mills was 8-30 km. The selling target of FFB according to 66% of respondents was PT PTS Bumi Raya Group, and 33% PT LAB (Lanang Agro Bersatu). The method of selling was 11% selling through cooperatives, 11% through collectors, 22% through BUMDES and 22% directly to palm oil mill. In direct sales, respondents said they had a contract/DO (delivery order) with the mill. Assistance from the mill was in the form of technical harvesting of palm fruit and cooperative contracts with PT PTS. Problems in marketing according to respondents were:

- If the CPO in PT PTS was full then the harvest would be delayed
- Unstable prices

4.6. Training and guidance

a. Pure independent smallholder

The majority of respondents stated that they had never received training and

guidance. Only 12% of respondents in Pematang Gadung and 6.3% of respondents in Mekar Raya Village said that they had received training and guidance. The training in Pematang Gadung Village was about how to cultivate palm oil according to standards, how to plant, treatment, fertilize, maintain quality fruit, and produce solutions for pest control (by PT BGA). While in Mekar Raya Village the training was obtained by respondents from the company PT Prakasa Tani Sejati (PTS) Bumi Raya Group. The results of the study show that respondents need several training topics related to oil palm cultivation, namely: (i) proper cultivation and care of oil palms, (ii) how to make the oil palm fruitful, (iii) training to make herbicide, (iv) training to make fertilizer, (v) marketing training.

b. Plasma farmer

Sixty seven percent (67%) of respondents stated that they had received training or guidance on oil palm but were not complete, including management of oil palm plantations, how to fertilize (the amount of fertilizer for each tree), how to treat oil palm, how to do the pruning and how to harvest, which was carried out by the company through the foreman. The majority stated that the training was conducted once, but there were also those who said that they had received training 20-24 times. All respondents who received training stated that the training or guidance was beneficial to farmers including farmers being able to know how to fertilize, harvest and manage oil palm plantation. The type of training or guidance that farmers wanted for the development of oil palm management was training from companies on oil palm cultivation/gardening, that was the training about fertilizer and maintenance, rejuvenation, pruning, planting systems and harvesting.

The 78% of respondents stated that there were knowledge and skills provided by the company/core estate to plasma farmer, including:

- Planting spacing
- Treatment and fertilization methods
- Pest control,
- Time and technique of harvesting, dodos equipment from the company
- The foreman instructed the SKT chair to be forwarded to the members
- Knowledge of oil palm processing through the foreman

c. Cooperative-based independent smallholder

There was only 1 respondent who had received training about technical harvesting from PT PTS. The type of training expected by respondents was training from the plantation office on:

- Proper technique to cultivate oil palm (56%)
- How to fertilize and maintain
- How to process palm oil

4.7. Smallholder business capital

a. Pure independent smallholder

The 78.4% of respondents stated that capital for the oil palm plantation business was obtained from their own capital combined with household/other expenses; only a few respondents (10-20%) prepared separate capital for the smallholder oil palm business. A small proportion of respondents (6.6%) obtained business capital from loans: (i) Credit Union loans (CU), in Gema Village (Cancur Pancur Dangeri) and Mekar Raya Village (Lantang Tipo CU), (ii) bank loans, in Pematang Gadung Village, Sungai Pelang and Sungai Besar, (iii) loans from families or other farmers in Sungai Pelang and Sungai Besar villages. The rest (12.6% respondents) got capital from others such as the results of arisan, rubber harvesting, laboring, selling, etc.

b. Cooperative-based independent smallholder Koperasi

The 56% of respondents stated that the source of capital for oil palm business came from their own funds, and source of funds 44% of respondents came from the farmers cooperative group 'Karya Bersama'; 56% said they prepared a special capital for oil palm cultivation.

c. Plasma farmer

All respondents stated that the source of funds for the management of plasma oil palm plantation came from loans; 89% of respondents stated that the initial fund for the construction of plasma oil palm amounting to IDR 17 million was owed to the company, from the sale of palm fruit every month it was deducted 30% and 11% of respondents stated that the loan funds before the handover and all costs were charged to the farmers.

The results of this study show that respondents who held land certificates in oil palm plantations were respondents in Mekar Raya Village (6.2%), Pematang Gadung (68.8%), Sungai Pelang (56%), and Sungai Besar (73.3%). These respondents had access to loans from both the Credit Union and the bank. The majority of respondents who did not have a certificate were found in Gema Village (88.2%) and Mekar Raya Village (93.8%).

4.8. Oil palm revenue

a. Pure independent smallholder

The study results show that oil palm, entrepreneurs, and rubber were the largest sources of income in certain villages, as follows: (i) the biggest source of income derived from oil palm took place in Mekar Raya, Sungai Besar, and Pematang

Gadung; (ii) the biggest source of income from entrepreneurs took place in Gema and Sungai Pelang, and (iii) the biggest source of income derived from rubber took place in the villages of Batu Daya and Kemora.

The highest average annual income obtained from independent smallholder oil palm was in Gema Village (IDR. 23,151,765/year), followed by Pematang Gadung (IDR.21,022,625/year), Mekar Raya (IDR.17,396,625/year), Sungai Besar (IDR 11,314,533/year), Sungai Pelang (IDR 9,380,480/year), Batu Daya (IDR 7,581,818/year) and Kemora Village (IDR 5,625,000/year). From the total average income of respondents per year, the percentage of income contributed from oil palm in each village varied; Gema contributed for 30%, Mekar Raya contributed for 49%, Sungai Pelang contributed for 23%, Sungai Besar contributed for 41%, Pematang Gadung contributed 34%, Batu Daya contributed 22% and Kemora contributed 18%; 20-30% of respondents stated that there was an improvement in the household economy after the oil palm plantation business, but only 10% of respondents stated that their income from oil palm was sufficient for their living needs.

Table 4.10. List of income sources

Sources of income	Sungai Pelang	Sungai Besar	Pematang Gadung	Gema	Mekar Raya	Kemora	Batu Daya
1. Agriculture							
Oil Palm plantation	23,151,765	17,396,625	9,380,480	11,314,533	21,022,625	5,265,000	7,581,818
Rubber plantation	4,725,882	4,507,500	68,000	2,293,333	3,397,500	18,556,667	15,981,818
Rice field	0	0	6,820,000	2,066,667	4,781,250	0	0
Other field	1,157,647	562,500	796,000	266,667	1,900,000	0	0
2. Worker	0	150,000	4,724,000	3,450,000	1,250,000	0	909,091
3. Entrepreneur	27,552,941	2,250,000	13,800,000	5,733,333	16,465,000	0	0
4. Professional	12,705,882	10,187,500	2,080,000	133,333	7,000,000	4,666,667	7,454,545
5. Other	3,823,529	0	1,580,000	2,333,333	7,093,750	0	2,727,273
6. Total income per year	73,117,647	35,054,125	39,248,480	27,591,200	62,910,125	28,488,333	36,654,545

Sources: Data Analysis Results TI (2019)

b. Cooperative-based independent smallholder

Revenue from the oil palm sector was 28% of the total annual income sources of respondents. As many as 89% of respondents said there had been an economic improvement after managing oil palm plantation due to a steady income.

Table 4.11. Sources of respondent income in Muara Jekak Village

Sources of income	IDR	%
1. Agriculture		
Oil palm plantation	30,971,111	27.63
Rubber plantation	906,667	0.81
Paddy field	88,800	0.08
2. Worker	0	0
3. Entrepreneur	62,155,556	55.45
4. Professional	17,333,333	15.46
5. Other	644,444	0.57
6. Total income per year	112,099,911	100

Sources: Data Analysis Results TI (2019)

c. Plasma farmer

Revenue from the palm oil sector was 68% of the total annual income sources of respondents; 44% of respondents stated that there was an economic improvement after managing oil palm plantation; oil palm yields were greater than other income. There were even respondents who stated that with the establishment of oil palm plantation they could build house, bought vehicle and opened independent oil palm plantation.

Table 4.12. Respondents' income in Teluk Bayur Village

Sources of income	Income per household	
	IDR	%
1. Agriculture		
Oil palm plantation	58,174,222	68.16
Rubber plantation	7,066,667	8.28
Paddy field	1,008,333	1.18
2. Worker	55,556	0.07
3. Entrepreneur	13,333,333	15.62
4. Professional	3,555,556	4.17
5. Other	2,155,556	2.53
6. Total income per year	85,349,223	100

Sources: Data Analysis Results TI (2019)

4.9. House conditions

a. Pure independent smallholder

The majority of respondents in Sungai Pelang and Sungai Besar stated that their houses had wooden floors and wooden walls; in Pematang Gadung Village, Gema and Batu Daya the majority of the houses had ceramic floors and brick walls, while in Mekar Raya Village and Kemora the majority of the houses had ceramic floors and cement walls. Most of the house roofs were zinc/asbestos especially in the villages of Gema and Mekar Raya, while in Sungai Besar, Sungai Pelang, and Pematang Gadung besides zinc/asbestos, there were several respondents whose houses were roofed with shingles and roof tiles.

House size and total yard area varied, in Sungai Pelang and Sungai Besar, the majority of respondents owned houses with a size of 36 m² and a yard of 2,500 m², while for the villages of Pematang Gadung, Gema, and Mekar Raya had various sizes. In detail, data on the size of houses and yards are presented as follows:

Table 4.13. Housing condition

Size (m ²)	Village						
	Sungai Pelang	Sungai Besar	Pematang Gadung	Gema	Mekar Raya	Kemora	Batu Daya
House Range more often	25-400 36	36-1,125 36	54-360	45-280	30-200	35-98 63	54-84 63
Yard Range more often	200-20,000 2,500	200-19,600 2,500	256-3000	96-1,200	100-8,500	200-3500	200-2,000

Sources: Data Analysis Results TI (2019)

b. Cooperative-based independent smallholder

House floors were 56% ceramics, 33% wood and 11% soil. The walls were 78% brick and 22% planks. The roofs were 78% zinc/asbestos and 22% shingles. House size was 54-198 m² and land size was 64-2,000 m².

c. Plasma farmer

All respondents had a house with brick walls and a roof made of zinc/asbestos; 56% of respondents had ceramic floor, 22% wooden floor and 11% cement floor. The size of the house was 60-175 m², most often was 72 m², with a land size of 140-4800 m².

4.10. Existence of High Conservation Value Areas (HCV)

a. Pure independent smallholder

High Conservation Value Areas (HCV) are areas that have a biological, ecological, social or cultural value or attributes related to ecosystems that are managed naturally or traditionally, which are considered very important at a national, regional and global scale. This study informs that not many respondents understand the concept of High Conservation Value (HCV); this is indicated by the low percentage of respondents who understand the HCV concept: Pematang Gadung (6%), Gema (6%), Mekar Raya (25%), Sungai Pelang (0%), Batu Daya (27%), Kemora (0%) and Sungai Besar Village (0%). Similarly, respondents' knowledge about BKSDA (the Natural Resources and Conservation Agency) was still low, including: Sungai Pelang Village (4%), Pematang Gadung Village (12.5%), and Gema Village (6%).

Regarding the existences of protected flora/fauna which are now no longer found according to respondents in each village as follows: (i) Sungai Pelang, the last orangutan discovered in 2013, (ii) Sungai Besar, the last orangutan found in 1990 and the last proboscis monkey was found in 2017-2018, (iii) Pematang Gadung village, the last hornbill was found in 2015, (iv) Kemora, the last orangutan in 1970-1980. Most respondents (94%) in Mekar Raya Village, 83% in Kemora Village and 73% in Batu Daya Village use rivers for bathing and washing, while other uses are for water transportation, agricultural irrigation or plantation irrigation and fishing. Following is the presence of HCV area around the plantation according to respondents:

Table 4.14. High Conservation Value Areas around the village

HCVA	Village						
	Sungai Pelang	Sungai Besar	Pematang Gadung	Gema	Mekar Raya	Kemora	Batu Daya
Protection Forest	-	Available: 3.3%	Available: 6.3 %	Available: 5.9%	Available: 93.8%	Available: 42%	Available: 55%
National Park	-	-	-	-	-	-	-
Customary Forest	-	Available: 3.3%	Available: 6.3 %	-	-	-	Available: 6%
APL (non-forest area)	Available: 4%	Available: 3.3%	Available: 37.5%	Available: 5.9%	Available: 87.5%	Available: 25%	Available: 45%
River border	-	-	Available: 56.3%	Available: 11.8%	Available: 43.8%	Available: 58%	Available: 63%
Peat area > 3m deep	Available: 28%	Available: 33.3%	Available: 18.8%	Available: 17.6%	-	-	-
Tembawang	-	Available: 3.3%	Available: 12.5	Available: 5.9%	-	Available: 58%	Available: 73%
Here is a lake/ swamp that is visited by birds/ other animals	-	Available: 36.7%	Available: 25%	Available: 11.8%	-	-	-

Sources: Data Analysis Results TI (2019)

According to respondents, the HCV area around the plantation mostly had status of APL (Other Utilization Area) in almost all villages. The presence of other HCV areas was as follows: (i) protection forest in Sungai Besar, Pematang Gadung, Gema, Mekar Raya, Kemora and Batu Daya (ii) peat area > 3 m deep, located in Sungai Pelang, Sungai Besar, Pematang Gadung, and Gema, (iii) customary forests, found in the villages of Pematang Gadung, Gema, and Batu Daya (iv) river border, found in Pematang Gadung, Gema, Mekar Raya Kemora and Batu Daya, and (v) tembawang, located in the village of Sungai Besar, Pematang Gadung, Gema Kemora and Batu Daya.

4.11. Knowledge of sustainable palm oil certification

a. Pure independent smallholder

The results of the study show that most respondents did not understand about palm oil certification because they did not receive any socialization about it. Some respondents who understood about palm oil certification obtained through their own initiative. This condition caused very few respondents to be interested in certifying their oil palm plantations. Some obstacles to obtaining certification of oil palm plantations according to the respondents included: (i) respondents had not received any information on palm oil certification, (ii) respondents did not know how to administer for palm oil certification, (iii) respondents did not understand the benefits of palm oil certification, (iv) respondents had limited capital.

The various obstacles above had caused limited knowledge of RSPO, ISPO and sustainable agriculture for respondents. From the survey results it was found that only 6% of respondents in both Pematang Gadung and Mekar Raya had obtained information about RSPO/ISPO, while information on sustainable agriculture was only known by 12.5% of respondents from Pematang Gadung and 6% of respondents from Gema Village.

b. Plasma farmer

All respondents said they did not hear or understand the purposes of palm oil management certification.

4.12. Replanting

The results of the study show that the majority of respondents stated they had no plans to carry out replanting, except 53% of respondents from Gema Village. The reason the respondents did not yet have a replanting plan was the fact that their oil palm plants were still very young and the price of palm fruit tended to be cheap. Respondents also prepared no special funds for replanting, in fact most of them said they did not know yet where the funding for replanting came if it was

carried out. Some other respondents managed special funds derived from selling palm fruit, set aside from the remaining household expenses, or borrowed from the CU and the bank.

In addition to replanting oil palm, there were also farmers who planned to expand their oil palm fields. The number of respondents who planned to expand oil palm land in each village was as follows: Sungai Besar (50%), Pematang Gadung (38%), Sungai Pelang (32%), Gema and Mekar Raya (<20%) while in Kemora and Batu Daya there were no plans for expansion of oil palm land. The reason for the small number of respondents who wanted to expand oil palm was because the price of palm was cheap. The motivation of respondents who wanted to expand their oil palm land were because they still had untapped land (i.e. 2 hectares of transmigration land in Sungai Besar Village), or because they wanted to have more oil palm plantations and still had land in the form of shrubs.

Among the respondents who would carry out replanting, there were respondents who planned to use certified seedlings, including: Gema (76%), Mekar Raya (56%), Sungai Besar (53%), Sungai Pelang (44%), and Pematang Gadung (44%). The purpose of using certified seeds was to produce good fruit and good production. However, some respondents also stated that the higher price of certified seed was the reason for farmers to not use it for replanting.

4.13. Oil palm farmer organization

Regarding the existence of oil palm farmer organizations, based on surveys in seven villages, the existence of farmer group organizations was only found in Sungai Pelang, Sungai Besar and Pematang Gadung villages with the following conditions: (i) Sungai Pelang, 16% of respondents were members of oil palm farmer group that aimed to obtain a pattern of revenue sharing with PT Limpah Sejahtera, (ii) Sungai Besar, 43% of respondents were members of the oil palm farmer group, and (iii) Pematang Gadung, 25% of respondents were members of the oil palm farmer group.

Whereas in Mekar Raya Village, 12.5% of respondents said that they were members of farmer group but their activities were more about rice farmers so that the benefits obtained were: to facilitate obtaining rice production (fertilizer and seed) support from the government. Whereas in the Kemora and Batu Daya Village there were no respondents who joined the farmer group.

There were several reasons why farmers were not members of farmer organizations, including: (i) farmers were not interested, (ii) farmers were not invited or facilitated to become members, (iii) farmers did not have time, (iv) no organization was

available yet, which was in accordance with the needs of the farmers; specifically in Gema Village no farmer organization has been formed until now.

4.14. Savings

The survey results show the percentage of respondents doing saving activities in each village, as follows: (i) Mekar Raya (100%), (ii) Gema (76%), (iii) Pematang Gadung (56%), (iv) Sungai Besar (50%), (v) Sungai Pelang (44%) (vi) Kemora (58%), and (vii) Batu Daya Village (91%). The average amount of savings most frequently made by respondents was less than IDR. 500,000/month. Respondents stated that the savings were planned to be used to: (i) finance children's education/schooling, (ii) buy land/investment, (iii) daily/family needs, (iv) urgent needs, (v) health and (vi) venture capital. Of the savings owned, almost all respondents stated that they did not set aside funds for replanting activities, only a few respondents (6.3%) in Mekar Raya Village stated that the savings would also be used for replanting.

4.15. Future plans

Regarding children education plans, almost all respondents wished their children education to reach the university level (bachelor), although there were respondents in Sungai Pelang (16%), Sungai Besar (23%), Kemora (16%) and Batu Daya (9%) who wanted to educate children up to high school only.

The survey results show that several respondents from five villages stated that there was indeed an improvement in the quality of life of farmers from oil palm plantation: (i) Gema (52.94%), (ii) Pematang Gadung (43.8%), (iii) Sungai Besar (36, 7%), (iv) Sungai Pelang (32%), and (v) Mekar Raya (6.3%). Through oil palm, they felt a change that the former income from wages as temporary laborers, now added by a fixed income every month from oil palm eventhough the yields were only small. The majority of respondents stated that the oil palm plantation business did not change their lifestyle; in addition the respondents also stated that there was a good impact on road access and smooth communication, but unfortunately it had not significantly improved their welfare. For this reason, farmers put their hopes in the government as follows: (i) the government gives attention to independent oil palm smallholder, (ii) the government provides assistance in order to be able to sell FFB directly to mills, (iii) support availability of fertilizer, superior seeds, production input, (iv) there is guidance/counseling on oil palm cultivation, (v) there are government policies that encourage changes in oil prices.

4.16. Topography and soil conditions of oil palm plantation

The topography and soil conditions of oil palm plantations in the villages where the study was conducted show variety of information. Specifically the topographic conditions were as follows:

- a. Flat topography; there were three villages with entire land (100%) had a flat topography (Sungai Pelang, Sungai Besar, and Pematang Gadung), and a portion of land with flat topography in Gema (12%), Mekar Raya (44%), Kemora (8%) and Batu Daya (45%).
- b. Wavy topography, found in Gema (29%), Mekar Raya (38%), Kemora (16%) and Batu Daya (27%).
- c. Steep topography, found in Gema (41%), Kemora (8%) and Mekar Raya (6,3%).

The survey results show that there were several types of oil palm plantation land, namely: mineral soil, peat, and swamps. The soil types of land of oil palm plantations in each village were as follows: (i) Sungai Pelang; 40% peat, 16% mineral, 4% peatlands and minerals, (ii) Sungai Besar; 57% peat, 17% small swamps, and 10% mineral soil, (iii) Pematang Gadung; 50% mineral soil and 31% small swamp, (iv) Gema, 88% mineral soil, (v) Mekar Raya, 75% mineral soil (vi) Kemora 33% mineral soil, and (vii) Batu Daya, 73% mineral soil.

4.17. Maintenance of oil palm plantation

This study surveyed the condition of pasar pikul, piringan, gawangangan mati, TPH, collection trenches, and main trenches. Based on the survey results, the most proper and complete maintenance activities in plantation could be found in Pematang Gadung Village; this was stated by the respondents as follows: (i) the condition of pasar pikul was good (stated 68.8% of respondents), (ii) the condition of piringan was good (75% of respondents), (iii) the condition of gawangangan mati was good (62.5% of respondents), (iv) the condition of collection site was good (81.3% of respondents), (v) the condition of collection trench was good (stated 75% of respondents), and (vi) the main trenches condition was good (stated 75% of respondents). While in Gema Village, there were respondents who said they did not have piringan (47%), did not have TPH (47%), and did not have main trenches (35.3%). Respondents who did not have main trenches were also found in Mekar Raya Village (62.5%); in addition respondents in this village did not have collection trenches (62.5%). The frequency of farmers on cleaning trenches varied 1-3 times/year. Cleaning the trench collection was done personally by cleaning thick weeds/shrubs then cutting manually. Most respondents said that they had never maintained it; maintaining the main trench was done by the government. The maintenance activities of oil palm plantation in detail were presented in the following table:

Table 4.15. Condition of oil palm plantation maintenance activities

Parameter	Village						
	Sungai Pelang	Sungai Besar	Pematang Gadung	Gema	Mekar Raya	Kemora	Batu Daya
Pasar pikul	Good: 64.0%	Good: 43.3%	Good: 68.8%	Good: 35.29%	Good: 50%	NM: 33%	Good: 27%
Piringan	Good: 48.0%	Good: 56.7%	Good: 75%	Good: 41.2% NA: 47%	Good: 44%	NM: 33%	Good: 27%
Gawangan mati	Good: 60.0%	Good: 53.3%	Good: 62.5%	Good: 29.4%	Good: 50%	NM: 33%	Good: 27%
Collection site (TPH)	Good: 56.0%	Good: 73.3%	Good: 81.3%	Good: 41% NA: 47%	Good: 62%	NM: 33%	Good: 27%
Collection trenches	Good: 52.0%	Good: 66.7%	Good: 75%	Good: 11.7%	NA: 62.5% NM 37.5%	NM: 25% NA: 16%	NM: 55% NA: 9%
Main trenches	Good: 60.0%	Good: 83.3%	Good: 75%	Good: 5.9% NA: 35.3%	NA: 62.5% NM: 37.5%	NM: 25% NA: 8%	NM: 55% NA: 9%

Sources: Data Analysis Results TI (2019)

Description: **NA** = Not Available; **NM** = Not Maintained

The table above shows that the most comprehensive maintenance activities had been carried out in Pematang Gadung Village, then followed by Sungai Besar Village, Sungai Pelang, Mekar Raya, and Batu Daya. On the other hand, there was no maintenance at all in Kemora Village.

4.18. Soil conservation

Survey related to soil conservation activities conducted by the respondents show the following results: (i) terrace ridges, almost all respondents stated that there were no terrace ridges in their oil palm plantation, very few respondents (6.3%) in Mekar Raya and (9%) in Batu Daya Village have terrace ridges, (ii) horseshoe, not many respondents prepared horseshoe in their palm oil plantation: respondents in Sungai Besar (6.6%), Gema (29.4%), Batu Daya (27%) and Mekar Raya (25%), (iii) frond stacking on the slope; all respondents in Mekar Raya Village stated that frond stacking was available, (iv) ponds/orak; no respondent stated that there was any orak/embung. Respondents' knowledge about the importance of land conservation was still limited: Mekar Raya Village (50% of respondents), Pematang Gadung Village (19%), Batu Daya Village (9%) and Gema Village (6%). Respondents' knowledge about the minimum distance of oil palm plantation

from the river boundary was also lacking: Mekar Raya Village (44%), Pematang Gadung Village (12.5%), Sungai Besar Village (7%), Batu Daya Village (9%) and Gema Village (6%). The survey results also showed that respondents still placed rows of oil palm plants that were so close or were on the riverbank, for example in Sungai Besar Village (a distance of 1-8 m), Pematang Gadung (1-15 m), Gema (2-500 m), Batu Daya (10-1,000 m), Kemora (50-500 m) and Mekar Raya (2-350 m).

Box 1: Soil conservation activities

Terrace ridges are mounds of ridges equipped with drains at the back of the ridges. This method is also known as the channeled ridges. On high permeability soils, ridges can be made precisely in the direction of the contour lines. Whereas on low permeability soils, mounds are tilted to contours of no more than one percent towards the drain. This is intended so that water that does not immediately enter the ground, can be channeled at low speed out of the field.

Rorak is a place/water reservoir or infiltration hole, made in the field of processing or infiltration channels. Dead holes of a certain size are made in the processed field and parallel to the contour lines. The function of the rorak is to trap and absorb water into the soil and collect sediments from the processed field. The excavation is made next to the main plant for drainage, containing erosion and placing organic material/fertilizer.

Horseshoe is a terracing technique commonly called horse tread. The terracing here only need to flatten the soil around the oil palm plants. Tread horse has a standard size of 3 m x 3 m to 4 m x 4 m.

FronD stacking is a pile up of leaves/midrib along the contour line, and mud holes are dug next to each plant. The leaves are stacked right away after harvesting and after corrective pruning, or just before the rainy season.

4.19. Water management

The survey results showed that in the villages of Gema, Kemora, Batu Daya and Mekar Raya, there were no respondents (0%) who carried out water management; this was because in the four villages there were no ditches. Unlike the case with Sungai Besar and Pematang Gadung villages, in these two villages the majority of respondents stated that there were primary and secondary ditches, but in Sungai Besar Village there were no tertiary ditches. In addition to the availability of trenches, respondents from Sungai Besar villages (50%), Sungai Pelang (36%), and Pematang Gadung (6%) stated that there were flood gates. Nearly all respondents stated that there were no water level measurements except stated by 7% of respondents in Sungai Besar, as for the mud dredging schedule the majority of respondents did not do this except 4% of respondents in Sungai Pelang Village and 3% of respondents in Sungai Besar.

This water management activity according to the respondents was carried out in several ways: (i) conducted by the government through a system of wages and collectives (according to respondents in Sungai Besar Village), (ii) conducted in

mutual cooperation and collaboratively (according to Sungai Pelang respondents), (iii) self-conducted (according to Pematang Gadung respondents).

4.20. Nutrient deficiency

Most respondents in Gema Village did not answer information about nutrient deficiencies, including N, Mg, K, Boron, or Fe/Cu/Zn, while other respondents (11.7% of respondents) stated that there was little nutrient deficiency in their oil palm plants. Most farmers (64.7%) also did not understand how to find out that their oil palm plants lack of nutrients, nor did they know where to obtain information about nutrient deficiencies.

In the village of Mekar Raya, only 60% of respondents stated that there was little nutrient deficiency in their oil palm plants, while the rest (40% of respondents) stated that there was a lot of nutrient deficiency. Their way to find out the symptoms of nutrient deficiency: by looking at the growth of stems and leaf color. Basically they did not know where to ask for information about nutrient deficiency; they only relied on their farming experience and their work experience from the company.

In Pematang Gadung village, the majority of respondents stated that there was little nutrient deficiency in their oil palm plants. Their way to find out the symptoms of nutrient deficiency was through learning from friends, farmers and neighbors (stated by 25% of respondents) or by looking at the symptoms of yellowing leaves (stated by 31.3% of respondents). Some respondents stated that in this village there were no extension staff, so regarding nutrient deficiency they asked friends, neighbors, or farmers; other respondents did not know where to ask.

In Sungai Pelang village, the majority of respondents did not answer whether nutrient deficiency occurred in their oil palm plants, only 12% stated that there was an N deficiency and 4% said it was yellowing leaves. No respondent answered how to find out the nutrient deficiency. Some of them (12%) did not know where to ask for information about nutrient deficiency, while others taught self-learning (12%), learned from other farmers (16%), or learned from neighbors (12%).

In Sungai Besar village, 63% of respondents said that there was little nutrient deficiency in their oil palm plants. To find out that their oil palm plantation lacked nutrients, the respondents learned from other farmers, seeing the conditions then asked friends, looking at the condition of plants for example with the yellowing leaves. The same thing they did when they wanted to find out information about nutrient deficiency was through: asking friends who worked on plantations, self-learning, or from relatives who had planted oil palm.

In the village of Kemora, out of 50% of respondents surveyed in the field, 16% stated that there were many N, Mg and Fe/Cu/Zn deficiencies and 33% stated that there were many K and Boron deficiencies, in Batu Daya Village 36% of respondents stated that there were many N deficiencies, Mg, K, and Boron and 45% expressed a lot of Fe/Cu/Zn deficiencies. Farmers know that their oil palms were nutrient deficient by looking at plant conditions and obtain information about nutrient deficiencies from their farming experience and from neighbors or other farmers.

4.21. Oil palm pests and diseases

The results of studies related to pests and diseases of oil palm plantation showed that Mekar Raya was the village where the most respondents stated that there were pests and diseases of oil palm plants, while the fewest pests and diseases were stated by respondents from Gema. Most respondents said they did not make any efforts to control pests and diseases. The effort to control was only carried out by a small number of respondents in Pematang Gadung, Sungai Besar and Sungai Pelang, through: spraying using pesticides, fungicides, cleaning land, removing rotten fruit or harvesting earlier.

Almost all respondents said that they had never been trained to use pesticides, except for 1 respondent each in Sungai Pelang, Pematang Gadung and Mekar Raya villages who had been trained to use pesticides, especially pesticides for rice plants. Respondents who said they knew the instruction for using pesticides were 31% of respondents in Pematang Gadung, 30% of respondents in Sungai Besar, and 16% of respondents in Sungai Pelang, 6% in Gema. The instruction for using pesticides were obtained from the brochures on packaging/bottles and customs. Respondents' knowledge about integrated pest control was still low, this was shown by the results of the survey as follows: in Sungai Besar village, none of the respondents stated that they knew about integrated pest control, while in other villages the number of respondents who knew integrated pests control also relatively low, that's in rice cultivation activities. The number of respondents who knew integrated pest control methods were respondent in Sungai Pelang (12%), Pematang Gadung (6%), and Gema (6%). In detail, the survey about pests and diseases of oil palm plants is presented as follows:

1. Survey on oil palm pests

Rat pests are the most common pests, and are found throughout the village. In the villages of Sungai Besar, Pematang Gadung, Sungai Pelang and Mekar Raya, a small number (<30%) of respondents stated that they carried out control efforts by

using rat poison and clearing the land, the rest stated that they did not carry out control efforts because the general attacks were still small. Whereas in the village of Gema there were no respondents who made efforts to control rat pests.

Orytes / beetles are the pests most often found after rats in all study villages. Several respondents in Pematang Gadung, Sungai Pelang and Sungai Besar villages stated that in controlling, they generally used pesticides. The rest of the respondents said they did not carried out control, because there were not many attacks. In the villages of Gema and Mekar Raya there were no respondents who stated that they were making efforts to control *Orytes* pests.

Fire caterpillars and **bagworms** are found in all villages, mostly in the villages of Kemora, Batu Daya, Mekar Raya (69%), Pematang Gadung (63%), Sungai Pelang (52%) and Sungai Besar (37%). In Gema only 6% of respondents stated that there were fire caterpillars and bagworms. In Mekar Raya and Gema, none of the respondents did control efforts to overcome the fire caterpillars and bagworms pests, while in Pematang Gadung (19%), Sungai Pelang (12%) and Sungai Besar (3%) respondents said they did control efforts.

2. Survey on oil palm diseases

Rotten fruit diseases is found in all villages, where this type of disease is most often found in the villages of Pematang Gadung, Sungai Besar, Sungai Pelang. Control efforts were only carried out by a number of respondents in Sungai Besar and Pematang Gadungs, that is by removing rotten fruit and harvesting earlier.

Ganoderma disease is found in all villages. Ganoderma is the most common disease encountered in Batu Daya (100%), Kemora and Mekar Raya Village, which was stated by 81% of respondents. In the Village of Gema and Mekar Raya there were no respondents who carried out control efforts. Some respondents in PematangGadung Village, Sungai Besar and Sungai Pelang undertook control efforts with fungicides, while the majority stated that they did not take control efforts.

Crown diseases in all villages. Most respondents said they did not make any efforts to control, only a few respondents in Pematang Gadung, Sungai Besar and Sungai Pelang made efforts to control the disease.

3. Pest control

Pest control efforts are carried out by the respondents as follows:

Owls, the use of predators such as owls to overcome rat pests is very effective than using rat poison or rodenticides. Rat poison has many disadvantages, among others it can cause chemical pollution to the environment, as well as causing the smell

of carcasses around the plantation. Respondents who stated knowing the benefits of maintaining owls were 24% of respondents in Sungai Pelang Village, 27% in Sungai Besar Village, 25% in Pematang Gadung Village, 6% in Gema Village.

Nine o'clock flowers (*Imago parasatit*): All types of oil palm are vulnerable to fire caterpillars. This caterpillar can cause damage to the leaves of plants up to 40-80 percent. If this caterpillar pest attack is not immediately controlled, the result is that the oil palm will eventually die because they cannot live well, and of course the production of Fresh Fruit Bunches (TBS) will also decrease dramatically. The nine o'clock flower turned out to be an ideal food source and habitat for *Sycanus*, a natural predator capable of preying on caterpillars. Respondents who stated knowing the benefits of the nine o'clock flower were: Sungai Pelang (28% of respondents), Sungai Besar (3%), Pematang Gadung (19%), and Village Gema (6%).

Paraquat: Used for more than 40 years, both on large and small plantations, paraquat dichloride, known simply as 'paraquat', is one of the most widely used herbicides in the world. In Indonesia, 'paraquat' is sold under the name Gramoxone. This highly toxic weed demolition material is commonly used in oil palm plantations in Southeast Asia. The substances it contain are very dangerous when inhaled, ingested or absorbed through the skin. Until now there has been no antidote to paraquat poison. An important issue regarding paraquat is the risk posed to workers on plantations. In northern countries accidents often occur in the use of this substance. However, conditions are more alarming in developing countries because the instruction and suggestion for the use are often not properly addressed. Workers on plantations often work long periods of time, such as ten months a year, and six days a week. Therefore, they are very likely to be exposed to poison routinely. Regarding paraquat, survey results showed that the majority of respondents (70.3%) did not use paraquat, some others still use paraquat in small quantities.

4.22. Accessibility

Collection road

In Sungai Pelang village, respondents stated that the collection road was 3-6 m wide, but most often it was 4 m; 32% of respondents stated that the condition of the road was good, some respondents said that the collection road was a dirt road. Respondents in Sungai Besar stated that the width of the collection road was 1-5 m, but most often it was 1 m; 63% of respondents stated that the road condition was good; some respondents mentioned that the collection road was in the form of dirt road. In Pematang Gadung, respondents stated the width of the collection road was 1-12 m, but most often it was 2 and 2.5 m; 68% of respondents said that

road condition was good. In the Village of Gema and Mekar Raya the collection road width was 1-2 m, but most often it was 1 m; 50% of respondents in Mekar Raya and 18% of respondents in Gema village stated that the condition of the collection road was good. In Kemora Village, respondents stated that the width of the collection road was 1-3 m, but most often it was 3 m while in Batu Daya Village the respondents stated that the width of the collection road was 1-4 m, but the most frequent were 1 and 3 m.

Main road

In Sungai Pelang village, respondents stated the width of the main road was 1-9 m, but most often it was 8 m; 40% of respondents stated that the road condition was good. Some respondents mentioned that the main road was asphalted, while some mentioned that it was a stone road. In Sungai Besar respondents stated that the width of the main road was 1-8 m, but most often it was 4 m; 67% of respondents said that condition was good. In Pematang Gadung, respondents stated that the width of the main road was 1-15 m, but most often it was 4 m and 81% of respondents stated that the condition was good. In Gema Village respondents stated that the width of the main road was 1-9 m and in Mekar Raya 1-15 m, but the most frequent was 2 m; 69% of respondents in Mekar Raya and 24% of respondents in Gema Village stated that the condition of the main road was good. In Kemora Village and Batu Daya Village, respondents stated that the width of the main road was 2-6 m, but most often it was 6 m.

Bridges and culverts

There were no bridges and culverts according to respondents in the villages of Gema and Mekar Raya. In Sungai Pelang, respondents stated that the bridge width was 3-6 m, but most often it was 5 m. 32% of respondents said that condition was good, some respondents said the bridge was made of wood. In Sungai Besar respondents stated that the bridge width was 1-6 m, but most often it was 6 m; 67% of respondents said that condition was good. In Pematang Gadung Village, respondents stated that the bridge width was 2-6 m, but most often it was 4 m and 50% of respondents stated that the condition was good.

Maintenance

As many as 40% of respondents in Sungai Pelang stated that the road maintenance was done annually, on the other hand 12% stated that there was no road maintenance. The collection road maintenance was done individually, while the main road maintenance was done collectively with the hamlet mutual assistance if the road had been damaged or if there were some funds from the government.

Maintenance of the collection road in Sungai Besar was done individually by cleaning own plantation while maintenance of the main road was carried out

annually with budget resources from the village funds through mutual assistance or by the government where special workers hired with a wage system and laborers come from the community.

As many as 40% of respondents in Pematang Gadung Village, 31% of respondents in Mekar Raya and 11% of respondents in Gema stated that the road maintenance was carried out in annual frequency. The road maintenance was only carried out if the road was damaged and the collection road maintenance was carried out by cleaning up their own plantation individually.

4.23. Income per capita

The average annual income of the respondents in all study villages was mostly obtained from agricultural business sources (oil palm, rubber, rice, and others). In Mekar Raya, 64% of income came from agricultural businesses. Other villages showed a percentage of income from diverse agricultural sources such as Sungai Besar (58%), Pematang Gadung (49%), Sungai Pelang (43%) and Gema (40%). Specifically in the agricultural sector, the oil palm plantation business was the highest source of income compared to other agricultural businesses. The highest source of income after oil palm was rubber, found in Mekar Raya, Gema and Sungai Besar, while in the villages of Sungai Pelang and Pematang Gadung the second source of income after oil palm was rice.

The complete source of respondent's income is presented in the following table:

Table 4.16. Sources of income of respondents

Source of income	Sungai Pelang		Sungai Besar		Pematang Gadung		Gemra		Mekar Raya		Kemora		Batu Daya	
	IDR	%	IDR	%	IDR	%	IDR	%	IDR	%	IDR	%	IDR	%
1. Agriculture		43		58		49		40		64		83		68
Oil palm plantation	9,380,480	24	11,314,533	41	21,022,625	33	23,151,765	32	17,396,625	50	5,265,000	18	7,581,818	22
Rubber plantation	68,000	0	2,293,333	8	3,397,500	5	4,725,882	6	4,507,500	13	18,556,667	65	15,981,818	46
Rice field	6,820,000	17	2,066,667	7	4,781,250	8	0	0	0	0	0	0	0	0
Other field	796,000	2	266,667	1	1,900,000	3	1,157,647	2	562,500	2	0	0	0	0
2. Worker	4,724,000	12	3,450,000	13	1,250,000	2	0	0	150,000	0	0	0	909,091	3
3. Entrepreneur	13,800,000	35	5,733,333	21	16,465,000	26	27,552,941	38	2,250,000	6	0	0	0	0
4. Professional	2,080,000	5	133,333	0	7,000,000	11	12,705,882	17	10,187,500	29	4,666,667	16	7,454,545	22
5. Other	1,580,000	4	2,333,333	8	7,093,750	11	3,823,529	5	0	0	0	0	2,727,273	8
6. Total income per year	39,248,480	0	27,591,200	0	62,910,125	0	73,117,647	0	35,054,125	0	28,488,333	0	34,654,545	0
7. Total income per day	107,530,08	0	75,592,33	0	172,356,51	0	200,322,32	0	96,038,70	0	78,050,23	0	94,943,96	0

Sources: Data Analysis Results TI (2019)

Chapter 5. Discussion

The study was conducted in nine villages, namely: Gema, Mekar Raya, Pematang Gadung, Pelang River, Sungai Besar, Kemora, Batu Daya, Muara Jekak, and Teluk Bayur. Although the nine villages have oil palm managed by community, each village has specific characteristics in the management of its oil palm plantations. One of the most stand out characteristics that distinguishes the oil palm farmers is the sources of funding to manage the oil palm plantations. For this reason, this study divided respondents into three groups based on their sources of funds:

- a. pure independent smallholders: the whole set of oil palm management is carried out independently by the community; there was no facilitation or assistance from other parties. Most of the capital was self-obtained, but a few respondents obtained loans/funds from financial institutions and the lending process was carried out personally without the assistance of the relevant institutions. There was no assistance in oil palm cultivation. Included in this group are 7 villages, namely: Gema, Mekar Raya, Pematang Gadung, Sungai Pelang, Sungai Besar, Kemora, and Batu Daya.
- b. cooperative-based independent smallholders; Some parts of the management of oil palm plantations, including the capital of oil palm plantations involves the role of cooperatives/BUMDes/plasma management organizations. Smallholder oil palm plantations is aged around 2-13 years old (planting started in 2006). Financing the construction of a smallholder plantation was assisted by a plasma administrator with a maximum area of 1 ha. The financing started from: land preparation, planting, procurement of seeds to maintenance. However, a maintenance cost component of up to 48 months was agreed later, whether financed by the plasma management organization or by the farmer. Managers of plasma plantations provided assistance in oil palm cultivation, they gained experience in oil palm cultivation from the company. Included in this group is Muara Jekak Village.
- c. plasma farmers: the oil palm management series involves oil palm company, started from the process of land clearing, land preparation, road development in plantation, seedling preparation, planting, fertilizing and maintaining; carried out entirely by the company (PT. PTS) up to the age of oil palm 4 years old. The company provided initial capital in managing oil palm. The management of plasma oil palm is carried out by companies, which then decided the sharing

profit 20% for the farmers and 80% for companies through the model of Primary Cooperative Credit for Members (KKPA). The oil palm age is 21 years old. Included in this group is Teluk Bayur Village.



Figure 5.1. Palm grains picked by women workers

Regarding to the table 6, it can be concluded that the certified oil palm land of pure-independent smallholder group is generally owned by respondents from the Javanese ethnic group (Sungai Pelang and Sungai Besar Villages) as well as respondents from the Malay. In Sungai Pelang and Sungai Besar the history of land acquisition by respondents came from the transmigration program, so it was easier to process for the land certificate of ownership. However, for the Dayak respondents (Gema, Mekar Raya, Kemora and Batu Daya), generally they have no certificate yet for their oil palm land.

The achievement of Indonesian Sustainable Palm Oil (ISPO) certification tends to be still low compared to the overall realization, although the oil palm area owned by smallholder farmers covers 45 percent of the total area of oil palm plantations in Indonesia which reaches 14 million hectares.

Generally, this study showed that for respondents in 9 villages, most respondents did not have a certificate (61.3%) compared to those who had an oil palm certificate (35.9%). Even specifically in the villages of smallholder oil palm, except plasma oil palm in Teluk Bayur Village, 67.6% of respondents had no palm land certificate. Whereas the legality of land in the form of Certificate of Ownership (SHM) is an absolute requirement for farmers to obtain ISPO certification. There are several obstacles for farmers to arrange palm oil certificates, including:

- i. The cost of obtaining land certificates is quite expensive, for example IDR 3.5 million/ha. In connection with the high cost of the arrangement, farmers prefer to buy fertilizer, rather than administer of land certificates. The expectation is to increase the productivity of smallholder oil palm which currently only around 1 ton/ha/month to be increased to 3 tons/ha/month; (<https://www.cnbcindonesia.com/news/20181128183250-4-44153/pak-jokowi-70-lahan-sawit-petani-tak-punya-certificate>).
- ii. The legality issue can cause trouble to farmers in front of the law, especially if oil palm lands encroach the forest area. The process to legalize the smallholder or independent oil palms often meet with overlapping lands.
- iii. The limited number of staff at the National Land Agency is not proportional to the number of certificates administered so that it becomes an obstacle in processing the certificates

The respondents situation which have no land certificate can be a major obstacle for oil palm farmers to get benefit from oil palm cultivation; this is due to: (i) lack of legal recognition of their land rights, (ii) the difficulty in accessing funding, plant materials, fertilizers, and training; and (iii) the ownership of land certificate become the trade precondition and a fair price for the sale of fresh fruit bunches that they harvest.

Farmers who have land certificates (SHM) are those who have the strongest proof of land rights in Indonesia. The certificate can be transferred and can also be used as collateral to borrow money from the bank. Moreover, the government is currently encouraging the certification of the Indonesian Sustainable Palm Oil (ISPO) to be compulsorily applied to all integrated oil palm plantations in the country, both state, private, and public. The government has also an interest for smallholder plantations to meet sustainability standards, so that our palm oil commodity does not become a target of bullying in Europe. Therefore, resolving the legality of land issues is certainly very important to fight against the black palm campaign by foreigners.

The respondents obtained capital from various sources to manage their oil palm plantation. Smallholders generally need significant funding to develop, maintain, and rejuvenate their oil palm plantation in order to increase the productivity and quality of fresh fruit bunches (FFB). On the other hand, they have limited sources of funding to run their oil palm plantation. Sahara, et al., (2018) in their study informed that there are several inhibiting factors for farmers to be able to access loans/credit from formal financing sources such as banks, namely:

- i. gap in demand and supply: offer loans for capital with a short term. On the other hand farmers want credit for capital and investment with a longer term.
- ii. gap in deadlines: loans cause problems considering the gestation period/the time difference (the grace period between planting and harvesting) on oil palm

is quite long. Farmers have not reap the production during this period (3-4 years). Very few loan schemes consider the situation and allow the first payment after the oil palm plantations to produce.

- iii. gap in risk sharing: Most independent smallholders do not have land certificate, considering the high costs incurred in obtaining land certificate, any changes in production cost and the price of palm oil tend to be borne by producers,
- iv. gap in legal aspects, that is, the absence of legal land ownership documents makes it difficult for farmers to provide collateral to access loans from banks.

Oil palm production is said to be successful when producing palm fruit in guaranteed quality and quantity. Farmers who did not use superior seeds in planting oil palm likely lose yields of up to 50%. However, the reality is farmers still use non-superior seeds for oil palm plants cultivation. There are several reasons why farmers do not use high quality seeds, including: (i) expensive seed prices range from IDR 35,000-IDR 50,000/stem, (ii) information and knowledge of farmers about quality seeds is still lacking.

Quality palm seedlings have some characteristics including: (i) Normal buds, and pure white color. Poor quality seedlings are shown by the deformed buds and slightly blackish brown; (ii) The shape of a broad leaf, not tangled, and not curled; (iii) Shells are dark black, and there are no cracks or other damage; (iv) Candidate stems or humps of short-sized seedlings, the shorter the prospective stems, the better the oil palm seedlings in growth and stronger when planted; (v) the shape of round or oval seedlings and the absence of hollows; (vi) Candidate roots (radicles) are slightly yellowish in color, maximum length of 5 cm, while prospective stems and leaves (flumules) are whitish; (vii) Roots in superior palm seedlings have a length of 2 to 3cm; (<https://www.isw.co.id/single-post/2018/11/07/Begini-Ciri-Bibit-Kelapa-Sawit-yang-Berkualitas>).

In addition to oil palm treatment by using herbicides, farmers also carried out fertilizing oil palm plants. In contrast to treatment of oil palm plants in the form of weeding or fertilizing, the results of the study showed that the majority of respondents did not control pests and disease of palm oil plant, only a few respondents did. Almost all respondents in each village did pruning/trimming leaves. Oil palm in the smallholding plantation is low in maintenance, pruning and fertilizing due to cost constraints.



Figure 5.2. Pruning activities of oil palm fronds



Figure 5.3. Palm oil harvest results placed at TPH (Harvesting Site)

This study analyzed the results of FFB production outside the first harvesting of respondents from oil palm plantations aged 5 years and over. According to Pahan (2008), oil palm plants can be harvested when the plant is three or four years old. The resulting production will continue to increase by age and will reach maximum production when the plants are 9-14 years old, after that the production will begin to decline. The economic life of oil palm plants ranges from 25-26 years. In addition

to affecting production, the age of oil palm plants will also affect crop productivity. This study also tried to compare FFB production between oil palm plantations with and without fertilization. Briefly presented in the following table:

Table 5.1. Oil palm FFB production yields aged 5 years and over

Village	With fertilizer (tons/ha/year)	No fertilizer (tons/ha.year)	Production based on land suitability class 5 years (tons/ha/year)		
			S1	S2	S3
Gema	6.8	2.7	18.0	16.0	14.5
Mekar Raya	5.8	4.8			
Sungai Pelang	9.0	0			
Sungai Besar	13.2	0			
Pematang Gadung	6.6	0			
Kemora	0	1.3			
Batu Daya	0	4.7			
Average	8.3	3.4			
Muara Jekak	13.2	0			
Teluk Bayur	20.9	0			

Sources: Data Analysis Results TI (2019)

The table above shows that in Gema and Mekar Raya villages where oil palm was fertilized, FFB productivity tends to be higher (5.8-6.8 tons/ha/year) compared to FFB production on un-fertilized land (2.7-4.8 tons/ha/year). However, the productivity of FFB was still lower when compared to the FFB productivity of oil palm plantations aged 5 years according to the Palm Oil Research Center (2010) in all land suitability classes, namely: (i) S1 MPA (18 tons/ha/year), (ii) KKL S2 (16 tons/ha/year), and KKL S3 (14.5 tons/ha/year). The highest productivity was obtained in Sungai Besar Village (13.2 tons/ha/year) although it was still lower compared to the level of productivity of the 5 year old palm oil according to PPKS (14.5-18 tons/ha/year). Levels of oil palm productivity aged 3-25 years based on Land Suitability (KKL) are presented in the following table:

Table 5.2. Oil palm productivity levels based on Land Suitability (KKL)

Age (year)	KKL S1			KKL S2			KKL S3		
	TBS	RBT	RJT	TBS	RBT	RJT	TBS	RBT	RJT
	(ton)	(kg)	(bunches/ trees)	(ton)	(kg)	(bunches/ trees)	(ton)	(kg)	(bunches/ trees)
3	9.0	3.2	21.6	7.3	3.1	18.1	6.2	3.0	17.9
4	15.0	6.0	19.2	15.5	5.9	17.6	12.0	5.3	17.4
5	18.0	7.5	18.5	16.0	7.1	17.3	14.5	6.7	16.6
6	21.1	10.0	16.2	18.5	9.4	15.1	17.0	8.5	15.4

Age (year)	KKL S1			KKL S2			KKL S3		
	TBS	RBT	RJT	TBS	RBT	RJT	TBS	RBT	RJT
	(ton)	(kg)	(bunches/ trees)	(ton)	(kg)	(bunches/ trees)	(ton)	(kg)	(bunches/ trees)
7	26.0	12.5	16.0	23.0	11.8	15.0	22.0	10.0	15.7
8	30.0	15.1	15.3	25.5	13.2	14.9	24.5	12.7	14.8
9	31.0	17.0	14.0	28.0	16.5	13.1	26.0	15.5	12.9
10	31.0	18.5	12.9	28.0	17.5	12.3	26.0	16.0	12.5
11	31.0	19.6	12.2	28.0	18.5	11.6	26.0	17.4	11.5
12	31.0	20.5	11.6	28.0	19.5	11.0	26.0	18.5	10.8
13	31.0	21.1	11.3	28.0	20.0	10.8	26.0	19.5	10.3
14	30.0	22.5	10.3	27.0	20.5	10.1	25.0	20.0	9.6
15	27.9	23.0	9.3	26.0	21.8	9.2	24.5	20.6	9.1
16	27.1	24.5	8.5	25.5	23.1	8.5	23.5	21.8	8.3
17	26.0	25.0	8.0	24.5	24.1	7.8	22.0	23.0	7.4
18	24.9	26.0	7.4	23.5	25.2	7.2	21.0	24.2	6.7
19	24.1	27.5	6.7	22.5	26.4	6.6	20.0	25.5	6.0
20	23.1	28.5	6.2	21.5	27.8	5.9	19.0	26.6	5.5
21	21.9	29.0	5.8	21.0	28.6	5.6	18.0	27.4	5.1
22	19.8	30.0	5.1	19.0	29.4	5.0	17.0	28.4	4.6
23	18.9	30.5	4.8	18.0	30.1	4.6	16.0	29.4	4.2
24	18.1	31.9	4.4	17.0	31.0	4.2	15.0	30.4	3.8
25	17.1	32.4	3.9	16.0	32.0	3.8	14.0	31.2	3.6
Jumlah	553.0	481.8	249.2	505.3	462.5	235.3	461.2	441.6	229.7
Rata-rata	24.0	20.9	10.8	22.0	20.1	10.2	20.1	19.2	10.0

Source: Palm Oil Research Center, 2010.

Information:

TBS = Fresh Fruit Bunches

RBT = Average bunch weight

RJT = Average number of bunches

The productivity of independent smallholders is generally lower compared to large-scale plantation companies. The yields of large-scale oil palm plantation companies can reach 30 tons/ha/year, especially those operating on mineral soils. Meanwhile, the average production yield of transmigrant independent smallholders and local smallholders in West Kotawaringin Regency when the palm trees aged 4-10 years was only 15.8 and 12.69 tons/ha/year.

The low productivity of FFB will correlate to the low productivity of CPO. The results of the research by the Indonesian Palm Research Institute stated that the yield of CPO for Tenera palm (thin-shelled) aged 4-16 years was around 17.32-21.44%, while the Dura palm (thick-shelled) aged 4-16 years had a CPO yield of around 15.78-19.72%. As according to Fauzi (2002), the difference in thickness of the palm fruit flesh causes a difference in the yield of palm oil (CPO) contained therein. The highest oil yield was found in fruit with the Tenera type (thin shell), which was an average of 22-24%, while in the Dura variety (thick shell) only contained an average oil yield of 16-18%.

Referring to the research results of the Indonesian Palm Research Institute, the average CPO productivity in the study villages ranged from 1.4-1.8 tons/ha/year for the form of thin shells (Tenera) and ranged from 1.3-1.6 tons/ha/year for thick shells (Dura). Specifically in Sungai Besar Village, CPO productivity ranged from 2.3 to 2.8 tons/ha/year (Tenera) or 2.1-2.6 tons/ha/year (Dura). This is consistent with what was conveyed by the Director General of Plantations at the Ministry of Agriculture (Kementan), that the average CPO productivity of smallholder oil palm plantations is only 2-3 tons/hectare/year. Far below the productivity of oil palm plantations in Negeri Jiran where CPO production can reach 12 tons/ha/year, as well as productivity in private plantations range from 4-8 tons/ha/year (<http://www.sertifikasimisb.com/berita/item/69-penyebab-rendahnya-produktivitas-sawit-petani.html>). Estimation of CPO production of oil palm plantations aged 5 years and above are presented as follows:

Table 5.3. Estimated CPO production result from oil palm plantations aged 5 years and above

Village	FFB Production in Fertilized Plantation (ton/ha/year)	Estimated Thin Shell / Tenera CPO (ton / ha / year)	Estimated Thick Shell / Dura CPO (ton / ha / year)
Gema	6.8	1.2-1.5	1.1-1.3
Mekar Raya	5.8	1.0-1.2	0.9-1.1
Sungai Pelang	9.0	1.6-1.9	1.4-1.8
Sungai Besar	13.2	2.3-2.8	2.1-2.6
Pematang Gadung	6.6	1.1-1.4	1.0-1.3
Average	8.3		
Muara Jekak	13.2	2.3-2.8	2.1-2.6
Teluk Bayur	20.9	3.6-4.5	3.3-4.1

Sources: Data Analysis Results TI (2019)

The table above shows that FFB and CPO production in oil palm plantations originating from the plasma pattern in Teluk Bayur Village, shows the highest FFB yield (20.9 tons/ha/year) which is then followed by cooperative-based oil

palm plantations in Muara Jekak Village (13.2 tons/ha/year), and finally pure independent oil palm plantations in seven other villages with an average FFB production of 8.3 tons/ha/year. For more convenience, you can see in the following figure:

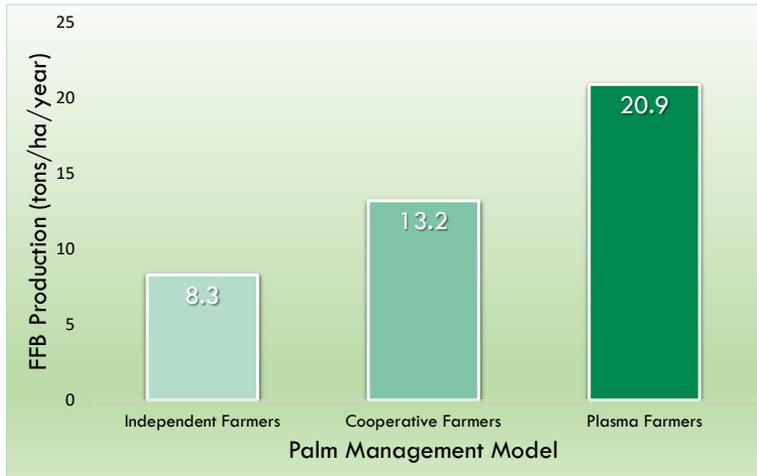


Figure 5.4. Comparison of FFB production in three management patterns of oil palm

The Indonesian Palm Oil Research Institute has classified CPO productivity levels as follows: (i) superior progeny productivity (12-13 tons/ha/year), (ii) highest commercial productivity (8 tons/ha/year), (iii) high productivity (> 6 tons/ha/year), (iv) medium-high productivity (4-6 tons/ha/year), (v) low-medium productivity (3-4 tons/ha/year), and (vi) low productivity (<3 tons/ha/year).

Low CPO productivity occurs if oil palm is not fertilized or fertilized but not enough, this is common in smallholder oil palm plantations as also found in this study where CPO productivity is around 1.4-1.8 tons/ha/year for shape thin shells (Tenera) and ranges from 1.3-1.6 tons/ha/year for thick shells (Dura). Meanwhile, if fertilization is not balanced it will cause low-medium productivity, as happened in Indonesia with CPO productivity of 3.8 tons/ha/year. Whereas balanced fertilization will increase CPO productivity to enter the medium-high category as CPO productivity in Malaysia reaches 4.5 tons/ha/year.

The low productivity of fresh fruit bunches (FFB) in smallholder oil palm is caused by several factors as conveyed by MISB Certification (2017), namely:

- i. the use of fake seeds or wild seeds is due to: lack of farmers' knowledge, the expensive price of certified superior seeds, lack of assistance from companies.
- ii. farmers want to plant oil palm quickly and cheaply regardless of yield
- iii. farmers do not maintain their plantation properly, from crop treatment, fertilization, to harvesting. Fertilization does not apply the principles of fertilization which are efficient, balanced and effective. Farmers also do not

know how to clean inter-row, do not know how to cut the midrib properly, do not know the criteria for ripe fruit.

- iv. rejuvenation of oil palm plantation (replanting) is late, currently there are more than 1 million ha of oil palm plantations with age over 25 years have not been rejuvenated.
- v. farmer institutions are not strong because they are not integrated into cooperatives or farmer groups. As a result, access to banks for capital and access to the National Land Agency, for land legality becomes limited.



Figure 5.5. Fresh FFB (Fresh Fruit Bunches)

Several other studies have also reported that oil palm smallholder plantations have low yields, apply unfavorable agricultural practices, and have vulnerability in the production process to the trade system. Various problems encountered by independent smallholders as the results of the Rizki, et al study (2017) include, among others:

- i. the non-adoption of sustainable oil palm business practices,
- ii. the use of non-superior seeds,
- iii. difficulties in obtaining capital,
- iv. there is a distortion of FFB prices at the level of oil palm farmers,
- v. low awareness of land legality,
- vi. poor administration,
- vii. lack of training and technical assistance that causes low farmer knowledge, and
- viii. lack of plant maintenance.

Furthermore, Molenaar et al. (2010) stated that the limiting factors of agricultural production systems including in oil palm include: (i) internal variables (land conditions, labor force, smallholders capacity, and smallholder organizations) and (ii) external variables (actors or institutions that control access to information, inputs, markets, and finance).

To increase the productivity of farmers' oil palm, replanting, cultivation improvement, and company support is needed through extensive partnership cooperation. The determining factors of CPO productivity according to the Indonesian Palm Research Institute include:

- i. **Climate:** the temperature (22-30°C, optimum 27°C), rain fall (1,250-3,000 mm/year, optimum 1,750-2500 mm/year), dry month (<3 months, optimum 0-1 month), humidity (50-90%, optimum 80%), long exposure to the sun (5-7 hours / day), altitude (<400 m asl, optimum 200 m asl).
- ii. **Soil condition:** oil palm grows properly on Podsolik (Ultisol), Latosol (Oxisol), Regosol (Entisol), Alluvial and Hydromorphic (Inceptisol), Andosol (Andisol), and Peat (Histosol). Good soil conditions reduce the bad influence of inappropriate rainfall. Chemical properties will be more useful for fertilizing to produce high productivity of oil palm.

For details can be seen in the following figure:

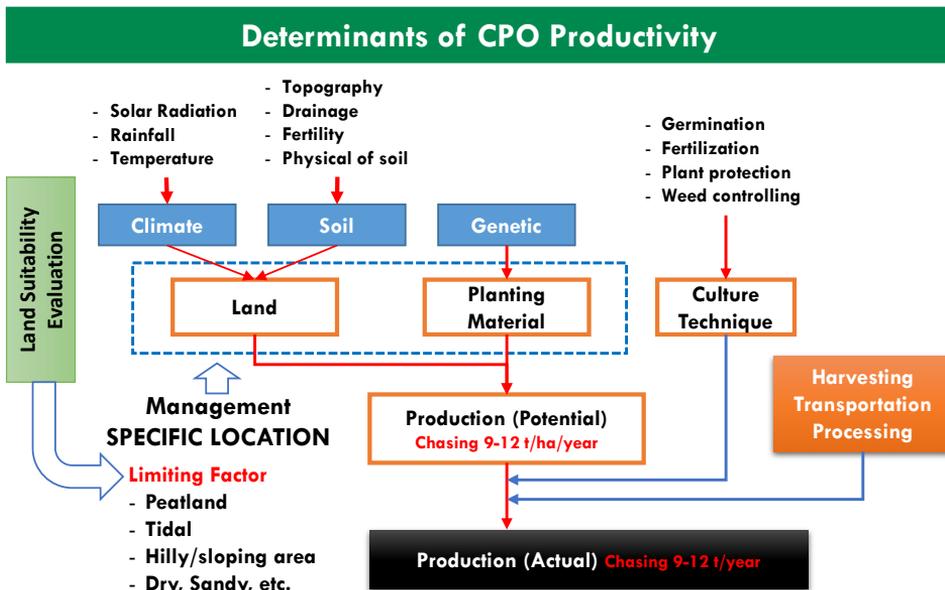


Figure 5.6. Determinants of CPO productivity (Sources: Indonesian Oil Palm Research Institute)

Besides the age of the plant, the productivity of oil palm also depends on access to plant material with high-quality varieties, fertilizers, credit, and market prices (International Finance Corporation, 2013). Farmers who want to plant oil palm can do it independently or in an institution so they have access to credit, plant material, and fertilizer needed to cultivate oil palm. They must also have access to palm oil mills to ensure that the fresh fruit bunches they produce can be processed within 48 hours after harvesting. Farmers who are able to overcome these obstacles find that the benefits they get from growing oil palm are greater than other plants they normally plant (Belcher et al., 2004).

The majority of farmers sell palm to collectors/middlemen. As a note, palm fruit must be processed within 48 hours after being harvested, otherwise it will have an impact on the increasingly damaged quality of crude palm oil (CPO). Most respondents stated that the determinant of the price and source of information on the price of oil palm were collectors.

Based on the results of the study above, it is shown that basically smallholder farmers find it easier to sell their crops through collectors because they do not have to bear the transportation costs. These collectors can sell directly to the factory, but can also sell to CV or PT network, which at any time goes around in the village. Because independent smallholders only sell through collectors, the selling price they receive is much lower than the prices issued by factories, CV or PT, especially the official price made by the local government. Here are some possible roles of collectors:

- 1) Providing agricultural inputs (seeds, fertilizers, etc.), in return that farmers only sell FFB to collectors,
- 2) Providing credit to farmers,
- 3) As a buyer of FFB from farmers,
- 4) Transport FFB from farmers, and
- 5) As a permit holder of an official delivery order from a palm oil mill. A delivery order is an exclusive right in this case that is given to collectors to send FFB to a palm oil mill (Anggraini and Grundmann, 2013). Usually collectors who hold delivery orders face pressure to fulfill orders and may be subject to sanctions or loss of permission if they cannot fulfill.

When collectors act as suppliers of inputs as well as buyers of oil palm products, it will affect the determination of prices to farmers, the same thing can also happen when farmers deal directly with oil palm plantations (McCarthy and Cramb, 2009).

The sustainable palm oil supply chain requires that all FFBs in the supply chain must be legal, sustainable and of high quality. This is a burden for smallholder farmers who often cannot fulfill it. Local governments, with the possibility of outside support, must help independent smallholders meet these requirements. This support

will ensure that plantation plots managed by independent smallholders are registered and the FFB they produce can be tracked. Farmers also need support to adopt good farming practices such as the use of high quality plant materials and suitable fertilizers. Adopting good farming practices also requires the availability of financial loans with conditions that meet the needs and abilities of independent smallholders. In ensuring the traceability of the fresh fruit bunches, the identity and practices of intermediaries such as collectors and transporters need to be known and regulated.



Figure 5.7. Loading activity of palm fruit for sale to collectors

The conditions among independent smallholder farmers vary greatly (seed quality, soil fertility, distance between plantations and mills, road conditions, number of oil palm populations, etc.) causing productivity and quality of oil palm production to vary and it is difficult to get high prices. Independent smallholders are generally not aware of several things about determining FFB prices, including:

- 1) the price of FFB is determined not only from the weight of the bunch but also from the rendement; this refers to the Regulation of the Minister of Agriculture No. 14 year 2013 stating that the determination of the price of FFB is strongly influenced by the rendement level of CPO (Crude Palm Oil) and PKO (Palm Kernel Oil), CPO and PKO prices, and CPO production costs from each PKS (Palm Oil Mill). This price determination is actually intended for plasma farmers, whose crop age can be certified, while independent smallholders generally have very variable crop ages making it difficult to use the prices determined by the local government. Therefore, companies generally determine lower price for FFB from independent smallholder estates.

- 2) in general, FFB price fluctuation is also influenced by climate factors, where in the dry season FFB production is usually low so that supply to PKS also decreases and pushes price higher. Whereas in the rainy season, production is abundant, causing price to be lower (Corley & Tinker, 2003; Pahan, 2012). The condition where there is a fluctuation in palm oil production due to the response to climatic conditions is one of the causes of variations in palm oil prices that are not widely known by farmers.
- 3) most of the independent smallholders have no certificate of plantation business registration (STD-B) yet, so the area and production of community palm oil have not been well documented. This condition results in the absence of accurate information regarding independent smallholder FFB production. The imbalance between FFB demand and supply cannot be anticipated properly and price fluctuations cannot be predicted precisely.
- 4) the price of FFB at the level of oil palm farmers is influenced by the distance and road conditions between the plantation and mills, the farther the farm the higher transportation cost will be accordingly, which causes greater price deduction.

Marketing channels are institutions that have activities to distribute or deliver goods or services from producers to consumers (Mursid, 1997). Marketing channels are divided into several levels, namely zero-level channel, one-level channel, dual-level channel, and tri-level channel (Swasta, 2002). The marketing channel involved in the oil palm FFB trade system is generally the one-level channel consists of: farmers, collectors, palm oil mills (Sumiati, Rusida, & Idawati, 2017). But in other areas, there are more complex FFB marketing channels by involving more marketing actors. The FFB marketing channel in Kutai Kartanegara District involves intermediary traders and the owner of the Fruit Carrier Letter (SPB) as a marketing institution (Nugroho, 2015).

Sumartono et al., (2018) stated that marketing channels that have been formed so far, namely: (1) marketing channel I: farmers sell to collectors then sell to mills, (2) marketing channels II: farmers sell to farmer groups and then sell to mills, and (3) marketing channels III (zero channel): farmers directly sell to mills. Channel III can be categorized as a zero-level channel (Swasta, 1991).

As is generally the case in the villages of smallholder oil palm plantations, farmers have the freedom to choose marketing channels in the sale of their crops. Marketing channel I (farmers-collectors traders-factories) is the channel that dominates the choice of the most farmers. The main reason farmers choose this channel pattern is the existence of a cash payment system by collectors. In addition, there has been a good relationship between farmers and traders in a long time. Trust between farmers and traders is one of the social capital that has been formed in the fabric of

the community in rural areas. Farmers generally acknowledge the partnership that exists with collectors not only in the marketing aspect but also in the procurement of production facilities.

Some collectors also provide capital loans to farmers. Buying and selling transactions are usually even done by farmers with collectors before the harvesting. Farmers have given their harvesting schedules to collectors in advance. At the time of harvesting, the traders are ready at the harvesting location, then transport the farmers' harvest to be weighed and paid directly on the spot. For farmers, this system is considered to be very simple and easy, even though the selling price received by farmers is much lower than if farmers chose other marketing channels.

The majority of respondents stated that they had never received training and guidance. The type of training or guidance that farmers want for the development of oil palm management is training from companies on oil palm cultivation / gardening, that is training about fertilizer and maintenance, rejuvenation, pruning, planting systems and harvesting.

In Indonesia, most independent smallholders do not have tenure certainty. Independent farmers who do not have proof of land ownership will have difficulty in obtaining bank loans and face big challenge in obtaining a certificate of sustainability. Land ownership certificate (Hak Milik or SHM) which is seen as the strongest proof of land ownership, is issued by the National Land Agency and can be used as collateral to borrow money from banks. As a condition of getting a certificate of ownership, a farmer must have a land certificate (SKT) from the village head. An alternative to SKT is the Land Statement (SPT) which is also issued by the village head. The sub-district head must sign the SKT or SPT. Issuance of SKT/SPT is recorded manually in the village land registry book. In Central Kalimantan, the local government has introduced another form of recognized land ownership, namely the Customary Land Certificate (SKTA). SKTA is issued by the head of the local adat institution. However, according to the National Land Agency (BPN), SKTA cannot be used as a basis for obtaining a Certificate of Property Rights because BPN only recognizes land ownership documents signed by the village head. After obtaining an SKTA, the farmer can administer the SKT if the privately owned land is less than 5 hectares, then after having the SKT, the farmer can administer for the Certificate of Property Rights (SHM). Certificate of ownership status and sources of loan funds are presented in the following table:

Table 5.4. Certificate of ownership status and sources of loan funds

Information	Gema	Mekar Raya	Pematang Gadung	Sungai Pelang	Sungai Besar	Batu Daya	Kemora
Land certificate of ownership (%)							
Do not have	88.2	93.8	31.2	40	26.7	91	92
Have	0	6.2	68.8	56	73.3	0	8
Not answer	11.8	0	0	0	0	0	0
Sources of loan funds (%)							
Credit Union	17.6	6.3	0	0	0	0	0
Bank	0	0	12.5	3.2	6.7	0	0
Family/neighbors	0	0	0	0	0	18	0
Self funding	0	0	0	0	0	0	100

Sources: Data Analysis Results TI (2019)

The table above shows that the villages where most respondents have a certificate of oil palm land (Pematang Gadung, Sungai Pelang, Sungai Besar) make loans to banks even though the number of respondents who make the loans is not much, 3.2-12.5% of respondents only. As for villages where most respondents do not have oil palm land certificates (Gema, Mekar Raya, Batu Daya, and Kemora), they generally do not make loans to banks, although there are some people who still make loans but through Credit Union (for example in Gema and Mekar Raya).

The results of the Tropenbos Indonesia study (2019) showed several loan products provided by CU and the most common reasons behind the loans are: (i) consumer consumption loans (buying motorbikes), (ii) educational funding loans, (iii) health needs loans, (iv)) business loans/investment/plantation/agriculture businesses including for oil palm (productive), (v) housing construction loans.

CU is a cooperative-based financial institution engaged in savings and loans, owned and managed by its members, and aims to improve the welfare of its members. There are three main principles of CU: (1) the principle of self-help (savings are only obtained from its members), (2) the loyal principle of friends (loans are only given to members), and (3) the principles of education and awareness (character building is the main point; only those with good character can be given loans). To apply for a loan from CU, there are several requirements: (i) photocopy of husband and wife's ID card, (ii) photocopy of KK (family registration certificate), (iii) photocopy of member book, (iv) land certificate or minimum SKT if borrowing funds above the savings value owned, (v) conducted a survey of the completeness, clarity and estimated price of land certificates that is used as collateral, (vi) the process is carried out for a maximum of 14 days (2 weeks), (vii) statement letter in case of default, (viii) lending cannot be done by the group, even if it is proposed by the group, there must still be individual representation on behalf of the group.

Even though CU's interest is higher (for example ranging from 1-1.25%), in general people prefer to borrow through CU, the reason is the ease process of loan funds based on trust. Capital loans can be given to the community even though the business has not run, whereas banks can only provide loan funds if the business has been running for at least 6 months.

According to respondents, the HCV area around the plantation mostly have the status as APL (Other Utilization Area) in almost all villages. The other existing HCV areas are as follows: (i) protection forest in Sungai Besar, Pematang Gadung, Gema, Mekar Raya, Kemora and Batu Daya (ii) peat area > 3 m deep, located in Sungai Pelang, Sungai Besar, Pematang Gadung, and Gema, (iii) customary forests, found in the villages of Pematang Gadung, Gema, and Batu Daya (iv) river border, found in Pematang Gadung, Gema, Mekar Raya Kemora and Batu Daya, and (v) tembawang, located in the village of Sungai Besar, Pematang Gadung, Gema Kemora and Batu Daya.

One effort to reduce the negative impact of oil palm on the environment is to ensure that smallholder palm farmers produce their oil palm productively and sustainably. To increase palm oil productivity, the community still relies on the expansion/ extensification of oil palm plantations; this is due to the lack of information/ knowledge about sustainable oil palm cultivation and the low attention of the community towards optimizing the production/intensification of oil palm plantations. With no guidance and assistance, it is feared that oil palm plantation extensification will disrupt the preservation of natural resources and social responsibility which makes it even more difficult for farmers to obtain certification of their oil palm plantations (Hutabarat, 2017).

As it is known, the certification of oil palm plantations is the response of the world community, especially the consumers of various products with palm oil raw materials, towards palm oil production process which is considered done unsustainably. Certification is an instrument to guarantee that palm oil production is carried out in accordance with standards and criteria that are environmentally and socially friendly so that certain products can enter certain markets, the aim of which is to guarantee that the products marketed are produced sustainably.

Although China and India as the largest market for palm oil products besides Europe currently have not implemented certification, in the future the tendency to implement certification will develop to non-EU countries. If all countries have implemented palm certification in the future, marketing access to palm products abroad, from community plantations to companies or factories that sell their palm oil products to the international market, will shrink.

At the same time market access for palm oil products in the country will also be increasingly difficult, when ISPO certification limits the access of marketing palm oil products to PKS for farmers who do not have ISPO certification.

This certification target is certainly aimed at all forms of oil palm plantations, including private large plantation (PBS), state large plantation (PBN), and smallholder plantation (PR). Certifications for oil palm products in Indonesia include the RSPO, ISPO and ISCC. Since 2015 through the Minister of Agriculture Regulation No. 11 year 2015 the Government of Indonesia has established the Indonesian Sustainable Palm Oil certification system (ISPO) which is a standard for the palm oil industry that must be met by all industries or operators of oil palm plantations located in the territory of Indonesia.

Recently, ISPO has only been applied to large companies and palm oil mills, while for plasma and independent smallholders its implementation is still voluntary. On the other hand, according to the data from the Directorate General of Plantations (2019), currently the oil palm plantations which are smallholder plantations cover an area of 5,958,502 ha or 40.6% of the total area of oil palm in Indonesia. Certification is a must for smallholder oil palm growers in order to gain market access, both domestically and abroad. This will be a big job when such a large area of smallholder oil palm plantations must have a certification. There are many things that need to be carried out when smallholder oil palm plantations want to obtain certification, including: (i) farmers must form an organization/group and become a member of an oil palm group, (ii) have a legal certificate of plantation land, (iii) have a Plantation Business Registration Certificate for Cultivation (STD-B), (iv) have an Environmental Management Statement (SPPL), (v) farmers document and record (activities) of oil palm plantations, (vi) farmers carry out maintenance and fertilization of oil palm plants according to the dosage and recommended internal control method system (ICS) based on RSPO standards, (vii) All farmer operational activities will be monitored by ICS before being audited by the auditing agency. Through this certification farmers are expected to get a premium price as the only incentive for farmers.

However, with the various requirements to obtain palm oil certification as mentioned above, it is described that the process towards certification is very difficult, on the other hand the capacity of individual farmer is not possible to overcome various obstacles faced without the help of various related parties. Thus, it is clear that the position of independent smallholders is very weak in the face of various market changes at the international level. For this reason, it is necessary for the roles of the parties in providing assistance, guidance and facilitation to independent smallholders when they are required to certify their oil palm lands, including (i) government through its authority by preparing legislation, (ii) regional/local government provides understanding and explanation in implementing related

regulations in field (for example about palm oil legality documents), (iii) NGOs, with the availability of resources in collaboration with local governments to provide guidance and facilitation in order to increase public awareness and knowledge about the importance of and process to obtain palm oil certification.

Rejuvenation of oil palm is an effort to develop plantations by rejuvenating plants (replanting) that are no longer productive with new plants, both all at once or gradually. Rejuvenation of oil palm is also closely related to efforts to increase production in a plantation. Oil palm plant is considered old if it is around 20 to 25 years old and needs to be rejuvenated. Rejuvenation of plants (replanting) is conducted to maintain the yield of oil palm plantations and to avoid the drastic reduction of production. At this stage, careful and detailed planning is needed to avoid losses during rejuvenation activities. Rejuvenation can be done in stages by dividing the area of old plants into several working areas. The rejuvenation stages of oil palm plants include: (i) uprooting old plants, (ii) enumerating branches and stems, (iii) stacking, (iv) planting cover crops (LCC), (v) piling, (vi) conserving soil, (vii) making planting holes, and (viii) planting oil palm seedlings (Mangoensoekardjo and Semangun 2005). The results of the study showed that the majority of respondents stated that they had no plans to carry out replanting, except 53% of respondents from Gema Village. The reasons that the respondents did not yet have a replanting plan were the fact that their oil palm plants were still very young and the price of palm fruit tended to be cheap.

In conducting maintenance activities of the plantation, the respondents paid more attention to the Production Collection Point (TPH) indicated by the number of respondents who stated that the condition of the TPH was in good condition, followed by the 'pasar pikul' which was used for the activity of issuing FFB to the TPH.

The TPH is the location used to place and arrange fruit resulted from harvest, it can be in the form of FFB and brondolan. Usually in 3 'pasar pikul' there is 1 TPH which is located in front of the main route which is on the edge of the collection road. The purpose of making the TPH is to: (i) facilitate the calculation of the number of long plants that have been harvested, (ii) facilitate the process of transporting fruit, (iii) so that the FFB and the loose fruit palms collected are clean of rubbish, soil or sand. To maintain the cleanliness of the loose fruit palms, usually every TPH must be covered with former fertilizer sacks or the loose fruit palms are put in sacks.

The average annual income of the respondents in all study villages is mostly obtained from agricultural business sources (oil palm, rubber, rice, and others). GDP per capita is one of the indicators to measure the prosperity of a region. The bigger income per capita indicates that the region is more prosperous. Conversely, the smaller GDP per capita indicates that the region is less affluent. The results of

the study showed that the total income per capita per year from the five villages ranged from IDR 27,591,200 – IDR 73,117,647 or daily income ranged from IDR 75,592.33 – IDR 200,322.32. The highest income per capita of respondents is obtained from Gema Village while the lowest is from Sungai Besar Village.

In March 2019 the Central Statistic Agency (BPS) released the Indonesian poverty line standard of IDR 425,250 per capita per month, indicating that the poor Indonesians have an income of IDR 14,175 per day. On the other hand, the Central Statistics Agency (BPS) recorded that the gross domestic product (GDP) based on 2018 prices reached IDR 13,588.8 trillion. With this GDP, the average income per capita or per person reached IDR 56 million per year. Referring to this data, respondents in the villages where the study was conducted do not belong to the poor, because their average daily income is currently above IDR 14,175, which is around IDR 75,592.33-IDR 200,322.32. However, based on national GDP, there are several villages that have income per capita per year less than national GDP (IDR 56 million/year), specifically Sungai Pelang Village (IDR 39,248,480/capita/year), Sungai Besar Village (IDR 27,591,200/capita/year), and Mekar Raya Village (IDR 35,054,125/capita/year). The Pematang Gadung Village (IDR 62,910,125/capita/year) and Gema Village (IDR 73,117,647/capita/year) have a GDP that is higher than the national GDP.

Chapter 6. Conclusion

Based on the results of the study, the profile of smallholder farmers in Ketapang Regency can be summarized as follows:

Respondent's identity

There are three groups of respondents in the management of smallholder oil palm plantations in Ketapang Regency: (i) Pure independent smallholders (oil palm cultivation is carried out personally without assistance, sources of funds for cultivation from themselves or borrowed from financial institutions on their own efforts), (ii) Cooperative-based independent smallholder (oil palm cultivation is accompanied by a plasma management organization, gets a loan from a cooperative/BUMDes), (iii) Plasma farmer (palm cultivation is carried out by the company, gets a loan from the company). The domination of the Dayak respondents can be found in Gema, Mekar Raya, Kemora, and Batu Daya. The domination of respondents of other ethnic groups instead of Dayak (Javanese, Sundanese, Malay, Lampung, Chinese) can be found in Pematang Gadung, Sungai Pelang, and Sungai Besar.

Land ownership

All respondents own oil palm land on privately owned land, which have a variety in size, land is occupied and self-cultivated. The area of oil palm owned ranges from 0.5-25 ha, the area of oil palm most widely owned is 2 ha, the age of oil palm ranges from 1-10 years and the maximum age is 5 years (in pure independent smallholder), aged 2-13 years (in cooperative-based independent smallholder), and age 22 years (in plasma smallholder). The types of land uses that are commonly found besides oil palm are rice fields, rubber plantations, and shrubs.

Land uses

Planting pattern; Most farmers planted oil palm monoculture, but there were others who planted mixed crops (for example in Sungai Besar Village, Sungai Pelang, Mekar Raya, Kemora, and Batu Daya). Mixed planting pattern is done by planting pineapple and jengkol in oil palm plantations.

History of land tenure; The oil palm land tenure origin was occupied by three means: (i) Land acquired from buying, (ii) Land acquired from grants/transmigration, (iii) Land acquired from inheritance, and (iv) Land is the distribution of plasma plantation from companies. Before oil palm was planted, the land was in the

form of shrubs (for example in the villages of Sungai Pelang, Sungai Besar, and Pematang Gadung) or in the form of rubber plantations (for example in Gema Village, Mekar Raya, Kemora, and Batu Daya).

Reasons for oil palm cultivation; Reasons for land use change into oil palm plantations are: (i) Higher price of oil palm, (ii) Following friends/other people who practice oil palm cultivation, and (iii) Frequent fires. Changes in land use to oil palm were mostly carried out in 2012-2014. The biggest factor driving the movement of people to the village was the hope of acquiring land to be managed.

Land legality status; There are two legal statuses of oil palm land: (i) Certified land, mostly in the villages of Sungai Pelang, Sungai Besar, Pematang Gadung, and Teluk Bayur; (ii) Uncertified land, mostly in the villages of Gema, Mekar Raya, Kemora, Batu Daya, and Muara Jekak, where these villages are dominated by the Dayaks. In general, more oil palm lands have no certificate (61.3%) compared to lands which have certificate (35.9%). Whereas the legality of land in the form of Certificate of Ownership (SHM) is an absolute requirement for farmers to obtain ISPO certification.

There are several obstacles for farmer to arrange palm oil certificate, including: (i) The cost of obtaining land certificate is quite expensive, farmers prefer to buy fertilizer rather than administer for the land certificate; (ii) The legality issue can cause farmers to deal with law enforcement, especially if the oil palm land is part of the forest area; it is related to overlapping land; (iii) There is a limited number of staff within the National Land Agency; incomparable to the number of certificates in process and becomes an obstacle in administering for the certificate. Farmer's organization; Most respondents were not parts of the oil palm farmer group for several reasons, including: not interested, no one invited or facilitated to become a member, did not have time, or the unavailability of the right farmer organization. The respondents have also put some savings with an average amount of less than IDR 500,000/month where the savings were planned to be used for various purposes. Very few farmers deliberately save money in preparation for replanting activities.

Plantation management

Funding sources; Sources of funds for the management of oil palm plantations are mostly of own capital, however some respondents also obtained capital from loan funds, including: (i) Pure-independent smallholder oil palm (loans from credit unions, banks, own families/other farmers), bank loans, (ii) Cooperative-based smallholder palm oil (loans from cooperatives/BUMDes with a range of IDR 8-10.5 million), (iii) Plasma palm (loans from palm oil companies).

Oil palm seedlings; Most respondents do not yet have knowledge about: the characteristics of quality palm seedlings, where to purchase quality seedlings, and the oil palm planting system. The type of seeds most widely cultivated is Marihat, followed by Lonsum, Sopim, Costarika, Sokpindo, Spindo, Tanera and Sriwijaya. Source of seeds: (i) Pure independent smallholder oil palm: most respondents obtain oil palm seeds by buying from other traders or farmers at the price of IDR 35,000/stem. Very few respondents buy seeds from the company or produce their own seeds; (ii) Cooperative-based smallholder oil palm: seed sources are all provided by cooperatives at the price of IDR 55,000/stem; (iii) Plasma palm: seedlings are entirely provided by the company, farmers do not know the price of the seedlings and are not involved in determining the types of oil palm seedlings to be planted.

Land clearing; Most of the pure-independent and cooperative-based smallholder respondents carry out land clearing by cutting, slashing, burning because this method is considered easier and cheaper, where the process is carried out by mutual cooperation/artisan, done alone, or employ other people. Land that has been opened, then sprayed with herbicides. This method of land clearing can cause fires and health problems. As for plasma farmers, there is no involvement in decision making related to land clearing, everything is determined by the company.

Oil palm planting; Most respondents apply planting space: 8m x 8m, 8m x 9m, and 9m x 9m or equivalent to the number of oil palm plants 100-125 stems/ha or 126-150 stems/ha. Planting implementation is as follows:

- (1) Pure-independent oil palm smallholder: planted personally, wholesale/contract planting per seed (IDR 3,000-10,000/seed), wholesale/contract planting per hectare (IDR 600,000-1,200,000/ha), or a daily wage system of IDR 65,000-120,000/day for 3 -12 days.
- (2) Cooperatives-based small holder; the number of oil palm 92-200 stems/ha, costs IDR 500,000-4.8 million; planting is included in the loan component.
- (3) Plasma; farmers are not involved in decision making of planting seedlings.

Oil palm plantations treatment; Almost all respondents treat their oil palm plantation either manually or using herbicides. The most widely used herbicides are Gramoxon and Round up. Palm treatment activities carried out by: independent, contract with piece rates, or daily wages.

Fertilization; Respondent in Kemora and Batu Daya did not do oil palm fertilization, whereas respondents of the other five village did it. Types of fertilizer commonly used: NPK and urea, and other fertilizers are Borax, KCl, dolomit, TSP, SP36, and manure.

Pest and diseases control; the majority respondents of pure independent smallholders and cooperative-based do not control pests and diseases of oil palm plants. Disease control activities are carried out using pesticides and are not done routinely; it is only done if an attack occurs. Pesticides used include Decis, Furadan and Regent.

Pruning; Almost all respondents carryout pruning/unplugging leaves, with a frequency of 1-3 times/year or done simultaneously with harvest time.

Child and women involvement; In managing oil palm plantations there is no involvement of children, but women are involved especially in fertilizing and harvesting activities.

Harvesting; The first harvest is generally done at the age of 3 years. Harvesting activities are carried out 24 times/year. The plants of pure independent smallholder oil palm are generally harvested at the age of 5 years old. Activity carried out after harvesting oil palm is only transporting to TPH. The prevailing TBS price is IDR 1,000/kg. The results of FFB production of oil palm plantations aged 5 years and over are: (i) pure independent smallholder (8.3 tons/ha/year), (ii) cooperative-based independent smallholder (13.2 tons/ha/year), and (iii) plasma palm (20.9 tons/ha/year). FFB production in fertilized pure independent smallholder (8.3 tons/ha/year) is higher compared to production in non-fertilized plantation (3.4 tons/ha/year). The productivity of pure independent oil palm smallholder FFB is still lower than the FFB productivity of oil palm plantation at the age of 5 years according to the Palm Oil Research Center (2010) in all land suitability classes, namely: (i) KKL S1 (18 tons/ha/year), (ii) KKL S2 (16 tons/ha/year), and KKL S3 (14.5 tons/ha/year).

Marketing

The marketing strategy must consider that the palm fruit must be processed immediately within 48 hours after it is harvested, because it will have an impact on the deteriorating quality of crude palm oil (CPO). Most respondents stated that they had never received any information on requirements of marketable oil palm. Traders will take oil palm fruit at farmer's house, plantation or TPH. The determinant of the price of oil palm is the middlemen, while the determinant of the price for the middlemen is the middlemen who have SPK from the mill. The sale transaction between farmers and middlemen can be done in cash or bonded system. So it is natural that there is a difference on the price of FFB between prices at the factory and middlemen of around IDR 500/kg. Sales of oil palm are as follows: (i) pure independent oil palm smallholder: sale of oil palm (FFB) through middlemen/collectors of SPK holders; (ii) cooperative-based independent smallholder: selling through collectors, cooperatives, BUMDes, or directly to PKS; (iii) Plasma palm: through company.

Training and guidance

The majority of respondents of pure-independent palm oil farmers said they had never received training and guidance on oil palm cultivation. Several cooperative-based independent oil palm farmers stated that they had received training. The majority of plasma oil palm farmers (67%) had received training from the company. The training topics required by respondents include: (i) proper cultivation and treatment of oil palm, (ii) how to increase palm productivity, (iii) training in producing organic pesticides (poison grass/weeds), (iv) training in producing fertilizers, (v) marketing, (vi) palm maintenance, (vii) palm replanting, (viii) palm harvesting.

Bussiness capital

Most respondents of pure-independent oil palm farmers stated that the capital for the oil palm plantation business was obtained from their own funds and most of them did not prepare special funds for it. Only a small number of respondents whose palm business capital were obtained from bank loans or Credit Union. In the case of cooperative based independent smallholders, some respondents' capital are of their own, while for others it comes from cooperative loans (Koperasi Kelompok Tani Karya Bersama). As for plasma oil palm farmers, all capital come from company loans (IDR 17 million), and a 30% deduction will be made from the sale of oil palm every month.

Oil palm revenue

The pure independent smallholder oil palm farmer stated that oil palm, entrepreneurship, and rubber were the biggest sources of income in the study villages. The average annual income obtained specifically from independent oil palm ranges from IDR 5.6-23.1 million/year, in which oil palm has contributed to community income by 18-49% of the total income/year. Not many respondents feel that the yields of oil palm have been able to meet their living needs or to improve the household economy. As for the cooperative-based and plasma-based independent oil palm, some respondents stated that there was an economic improvement after managing the oil palm plantation since there was a steady income and the yield of oil palm was higher than other sources of income. Oil palm products in cooperative-based independent smallholders contribute 28% of total annual income, while in plasma oil palm contribute 68%.

House conditions

Houses commonly have wooden floors, ceramics, cement, or land; the walls are made of boards, bricks, cement; the roof is made of zinc/asbestos or a small number of shingles/tile; the average house size is 36 m² and the yard is 2,500 m². Existence of High Conservation Value Areas (HCV).

Not many respondents understood the concept of High Conservation Value (HCV) and the existence of the Natural Resources Conservation Agency (BKSDA). It is related to the existence of protected flora/fauna, which are now no longer found, including: orangutans, hornbills. The HCV areas around the plantation are mostly APL (Other Utilization Area) in almost all villages. The other HVC areas are: protection forest, peat area > 3 m deep, customary forest, and tembawang.

Knowledge of sustainable palm oil certification

Most respondents did not know about palm oil certification because they did not get any socialization about it. This condition caused very few respondents are interested in certifying their oil palm plantation. Information about RSPO, ISPO and sustainable agriculture is also very little known by respondents. Some obstacles in obtaining certification of oil palm plantation according to respondents include: (i) respondents have not received any information on palm oil certification, (ii) respondents do not know how to administer for palm oil certification, (iii) respondents do not understand the benefits of palm oil certification, (iv) respondents have limited capital.

Oil palm replanting

Most respondents of pure independent smallholder do not have any plans to carry out replanting of oil palm; the reasons are: oil palm is still young (1-10 years) and the price of oil palm is cheap. They also did not prepare special funds for replanting. There are some respondents who plan to expand (extensify) oil palm land; the reasons are: they want to have more oil palm (increase the amount of production) and land is still available. Conversely, there are no respondents who plan to intensify their oil palm fields. Some respondents plan to use certified seed for replanting, but some will not use certified seed because the price is more expensive.

Oil palm farmer organization

A small number of farmers in some villages have become members of farmer groups and most others have not. The reasons for farmers not being members of farmer organizations, include: (i) farmers are not interested, (ii) farmers are not invited or facilitated to become members, (iii) farmers do not have time, (iv) no organization which is in accordance with the farmer needs is not available yet.

Savings

More than half of the respondents put their money at the bank with the average amount of savings up to IDR 500,000/month.

The plan to use the savings are for: (i) children education/schooling, (ii) buying land/investment, (iii) daily/family needs, (iv) urgent needs, (v) health and (vi) venture capital.

Future plans

Most respondents want their children education to reach the college level (bachelor). Palm farmers' expectation to the government include: (i) the government gives attention to independent oil palm smallholder, (ii) the government provides assistance in order to be able to sell FFB directly to mills, (iii) support availability of fertilizer, superior seeds, production input, (iv) guidance/counseling on oil palm cultivation are available, (v) there are government policies that encourage changes in oil prices.

Topography and soil condition of oil palm plantation

The oil palm plantations have flat, wavy to steep topography with soil types of mineral, peat and swamp. The types of soil that dominate each village are: peat soils (Sungai Pelang and Sungai Besar) and mineral soils (Pematang Gadung, Gema, Mekar Raya, Kemora, and Batu Daya).

Maintenance of oil palm plantation

Plantation maintenance includes 'pasar pikul, piringan, gawangan mati, collection site (TPH), collection trenches, and main trenches. Based on the survey, the most complete maintenance activities of plantation were found in Pematang Gadung Village, then followed by Sungai Besar Village, Sungai Pelang, Mekar Raya, and Batu Daya. As for Kemora Village, there is no maintenance at all.

Soil conservation

Soil conservation activities include: terrace ridges, horseshoe, front stacking, ponds/rorak. Almost all farmers' plantation have no terrace ridges, very few horseshoe, no ponds/rorak, and front stacking is only found in Mekar Raya Village. Respondents' knowledge about the importance of land conservation is still limited; respondents' knowledge about the minimum distance of oil palm plantation from the river boundary is also lacking, and respondents still place rows of oil palm plants which are so close or even on the riverbank.

Water management

Water management activities are not much carried out by farmers. Those who carry out water management activities do so in a number of ways: (i) the government through a wage or collective system, (ii) mutual cooperation and collectively, (iii) self-conducted.

Nutrient deficiency

Most farmers do not understand how to find out the characteristics of nutrient deficiency in oil palm plants. Some farmers understand how to find out the symptoms of nutrient deficiency by looking at stem growth, leaf color, learning from friends who work on plantations. But they do not know where to get information about the nutrient deficiency.

Pests and diseases of oil palm

Respondents' knowledge about integrated pest control is still low. Most respondents have made no efforts to control pests and diseases; it is only done by a small number of respondents through: spraying using pesticides, fungicides, cleaning land, discarding rotten fruit, or harvesting oil palm fruit early. Almost all respondents have never been trained on how to use pesticides. The most common types of pests are rats, *Oryctes*/beetles, fire caterpillars and bag caterpillars. The types of diseases that are often found are fruit rot disease, Ganoderma, Crown diseases. Pest control efforts known by the respondents include the use of owls, the use of nine o'clock flowers (*Imago parasatoides*), and paraquat (one of the most widely used herbicides).

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Annexes

Annex 1. Questionnaire on Village Data Collection

STUDI OIL PALM SMALLHOLDER MANAGEMENT

GUIDANCE OF VILLAGE INTERVIEW

1. Province : _____
2. Regency/City : _____
3. Subdistrict : _____
4. Village : _____
5. Address of the Village Office : _____
6. Name of the interviewees : _____
7. Interviewees position : 1. Village Head 2. Village Secretary 3. Other Village Officials
8. Date of interview : _____
9. Start-finish time : _____
10. Interview location : _____
11. Interviewees phone : _____
12. Name of interviewer : _____
13. Interviewer note : _____

Completeness interview checklist

<input type="checkbox"/>	Approval Form / Consent
<input type="checkbox"/>	Voice Recorder
<input type="checkbox"/>	Observation Note
<input type="checkbox"/>	Village Office Picture

Guidance of Village In-depth Interview In Kerupang © TROPENBOS INDONESIA 2019 1

A. VILLAGE BASIC INFORMATION

1. Area Boundaries:
 - a. East: _____
 - b. West: _____
 - c. North: _____
 - d. South: _____
2. Division of village area
 - a. Number of hamlets and hamlet names: _____
 - b. How many families each hamlet: _____
3. Current Area :
 - a. Total area : _____
Total area based on Land Use Type (sketch map)
 - b. Rice fields (mention based on the type of rice fields in the village): _____
 - c. Field : _____

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- d. Oil palm Plantation : _____
- e. Non-Palm Plantation : _____
- f. Sheds : _____
- g. Settlement : _____
- h. Forest land (if any), along with their vegetation : _____
- i. Areas of plantation / forestry companies that enter the village area, along with their commodities: _____

Note : If the exact figure is difficult, it can be in percentage (%)

4. Commodities
 - a. The main commodity in the village : _____
 - b. Side commodity : _____
5. Population
 - a. Total families : _____
 - b. Total inhabitant : _____
 - c. Kind of ethnic : _____
 - d. Population composition based on ethnicity : _____
 - e. Population composition based on livelihood : _____
 - f. Population Education Level (%) : _____

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6. Facilities and Infrastructure
 - a. School include Elementary school, junior high school, non formal : _____
 - b. Health: health center, midwife doctor : _____
 - c. Road Infrastructure: asphalt, unpaved, etc. : _____
 - d. Financial Institutions: (banks, informal credit, etc.) : _____
7. Market
 - a. Is there a market in this village? (Yes / No)
 - b. Market type in the village? (daily, weekly, etc)
 - c. Types of commodities sold in the Market?
 - d. Where do people usually sell agricultural products? (traders come or farmers to the market, explain)
 - e. Commodity community products:
 - f. What commodities are hard to sell? Why?

B. ACCESS TO CREDIT / LOAN

1. Availability of money lending place: (circle the answer)
 - a. Bank 1. Yes 2. No
 - b. Cooperative 1. Yes 2. No
 - c. Savings and loan group 1. Yes 2. No
 - d. Trader / collector 1. Yes 2. No
 - e. Ijon 1. Yes 2. No
 - f. Family 1. Yes 2. No
 - g. Other farmers / neighbors 1. Yes 2. No
 - h. Loan sharks 1. Yes 2. No
 - i. Staff 1. Yes 2. No

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C. VILLAGE HISTORY

1. When was this village formed?
2. The first ethnic / community present in this village?:
3. Mention the factors that make the tribe / community inhabit this village:
4. Please described about how is land clearing started in this village:
5. How does the system of land ownership in this village:
6. Please described the history of land ownership in this village:
7. Does anyone outside the village own land in this village? (Yes/ No). If yes, explain whether the sale is private or in the knowledge of village officials:
8. Is there any clarity in the boundaries of forest areas and land outside forest areas? Please explain:

D. HISTORY OF OPENING OIL PALM PLANTATION IN VILLAGE

1. How many family heads (HH) open oil palm in this village?

Type of oil palm plantation	1. Available	Number of families	Percentage (%)	Total area (Ha)
a. Independent oil palm plantation	2. No			
b. Plasma oil palm plantation				
2. When was the opening of oil palm plantations in this village (year)?
3. Is the initial opening of oil palm plantations done independently or direct plasma oil palm plantations?
4. Why do people switch to planting oil palm? Please explain
5. Does the community build oil palm by clearing secondary forests from ex-SHPH or by converting their existing plantations?
6. Is the availability of land in this village now limited?
7. How is the ownership of the oil palm plantation (private own / other investors / outside the village)?
8. How is the management of oil palm plantations in this village? Is it managed individually / group / village / plasma?
9. Are there any oil palm farmer groups / cooperatives in this village? 1. Yes 2. No
10. Can the oil palm plantation be traded? 1. Yes 2. No
11. If yes, what are the rules and who (local institutions) govern them?
12. Is this village a palm oil concession area? 1. Yes 2. No
13. If yes, does village and communities involved in the process of developing oil palm plantations? 1. Yes 2. No
14. How does the process of land acquisition (for plasma oil palm plantations? (land compensation process, determination of plasma area)
15. How does the relationship between plasma smallholders and the company?
16. Is there a conflict with the company? 1. Yes 2. No
17. If yes, explain what the conflict is like and the main cause of the conflict

18. How do people meet their traditional / basic needs such as hunting, looking for fruits, etc. after most of their land is converted to oil palm?

E. FIRE USE

1. Are there values of tradition that are still alive in slash and burn activities? (Yes/ No)
2. What is the community's tradition of burning?
3. What traditions are still alive until now, and how these traditions adapt to changing land conditions
4. If there are sanctions, please specify?

F. LAND FIRE

- 1) Most of the fires are caused by independent or corporate palm oil. Please explain:
- 2) Is it true that most of the oil palm corporations do not carried out land clearing by slash and burn system? Please explain:

G. ISPO/RSPO and HCV UNDERSTANDING

1. Has the village heard of the term ISPO / RSPO? (Yes/ No). If yes, please explain:
2. Does the village know about High Conservation Value (HCV)? If Yes, please explain about HCV:
3. According to the village, has the palm oil corporation allocated HCV areas? please explain:

H. LAND CONFLICT

1. Have there been conflicts / disagreements / disputes related to land ownership?
2. If yes, what year?
3. If ever, is it inter-ethnic? Or is it between the community and the company? Please explain
4. What is the area of disputed land?
5. How is the solution?
6. What is the causes of conflict?
7. Who is involved?

Annex 2. Questionnaire on Smallholder Oil-palm Data Collection

No. _____

SMALLHOLDER PALM OIL SECTOR STUDY

INTERVIEW GUIDE

HOUSEHOLD OF PALM OIL PLASMA SMALLHOLDER

- Name of Respondent : _____
- Number of Family member s : _____
- Village Name (permanent address) : _____
- Sub-District : _____
- District/Province : _____
- Gender : 1. Male 2. Female
- Age of Respondents : _____
- Position in family : 1. head of family 2. Wife/husband 3. Children 4. Other, please specify... _____
- Respondent Status : 1. Married 2. Divorced 3. Not married
- Tribes : 1. Dayak 2. Malay 3. Other, please specify... _____
- Last education : _____
- Migration Status : A. Born in this village B. Migration from outside of the village
- The Main job : _____
- Side job : _____
- Year moved to this village : _____
- Place of Origin (Sub-District & Province): _____
- Reasons for Migration / Transmigration
 - Stimulus Factor : _____
 - Attractor Factor : _____
- Phone Number / Respondent's Cell : _____
- Interview Date : _____
- Interview Hours (start – finish) : _____
- Interviewer's name: _____

Completeness interview checklist

Approval Form / Consent
Voice Recorder
Observation Note
Photo

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1

No. _____

GENERAL QUESTIONS

A. TYPES OF LAND OWNED / OCCUPIED

01. Farms owned by / occupied in this village:

Type of agricultural land	Owned/no	Number of Plots	Management Status (1)	Land area (Ha)	Garden location (2)
1. Rice fields					
2. Fields					
3. Oil palm plantations					
4. Rubber Gardens					
5. Shrub					
6. Others					

Coding (1)
 1. Occupied and not cultivated
 2. Working on peasant's land (profit sharing)
 3. Working for other people
 4. Working for others
 5. Occupied and not used
 6. Occupied and not cultivated
 7. Working on land owned by people from outside the village

Coding (2)
 1. Presently used
 2. Forest land

B. CHARACTERISTICS OF PLASMA PALM OIL UTILIZATION

No	Question	Answer	Description
01	a. Palm plantation area (local unit)		
	b. Palm plantation area (Ha)		
02	Age of oil palm plantations (yrs)		
03	Oil palm begins to bear fruit at what age (years)		
04	Land slope in oil palm plantations: 1. Flat 2. Slope 3. Curved		
05	Oil Palm location: 1. Presently used 2. Forest land		
06	a. Travel time from home to location (minutes)		
	b. Distance from home to location (Km)		
07	a. How to owned/ occupied oil palm: 1. inheritance 2. Renta 3. Open 4. Profit sharing 5. Reraya 6. Reraya (All other answer write)		
	b. If you buy / compensate, how much? (rupiah)		
	c. Year		
	d. From: 1. Asset 2. Present 3. Ancestral forest		

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2

No. _____

B. CHARACTERISTICS OF PLASMA PALM OIL UTILIZATION

No	Question	Answer	Description
08	Land use: (Coding) 1. Oil palm 2. Shrub 3. Rubber 4. Primary forest 5. Field garden 6. Uncultivated 7. Other palm 8. Other 9. Rice paddy 10. Other answer specify		
	a. Currently:		
	b. Before occupied:		
	c. one year after occupied		
	d. the last condition before this time		
09	If there is a change in land use from the previous condition (8) to the current one (a), state the reasons: 1. Price is higher / profitable 2. Long maintenance 3. Other answer specify		
10	When did it begin to change (Year)?		
11	Is this Plasma oil palm plantation certified? 1. Yes 2. No		

C. MANAGEMENT OF PLASMA OIL PALM PLANTATION

- Plasma plantation ownership**
 - Did the farmer is the land owner before the land was turned into a plasma oil palm plantation by a large company? 1. Yes 2. No
 - Was before becoming a plasma smallholding, this garden is an independent oil palm plantation?
1. Yes 2. No
 - If yes, how is the process of transforming an independent oil palm plantation into a plasma oil palm plantation?
 - How is the process of acquisition by a palm oil company? Please describe
 - If farmers are native to the village, how do they feel before and after converted to plasma oil palm plantations? 1. Happy 2. Not happy 3. Same
- Involvement in decision making**
 - Are farmers involved in decision making in labor resources? 1. Yes 2. No

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3

No. _____

b. If yes, in what activities are farmers involved:

Activities	Involved (1. Yes 2. No)	Type of involvement
1. Source of seedlings planted		
2. Variety of seedlings planted		
3. Number of seedlings planted		
4. Land clearing and preparation		
5. Planting oil palm seedlings		
6. Plantation treatment		
7. Plantation fertilizing		
8. Pest and diseases control		
9. Leaves trimming		
10. Harvesting		

c. Does the company involve / notify about

Activities	Involved (1. Yes 2. No)	Description
1. Calculate the investment cost of the plasma plantation		
2. Total FFB production		
3. Prices of FFB		
4. Calculation of farmer's income		
5. Profit sharing mechanism		

- Is there a complaint mechanism or problem for plasma oil palm plantations? 1. Yes 2. No
- If so, how is the mechanism for the complaint? described:
- Are there knowledge and skills provided by the company / core estate to plasma smallholders?
1. Yes 2. No
- If yes, what kind of knowledge and skills? described:

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4

NO. _____

7. Are the conditions / quality of land (eg slope, flood hazard, fire hazard / conflict with orangutans, fertility) lower than the core estate? (Yes/ No). Described

8. Does the plasma smallholding receive different treatment from the nucleus estate? 1. Yes 2. No

9. Is the smallholder oil palm productivity less than the core estate?
1. Yes 2. No 3. Don't know

10. If yes, how did the smallholders find out about the various differences, mention the cases?

11. Are there any written / oral promises / agreements of the manager of the core estate that have not been fulfilled, mention the cases?

12. Does government assistance exist to facilitate communication between smallholders and companies? 1. Yes 2. No

13. If yes, explain:

14. Who bears the risk if crop failure or damage occurs?
1. Plasma Farmers 2. Companies 3. Plasma farmers and companies

15. Source of funds for the management of plasma oil palm estates

a. Where are the sources of funds for the management of plasma oil palm plantations (whether own / independent funds or loans), explain, mentions the system/ agreement:

b. Whether the agreement is the result of negotiations between core estate involving farmers plasma or one-sided agreement from the core company and the village elite ?

16. Oil Palm seedlings:

a. Where does the source of palm seedlings

1. Own nursery	3. Buy from company
2. Buy from trader/other farmer	4. Provided by company

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3

NO. _____

b. If buying from a company / provided by the company, are farmers involved in determining the type / quality of oil palm seedlings planted? 1. Yes 2. No

c. Do farmers know the variety and quality of oil palm seedlings planted in plasma plantations? 1. Yes 2. No

d. If yes, what is the variety of palm seedlings are planted and how is the quality:

e. Are the types variety and quality of seedlings in smallholdings is similar with core estates?

f. Do smallholders know how much the price of oil palm seedlings planted in their plasma plantations
1. Yes 2. No

g. If yes, what is the price of oil palm seedlings per stem

h. How is the simplicity to obtaining oil palm seedlings ?

i. Are farmers aware if the quality of oil palm seedlings affects the quality of their production

j. Do farmers know the quality of oil palm seedlings planted: 1. Yes 2. No

k. Did in farmers opinion that the seedlings planted in the core estate differ in type / quality from those planted in the plasma plantations: 1. Yes 2. No

l. If yes, which palm seedling is better type / quality:
1. Oil palm seedlings for core estates 2. Oil palm seedlings for plasma plantation

D. LABOR

1. Aside from being a plasma owner, is there a family of plasma farmers who also work as UP palm oil employees?

Laborer	Worked as UP Palm employee (1. Yes 2. No)
a. Head of family / owner of plasma plantation	
b. The couple head of the family	
c. Son	
d. Other family members	

2. If there are UP palm oil employees, in what division? Explain

E. TRAINING AND GUIDANCE

1. Have farmers ever received training or guidance on oil palm? (Yes / No). If ever, please explain:

2. From where the training and coaching?

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NO. _____

3. How many times have farmers received training or guidance on oil palm. Please explain

4. Is the training or coaching useful for farmers. Please explain

5. What else is the type of training or guidance that farmers want for the development of independent palm oil management. Explain the type and institution:

F. PRODUKSI TBS KEBUN SAWIT TAHUN 2017/2018

1. Apakah petani mengetahui jumlah hasil produksi TBS kebun plasmanya setiap panen?
1. Ya 2. Tidak

2. Jika Ya, berapa hasil produksi TBS/ha nya pada tahun setahun terakhir ini?

G. CERTIFICATION

1. Do farmers have heard and understood the purpose of oil palm plantation management certification?
1. Yes 2. No

2. If yes, whether the plasma smallholders plantation have been certified for their management of oil palm plantations
1. Yes 2. No

3. Which certificate?
1. ISPO 2. RSPO

4. Is there a change in management after the farmer's plasma smallholdings are certified
1. Yes 2. No

5. To whom is the certification fee charged?
1. Plasma smallholder 2. Company 3. Smallholder and company

6. If the farmers' oil palm plantations have not been certified, are they interested in certifying of their oil palm plantations management?
1. Yes 2. No

7. If yes, which certificate desired
1. ISPO 2. RSPO

8. What is the hope that farmers desired after their palm oil plantations are certified

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NO. _____

H. CONTRIBUTION OF OIL PALM INCOME IN 2017/2018

1. What are the types of farmers' income in the last 1 year (2017/2018):

Income Types	Amount (Rp)	Description
1) Agriculture		
- Oil palm		
- Rubber		
- Other garden		
2) Other farming		
3) Farm laborers		
4) Remittances		
5) Business		
6) Professional		
7) Other		

2. Has there been any improvement in the farmer's household economy after after becoming a plasma oil palm smallholder, please described

I. HOUSE CONDITIONS IN 2018

1. What is the condition of the farmer's house in 2018

Kualitas Rumah	Coding
a. Lantai (Coding 1)	
b. Dinding (Coding 2)	
c. Atap (Coding 3)	
d. Ukuran bangunan (M ²)	
e. Ukuran luas total (rumah+pekarangan) M ²	

Coding 1:	Coding 2:	Coding 3:
1. Suf	1. Berseki	1. Gorden Awam
2. Besor	2. Besor	2. Shingle
3. Cement	3. Besor	3. Other material
4. Concrete	4. Besor	4. Besor tile

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