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Impact of Palm Oil Plantation Expansion on Lowland Paddy Socio-Economic Situation in Ogan Komering Ilir Regency

ABSTRACT

In the wetlands, especially peatlands, there are extensive developments and an increasing number of oil palm plantation companies. One of them is the issue of crop failure and crop failure that Ogan Komering Ilir *lebak* farmers had experienced during the rice season. The purpose of the study is to determine the influence of the expansion of oil palm plantations on the region's micro and macro levels. In order to have a better understanding of the farmers' perspective, farmers samples were gathered from 10 percent of the total population of 721 homes in Srigeni Baru and Mariana villages. The findings show that there is no reason for any party to view the presence of a plantation company around a small farming community in a bad manner. Communities and villages concerned about fire, palm oil plantation companies, and even rural harmony can be developed until it is fostered, for example, under the coordination of the BUKD (Badan Usaha Kemitraan Desa), which actively promotes village prosperity.

Keywords: *Lowland Paddy, Peatlands, Palm Oil Plantation, and Wetland*

INTRODUCTION

This Wetland habitats, particularly peatlands and soft soil, are seeing an increase in the number of palm oil plantation firms. The importance of positive and negative factors cannot be overstated, especially given the scale of each unit's effort is enormous enough to alter the landscape or wetland ecosystem in particular. The majority of palm oil plantation company units in the field are between 5000 and

10000 hectares. While there has been a significant growth in the number of units, there are still many garden units with the status of crop yield, as well as numbered TBMs (plants have not produced). Oil palm crops can be grown in a number of Indonesian areas, mostly in Sumatra and Kalimantan. Oil palm land development in Sumatra and Kalimantan continued to grow in mid-2009.

Land clearing for the establishment of oil palm plantations, on the other hand, is said to have a negative impact on the productivity of rice cultivation *lebak* rice farming. As in the *lebak* rice paddy area of Ogan Komering Ilir, one of the regency in South Sumatra (Goenadi, 2005). Oil palm plantations are said to have a harmful impact on the environment and biodiversity in the surrounding areas. According to data from the Ogan Komering Ilir Regency Agriculture Office, as many as 7998 hectares of rice fields in Ogan Komering Ilir Regency have failed to plant in the last four years due to water discharge that has not retreated or drought. The total includes 2550 hectares of ordinary *lebak* swamp in Kayuagung District, 2490 hectares of Sirah Pulau Padang District, 813 hectares of Jejawi Subdistrict, and 2145 hectares of Pampangan District. Rice output in Ogan Komering Ilir Regency has reduced to 32000 tons of dry grain harvest (GPK) per year as a result. In addition, oil palm plantations cover around 350 thousand hectares of land.

Peat swamp land makes up the majority of the oil palm plantation acreage. Water governance in agricultural areas or rice fields has been disrupted as a result of the construction of huge canals. (Dinas Perkebunan Kabupaten OKI, 2014). Sjarkowi & Noerdin (2013) voiced concerns about ecosystem disparity in the east coast wetland zone almost two decades ago. Both writers have said that there are seven challenges that constitute hurdles for sensible management of wetland ecosystems based on conceptual reasons and professional attitudes in understanding facts and data. The function of wetland ecosystems is critical for excellent sustainability.

The seven constraints are: 1) physical facilities and infrastructure limitations for controlled development; 2) activities of HPH (Forest Management Rights) and now HP-HTI that are not controlled by rights holders; and 3) activities of HPH

(Forest Management Rights) and now HP-HTI that are not controlled by rights holders. 3) River shallowing, which is continuing to worsen, disrupting river transportation routes and flow behavior; 4) Illegal but well-organized loggers; 5) The fact that land allocation for multiple operations overlaps is not in the sector's or other sectors' interest; 6) The threat of some unique habitats that do not have adequate protection systems; and 7) A lack of appropriate levels of science and technology in wetlands, particularly peatlands, which are particularly vulnerable to human touch development because wetland ecosystems have their own (unique) characteristics that must be understood in order to be preserved as functional entities as well as the quality of life.

The constraints of the first to seventh items have been fixed here and there till now, but the negative influence in the region is still present and has a significant negative result. The beauty of the Unit Taman Nasional Sembilang (190000 ha) (Yetti, 2013) as well as the source of living in the swamp *lebak* and estuaria area are among those who have been injured (Sjarkowi, 2012; Sjarkowi, & Nurdin, 2013).

Given the importance of swamp *lebak* and peat swamp areas as foundations of rice production and animal protein sources or freshwater fish and cage horticulture, in addition to swamp buffalo, the quality of wetland agro-ecosystems is critical to farmers' livelihoods and national food security. Furthermore, many specialists in soil science and agronomy (Susanto, 2010) believe that with proper management of wetland agro-ecosystems, the production of previously cultivated wetland landscapes can be raised by at least twice the current level. Rather than, *lebak* rice farmers are increasingly complaining about the difficulty of arranging rice crops (Ostergaard, 1990 for Riau; and Sjarkowi, 2013 for OKI South Sumatra), with some failing to plant or due to puddles over time and others failing to harvest (Ostergaard, 1990; Sjarkowi, 2013) (due to lack of water).

When such disruptions have reduced citizens' well-being and destabilized PAD (Regional Native Income, such as the value of the land tax levy building (PBB); levy "auction *lebak lebung*" retribution of water and land transportation), food security is jeopardized, which can lead to social unrest and even riots among citizens or *so-*

called riots. Certainly, disruptions in citizens' eye-searching activities as a source of income must be linked to changes in the environment's behavior, citizens' behavior, or the attitude of every human development.

The dynamics of socio-anthropological change should be studied in order to identify the primary determinants and important elements that influence behavior, quality, and environmental functions. Any change is the result of haphazardly extracting natural resources without environmentally sound plans. According to conceptual and literature research, if the growth of oil palm plantations produces changes in the hydro-dynamics of rice fields in *lebak*, rice yield and production will be affected by the timeliness of planting and will no longer be guaranteed according to farmers' customs. Farmers' revenues undoubtedly decrease when their source of livelihood is disrupted (Wolf, 2013 ; Yasmi, 2007 ; Zachrisson, 2013).

Reduced crop productivity and rice crop area *lebak* will encourage farmers to engage in side enterprises such as palm oil workers, fish farmers, or horticulturists, allowing revenue to be compensated or even replaced multiplied, allowing for a return to the prior level of income. (Dhiaulhaq, 2015; Basyar, 1999; Colchester, 2006).

It can be compared to the revenue level of *lebak* rice farmers before and after the presence of oil palm plants based on these changes. As a result, the goal of this research is to determine the influence of expanding oil palm plantations in the micro and macro perspectives of the region on the environment, as well as bio-geophysical changes in paddy fields, on land production.

RESEARCH METHODS

The choice of this area was made with care or purposive. Land landscape alterations encompassing wetland ecosystems are relatively big and occur very quickly in the Ogan Komering Ilir capital region and its vicinity. Changes in spatial usage or conversion of wetlands are undoubtedly linked to the increase of residential areas, as well as the expansion of various urban infrastructures. As a result, the area surrounding Kayuagung is a particularly critical section of the Ogan Komering Ilir

area that should be observed. Serigeni Baru Village, Kayuagung District, Ogan Komering Ilir Regency, and Mariana Village, Banyuasin I District, Banyuasin Regency are most affected.

The balanced layered random sample recall approach was chosen for this study or proportionate stratified random sampling. Because the samples tested were heterogeneous, this strategy was chosen. This study used both primary and secondary data to get information. Surveys and interviews with respondents utilizing a pre-prepared list of questions are used to collect primary data. Secondary data was gathered from relevant agencies such as the Central Statistics Agency (BPS) Ogan Komering Ilir Regency, the Plantation Office of Ogan Komering Ilir Regency, the Agriculture Office of Ogan Komering Ilir Regency, the Head Office of Kayuagung City, and other sources that could help with this study.

RESULTS AND DISCUSSION

Changes in water governance include a regional macro perspective

The symptoms of changing landscapes and changes in the water system of runoff from the present conditions in the Kayuagung region. BBasen on shows satellite imagery maps from the wet seasons of 2002 and 2014 is dry season. The effects of bio-physical alterations on hydrodynamics were demonstrated in two separate settings that year. Compared to the condition at the same site in 2014, there were more inundations upstream of the obstacle position of the road that divides the marsh, as seen in the 2014 map.

There has been a shift in the number and density patterns of the people, in addition to the change in inundation patterns. The density of housing along the komering river portion in Kayuagung District is fast increasing compared to ten years ago, with a thickening of the number of buildings inwards from the riverbank. This last thickening element, in particular, will have numerous environmental effects. Domestic waste deposits and solid waste where like tucked B3 (toxic hazardous materials) that can cause many problems or negative impacts when the water level of rivers and swamps flood and spread various diseases and toxins that are very

dangerous to pets or fish and livestock as well as humans are among those who need to be carefully monitored. The solid canopy space section of the wetland ecosystem was still sustainable roughly 10 years ago, as revealed by the landschape image map. In 2014, circumstances appeared to shift dramatically from wetland ecosystems to oil palm plantation agro-ecosystems.

According to the representation of this infrastructure network, the distance between the major channel and the parallel channel primary can be as large as concession land (e.g. 5000m). Connecting principal channels 1 and 2 must have created a secondary drainage channel that ran for 5000 meters and boiled down to the primary channel at any distance of 1000 meters. Each huge tile might be 5000000m or 500 hectares. Because the tertiary channel is built into the secondary channel at a maximum distance of 250m, each small plot has an area of 250m x 1000m or 25Ha, or 20 small tiles for every 1 large tile. The composition of the network of irrigation infrastructure and connecting infrastructure has been widely distributed in step with the rise of palm oil plantation business investment, as shown in the image map.

A plantation company's infrastructure network configuration will be distinct from that of other companies' infrastructure networks. The distinction can be viewed not just in terms of concessions, but also in terms of the importance of a tributary as a source of water and a drainage target (500Ha). The 250m figure is usually based on the technical belief that manually transporting FFB (fresh fruit bunches) using labor will be extremely exhausting if it exceeds a distance of 250m from the edge of a small plot to one side of the secondary channel, which is accompanied by a road for the transport truck.

As a result, the network of drainage channels and irrigation concessions in oil palm plantations is so well-designed to control the supply and excess water, as well as the flow of TBS transportation from a small plot to the connecting road in the secondary channel, and then to the main road to the crude palm oil factory location point. So, based on the findings of firsthand observations in the field and the visual expression of Image Show 1, there appear to be 3 (three) primary factors that cause

changes in the behavior of surface water and, by themselves, changes in the volume of run off water:

(1) Road facilities built to divide the swamp in the direction of surface water runoff will be blocked due to a lack of sewers and bridges, despite the fact that this is being built as an infrastructure to support the region's development with the allocation of tens of thousands of palm oil plantations.

(2) Canal facilities and road networks are expanding in plantation concessions, and there is a direct relationship in each unit of plantation concessions: the larger the concession of oil palm plants, the longer the road network and drainage channels as supporting facilities.

(3) Residential facilities and communities are becoming increasingly dense and permanent as a result of the distribution of fully irregular building plots, which are increasingly supported not by wooden poles or concrete but by walls sitting on ground urugan piles.

The three facilities (1, 2 & 3) are currently present in this area at the same time, causing impediments to arise in the flow of surface water runoff from upstream to downstream at the same time, especially when it is raining severely or during wet months typified by frequent and high rainfall. As a result, there will be barriers (blocking) that effectively cause puddles in the *lebak* pots for a longer period of time on the upstream side of the inhibitor and quickly dry up on the downstream side.

The collection of various nutrients and chemical contaminants, as well as the residues of organic waste, will occur in puddles with a longer retention duration. Facilities (1) and (2) will be found in similar places that are indeed peatlands or layered peat *hemic* to *sapric*, which is quite thick and ideal for oil palm crops. It's not uncommon for some large-scale palm agribusiness corporations to pursue such areas for palm agribusiness investment.

The conversion of wetland habitats into agro-oil palm ecosystems appears to be approaching from all directions, according to the 2012 satellite imagery map. Even the rest of the ecosystem that hasn't altered may have been separated into

principle permit holders on their investment plans who haven't had time to move to the status of location permits in order to start field executions (at the time this reference satellite imagery was taken). The pattern of combining facilities (1) and (3) will almost definitely become more common in the future. This is partly due to future advances that will inevitably deepen the geographical closeness between the five places crucial to the OIC's economic growth region.

There is even an impending development of the kayuagung road-toll road to Palembang, which will be in the form of wetland conversion in accordance with the nature and pattern of facility development (1) and (3). The combination pattern of facilities (2) and (3) is still likely to develop in the Ogan Komering Ilir Regency area further from Kayuagung, particularly in the area near the tides, i.e. if pirbun-trans pattern plantations are invested in. That is, even while the investment is far from current village crowds, the advent of trans-migrant workers, however much they will assist plantation activities, will undoubtedly reflect the pattern of facility development (2) and (3), and will undoubtedly be accompanied by a variety of repercussions.

As a result, it is critical for planners and development managers in this field to recall and respond to the standard benchmark. Here are 3 wise keys that should not be ignored, namely:

(1) If the construction of the road divides the swamp then the number of sewers or bridges of surface water must be directly proportional to the discharge and volume of water separated.

(2) If the conversion of wetland ecosystems to oil palm plantations, then the drainage channel network in the concession must have "in-let" and "out-let" which ensures sufficient water portion arrangements for the continuity of *lebak* rice farming.

(3) If a new settlement process is being developed along the riverbank, the structure of the building, as well as its density and facilities, must be designed in such a way that the surface water system is kept sustainable and does not impair aquatic biota or humans in general.

Furthermore, runoff water held in a swamp pot *lebak* will result in a slow-disappearing pool. Eutrophication (nutrient hoarding and inundation) will occur in puddles with practically dead flow patterns, accompanied by a reduction in pH and increasing water acidity, which is bad for fisheries. When raining against puddles in the swamp pot *lebak*, the effect of water runoff must be directly tied to the unevenness of the residents' rice *lebak* rice. Drought and inundation behavior in a swamp pot *lebak* (around which wetland habitats have already been converted to agro-oil palm ecosystems) is also clearly linked to this transformation. However, the core of the problem that plays behind each problematic *pasu rawa lebak* (which is often utilized by *lebak* rice growers) may be different.

Based on this situation, it is clear that the behavior of surface water (long inundated or swiftly drying) has changed and will continue to alter in regions where palm plantations have been widely developed. This symptom has a significant impact on the number of runoff coefficients (this coefficient is between 0 & 1). The coefficient figure tends to rise high near 1 in the rainy season in the agro-ecosystem area of wetlands that have been widely converted for oil palm plantations and touched by human hands of development, but it falls dramatically in the dry season because palm plantation concessions need to hold water.

Oil Palm Plantation Expansion Causes; Perpektif Micro Region

Many cultivation procedures, ranging from land clearing to trash release, have a technical and social impact on the environment. According to the Ogan Komering Ilir Regency Plantation Office, several cultivation processes were obtained, including land clearing and land preparation, with land conditions consisting of secondary forests and young shrubs, as well as a sleeping area with a bush and trees larger than 10 cm in diameter. Another procedure is drainage creation; the objective of drainage formation in a plantation is to regulate the moisture content of the soil to be used as plantation land.

The river flow causes water to flow towards rice fields in several sub-districts, culminating in the formation of this drainage. Because rice fields are geographically

positioned in the southern sections of plantations, they are subject to the principles of hydrodynamic water movement from a high to a low point. This water fills the arable area, causing the water level to rise or flooding, preventing rice planting. Furthermore, the emission of trash from oil palm plants causes other environmental impacts.

Various operations, such as weeding plants and burning trees infested with disease pests, as well as applying fungicides or herbicides, resulted in solid or liquid waste that flowed into the river close to the rice fields via trenches. This has an impact on the soil's physical state as well as the nutrients it contains. This waste tends to poison the soil that will be used as cropland for farmers, either rice fields *lebak* or horticulture crops utilized by farmers to cultivate crops, in addition to diminishing the amount of nutrients in the soil.

According to the study's findings, 84 percent of respondents agreed that the development of oil palm plantations was the cause of farmers' decreased rice production in the year before the development of oil palm plantations, and 16 percent said maybe because there is a lack of arable land in the year before the development of oil palm plantations.

Farmers complain about the state of their cultivated land, which is becoming increasingly ineffective, in addition to having a distinct impression after the growth of the oil palm plantation region. The *lebak* rice fields were flooded during the planting season, the soil was very dry and cracked during the dry season, and the farmers had trouble planting, according to 100% of the respondents. In terms of soil fertility, 100 percent of respondents said it was because they couldn't tell whether their cultivated land was still fertile or not because they hadn't planted post-flood planting on their cultivated land. In terms of farmers' willingness to become laborers after the unplanted rice fields *lebak*, 100 percent of those who work as laborers believe they are forced to do so because they need money to survive.

According to numerous perceptions and complaints, farmers believe that the expansion of oil palm plantations will have a favorable impact on rice farmers' *lebak* rice fields. However, 100 percent of farmers claim that the activity will have more

negative affects. The production that farmers strive for will be affected if one of the production elements is disrupted. Rice production for *sawah lebak*, which is traditionally done once a year, is now no longer possible. According to sample data collected in Serigeni Baru Village, there had been no interruption to rice farming *lebak* farmers in the area prior to the establishment of oil palm plantations in 2007, in terms of land available for farmers to produce, with rice output averaging 2644 kg/years/lg. Following the growth of oil palm plants in 2010, production fell to 908 kg/years/lg, owing to a decline in arable land of 0,27 ha from 0,31 ha to 0,03 ha. This interruption has an impact on the revenue of farmers who rely on rice growing as a source of income.

Based on the t test results, an estimated t value of -11,519 was produced with a probability value of 0,000, which is less than 0,01. This shows the difference between pre-production and production after the expansion of oil palm plantation areas, indicating that average production before the expansion of oil palm plantation areas is higher than average production after the expansion of oil palm plantation areas due to the reduction in the area of rice paddy fields *lebak* cultivated by farmers. Disturbance of land directed by *lebak* rice farmers, on the other hand, not only has a bad impact on rice production and productivity, but it also has a negative impact on farmers' income, particularly the income of rice farmers in *lebak*.

Based on the results of the t test analysis, which produced a calculated t value of 1,724 with a significant probability value of 0,093 at a 10 percent rate, this indicates a difference between the previous income and the income after the expansion of the oil palm plantation area, with the prior revenue mean of IDR 77258530,39/MT/ha and after-income of IDR 5605946,41/MT/ha, this indicates that the average income after the expansion of the oil palm plantation area. When compared from the data of the average income of rice farming *lebak* farmers in Serigeni Baru Village after the expansion of oil palm plantations with the total income of farming in Mariana Village that is not affected by the expansion of oil palm plantations obtained a relatively large difference, the average income of rice farming *lebak* in Mariana Village is greater than the average income of *lebak* rice farming in

Serigeni Baru Village after the expansion of oil palm plantations. The difference in revenue is IDR 1280310/MT/Ha.

The mean revenue in the Serigeni Baru Village was IDR 5605946,77/MT/Ha, while the mean revenue in Mariana Village was IDR 6964576,58/MT/Ha, based on the results of the statistical t test for the calculation of the difference in revenue in the Serigeni Baru Village with the total income in Mariana Village. This suggests that Serigeni Baru Village's income is lower than Mariana Village's. The known value in significant 2-tailed is 0,264, which is significant at the 30 percent level. In conclusion, the explanation is as follows: Following the establishment of plantations, there are a number of conditions that affect farmers' total revenue, including:

(1) Income from *lebak* rice farming declines, and farmers do not have this side job, so farmers do not have income.

(2) Income from *lebak* rice farming declines, but farmers have side employment, so farmers have income even if their income declines.

(3) Farmers' incomes may decline, remain constant, or grow as a result of their involvement in *lebak* rice production.

Farmers of *lebak* rice have complained about flooding at the site for the past three years, preventing them from planting. The citizens accused of the crime point to the presence of certain oil palm plantations as the source of the problem (PT. X). According to the findings of a field investigation and geography location analysis of two different entities of interest (namely, the site of rice farming *lebak Belanti* and the location of PT-X activities), both are said to have negatively interacted with each other. In truth, what transpired there was quite different from what many people assumed.

This argument is presented because of three facts:

(1) *Lebak* around this village is influenced by the Komering River to Palembang direction, which flows on the left side (west), and the Komering River to Lempuing direction, which flows on the lower right side of *lebak*; the shallowing of the western river branch impedes drainage and prolongs the period of *lebak* inundation; and

(2) the shallowing of the western river branch impedes drainage and prolongs the period of *lebak* inundation. The location of PT-X and the connecting road infrastructure in the northeast of *lebak* will obstruct some of the *lebak* water runoff (10%) whose currents follow the direction of the Komering River flow towards Lempuing (east);
(3) When the palm oil crop is 100 percent productive, it should be expected that the plant's water needs will be met.

From the three (three) facts presented, it is apparent that the presence of PT-X is not the only reason of the stubbornly persistent *lebak* puddle that has hampered people' efforts to plant rice on shallow *lebak* or *pematang* let alone *lebak tengahan*. It turns out that nature plays a role, specifically in the condition of the Komering River branch that is experiencing symptoms of sedimentation, which is connected to the estuary *lebak* in some segments but is increasingly disrupting its function as a reservoir for water drainage runoff from this *lebak* pot.

Given the description of the modifications that have been mentioned, there are three things to remember when it comes to the problem of failed planting and/or harvesting rice *lebak*, namely:
(1) Issues and their causes may vary by place; for example, 'other locust fields; other "*lubuk* fish", alias can't always be hit flat backdrop circumstances and the cause behind it.
(2) There may be more than one cause reason for the amount of difficulties that exist in a swamp pot *lebak*, thus it is necessary to determine what are the causative elements for a problem *lebak* swamp pot.

CONCLUSION

If the ecological perspective of development is considered from both the macro and micro levels of the region, the study's conclusion is that there is a causal relationship between the parties who are the source and beneficiary of detrimental negative consequences. When looking at the region from a macro perspective (tata-air), it is clear that there will be obstacles (blocking) that produce puddles in the

lebak pots for a longer period of time upstream and quickly dry out downstream of the inhibitor.

This micro-area is backed up by farmer complaints and statements that the expansion of oil palm plantations has a negative impact on rice fields, causing them to flood during the rainy season and become cracked during the dry season, making it difficult to grow rice and forcing farmers to become oil palm workers.

This situation is not unusual in the end to serve as a breeding ground for conflict between parties, particularly between corporations and small business owners. The development of the business world in the agroecosystem swamp *lebak* requires a holistic, integrated, and systemic approach strategy, according to all categories of interconnection. This is because a pattern of approach that is not integrated or only sectoral partial will make it impossible to get the parties to minimize business risk, or vice versa, it will be difficult to maximize the positive achievement of each branch of the business in question.

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