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Rice land conversion into plantation crop and challenges on sustainable land use system in the East Tanjung Jabung Regency

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Abstract

Rice land conversion into palm oil and rubber in the Regency of East Tanjung Jabung has come to the fore but no data to confirm them as threats for the sustainability of rice land. Through overlaying Landsat Imagery year 2006, 2010 and 2014, we find the massive conversion of rice land into palm oil during 2006-2014 as much as 15,616 hectares while rubber was not being a threat. The land rent of palm oil is higher than that of paddy as much as Rp7,661,584/hectare/year. This high revenue together with some difficulties faced by the rice farmers make the sustainable land use system is difficult to achieve.

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1. Introduction

Issues of land conversion of food crop into plantation crop especially palm oil and rubber in Jambi Province has been emerging recently. The Regency of East Tanjung Jabung is one of main rice producers in Jambi Province that experiences high loss of rice land. This area was the second biggest rice producer in Jambi Province after Kerinci Regency, which supplied about 102,683 tonnes of paddy in 2013 (SJP, 2014). Based on rice land audit that was

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conducted by the Office of Agriculture and Food Crops of Jambi Province in 2012, rice land in East Tanjung Jabung was dominated by non-irrigated rice land. Its number continued to decline by an average of 10.83% per year. The utilization of non-irrigated rice land to cultivate paddy also declined, of 41,231 hectares of non-irrigated rice fields in 2011 was only about 71.8% or 29,863 hectares that had been cultivated by paddy. On the other side the land for plantation crops such as rubber and palm oil has been growing very fast. As examples, palm oil plantation and rubber increased respectively from 32,759 hectares and 7,172 hectares in 2009 to 107,228 hectares and 7,750 hectares in 2013, while coconut decreased from 59,370 hectares in 2009 to 53,724 hectares in 2013 (SJP, 2009; SJP, 2013).

Realizing this, the Government of East Tanjung Jabung Regency set the target for the Protection of Sustainability Food Agricultural Land (PSFAL) that is considered ambitious and difficult to achieve if we take into consideration that this regency is also being the development area of plantation crops such as palm oil, rubber and coconut. The target of PSFAL is 17,000 hectares plus reserving another 4,000 hectares as mentioned in the Regional Regulation Number 18 year 2013 about protection of Sustainability Food Agricultural Land (GETJR, 2013). PSFAL Program itself is very important as the first step to guarantee the continuity of paddy land supply (Barus *et al.*, 2012) especially when Indonesia Government targets food (rice) self-sufficiency in 2017.

In order to support the implementation of the Regional Regulation Number 18 year 2013, the Local Government had conducted a validation toward existing rice land. It was found a report in Rantau Rasau, one district that experienced the highest rice land conversion, that was only 938.75 hectares of rice land were successfully validated to join PSFAL Program, while the remaining 1,307.61 hectares targeted land could not be validated because the farmers were not willing to make/sign the Statement of Having SFAL or in many cases the land had been converted.

Up to now there are no data about the number of rice land that had been converted into plantation crops. According to Sa'ad (2012), it's important to know the land use change in order to make a development plan for achieving a target in future. This research will answer the doubt whether plantation crops are being a threat for the sustainability of rice land in the East Tanjung Jabung and what crop that threatens the most as well as the analysis of land rent palm oil and paddy that influences rice farmers to do land conversion.

2. Methodes

In order to identify rice land that had been converted into plantation crops, we overlaid Landsat Imagery year 2006 and 2010 as well as 2010 and 2014. These result the land use maps year 2006-2010 and year 2010-2014. Subsequently we got the number of rice land (in hectares) that had been converted to develop plantation crops. This data will confirm a particular plantation crop (whether palm oil or rubber or coconut) that become the main threat for the sustainability of rice land in this region. The next step was to analyze the value of land rent of rice field and its plantation crop competitor. Respondents for the land rent analysis were chosen from a district that experienced the highest number of rice land conversion during 2006-2014. This involved 42 rice farmers and 42 palm oil farmers. The equation used to count land rent refers to Rustiadi *et al.* (2011) as follows:

$$LR = Y(m-c) - Y.t.d \quad (1)$$

LR = land rent
Y = output per land unit
m = market price per output unit
c = cost per output unit
t = transportation cost per output unit per distance unit
d = the distance between production location and market

We also interviewed government employees to support information and clarify the situation in the study area.

3. Result and Discussions

Below are the land use maps year 2006-2010 and 2010-2014. Each of them was gained by overlaying maps from the Landsat Imagery year 2006 and 2010 and map from the Landsat Imagery year 2010 and 2014.

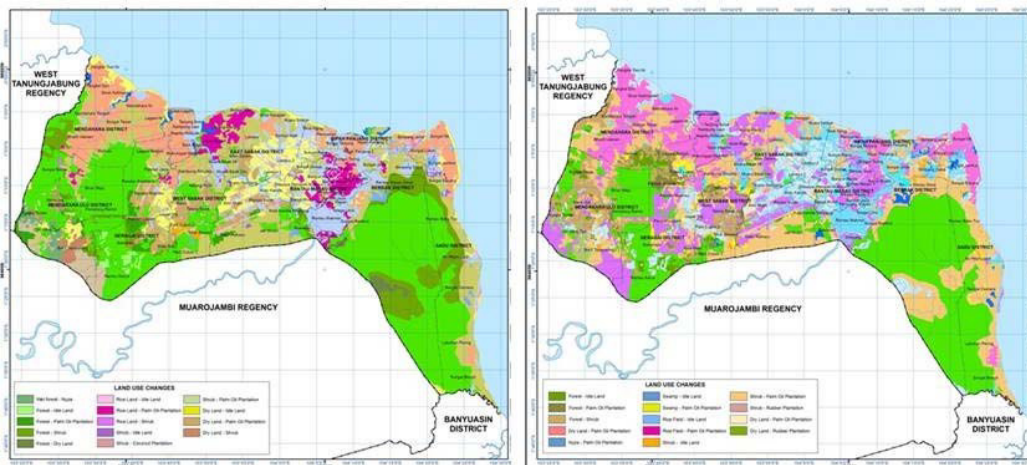


Fig.1. (a) Land use map in East Tanjung Jabung Regency year 2006-2010; (b) land use map year 2010-2014

From interpretation those maps, we got information about the sources of land to develop palm oil plantation as can be seen in Table 1. There were five sources of land identified here, i.e. forest land, shrub, dry land, rice land and idle land. During 2006-2014, there were established 56,766 ha of new palm oil plantation whereas 5 districts became the major areas of expansion, their ranks in sequence were: (1) Rantau Rasau, (2) East Sabak, (3) Berbak, (4) Nipah Panjang and (5) Kuala Jambi. It's confirmed here that there was no conversion found from rice land into rubber or coconut, two plantation crops that are also popular in East Tanjung Jabung Regency.

Table 1. Sources of land to expand palm oil plantation in Tanjung Jabung Timur in year 2006-2010 and 2010-2014

No	District	Year 2006-2010				Year 2010-2014					Total land for palm oil expansion (ha)
		forest-palm oil (ha)	shrub-palm oil (ha)	dry land-palm oil (ha)	rice land-palm oil (ha)	forest-palm oil (ha)	shrub-palm oil (ha)	dry land-palm oil (ha)	rice land-palm oil (ha)	idle land-palm oil (ha)	
1	Berbak	124	126	50	1,155	-	351	-	133	-	1,939
2	Dendang	1,018	-	3,780	52	474	397	970	-	-	6,692
3	Geragai	3,061	70	5,002	391	2,869	1,790	358	96	7	13,644
4	Kuala Jambi	-	-	261	628	-	-	-	-	-	889
5	Mendahara	-	-	-	71	695	228	-	-	-	994
6	Mendahara Ulu	2,690	-	971	461	434	60	285	-	7	4,909
7	Nipah Panjang	-	-	-	737	-	487	18	24	15	1,281
8	Rantau Rasau	7	-	479	5,822	-	268	809	80	-	7,465
9	West Sabak	44	-	4,442	55	1,488	1,322	32	120	-	7,503
10	East Sabak	-	-	2,653	5,696	13	125	1,112	-	-	9,599
11	Sadu	-	143	30	54	24	1,321	39	41	199	1,853
SUM		6,944	339	17,670	15,121	5,998	6,348	3,623	495	228	56,766

Source: interpretation of land use maps

Rantau Rasau is one of the first places that were being transmigration location. According to Sa'ad (2012), the total area for transmigration program was around 48,919 ha that covered area of Rantau Rasau, Lagan Hulu, Simpang Pandan, Simpang Puding, Pamusiran, Lambur, and Dendang. Decades after this area established thousand hectares of new paddy land, there was just a little improvement in the productivity of paddy. In 2002 the paddy productivity in this regency was 31.57 quintal/ha (SJP, 2002) while in 2013 was around 36.08 quintal/ha (SJP, 2014). In comparison, the paddy productivity in Kerinci Regency in 2013 has reached 57.42 quintal/ha and Tebo Regency 47.98 quintal/ha. Paddy productivity in The East Tanjung Jabung was the lowest among all regencies/municipalities in Jambi Province.

Rather than continuing grow paddy, the land seems to give better revenue if planted by palm oil. Base on land rent analysis on 84 rice and palm oil farmers in Rantau Rasau District, gained result that paddy land rent Rp5,867,524 per hectare/year while palm oil land rent Rp13,529,108 per hectare/year or their comparison equals to 1: 2.3. Paddy land rent in the East Tanjung Jabung is much lower than that of in West Java. In 2010, from 1 ha paddy land, the farmers earned around Rp10,950,000 per harvest time while farmers that own land around 0.5 hectare can earn around Rp5,475,000/hectare per harvest time (Sumarno and Kartasasmita, 2010). Rice land rent in the East Tanjung Jabung is low even though the average of land ownership is high, i.e. around 1.3 hectares. This is a part due to the paddy planting season that is only once in a year so the use of land is inefficient. In contrast, palm oil can be harvested twice in a month throughout the year and the land ownership is also higher, i.e. around 1.79 hectares per household. These can double palm oil farmer's income.

Based on land rent analysis, there is a disparity of Rp.7, 661,584 per hectare/year between paddy and palm oil land. This condition hampers the effort to practice the sustainable land use system or to achieve the target of PSFAL. According to Pambudi (2008), land rent can be used as a basis to explain how one business presses another in one certain area. Refers to Barlowe (1978), land with higher land rent is relatively easy to occupy prime location, and explain why there is a shift of land use from one to another (Tietenberg and Lynne, 2009), as well as become a reason for agricultural land conversion to other uses (Rustiadi *et al.*, 2011).

According to Feintrenie *et al.* (2010), farmers are very responsive to the economic opportunity and they don't hesitate to change their livelihood if it can improve their revenues. This also explains why they convert their land for the other uses. This is also true in the East Tanjung Jabung. In the period of 2006-2010, the main source of land to expand palm oil is rice land and dry land. They outnumbered the land conversion from forest land. However, the expansion of palm oil that use forest land, rice land as well as dry land reflects a system of land use that categorised as business as usual (that will give adverse impacts on food production and the environment) and should be quitted and replaced by a system of land use that is more sustainable. In order to achieve a system of sustainable land use, the expansion of palm oil plantation should be only on the degraded land (Wicke *et al.*, 2011). According to Reed *et al.* (2015), it's important not to ignore the cultural and economic barrier in order to adopt the more sustainable land management. From Table 2 we can learn some social and economic aspects of paddy and palm oil farmers. The survey was conducted in the District of Rantau Rasau.

Table 2 Descriptive statistics of respondents

Variable	N	Mean	
		Paddy Farmers	Palm Oil Farmers
Age (year)	42	47.50	45.10
Education	42	1.40	1.93
Work Experience (year)	42	23.4	11.00
Land ownership (ha)	42	1.31	1.82
land productivity (kg/ha/year)	42	1.981	45.571
Land rent (Rp/ha/year)	42	5,867,524	13,529,108

Source: data analysis

As can be seen in Table 2, the descriptions of palm oil farmers are better in the aspects of age, education, land ownership, yield productivity and land rent value. This indicates that the young farmers with a better education are more willing to convert their paddy land. Most of these palm oil farmers here are the second generation of

transmigrates that coming to this region in early 1970s. At that time, each household got 2 hectares land for agricultural land (rice land) and another 0.25 hectare for housing.

Some palm oil farmers that were interviewed still have paddy land and vice versa. Around 73.81% of respondents from rice farmer group revealed that they ever did rice land conversion in the past. This number is lower than that of palm oil farmer group that did the same thing, i.e. around 93%. The high percentage of farmers that did paddy land conversion again emphasizes the view of farmers toward palm oil as a very profitable plant. It's only 7% of palm oil farmers that never did land conversion; this strengthens the presumption that most of palm oil farmers were rice farmers previously.

Table 3 Experiences in rice land conversion

Farmer Group	
Paddy Farmers	
• Never did rice land conversion into palm oil plantation (%)	26,19
• Did rice land conversion into palm oil plantation (%)	73,81
• Average rice land that had been converted into palm oil plantation (ha)	1,27
Palm oil Farmers	
• Never did rice land conversion into palm oil plantation (%)	7,00
• Did rice land conversion into palm oil plantation (%)	93,00
• Average rice land that had been converted into palm oil plantation (ha)	1,74

Source: data analysis

Beside the land rent factor that change the land use in the District of Rantau Rasau, respondents also revealed some problems that pushed them to left their rice land, i.e. rice land was less productive, high price of inputs and their scarcity, the soil became very acidic or pyrite, and irrigation problems. While the reasons that pulled them into palm oil plantation were the high yield of palm oil and can be harvested twice in a month as well as the easiness in taking care. Feintrenie *et al.* (2010) that conducted a research in Bungo Regency of Jambi Province revealed farmers' perceptions about palm oil as plants that have high productivity, the pre-production period is short, having secondary products, as well as the relatively low investment and input costs.

In Rantau Rasau District, many farmers are reluctant to sign the Statement of Having Sustainability Food Agricultural Land because in the letter of statement there is no agreement about agricultural incentives that they will receive from local or provincial government (Kiswanto, 2015). In the other hand they are demanded to agree to the following conditions as mentioned in that letter of statement: (1) willing to provide land for the Program of PSFAL and participate to protect it from conversion; (2) Willing to work together among the farmer group to build a physical work in the food agricultural sector in order to reach the state of food self-sufficiency in the East Tanjung Jabung; (3) will not demand any kind compensation for the use of their land to support the Program of PSFAL; (4) Be willing and ready to grow food crops base on technical guidelines given by extension workers and their recommendations; (5) Willing to accept the ease as well as sanctions provided by the local government in accordance with Regional Regulation Number 18 Year 2013; and (6) From point 1 up to 5, if farmers do not adhere to this statement, the farmers are willing to accept sanctions / penalties in accordance with applicable regulations. At point (5), i.e. 'the ease provided by the local government' is interpreted as agriculture incentive but there is lack of explanation or socialization about this. This emerges a doubt about the seriousness of government to support the rice farmers. Based on the research conducted by Mukhlis (2014) in the District of East Sabak, Berbak and Dendang, obtained result that as much as 62.96% of the farmers had received socialization about the Program of PSFAL. However around 60.74% of respondents disagree if the farmers would get legal sanction if they violate the contract with government.

The challenge on sustainable land use system will be persistent as long as there are a wide disparity of land rent between paddy land and other uses and no firm rule to prevent its happening. According to Pearce and Turner (1990), protection of wetlands can be done in three ways: (1) through regulation, (2) acquisition and management, (3) incentives and charges. Among these three ways, giving incentives or easiness is the most effective ways to protect wetland from conversion. The presence of firm rule and law enforcement is also needed to maintain the

sustainable land use system or in this case the PSFAL. Regulatory policy had been carried out in some countries in South Asia that aims to prevent the fragmentation of agriculture land as it happened in Bhutan by banning to sell land with the size of two hectares or less. The Thai Government gives soft loans to the farmers to purchase additional farmland (Niroula and Thapa, 2005). Incentives in the form of selling price subsidization and agricultural supporting price policies applied in Malaysia and Brazil (Halfand, 1999; Athukorala and Loke, 2009) while Nigeria set a high import tax for food products (Warr, 2008; Oguntade, 2011). Japanese government applies high import taxes on food products, providing bank loan with interest subsidizing so the farmers could buy machines and production facilities, as well as large government investment in building infrastructure in the rural areas (Purnama, 2010).

4. Conclusions

The conversion of rice land into palm oil plantation has been occurring massively in the regency of East Tanjung Jabung. Among plantation crops grown in this area; palm oil, rubber, and coconut, palm oil becomes the only threat for the sustainability of rice land. Within two periods of time observation, the highest occurrence of rice land conversion happened in year 2006-2010, which reached 15,121 hectares in all districts. In year 2010-2014 there was a decrease of rice land conversion, that was only 495 hectares and it happened only in 6 districts. In the second period of observation, the land for the expansion of palm oil plantation dominantly sourced from forest and dry land. The comparison of land rent between paddy and palm oil is quite high. The sustainable land use system is difficult to achieve in the Regency of East Tanjung Jabung as long as the wide land rent disparity between palm oil and rice still exist as well as the absence of firm but fair sanction to support PSFAL.

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