



## **The Role of Farm Household Saving for Oil Palm Replanting at Paser Regency, East Kalimantan**

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### **ABSTRACT**

Oil palm replanting is a long-term investment decision and requires relatively large amount of capital. Decision of farm households for oil palm replanting was determined by their economic condition and behavior on production and consumption. The objectives of this research are to analyze the role of household saving behavior for oil palm replanting and to determine the factors affecting household saving for replanting purpose. The research conducted at Paser Regency, East Kalimantan Province. Data were collected from a survey to 113 households with the age of oil palm trees between 21 and 33 years which are purposively sampled. The role of household saving for replanting was measured by economic ability of replanting, which is the ratio between replanting savings and the total requirement for replanting costs. The factors affected household saving for replanting was analyzed using a multiple regression method. The descriptive results of the study showed that 46.02% of the households' sampled had savings for replanting, while the rest 56.98% had no saving. Households' economic ability for replanting was only 10.81%, very far from the required costs. The factors that could household saving were land area to be replanted, total household income, and credit of household for non-replanting purpose; while the age of oil palm, household size, expenditure per capita and loan repayment variables could reduce the saving. The implication of this research are: Households should plan and implement gradual replanting program; and they should increase the savings, particularly some years before achieving the optimal replanting age.

**Keywords:** Saving, Farm Household, Oil Palm, Replanting

**JEL Classifications:** D10, D14, D24

### **1. INTRODUCTION**

Oil palm replanting is an important thing to do by the farmers and can't be ignored specifically when the plantation has become old and its productivity tends to decline. Replanting is an effort to replace an older plant with the new one to stabilize and/or maximize income (Kotagama et al., 2013). Replanting has becoming an effort to maintain high productivity of oil palm plantation to ensures the sustainability of oil palm industry to compete (Omar et al., 2001).

The age of trees and the number of productive trees are two factors that affect the profitability of oil palm plantations (Dewi et al.,

2013). The average age of oil palm trees in Indonesia is currently 30 years (Badan Pusat Statistik [BPS], 2013) and categorized as an old plant or a damaged plant. Total unproductive area in 2015 covered an area of 169.326 hectares (BPS, 2013), in which 100,890 hectares (59.6%) were categorized as smallholders plantations. The accumulation of old trees and the suspension in the implementation of replanting program will affect the flow of households' incomes.

There are two fctors influencing oil palm replanting activities: Physical factors and economic factors (Omar et al., 2001). Physical factors are related to plant height, plant density, and plantation infrastructure, while economic factors are mostly influenced by physical factors. Economic factor that significantly affects

replanting activity is the availability of funding (Andriati and Wigena, 2011; Safitri and Rosyani, 2014; Ruf and Burger, 2015; Anggraeny et al., 2016). Thang (2011) and Hutasoit et al. (2015) also claimed that farmers would not do replanting if they did not have enough funds for that investment activity.

Fund insurance program for oil palm replanting (IDAPERTABUN) has been implemented by cooperation between Bumiputera insurance company with Directorate General of Indonesian Plantation to prepare for oil palm replanting. However, the program did not work properly. Many participants (farmers) took their funds before the contract expired. Another government assistance for oil palm replanting was the Plantation Revitalization Program in the form of Credit for Development of Bio-energy and Revitalization of Plantation organized by the government through the Directorate General of Plantations and the Ministry of Finance. This credit provides interest subsidy of 7%. However, it has been suspended as of January 1<sup>st</sup>, 2015 because there was no funding budget from the government. Then in 2015, the government established Indonesia Estate Crop Fund for Palm Oil (IECFPO/BPDPKS). IECFPO is a working unit under The Ministry of Finance. IECFPO collected funds on the export of oil palm i.e., crude palm oil and/or its derivative products. The funding of oil palm plantations can help provide incentives for replanting of the smallholders. The disbursement of oil palm replanting fund collected by IECFPO has only been realized in Riau Province, while other provinces are still in the process of grant application. Realization of replanting fund from IECFPO was amounting to IDR 623.49 million (BPDPKS, 2016).

Oil palm replanting requires a high cost. The unavailability of funding which is easily accessed by farm households imply that they should strive to independently provide the required replanting funds. They are expected to be able to prepare the replanting funds from their own savings. The decision to save is a two-stage sequential process as it involves first, a decision on consumption level after which a residual is left called 'saving'; and, second, a decision on the allocation of surplus funds among various forms of saving. Saving can increase the amount of capital available. Thus, it is important to understand households' decision-making process on replanting activity to formulate an effective policy formulation.

About 14,608 households in Paser regency, East Kalimantan, are depended on oil palm as their main source of incomes. Their oil palm plantations currently have entered older age and decreased in productivity. According to the Paser's Distanbun (2017) data, there are approximately 17,000 hectares of oil palm plantation in Paser Regency that need to be rejuvenated. However, only 1.59% of the total area has been replanted. In case of rubber replanting, Jayasuriya and Carrad (1977) explained that the main factors encouraging the farmers to do replanting were to obtain stable outputs and a reasonable incomes, lower risk, and a lack of viable alternative crops. Jayasuriya et al. (1981) stated that cash subsidies could encourage farmers to make long term investments such as replanting. Households may be interested in replanting but they don't have the required funds. The existence of replanting subsidy can helps farmers to meet most of the costs of replanting and cost of living during the gestation period, before the crops produce.

For small farmers, the socioeconomic conditions such as size of land holding, income levels, sources of income, land ownership etc. also affect the replanting decision (Septianita, 2009; Safitri and Rosyani, 2014; Anggraeny et al., 2016). Suminartika (1997) found that the capital formation in oil palm business can be done by increasing farm and off-farm incomes. Bakir (2007) confirmed that the ability of a farmer to set up replanting funds is determined by productivity and price of the product (fresh fruit bunch or FFB), off-farm income and levels of expenses, including consumption, education and health expenses, and credit repayment.

The average age of oil palm in Paser regency was 34 years. The production of oil palm is entering the stage of declining yield. Income household from oil palm farm determine amount of saving. However, there are some significant questions concerning households savings for replanting, such as: Do the households have a sufficient capacity to save for replanting? What factors determine household savings behaviour? This research is generally aimed to analyze the role of farm households saving for oil palm replanting activities in Paser regency, East Kalimantan province. Meanwhile, the specific objectives of the study are first, to analyze the economic ability of farm households to replant their oil palm trees; second, to analyze the factors affecting households saving for that activity.

## 2. LITERATURE REVIEW

Saving is a form of cash or physical product that is saved for future use. Saving is an activity where some resources are used in the current period and the results are enjoyed in the future (Bryant and Zick, 2006). Saving is the difference between income and consumption. Saving is an important variable that could enhance the productive capacity of farm household. Supply of saving represents an important source for investment financing (Anttanasio and Banks, 2010). The inability of households to save will affect the level and sustainability of capital formation (Obayelu, 2012). A household with high-saving ability will have a higher potential income if the savings are invested in productive activities.

Household saving can be consumed later. The farm households as economic agents have the resources to be allocated optimally over time. The household is led to set aside some portion of current production as capital accumulation in order to produce more in future periods. Households must make decision about additions to or reductions in the level of some stock, and those decision will affect both current and future well-being. Based on Nicholson (1998), there are two variables in allocating resources over time: The stock being allocated (K) and a control variable (C) being used to effect increases or decreases in K such as saving rate or total net investment. Choices of K and C will yields benefits over time to the economic agents involved. The benefit at any point of time will be denoted by  $U(K,C,t)$ . The household's goal is to maximize:

$$\int_0^T U(K, C, t) dt \quad (1)$$

Where: T denotes the time period over which decisions are to be made, K is capital stock, C is saving rate or total net investment, t is time.

There are several studies describe the factors influencing saving behavior. Adeyemo and Bamire (2005) examined the pattern of saving and investment among cooperators farmers. Their study indicated that income, loan repayment and amount of money borrowed are significant variables that influenced saving pattern. Rehman et al. (2010) investigating the determinants of households' saving in Multan district of Pakistan showed that factors increase the household saving were spouse participation, total dependency rate, total income of household and size of landholdings, while those reduce saving level were education of household head, children's educational expenditures, family size, liabilities to be paid, marital status, and value of house. Obayelu (2012) showed that age squared, farming experience and diversification into non-farm activities positively influence rural saving rate. Nwibo and Mbam (2013) showed that age, educational level, household size, farming experience, and household income significant effect on the capacity to save and invest.

### 3. RESEARCH METHODOLOGY

This research was conducted in Paser Regency, East Kalimantan Province, from December 2016 until March 2017. The data consists of primary data and secondary data. Primary data were collected through a survey to 113 farm households in three sub-districts of Paser Regency. The samples are purposively determined. The respondent sample is determined based on the age between 21 and 30 years that have not been replaced. This criterion is determined by the researchers with the consideration that at this age, the yield of the trees has started to decline and it has to be prepared for replanting.

Primary data collection was done by interviewing the respondent using a questionnaire. Total respondent is 113 farm households consisted of 60 respondents with the age of the trees between 21 and 30 years, and 53 respondents with the age of trees over 30 years. Data collection for respondents that had not done oil palm replanting was done using an open question. Secondary data were collected from data publications and research results from The Office for Agricultural and Estate of Paser Regency, Estate Office of East Kalimantan Province, PTPN XIII, and KUD Sawit Jaya.

Primary data consisted of the characteristics of farmers, the area of oil palm, the source and amount of household income and expenditure, and saving behavior. Secondary data consisted of data

on the land area of oil palm to be replanted, regional distribution, articles, and publications related to research problems.

The role of household saving was measured by economic ability of replanting, which is the ratio between the amount of savings for replanting and the total costs of replanting. The equation for economic ability of household to replant oil palm is:

$$\text{Economic ability of replanting} = \frac{\text{Replanting saving}}{\text{Total cost of replanting}} \times 100 \quad (2)$$

The multiple regression analysis was used to determine the factors affected household saving for oil palm replanting. The form of regression model is presented as:

$$Y = a_0 + a_1X_1 + a_2X_2 + a_3X_3 + a_4X_4 + a_5X_5 + a_6X_6 + a_7X_7 + a_8X_8 + e \quad (3)$$

Where: Y is farm household saving for oil palm replanting (IDR); X<sub>1</sub> is age of oil palm (year); X<sub>2</sub> is household size (person); X<sub>3</sub> is land area of oil palm to be replanted (ha), X<sub>4</sub> is share of oil palm income to the total household income (percent); X<sub>5</sub> is total household income (IDR per year); X<sub>6</sub> is expenditure per capita (IDR per capita per year); X<sub>7</sub> is household credit for non-replanting purpose (IDR); X<sub>8</sub> is amount of credit repayment of household credit for non-replanting purpose (IDR per month).

### 4. RESULT AND DISCUSSION

#### 4.1. Socio-economic Characteristics of Farm Households in Paser Regency

The result of the socio-economic characteristics of the farm households were presented in Table 1. Table 1 indicates that the age of respondents was ranging from 23 to 85 years, with an average age of 51 years. Thus, they categorized as productive age. The average formal education of respondents is 6 years or elementary school. Farm households have the average land between 1 and 20 hectares, with an average land area of 5.02 hectares. The age of oil palm trees were between 21 and 33 years, and have entered the stage of declining production. The average number of dependents family members is around 3 persons. The average contribution of income obtained from oil palm farming is around 67.33% of total household incomes, while non-farm activities contribute around 18.89%, which indicating that oil palm is the main sources of income to farm households in paser regency. The average expenditure is IDR 11.54 million per capita per year. The

**Table 1: Socio-economic characteristics of farm households**

Household characteristics	n	Minimum	Maximum	Mean	Standard deviation
Age of respondents (year)	113	23	85	51.16	10.43
Formal education (year)	113	0	16	6.41	4.01
Household size (person)	113	0	9	2.62	1.38
Land area (Ha)	113	1	20	5.02	4.27
Income share of oil palm (%)	113	6.58	100	67.33	27.04
Income share from non-agricultural Activities (%)	113	0	90.57	18.89	24.07
Expenses per capita (IDR million/capita/year)	113	3.8	42.01	11.54	6.05
Age of oil palm plantation (Year)	113	21	33	29.32	3.26

average expenditure of households in Paser Regency is larger than that of national in 2016, which is around IDR 868,823 per capita per month or IDR 10.43 million per capita per year (BPS, 2016).

The reasons of households who have not done oil palm replanting in Paser Regency is presented in Table 2. Responses from all respondents indicated that households expect that they will get funding for replanting in the near future and most of them are in the process of applying for a replanting grant. Farmers in Paser regency were waiting for the replanting grant from IECFPO. In 2016, farmers who are members of 9 cooperative village units (KUD) have applied for assistance of replanting to ICEFPO. The submission of replanting grant funds is constrained by the legality aspect of land such as land certification, whereby some land for oil palm plantations have been transferred their ownership without clear information. Households with plant age between 21 and 30 years thought that the production of FFB was remained high and they have planned to replant independently. A research conducting by Iyan et al. (2014) in Riau showed that the farmers who have already planned to replant their plantation and have the required capital, they prefer to replant the trees with their own capital.

## 4.2. Role of Farm Household Saving for Oil Palm Replanting

Farm households in Paser Regency have their replanting savings in the form of cash and oil palm seedlings. The study found that 46.02% of 113 households have a plan to rejuvenate their old trees and they started to save some of parts of their incomes. About 29.20% households have saved regularly, while another 16.81% irregularly. Households with the age of plants over 30 years are more likely to save in cash. These findings were in line with those of IFC (2013). IFC research involved 1,069 smallholders as respondents in Sumatera and Kalimantan and showed that only 35% of farmers that regularly saved for replanting, 28% did not save regularly and the remaining 37% never saved. Farm household behavior in saving is presented in Table 3.

The cost of oil palm replanting per hectare is IDR 29.54 million. Replanting costs are calculated from 0 years to 3 years. At 0 year, the expenditures include the costs for land clearing, spraying, injecting crops, seedling and planting, plant maintenance, and labor, while at 1–3 years include the costs for plant maintenance and input (fertilizer, pesticide, labor). Since the average land area of oil palm to be replanted is 3.94 ha, then the cost of replanting

**Table 2: The reason of farmer's has not done the replanting in paser regency**

No	Reasons have not done oil palm replanting	Frequency (%)		
		The age of plant 21–30 years	The age of plant >30 years	Total respondents
1	The production of FFB is still quite high (still productive)	19 (31.67)	4 (7.55)	23 (20.35)
2	Main source of family income	3 (5.00)	2 (3.77)	5 (4.42)
3	No funds for replanting	6 (10.00)	8 (15.09)	14 (12.39)
4	Have their own plan for replanting	11 (18.33)	24 (45.28)	35 (30.97)
5	Have an expectation to get support for replanting soon	18 (30.00)	23 (43.40)	41 (36.28)
6	Have an expectation to be organized or doing replanting together	2 (3.33)	4 (7.55)	6 (5.31)
7	In the process to get funds for replanting	24 (40.00)	17 (32.08)	41 (36.28)
8	The availability of labor for harvesting	0 (0.00)	3 (5.66)	3 (2.65)
9	No guarantee to get a lending for replanting	1 (1.67)	1 (1.89)	2 (1.77)
10	No trust with grant funds	1 (1.67)	2 (3.77)	3 (2.65)
11	Constraint by the availability of seed	1 (1.67)	0 (0)	1 (0.88)

**Table 3: Farm household behaviour in saving for oil palm replanting**

Household behavior	Frequency (%)		
	Respondents with the age of plantation 21–30 year	Respondents with the age of plantation >30 years	Total respondents
Savings			
Yes	25 (41.67)	27 (50.94)	52 (46.02)
No	35 (58.33)	26 (49.06)	61 (53.98)
Saving frequency			
Regularly	20 (33.33)	13 (24.53)	33 (29.20)
Irregularly	5 (8.33)	14 (26.42)	19 (16.81)
The form of saving for replanting			
Cash	4	6	10
Oil palm seedlings	4	10	14
Cash and oil palm seedlings	1	5	6
The value of savings for replanting			
Cash (IDR)	2.15	7.38	4.61
Oil palm seedlings (trees)	386	166	283
The average of saving for replanting cash (IDR)	15.68	13.22	14.53
Household economic ability for replanting			
The average of land is to be replanted (ha)	4.10 (86.47)	3.75 (70.32)	3.94 (78.41)
The average replanting cost required (millions IDR)	121.11	110.91	116.33
Economic ability for replanting (%)	6.63	15.55	10.81



that must be prepared by households is IDR 116.33 million. However, the average amount of saving has been prepared by the households is IDR 14.52 million, indicating that the ability of households to save some of their incomes for replanting purpose is relatively low (10.81%), implying that most of the households (73.45%) in paser regency did not have the economic capacity to generate the replanting costs independently. Households with the capability coefficient above the average were 15.93%, above 50% as much as 5.31%, and above 100% only 2.65%. This result is in line with Jenahar dan Hildayanti (2017) result for rubber replanting case, where household saving can afford only 8% of the cost of rubber replanting.

The average income of oil palm farming is IDR 95.12 million per hectare per year, while the average total household expenditure is IDR 41.79 million per year. Comparing these conditions with the costs of replanting, then the farmers can be categorized as follows:

1. Households with the coefficient around 0–10.81% were categorized as those with no capability at all to do replanting independently and should be assisted.
2. Households with the coefficient between 10.81% and 50% have the capability to gradually replant the trees if they were assisted by loans from the banks and grants.
3. Households with capability coefficient above 50% have ability to gradually replant the trees without loans from any bank.
4. Households with the capability coefficient above 100% have the ability to independently replant the trees without any credit or assistance from any financial institutions.

### 4.3. The Factors Affecting Saving Farm Household for Oil Palm Replanting

Household prepare the fund for replanting by saving. The savings are determined by some socio-economic characteristics. Multiple regression analysis was used to determine the effects of socio-economic variable of the households. The dependent variable was based on the amount money saved for oil palm replanting. The output of the regression was presented in Table 4. Table 4 showed that the coefficient determination ( $R^2$ ) was 0.2416 which signified that about 24.16% of total variation observed in the dependent variable was explained by the explanatory variables. The overall significance of the model was depicted by the F-statistics that is significant at 1% of significance level. The household saving for oil palm replanting ( $Y$ ) is influenced by age of oil palm ( $X_1$ ), household size ( $X_2$ ), land area of oil palm to be replanted ( $X_3$ ), total household incomes ( $X_5$ ), expenditure per capita ( $X_6$ ), credit

of household for non-replanting purpose ( $X_7$ ), and repayment of household credit for non-replanting purpose ( $X_8$ ).

Age of oil palm ( $X_1$ ) was negatively signed and statistically at 15% level of significance. The older the age of oil palm trees affect the productivity of oil palm (Sutarta and Rahutomo, 2013; Woittiez et al., 2017) and it affects the household income for replanting saving. This research indicates that productivity of FFB with the age of trees 21-30 years is 20.24 tonnes per year, while FFB from oil palm trees with age over 30 years is 15.24 tonnes per year.

Household size ( $X_2$ ) was negatively signed and statistically at 15% level of significance. This was justified as increase in household size brings about decrease in the saving as increasing spend of income for consumption. Rehman et al. (2010), Nwibo and Mbam (2013) had found that farm household’s saving rate is influenced by household size.

Land area of oil palm to be replanted ( $X_3$ ) was positively signed and statistically significant at 1% of significance level. Increasing in replanted-land area of oil palm has been found to raise the cost of replanting. Household must be prepare the fund before replanting done. Savings performance among households might vary considerably, depending on land area of oil palm to be replanted. About 58.41% of the respondents had between 1 and 2 hectares of land area of oil palm to be replanted, about 22.12% of respondents had between more than 2 and 4 hectares, about 30.08% of the respondents had between more than 4 and 10 hectares of farmland land area of oil palm to be replanted, while 6.19% of the respondents had between more than 10 and 20 hectares of farmland land area of oil palm to be replanted. The mean land area of oil palm to be replanted was 3.93 hectares.

Total household income ( $X_5$ ) was positively signed and significant at 10% significance level. This was justified as increase in the income level of a household will bring about increase in the saving as increasing income will lead to more surplus that could be saved for replanting purpose. An increase in income has been found to raise the household’s ability to acquire surplus funds. Household can save and replanting independently. This finding justified the Keynesian theory of consumption which shows a positive relationship between income and saving; and that household savings is directly and significantly affected by the income level. Nwibo and Mbam (2013), Osondu et al.

**Table 4: Determinant of farm household saving for oil palm replanting**

Variables	Coefficient	Standard error	t	p > t
Constant	96.9624	65.6902	1.48	0.0715
Age of oil palm ( $x_1$ )	-2.2665	1.935453	-1.17	0.1220
Household size ( $x_2$ )	-	5.109014	-	0.1330
Land area of oil palm to be replanted ( $x_3$ )	9.0854	2.571365	0 3.53	0.0005
Share of oil palm income to the total household income ( $x_4$ )	-0.1356	0.2392386	-0.57	0.2860
Total household income ( $x_5$ )	0.1561	0.1039306	0 1.50	0.0680
Expenditure per capita ( $x_6$ )	-2.3504	1.278235	-1.84	0.0345
Household credit for non-replanting purpose ( $x_7$ )	0.6606	0.3434434	0 1.92	0.0285
Credit repayment of household credit for non-replanting purpose ( $x_8$ )	-26.6510	9.919425	-2.69	0.0040
Number of obs	113	$R^2$		0.2416
Prob > F	0.0003			

(2015) had found that farm household's saving is influenced by household income and expenditure. The income of household with the age of trees 21–30 years is IDR 107.52 million per year, while income of household with with age over 30 years is IDR 103.17 million per year. The contribution of oil palm income on total income of household with the age of trees 21–30 years is 71.39%, while the contribution of oil palm income on total income of household with over 30 years is 62.74%. The high contribution of oil palm income on total household incomes should be replaced from other sources when the oil palm replanting is implemented.

Credit of households for non-replanting purpose ( $X_7$ ) was positively signed and significant at 5% significance level. This implies that households with more access to credit would have higher opportunity to save more for replanting purpose. Households with loans in Paser Regency of 57.52% and household without loans of 42.28%. This finding was similar to Obayelu (2012) that show positive and significant effect between credit access and households saving. The amount of credit by household is an indicator that farm households in Paser Regency can participate in external financing such as banking.

Expenditure per-capita variable ( $X_6$ ) was negatively signed and significant at 5% significance level. Saving is difference between income and consumption. The higher household consumption will reduce the allocation of the income for saving. The average expenditure per capita of household is IDR 11.54 million per capita per year. The largest household expenditure is that of food. Share food expenditure from the total household expenditure is 51.50% for the households with 21–30 years of trees, and about 56.37% for those with over 30 years old of trees.

Credit repayment of household for non-replanting purpose was negatively signed and statistically at 1% level of significance. The higher loan repayment reduce the allocation of households income for saving. Adeyemo and Bamire (2005) that loan repayment is one of factors affects saving. The average number of household loans amounted to IDR 39.91 million. The average loan term is 18 months. The average monthly loan repayment is IDR 1.63 million per month. The average remaining payment is about 7 months.

## 5. CONCLUSION

1. The capacity of the smallholder farm households in Paser Regency to independently replant their old palm trees is still low, only 10.81%. This indicates that they still need external funds to rejuvenate their old plantation. The farmers are still expecting to obtain replanting grants from IECFPO and/or loans from bank to implement their replanting plans.
2. Households with more land area of oil palm to be replanted need greater replanting funds. These farmers actually have relatively high incomes, but they mostly have high loans for non-replanting purpose which implies in high amount of monthly loan repayment scheme. Thus, they have low capacity to develop saving funds for replanting purpose.

## 6. RECOMMENDATION

Farmers with plant age close to the optimal replanting age i.e., 33 years, should develop a strict saving arrangement program to prepare the required replanting funds. Another alternative, the farmers should make a gradual replanting program in some years before the trees achieving 33 years old.

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