# Independence Smallholder Oil Palm Replanting: An Analysis of Income Inequality

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**Abstract.** Data showed that both plantation area and productivity of oil palm in Jambi are consistently increase positively every year. Half of those area goes to smallholder who manage his farm on his own resources. Income is the purpose of palm oil smallholder in manging his farm. This research is aimed to study the income distribution of smallholder oil palm farmers in Mulia Bhakti Village, Pelepat District, Bungo Regency. This location is selected purposively due to its smallholders' successfulness in replanting their oil palm plantations in Bungo Regency. This research object are oil palm farmers who have replanted their oil palm plantation in Mulia Bakti Village. The data used in this study are primary data which is and secondary data. Primary data is collected directly from farmer samples by interviewing and using research questionnaires, while secondary data is obtained from relevant sources such as academic research reports and related agencies and offices. The research showed that oil palm farmers who had replanted their old oil palm plantations in Mulia Bhakti Village obtained a less optimal average income as a result of their replanting plants that were still not producing optimally yet. The non-optimal productivity of oil palm caused the average income of oil palm smallholder in the study area to be distributed unequal. This implicitly shows the need to open other business fields outside the agricultural sector for oil palm farmers in replanting periods.

**Keywords:** income inequality · oil palm · replanting · smallholder

## 1 Background

Oil palm plantations have grown rapidly (6,83%/year) since 2000 – 2020. This commodity has become a major income source for a number of communities in rural areas. Oil palm plantation either owned by state, big private company or smallholder can now widely found in Sumatra and Kalimantan Islands and parts of the Sulawesi and Papua Islands. The government on the other hand pays great attention to the sustainable growth of oil palm in Indonesia. This, for example, can be seen from the policies implemented to maintain the sustainability of oil palm plantations in Indonesia. One very real policy is the government's efforts to motivate oil palm planters to replant old oil palm plantation through replanting programs in various regions. In addition, to support the


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replanting program, Indonesia government is also inducing a domestic downstream palm oil industry. Indonesia has now succeeded in producing biofuels made from CPO.

Wikanto [1], said that besides having succeeded in producing B-30 biofuel, Pertamina is now building D-100 industry, diesel fuel, which is produced from CPO which has been further processed to reduce the sap, impurities, and smell, or commonly called RBDPO. In the trial phase, the use of a mixture of D-100, Dexlite and Fame fuels in the amount of 20%, 50%, and 30%, respectively, has been carried out. The test results show satisfactory vehicle performance and low exhaust fumes. The demand for palm oil has been getting better as indicated by the price of palm oil in both the domestic and global markets which has consistently increased with a positive trend. World Bank data shows that the average CPO price in the first quarter of 2020 is US$ 725 per tonne. The price then increased by 39.86% to US$ 918 per tonnes in the fourth quarter of 2020 and then increased again by 10.46% to US$ 1,014 per tonnes in the first quarter of 2021 (GIMNI, 2021). The increase in price and increase in productivity have resulted in better income of oil palm farmers. Plant replanting with high-yielding seeds and sustainable cultivation technology as well as area expansion also contribute to increasing the income of oil palm farmers. Ngadi [2] said that the number of household working members, and land area significantly affect the income of oil palm farmer households.

Again, oil palm plantations has been well developed and become one of the leading regional commodities both nationally and especially in Jambi Province. It has an opportunity to become a profitable commodity. However, the acceptance of oil palm farmers is influenced by the costs incurred in farming, the production in each harvest, and the price of fresh fruit bunches in force. Therefore, it triggers replanting of oil palm to improve quality and continue the sustainability of farmers' incomes. Oil palm replanting has been done in Pelepat Sub-district precisely in Mulia Bhakti Village. This study is aimed analyze farmers' income and income distribution of smallholders in that area. The data a then was analyzed using Gini Ratio formula This research finding is expected to be a reference to improve farmers' standard of living, especially those in rural areas.

## 2 Methodology

This research was conducted in May to August 2021 in Mulia Bhakti Village, Pelepat District, Bungo District, Jambi Province by using survey method. This location is selected purposively, considering that oil palm smalholder in Mulia Bakti Village has been successful and the first in replanting oil palm plantation in Pelepat Subdistrict. Therefore, the object of this research was oil palm farmers who had been replanted his old oil palm trees. The data came from two sources: primary and secondary sources. Primary data is collected directly from sample farmers by interviewing them using researchers' questionnaires. Secondary data was obtained from relevant authorities and related agencies in Jambi Province.

In 2019 the number of oil palm farmers amounted to 385 people spread across 11 farmer groups. 10% of each farmer group members represented by one farmer from each group was randomly selected to be the respondent sample. Total sample of oil palm farmer interviewed in this research was 39. Farmers' income was counted by summing farmers' income from on-farm, off-farm, and non-farm. The analysis of income distribution was done by using the Gini Ratio approach.

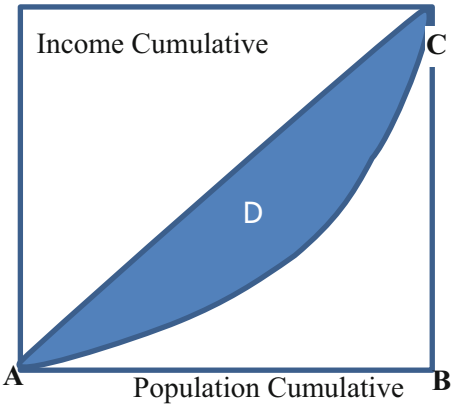


**Fig. 1.** Kurva Lorenz

The Gini Index is a number indicate the degree of income or wealth inequality of the population in an area [3]. Mathematically, the Gini Index is calculated based on the Lorenz curve which describes the cumulative proportion of total income owned by the population presented on the Y axis with the cumulative percentage of the population in the area depicted on the X axis. The greater the cumulative number of people who have a low cumulative income, the more unequal the income of the population in the area. Increasingly uneven because only a small number of people have a large cumulative income. In Fig. 1, it is shown that if the area colored is getting bigger, then the area of triangle ABC that is not colored will be getting smaller. If the area of the triangle is completely covered by a colored curve, it means that the Gini Index becomes 0 the total area of the ABC Triangle is equal to 1 (one). If it is the case, means the income of that area population will be perfectly unequal. On the other hand, if the cumulative percentage of population income equally followed by the cumulative population own the income the Gini ratio index will be 1, means the income of the population is perfectly distributed well and equal.

Formula that could be used to calculate the Gini Ratio Coefficient is:

$$GR = 1 - \sum f_i(Y_i + Y_{i-1})$$

where:

fi = Percentage of cumulative population belongs to class-i.
Yi = Percentage of cumulative income own by people in clas -i.

If:

- Value of GR Coeficient > 0,4 Low unequal income distribution
- Value of GR Coeficient 0,4 - 0,5 Medium unequal income distribution
- Value of GR Coeficient > 0,5 High unequal income distribution

# 3 Finding and Discussion

## 3.1 Smallholders Description

Age affects the physical ability of smallholders in managing both their smallholdings and other businesses. The older the farmer, the lower the physical ability and vice versa. Age is one of the most influential factors that determine the productivity of a workforce. Age determines the ability of smallholders to make decisions regarding smallholding development. It is found in in this research that the farmer age ranges between 48 to 65 years old with the modus (26,67%) went to aged 51 – 53 years old interval. This age group consists of 8 smallholders, or 25,64% of the total respondents. Consequences of that sample distribution based on age of the agricultural labor force have attracted widespread attention, but the conclusions vary. The aging of the farm labor force intensifies the local farm labor force shortage, promoting technological evolution, which may positively impact agricultural production. The positive impact of better production is expected to also encourage the sustainability of palm oil farming activities by conducting good agricultural practices lead to produced efficiently and create higher opportunity to rice better income.

Other factor could help smallholder lifting up his income is creativity which is positively correlated to farmer knowledge and skill. This study analyzes the level of formal education of the sample smallholders. Education level greatly influences the capabilities of smallholders in managing their smallholdings, both at the planning and decision-making stage. Education level of the sample smallholders in this research area varies from elementary school to university. Some 48,72% of smallholders are only graduate from elementary school while the rest: 23,07%; 23,07%; and 5,13% graduated from Junior High School, senior High School and Graduate School respectively. This showed that very little chance to some farmer for being able to make better life from his business and contribute to accumulate some income.

As Ngadi [2] stated, Number of Dependent Family Members include spouse, dependent parents, dependent children, or any other person that lives in the same house and is financially reliant on the smallholder or unemployed. However, many family members can be a source of labor to directly or indirectly support farming activities, especially those that are in their productive age. Thus, the number of family members reflects the contribution to family income, causing smallholders to work harder to meet their needs.

Data shows varying numbers of family members of the sample smallholders in the research area. Most (28,21%) smallholders have only two family members, and the rest own vary from 3 until 6 Family member. This family member number goes differently motivate the farmer in making more income to feed his family. Larger family member number could cause farmer to make higher income since also he has greater human resources. This could in turn make more opportunity to have higher income and chance to have smaller Gini ratio coefficient in that area.

## 3.2 Smallholders Income

### 3.2.1 On-Farm

Smallholder On-Farm income in this research by definition is generated from oil palm plantation managed by farmer respondent. Data showed that the average number of

oil palm smallholder in Mulia Bhakti Village could produce as much as 1.158 kg per hectare per month or equal to 13,896 Tonnes in Year 2020. This number is some how lower than PPKS standard, 24 per hectare per year, to smallholder oil palm plantation. This un-happy productivity of smallholder oil palm farmer in the research area mostly due to still low technology input used such as fertilizer and pesticide to control the plant weed. It was found that some oil palm plantation area is not really free from weed.

Having the average price received by smallholder in Year 2020 was Rp. 1168,65 per Kg, an average farmer could made an income as much as Rp 1.475.631,60 per hectare per month or equal to Rp. 70.744.615,38 per respondent per year with an average oil palm harvested area 4,15 Ha per farmer. Take home earning of oil palm smallholder further more could be calculated by subtracting the value of fresh fruit bunches (FFB) received at cost paid by smallholder.

### 3.2.2 Smallholding Costs

Production costs are the value of goods and services used during production. In general, the costs incurred in the production process consist of fixed and variable costs. For example, fixed costs include equipment depreciation costs in smallholdings, while variable costs include fertilizer, labor, and pesticide costs. Equipment depreciation is defined as the cost of agricultural equipment used by smallholders. It is calculated by subtracting the residual value of the equipment from its purchase value and dividing the result with the economic life of the tool. Smallholders utilize hand sprayers, egrek, tojok, basket/obrok, machetes, hoes, and egrek poles. The average value of equipment depreciation paid by smallholder in Bungo Regency was Rp. 82.156 per hectare per month or equal to Rp. 328.624,00 per respondent per year.

Other cost paid by smallholder in managing his oil palm plantation is variabel cost. Variable costs is the costs incurred that changes according to production. In oil palm farming, variable costs include all expenses in one production process, namely fertilizer, pesticide, labor, and other expenses. Average variable cost paid by respondent in research location was Rp. 19.969.620 per respondent per year, consist of fertilizer value Rp. 10.051.632,00; pesticide need Rp. 954.492,00; wages for non-family workers Rp. 3.866.236,00; in-house worker value Rp. 4.694.688, and other expenses Rp. 402.572,00. Total cost paid by average smallholder was Rp. 20.298.244,00.

### 3.2.3 Smallholding Income

Smallholding house hold income in this research is calculated by summing three sources of income namely: on-farm (oil palm plantation), off-farm, and non farm income. On-farm income is the amount of money received from selling the oil palm production from his own plantation area. It is the total FFB produced during Year 2020 multiplied by the average price received in the same year. Off-farm income is the total money earned by whole family member by doing farming activities in his farm area other than oil palm. Non farm income is the amount of money made by all family member for doing job out side the farm area, such as civil servant, or other productive work or services activities.

Data showed that the average area of oil palm plantations cultivated by smallholder in the research location was 4.15 Ha with an oil plan age variates from 3 to 21 years.

**Tabel 1.** Household Smallholder Income in Mulia Bhakti Village, Pelepat District, Bungo Regency, Year 2020

| Incators | Value |
|---|---|
| Average Area | 4,15 |
| Average Tone/Ha | 1.16 |
| Average Tone/Month | 5,08 |
| Price per Kg | 1.181,47 |
| Revenue/Ha/Month | 1.475.631,60 |
| Revenue/Farm/Month | 5.895.384,62 |
| Revenue/Farm/Year | 70.744.615,38 |
| Cost/Farm/Year | 20.298.244,00 |
| On-Farm Earning/Farm/Year | 50.446.371,38 |
| Off-Farm Earning/Farm/Year | 584.996,44 |
| Non-Farm Earning/Farm/Year | 8.940.000,00 |
| Total Household Income | 59.971.367,82 |

A number of farmers have a plant age of 3–4 years as a result of replanting program. Those unmature oil palm plants still produced some how small FFB called buah pasir. This causes the average productivity is still below the average productivity of PPKS standards. An income made by farmers from oil palm farming has not optimal yet.

Assuming that the family members of smallholder farmers including the farmer himself are 5 people per household, and the minimum income assumption is Rp. 30,000 or US$ 2 per capita per day (BPS), the average farmer in order to free from poverty line will be Rp. 54,750,000.00 [4]. The amount of income needed is still above of farmers' income if they only rely on oil palm farming. The implication is that farmers still have to be supported by activities outside of oil palm farming to be able to live outside the poverty line particularly in replanting periods.

Income Distribution.

Respondents who are relatively homogeneous in this research should be evenly distributed based on the average income per family per year. The results show the Gini Ratio coefficient value of oil palm smallholder in Mulia Bhakti Village is classified to "unequal income distribution" where the poorest 20% of respondents only control the accumulated income of 2.90% while 20% of the highest income group controls the accumulated income of 34,89%. The Gini Ratio Index (GR) is 0.63 or classified as high unequal income distribution.

One of the reasons for the high un equality in income distribution of smallholder oil palm farmers in the research area is the un proportional number of replanted oil palm distribution. Some farmer who replant larger area could suffer from low productivity of FFB. In the early years of replanting program, a number of oil palms were still produced small size and unmature FFB, they had not been able to optimally contribute to the income of smallholder.

In addition to the oil palm area which is still dominated by replanted palm oil, a number of farmers are also engaged in farming outside of oil palm and some others work in the service sector, both as civil servants and other productive service activities. The field of work outside of oil palm farming, although not too large, can be used as supporting income sources during the replanting period. The income of non-oil palm and non-agricultural farmers in the research location is Rp. 584.996,44 and Rp. 8.940.000,00 respectively. By obtaining household income from the service sector and other productive activities, the minimum needs of farming families can be covered.

## 4 Conclusion

The results showed that oil palm farmers who had replanted their old oil palm plantations in Mulia Bhakti Village obtained a less optimal average income as a result of their replanting plants that were still not producing optimally yet. The non-optimal productivity of oil palm caused the average income of oil palm smallholder in the study area to be distributed unequal. This implicitly shows the need to open other business fields outside the agricultural sector for oil palm farmers in replanting periods.

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**Authors' Contributions.** The first and second Authors contributed in preparing the initial research by discussing and writing proposal, doing research and writing the report. The second author help the main author in preparing administration and organizing in collecting data.

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