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LABOR PRODUCTIVITY OF INDEPENDENT PALM OIL FARMING IN CENTRAL LAMPUNG

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ABSTRACT

This study aims to analyze the level of labour productivity and the factors influencing labour productivity in independent oil palm plantations. The research has taken place in Bangunrejo Sub-district, Central Lampung Regency. Data collection used the survey method. The sample size was 70 independent oil palm farmers. Sampling of oil palm farmers using a stratified random sampling method according to the age of the oil palm plants. Based on the conditions at the research location, the age of the plants is categorized into 19-12 years, 13-16 years, 17-21 years, 22-25 years. The sample size of each age category is 8, 14, 24 and 24 farmers. Data analysis employed descriptive quantitative methods and multiple linear regression. The results revealed that there is a tendency that the older the plant, the higher the labour productivity. The level of labour productivity in independent oil palm farms in the 9–12 year plant age group was 247.40 kg TBS/HOK, 13–16 year plant age was 250.81 kg TBS/HOK, 17–21 year plant age was 230.70 kg TBS/HOK, and 22–25 year plant age was 253.95 kg TBS/HOK. This is reinforced by the results of the regression analysis, which shows that when the land size, farming experience, and age of oil palm plants increase, the labour productivity of independent oil palm farms also increases.

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INTRODUCTION

Palm oil in the Indonesian economy plays an important role because its production is always increasing, so it has bright prospects as a source of foreign exchange (Bindrianes et al., 2017). Indonesia's palm oil export value reached US$17.36 billion in 2020. This value contributed 53.46 percent of the total global palm oil export value of US$32.48 billion, followed by Malaysia at 30.12 percent (Kementerian Pertanian, 2020). This shows that Indonesia is the largest country in the world's palm oil market.

One of the oil palm producers in Indonesia is Lampung Province. The status of oil palm plantations is divided into three categories: smallholder plantations

(Perkebunan Rakyat), large state plantations (Perkebunan Besar Negara), and large private plantations (Perkebunan Besar Swasta). Smallholder oil palm plantations consist of independent and plasma plantations. According to Iskandar et al., (2018) independent smallholders (individuals) are farmers who build their plantations directly from their own funds without the assistance of other parties. Production facilities such as fertilizers, pesticides, and equipment are also provided by the farmers themselves. Independent farmers sell their produce directly to intermediary traders or factories, as desired. On the other hand, plasma farmers are farmers who have a partnership with large companies.

Oil palm farming in Lampung Province has absorbed the labour of 95,792 farmers, or around 34.43 percent of all smallholders. The wide employment opportunities in oil palm farming are influenced by the fact that Lampung Province has the potential to become the largest producer of oil palm in Indonesia. This can be seen from the area and production of oil palm plantations that continue to increase every year. In 2000, the area of oil palm plantations in Lampung Province was 97,445 ha. Then it increased by 98.06 percent to 193,004 ha in 2019. In 2000, oil palm production was 132,665 tons, then increased by 212.22 percent to 414,206 tons in 2019 (Direktorat Jenderal Perkebunan, 2021).

The area of smallholder oil palm plantations in particular has fluctuated. In 2015, it amounted to 111,414 ha and increased by 2.17 percent to 113.837 ha in 2016. However, in 2019, it decreased by 3.21 percent to 109.609 ha. Fluctuations in the area of smallholder oil palm plantations cause fluctuations in oil palm production. This can be seen from the fluctuations in smallholder oil palm production from 2016 to 2019. The highest oil palm production was achieved in 2019, which amounted to 203,346 tons (Direktorat Jenderal Perkebunan, 2021).

The main problem faced by smallholder oil palm plantations is low productivity, which is the result of poor plantation management practices. Portal Data Ekonomi & Bisnis (2022) states that the productivity of Indonesian smallholder oil palm plantations is 3,273 kg CPO/ha/year, which is lower than the productivity of Malaysian oil palm at 3,360 kg CPO/ha/year. This is due to the lack of knowledge and ability of farmers in technical farming and a lack of capital (Suharno & Yuprin, 2017). In line with this, Maat et al., (2019) stated that farmers have less access to production inputs due to a lack of banking or other forms of financing, which makes it harder for them to implement good agricultural practices. Therefore, there needs to be attention given to managing production factors in oil palm cultivation, such as seeds, labour, capital, and land.

The labour factor has a major influence on carrying out the oil palm cultivation process. Ismiati & Afroda (2023) said labour variables have a positive and significant influence on oil palm production. According to Oktavia et al., (2017), increasing labour productivity is the most strategic target because it can increase the productivity of other production factors such as capital, raw materials, energy, and others.

Previous research has shown that the labour productivity of oil palm farms is higher than that of other alternative cash crops, such as rubber (Clough et al., 2016). However, research analyzing the productivity of oil palm farm labour in four age groups of oil palm plants is still limited. According to Nurchaini et al., (2020), plant age is the most sensitive attribute to crop productivity. Furthermore, (Efendi et al.,

2023) stated that the level of oil palm productivity depends on the age composition of the oil palm plants being cultivated. This is related to the condition of the age of the smallholder oil palm plants in Lampung Province, which is very varied. It is expected that the level of labour productivity remains high in each age group of oil palm plants in order to obtain optimal production. Therefore, this research is important to conduct with the aim of (1) analyzing the productivity of independent oil palm farm labour in four age groups of plants and (2) analyzing the factors that affect the productivity of independent oil palm farm labour.

RESEARCH METHOD

Data and Sample

The research was conducted in Bangunrejo Sub-district, Central Lampung District, Lampung Province, using the survey method. The selection of the study site is Central Lampung District, which has the second-highest concentration of oil palm farmers in Lampung Province, and is home to several oil palm production centres, after Mesuji District.

Two types of data were collected: primary and secondary. Farmers who grow oil palm were directly interviewed in order to gather primary data. Secondary data for this study were gathered from pertinent organizations or agencies, including the Plantation Office, the Badan Pusat Statistik, and other relevant publications. This study was written based on data collected in 2020.

The respondents in this study were independent oil palm farmers. The determination of the sample size was done by formula (Issac & Michael cited by Sugiarto, 2003):

$$n = \frac{NZ^2S^2}{Nd^2 + Z^2S^2} \quad \text{.....(1)}$$

Note: n = sample size; N = population size; S^2 = sample variance (5%); Z = confidence level (95% = 1.96); d = degree of deviation (5% = 0.05)

Based on formula (1), a sample size of 70 independent oil palm farmers was obtained. Two villages, Mekar Jaya Village with up to 12 farmers and Sidoluhur Village with up to 58 farmers, were selected for the sample count, which was done proportionately to ensure that a sample was taken from each village.

Furthermore, the determination of the number of samples in each age group of oil palm plants is based on the stratified proportional random sampling method. The sample of oil palm farmers is categorized into four age groups: plant age 9–12 years, plant age 13–16 years, plant age 17–21 years, and plant age 22–25 years. The division of plant age groups is carried out according to field conditions with the aim that the data obtained can cover all plant ages, both young, mature, and old. The detailed distribution of oil palm smallholder samples based on plant age groups is presented in Table 1.

Table 1. Sample Distribution of Independent Oil Palm Farmers in Bangunrejo Sub district Based on Plant Age

Age of plant (years)	Sidoluhur (people)	Mekar Jaya (people)	Total (people)
09 – 12	06	02	08
13 – 16	12	02	14
17 – 21	20	04	24
22 – 25	20	04	24
Total	58	12	70

Data Analysis

The research employs a descriptive-quantitative method to analyze both the level of productivity of oil palm plantation labor and the factors influencing this productivity.

Analysis of Labor Productivity at Independent Oil Palm Farms

Labor productivity on oil palm farms is obtained by comparing the amount of production harvested in kilograms (kg) fresh fruit bunch (Tandan Buah Segar/TBS) with the amount of labor time in man-days (Hari Orang Kerja/HOK). Labor productivity is calculated using the formula:

$$\text{Labor Productivity} = \frac{\text{Production of palm oil (kg)}}{\text{Labor time (HOK)}} \quad \text{.....(2)}$$

By analyzing the labor productivity of independent oil palm farms for four age groups of oil palm plants, the level of labor productivity in each age group of oil palm plants was determined.

Analysis of Factors Affecting Labor Productivity of Independent Oil Palm Farms

To support high levels of productivity, overall land conditions, including soil quality, water availability, and climate factors, also need to be considered. So, land area allegedly affects labour productivity. In addition, the quality of human resources is required. So labour productivity is influenced by various factors, including age (Soekartawi, 1990 in Supriyo & Indriani, 2022). Juswandi and Sumarna (2023) proved that age has a negative effect on labour productivity. Nowak & Kijek (2016) and (Oktavia et al., 2017) stated that the level of farmer education influences total labour productivity in producing products. Furthermore, good farming experience possessed by farmers contributes to labour productivity (Harahap et al., 2016; & Soekartawi, 1990). Family factors can affect labour productivity. A high number of family dependents can increase household expenses, thus encouraging farmers to seek additional income from other sources. This will reduce the outpouring of labour in their oil palm plantations, therefore affecting the productivity of their labour. But on the other hand, if household income is high, it allows farmers to hire labour outside the family, thereby increasing productivity (Karmini, 2018). The age of palm plants has been shown to be a sensitive factor to productivity (Nurchaini et al., 2020). Soekartawi (1990) in Supriyo & Indriani (2022) stated that the adequacy of farmer family labour can be used as a production input

in farming. Family labour has a significant role in increasing labour productivity (Mubyarto, 1994).

Analyzing the labour productivity of independent oil palm plantations involves using multiple linear regression models through the Ordinary Least Squares (OLS) method. Based on the references above, then the factors considered to influence the productivity level include land size (X1), farmer age (X2), farmer education level (X3), farming experience (X4), number of family dependents (X5), age of the oil palm plants (X6), farmer's household income (X7), and family labor (X8). Consequently, the applied multiple linear regression model is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + e \quad \ldots.(3)$$

Note: Y = labor productivity of oil palm farming (kg TBS/HOK); X1 = land size (ha); X2 = farmer age (years); X3 = farmer education level (years); X4 = farming experience (years); X5 = number of family dependents (people); X6 = age of the oil palm plants (years); X7 = farmer's household income (Rp/year); X8 = family labor (HOK); β0 = constant; β1,. β8 = regression coefficient; e = disturbance term.

Regression parameters are tested using both simultaneous testing (F-test) and individual testing (t-test). Previously, the classical assumption violations contained in the regression model with the Ordinary Least Squares (OLS) method were tested, namely multicollinearity and heteroscedasticity. The multicollinearity test is conducted by examining the Variance Inflation Factor (VIF) values, while heteroscedasticity is tested using White's test.

RESULT AND DISCUSSION

Respondent Characteristics

In Bangunrejo Sub-district, the majority of independent oil palm farmers fall within the age range of 51 to 58 years, and typically have three to four family dependents. According to Omotesho et al., (2016), a farmer's age influences their experience, decision-making, attitudes, productivity, and perceptions. This age range is considered ideal for independent oil palm farmers in Bangunrejo Sub-district.

The formal education level of these farmers is primarily at the elementary school level. Omotesho et al., (2021) asserted that there is a strong link between education level and the adoption of agricultural innovations. This view aligns with Nowak & Kijek (2016), who identified education as the most significant economic driver. The higher the level of education, the easier it is to receive new information and advanced technology, and the easier it is to access relationships, processing results, and the marketplace (Paloma et al., 2020).

Oil palm farmers have between 17 and 21 years of farming experience. Chandio & Yuansheng (2018) said that farming experience has a positive effect on farmers' ability to find new ideas. The average oil palm land ownership ranges from 0.50 to 1.00 ha. Murphy et al., (2021) noted that in Southeast Asia, there are over three million smallholders, most of whom manage their farms individually and are family-operated, typically owning less than 50 ha and often just 1.00 to 2.00 ha. Table 2 provides details on the characteristics of independent oil palm farmers.

Table 2. Characteristics of independent oil palm farmers in Bangunrejo Sub-district

Characteristics	Age of Oil Palm Plantation (Years)			
	9-12	13-16	17-21	22-25
Farmer age (years)	58.0	47.0	54.0	51.0
Education level	Elem. S	Midle S	High S	Elem. S
Number of family dependents (people)	4.00	4.00	3.00	4.00
Farming experience (years)	19.0	17.0	21.0	21.0
Oil palm land size (ha)	0.78	0.84	0.97	0.93

Production of Independent Oil Palm

The oil palm harvesting period is divided into three seasons in a year, namely the grand season, track season, and normal season. The grand season, which is the season with high yields, lasts for 5–6 months, from January to May, while the track season, which is the season with low yields, takes place after the grand season is over, from June to October. The remaining months are the normal season with normal yields.

In general, oil palm harvesting is done every 20 days, or 18 times per year. Figure 1 shows that each age group of plants obtained different oil palm production depending on the area of land, seeds, care taken, and the month of harvest. Oil palm production in each plant age group from January to December fluctuated. The highest oil palm production is in the 17–21 year plant age group of 18,331.46 kg TBS/0.97 ha, or 18,917.91 kg TBS/ha/year. The 17–21 year plant age group is included in the mature plant category, where oil palm production is still quite high. In the 17–21 year old group, there were farmers who had participated in the PTPN VII Bekri Central Lampung partnership program in 1999 and 2000. Through this program, farmers were able to plant quality oil palm seedlings with the Marihat long-leaf type.

According to the Centre for Agricultural Technology Research and Development (Balai Pengkajian dan Pengembangan Teknologi Pertanian, 2008), the highest estimated peak production is at 14 years of age, at 22,000 kg TBS/ha/year. However, the highest production in Bangunrejo Sub-district occurs in the 17–21 year plant age group, while the 13–16 year plant age group is in second place with a production of 14,007.86 kg TBS/0.84 ha or 16,695.90 kg TBS/ha/year. Oil palm production in the 13–16 year plant age group, or the average plant age of 14 years, is not too high because the seeds used are not quality seeds. Farmers buy uncertified or random seedlings from village or sub-district traders, in line with Ardana et al., (2022), which states that the low productivity of oil palm is because of the use low-quality seeds, especially for small farmers. Ichan et al., (2021) also highlighted that many smallholders in Indonesia continue to cultivate oil palm traditionally, utilizing low capacity and minimal production inputs, such as uncertified seeds, limited land, and inadequate fertilizer use. More clearly, according to Jelsma & Schoneveld (2016), some farmers only control 1.8–2.1 ha.

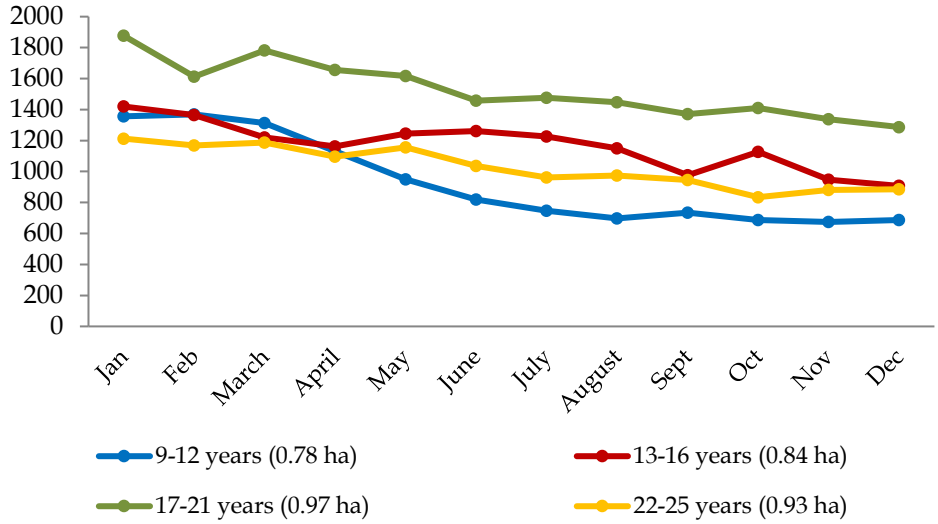

Figure 1.
Oil Palm Production in A Year
Source: Field Survey, 2020

Some of the factors that lead to the use of uncertified or fake seeds at the farm level are the unavailability of certified seeds at the farm level, the low understanding of farmers, the lack of access to certified seeds, and the relatively high price of certified seeds. On the other hand, uncertified or fake seedlings can be circulated easily and cheaply.

Labour Influx of Independent Oil Palm Farm

The labour of independent oil palm farms consists of labour within the family (FL) and labour outside the family (NFL). Activities that use NFL include maintenance activities namely pruning/the removal of unproductive fronds and harvesting. The use of NFL is on a piece-rate system. Family labour is used in fertilizing, pest and disease control, and harvesting. Labour consists of male and female workers with a standard workday of 8 hours and wage rates ranging from Rp60,000 to Rp70,000 per HOK. Table 3 shows the average labour influx of independent oil palm farms in Bangunrejo Sub-district.

Table 3 presents that the labour influx in each plant age group is different. The group with the highest labour was in the 17 – 21 year plant age group, at 83.99 HOK. In the 17 – 21 year plant age group, the outpouring of NFL in harvesting activities is very high compared to other plant age groups because the oil palm production is quite high, which affects the high labour used. This is in line with Yulistriani & Mahdi (2017) which states that the most labour absorption in oil palm farming is in harvesting activities with a harvest frequency of 18 to 24 times per year (24 HOK/ha). The lowest labour influx is in the 22 – 25 year plant age group at 54.57 HOK. Farmers in the 22 – 25 year plant age group were less intensive in fertilizing and spraying due to the old condition of the plants and the need for replanting.

Table 3. Average labor influx per ha of independent oil palm farms in Bangunrejo Sub-district

Age of oil palm	Labor category	Activity				Total
		Fertilization	Maintenance	Spraying	Harvest	
9 - 12 Years	FL	7.350	3.450	4.170	2.880	17.87
	NFL	02.81	9.240	2.240	41.83	56.13
	Total	10.18	12.69	6.410	44.72	74.00
13 - 16 Years	FL	8.460	0.850	6.550	0.000	15.86
	NFL	3.740	9.150	3.570	47.49	63.95
	Total	12.20	10.00	10.12	47.49	79.81
17 - 21 Years	FL	4.630	1.270	3.910	0.000	9.800
	NFL	5.330	8.030	3.610	57.22	74.19
	Total	9.960	9.300	7.520	57.22	83.99
22-25 Years	FL	3.570	0.000	1.800	0.000	5.370
	NFL	1.220	9.300	1.080	37.52	49.11
	Total	4.780	9.300	2.870	37.52	54.47

Analysis of the Labour Productivity Level of Independent Oil Palm Farming

The labour productivity of independent oil palm farms in Bangunrejo Sub-district is the ratio between the amount of oil palm production (kg) and the outlay of oil palm labour, namely FL and NFL in man-days (HOK). The low productivity of oil palm farm labour in the 17 - 21 year age plant group is due to the high level of labour used, but not quite high oil palm production. Siswati & Putri (2023) stated that the older the oil palm plant, the lower the CPO content in the fresh fruit bunches. In the maintenance process, quite a lot of labour is needed. Not only the land area but also the use of oil palm seedlings determines the amount of oil palm production per hectare. However, the intensity of maintenance on oil palm farms also affects the production of oil palm.

Table 4. Labor Productivity Per Ha of Independent Oil Palm Farms in Bangunrejo Sub-district

Age Group (Years)	Oil Palm Production (kg TBS)	Oil Palm Labor Influx (HOK)	Oil Palm Labor Productivity (kg/HOK)
9-12	14,314.91	74.00	247.40
13-16	16,676.02	79.81	250.81
17-21	18,898.41	83.99	230.70
22-25	13,267.70	54.47	253.95

Table 4 shows that the labour productivity of oil palm farming is lowest in the 17-21 year age group at 230.70 kg TBS/HOK. This means that every HOK is able to produce a palm oil production of 230.70 kg TBS. The highest labour productivity was in the 22–25 year age group at 253.95 kg TBS/HOK. This means that every HOK

is able to produce 253.95 kg TBS. The high labour productivity in this plant age group is due to the low labour expenditure of farmers, while the resulting production is still quite high. Farmers with this plant age are more focused on devoting labour to work in other sectors to obtain additional income. This is in accordance with Nurliza et al., (2023) who found that the age of oil palm plants is a critical factor in financial decision-making and resource allocation. Table 4 presents the labour productivity of independent oil palm farms.

According to Wahyuningsih (2016), the higher the labour productivity, the more efficient the use of human resources is. This productivity can be increased by paying attention to the use of production factors and also by training, practice, demonstration plots, and the use of appropriate technology. But if not, then additional labour input will lead to a decrease in the level of labour productivity.

Factors Affecting the Labour Productivity of an Independent Oil Palm Farm

The results of multiple linear regression analysis as presented in Table 5 show that there are no classical assumption deviations, namely multicollinearity and heteroscedasticity. The VIF value is ≤ 10, then in the model used, there is no multicollinearity problem. Furthermore, the Prob obs * R-squared value ≥ 0.05 is obtained, so there is no heteroscedasticity problem.

Table 5. Results of Regression Analysis of Factors Affecting Labor Productivity of Independent Oil Palm Farms in Bangunrejo Subdistrict

Variable	Coefficient		t-Statistic	Prob.	VIF
Contant	173.2961		3.9264	0.0002	
X1 (Land Size)	18.91270	*	1.8816	0.0647	1.8870
X2 (Farmer Age)	-0.693100		-0.9790	0.3315	2.8611
X3 (Farmer Education Level)	-1.339200		-0.7683	0.4453	1.4058
X4 (Farming Experience)	2.173900	*	1.7232	0.0899	2.9086
X5 (Number of Family Dependents)	-2.622000		-0.5352	0.5944	1.3098
X6 (Age of Oil Palm Plants)	1.916200	*	1.8516	0.0689	1.2335
X7 (Farmer's Household Income)	$6.3300E^{-8}$		0.3205	0.7497	2.1762
X8 (Family Labor)	0.026400		1.0982	0.2764	1.4154
R-squared	0.275800				
Adjusted R-squared	0.180900				
F-statistic	2.904200				
Prob. (F-statistic)	0.008200				
Prob. Obs*R-squared	0.525400				

Note: *) significant at 90% confident level

The adjusted R-squared result of 0.180 indicates that 18.0 percent of the variation in oil palm farm labour productivity can be explained by the variables included in the model, while the remaining 82.0 percent is attributed to factors not included in the model. Other factors that allegedly influence labour productivity but have not been included in this analysis include internal farmer factors such as health

level, gender, work motivation, and work methods, as well as external factors such as labour wages, work organization, work facilities, and the environment.

The F-statistic demonstrates that all the variables in the model collectively have a significant impact on the labour productivity of independent oil palm farms, with a confidence level of 99 percent. This test result implies that the regression model used is valid and suitable for further interpretation. The analysis can then be continued to determine which variables are most influential individually.

Table 5 informs that land size, farming experience, and the age of the oil palm plants significantly affect the labour productivity of independent oil palm farms. In contrast, factors such as farmer age, education level, number of family dependents, farmer's household income, and family labour expenditure do not have a significant impact on labour productivity.

Land size, in particular, significantly influences labour productivity at the 90 percent confidence level, with a positive regression coefficient value of 18.922. This suggests that an increase in the size of oil palm land substantially boosts labour productivity on independent oil palm farms. Pawlewicz & Pawlewicz (2018) state that production capacity is determined by considering basic productive resources such as land area, labour, and capital. Purwadi et al., (2023) said that, oil palm farmers in Indonesia have characteristics, one of which is small land ownership, which can limit access for oil palm farmers to increase their capacity and ability to manage their plantations.

The age of farmers does not significantly affect the labour productivity of independent oil palm farms because the confidence level is less than 90 percent. Although the age of farmers varies quite a bit, namely an average of 47 years for plants aged 13-16 years, and an average of 58 years for plants aged 9-12 years, this variation cannot show a significant influence on productivity. Oil palm farming is a profession that places a high premium on physical health. Farmers employ not only family labour but also non-family labour, selected for their good physical health. This is in accordance with the research of Bindrianes et al., (2017) who found that the age of labour, both young and old, does not really affect labour productivity. Oil palm farming is a job that prioritizes physical health. If the farmer's health decreases, then the farmer cannot farm well.

The level of education does not have a significant effect on the labour productivity of independent oil palm farms, as the confidence level is below 90 percent. This is not only caused by the low level of education, where most of them are elementary school graduates, but also by the fact that oil palm farming work generally involves fertilizing, weeding and harvesting, so it only requires physical strength. This is consistent with the findings of Bindrianes et al., (2017), who discovered that the length of education does not significantly impact the productivity of oil palm labour.

Farming experience significantly impacts the labour productivity of independent oil palm farms at the 90 percent confidence level. The positive regression coefficient of 2.184 indicates that increased farming experience leads to higher labour productivity. Oil palm farmers in Bangunrejo Sub-district have extensive experience in oil palm farming. More experienced farmers possess the skills, abilities, and responsibility to manage their plantations and boost production. This finding aligns with the research by Kumbadewi et al., (2021), which

demonstrated that work experience positively and significantly affects labour productivity. Aulina et al., (2021) said that in rubber farming the longer experience of farming makes farmers able to innovate technology or improve good farming methods.

The number of family dependents does not significantly impact the labour productivity of independent oil palm farms due to a confidence level below 90 percent. The number of dependents in the family does not vary (mostly 4 people) which means that the number of dependents has no significant influence on productivity. This finding is consistent with the research by Bindrianes et al., (2017), which also found that the number of dependents in oil palm families does not significantly affect labour productivity. This shows that the number of family dependents has no impact on encouraging workers to increase the labour productivity of independent oil palm farms in order to obtain a higher oil palm income.

The age of oil palm plants significantly affects the labour productivity of independent oil palm farms at the 90 percent confidence level. The positive regression coefficient of 1.902 indicates that as the age of oil palm plants increases, labour productivity significantly improves. The older the plant, the less labour it requires, the lower the labour devotion. But on the contrary, the more oil palm production increases, the higher the labour productivity. Labour productivity is one of the important factors that has productive potential in producing output and competitiveness in the agricultural sector (Pawlewicz, A., & Pawlewicz, 2018).

Farmer household income does not significantly influence labour productivity in independent oil palm plantations because the confidence level is below 90 percent. This is due to the fact that, in all four age groups of oil palm plants, the largest portion of household income comes from non-primary activities on agricultural land. Ismono et al., (2019) stated that although oil palm farming is the main livelihood, it is not the largest contributor to the household income structure of oil palm farmers in Lampung Province. Lestari et al., (2025) also found that the largest income in farmer household income comes from farming businesses other than oil palm, reaching 38.15 percent, while the contribution of income from oil palm farming is only 18.56 percent. Therefore, household income does not significantly influence labour productivity in oil palm plantations. Several studies have shown that non-agricultural activities have a positive impact on household welfare by increasing farmer income (Ali et al., 2015 & Zereyesus et al., 2017).

Farmer family labour influx did not significantly impact the labour productivity of independent oil palm farms due to a confidence level below 90 percent. The results indicated that the average family labour for the four age groups of oil palm plants was still low, and there remained untapped labour potential among the farmers. This causes the family labour influx to have no effect on the labour productivity of oil palm farms.

CONCLUSION

In one hectare of land, labour productivity of oil palm farms was highest in the 22–25 year old group at 253.95 kg TBS/HOK, while the lowest was in the 17-21 year old group (230.70 kg TBS/HOK). Land size, farming experience, and age of the oil palm plants have a positive effect on the labour productivity of independent oil palm farms. So, if the land size, farming experience, and age of the oil palm plants increase, then the labour productivity of the oil palm farm also increases.

The finding indicates that farmers' enthusiasm for managing their oil palm plantations increases with the larger the land size and the longer the farming period. It is hoped that the government can utilize this enthusiasm to develop independent oil palm farmers further so they can manage their plantations better. Ultimately, independent oil palm farmers can increase the productivity of oil palm farming. Because there are still other internal factors that influence labour productivity such as health level, gender, work motivation, and work methods, as well as external factors such as labour wages, work organization, work facilities, and the environment that have not been analyzed, there is still an opportunity to conduct other research by including the internal and external factors above.

AUTHOR CONTRIBUTION STATEMENT

[Author 1]: research designed and conceptualization, data analysis, the initial manuscript draft, and addressed reviewer's comments; [Author 2]: research designed and research supervision; [Author 3]: data collection, data analysis, and writing.

DECLARATION OF COMPETING INTEREST

The authors declare that there are no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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ETHIC STATEMENT

This research did not have ethical approval. Data was obtained from anonymous and confidential farmer respondents.

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