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AREAL AND PRODUCTION OF PALM OIL TREES

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Abstract

Palm oil is one of the plantation products that has a significant impact on the Indonesian economy. Indonesia, being one of the major palm oil exporters in the world, has successfully reduced poverty and unemployment rates by expanding oil palm plantation areas. This research aims to explore the relationship between the extent of oil palm plantation land and the annual production of palm oil in Paser Regency. The research method employed for this study is quantitative, involving the collection of data on the amount of palm oil plantation land from 2018 to 2022, along with the annual palm oil production figures in Paser Regency. The gathered data will be examined using correlation analysis, utilizing IBM SPSS 25 as the tool for conducting the correlation analysis. The researcher found that there is no significant correlation between the extent of oil palm plantation land and annual palm oil production. Additionally, the researcher discovered other variables that correlate with the annual volume of palm oil production, which were not considered in this study. The variables identified by the researcher as influencing production volume after conducting this study include soil conditions, fertilizers, seedlings, human resources, and the age of oil palm trees. This research provides insights to readers, stakeholders, and other researchers regarding factors correlated with the annual volume of palm oil production. These findings can serve as a solid foundation for business decision-making and as reference material for future research.

Keywords*: Oil palm plantation area, Palm oil production, Paser regency*

1. Introduction

One of the commodities that has a significant impact on lifting national prosperity and economy is the palm tree. Based on research by Silitonga (2019) the palm trees industry and related business sectors generate almost US$ 4,7 Million; meanwhile, in job creation, palm oil industries give a livelihood to 697 thousands of workers. This result is supported by the research by Nawiruddin (2017), who believes the palm oil industry will end unemployment issues and generate proper income for the people. Additionally, the income and employment levels in Paser shown in the research by Nare et al. (2018) depict palm oil sectors successfully giving 91 new job opportunities and showing the development of the people's livelihood, which people now have more buying power, especially in purchasing personal vehicles like motorbikes. Moreover, Saragih et al. (2020) point out that palm oil industries are efficient industries for solving poverty issues, issues that haunt Indonesian rural areas for years.

One of the factors that make palm oil industries affect and change a lot of people's lives is the competitiveness of palm oil as a product. Palm oils subsectors concurrently are competitive businesses and able to compete with European products counterparts (Khairunisa & Novianti, 2017). At the same time, the market's trust in Indonesian palm oils is high and resisting negative issues from competitors (Ermawati & Saptia, 2013).

To produce competitive palm oil products, attention to palm trees needed to be intensified. One solution is that the farming industry should provide enough land and space for palm trees. With enough space for palm trees, palm trees' growth potentially reaches its highest potential and is able to produce high-quality palm oils. This growth is able to occur since roots and trunks can find their way to grow (Nurkholis & Sitanggang, 2020) normally. By ensuring palm trees grow maximally, the production level will reach a higher productivity level. Based on Hayata et al. (2020) research, if the distance between trees is around 9

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meters, palm trees are potentially more fruitful compared to palm trees that live in limited space. The similar result is proven through research by (Afifuddin et al., 2023).

Based on the previous research by Adzani & Arif (2023) on Oil Palm Production in the West Kalimantan Province and Influencing Factors, it is concluded that land area has a significant impact on oil palm production. The relationship between the quantity of plants and the land area is closely related; the larger the number of fruits produced by the plants, the larger the land area used. Plants that produce a large quantity of fruit will lead to an overall increase in production. This is also consistent with the research by Nur (2019) The findings of a previous study by Siswanto et al. (2020) analyzing factors Influencing Smallholder Oil Palm Production in the Tebing Linggahara Village, Bilah Barat Subdistrict, Labuhanbatu Regency, also state that land area plays a significant role in smallholder oil palm production in that area. However, a study conducted by Arsyad & Maryam (2017) states that land area does not have a significant impact on the production results of oil palm in the Sawit Mandiri farmer group in Suka Maju Village. This is due to the planting pattern of oil palm by farmers with a spacing of about 9 meters between plants but done irregularly.

Therefore, based on the references from previous research and considering the importance of the oil palm plantation area in the annual production of oil palm, as well as recognizing the significance of oil palm plantations for the economic conditions of the Indonesian community, the researcher aims to analyze the relationship between the plantation area and the annual oil palm production in Paser Regency, East Kalimantan Province.

2. Method

This research will be conducted in Paser Regency, East Kalimantan Province. The choice of research location is based on the consideration that Paser Regency has the second-largest oil palm plantation area in East Kalimantan (82,459 ha/2020). The study employs a quantitative research method with land area as the independent variable (X) and annual oil palm production as the dependent variable (Y).

Secondary data for this research are obtained from the Department of Plantation and Livestock of Paser Regency in the year 2022. The researcher processes the collected data using Pearson Correlation analysis through the IBM SPSS 25 application. Correlation analysis is employed to assess the extent of the linear relationship between the two variables. Pearson Correlation, also known as the product-moment correlation, is a method used to evaluate the relationship between two variables when the data used have interval or ratio scales.

3. Results and Discussion

Results

Based on the information collected regarding the oil palm plantation area, as depicted in Table 1 and Figures 1 and 2, the total oil palm plantation area has not changed over time. From 2018 to 2019, there was no noticeable production growth in the oil palm plantation area in Paser Regency. However, in 2020, there was a significant decrease of 7,997 hectares in the oil palm plantation area in that region. Although there was an increase in the following year, amounting to 534.7 hectares, this growth is still considered less significant. In 2022, there were major developments, indicating further growth, reaching a total area of 6,242 hectares.

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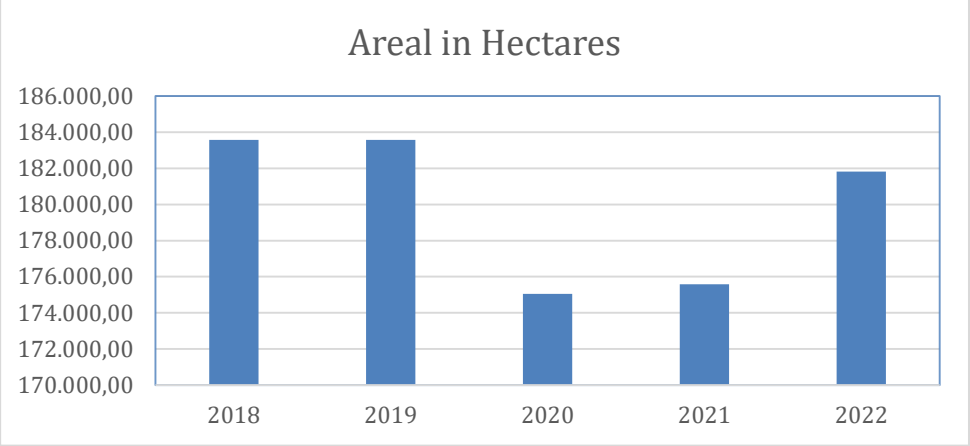
Table 1 Area and Productivity

	Areal Wide of Palm Oils	Production (Tons)
2018	183.574,72	1.989.831,30
2019	183.574,72	1.987.340,35
2020	175.042,72	1.802.818,00
2021	175.577,42	1.622.067,45
2022	181.819,42	2.031.636,67

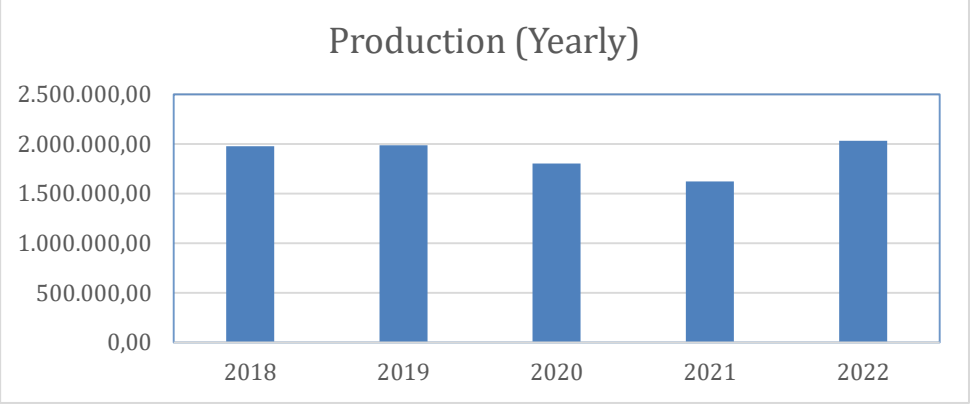
Source: Data Area and Productivity 2018-2022

Turning to the data on annual oil palm production in Paser Regency, there doesn't appear to be any significant change in the annual production figures for the years 2018 and 2019. The noticeable change in annual production started in 2020, which coincided with the decrease in the oil palm plantation area. In that year, the annual oil palm production decreased by 184,522.35 tons from 1,987,340.35 tons in 2019 to 1,802,818.00 tons in 2020. The production continued to decrease in 2021, reaching 1,622,067.445 tons, even though there was a slight increase in the oil palm plantation area in the same year.

In the subsequent year, 2022, the annual oil palm production in Paser Regency increased to 2,031,636.67 tons. This figure is still higher than the oil palm production before the COVID-19 pandemic (in 2018 and 2019).



Picture 1. Areal of Palm Oil Plantation Tree
Source: Research Data



Picture 2 Production Growth
Source: Research Data

Based on the empirical analysis results, a clear correlation between the two variables has been found, as the researcher has only conducted a preliminary comparison of the

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available data. Nevertheless, the gathered data aligns with the findings of a study conducted by Maranata (2022), affirming that land area has a relationship and impact on the quantity of oil palm production. Therefore, the researcher will provide a more detailed explanation by considering correlation analysis using the IBM SPSS 25 software.

Table 2. Normality Test
Unstandardized Residual

N		5
Normal Parameters	Mean	.0000000
	Std. Deviation	2102.451586
Most Extreme Differences	Absolute	.343
	Positive	.225
	Negative	-.343
Test Statistic		.343
Asymp. Sig. (2-tailed)		.055

Source : Data Normality Test Unstandardized Residual

From the normality test results, a significant value (sig.) of 0.055 was found. The significance value calculated by the SPSS software indicates a value > 0.05. Therefore, based on this normality test, it can be concluded that the data collected by the researcher passes the normality test, or in other words, the data shows a normal distribution pattern. A sig. result > 0.05 indicates that the data collected by the researcher has a high level of reliability as a representation of the phenomenon under investigation (Nasrum, 2018). Thus, the conclusion is that the data obtained by the researcher falls into the category of normal data and has a high level of reliability.

Table 3. Correlation Test Areal Yearly Production

Land Area	Pearson Correlation	1	.870
	Sig. (2-tailed)		.055
	N	5	5
Annual Production	Pearson Correlation	.870	1
	Sig. (2-tailed)	.055	
	N	5	5

Source : Data Correlation Test Areal Yearly Production

The results of the Pearson correlation test using IBM SPSS 25 can be seen in Figure 3. Based on this, it was found that the Pearson correlation value was .870. The positive Pearson correlation figure reflects a directional relationship between land area and oil palm production each year. The unidirectional relationship also indicates that the larger the land area, the higher the production, or the higher the production, the larger the land required. Thus, it can be concluded that there is a relationship or correlation between land area and oil palm production each year.

In the calculation of the sign value. found that the sig value. .55> .05 which means that land area and oil palm production have an insignificant relationship even though they have a correlation.

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Discussion

Based on the results of the Pearson correlation test using IBM SPSS 25, the analysis proves a Pearson correlation coefficient of 0.870. A positive Pearson correlation coefficient indicates a positive relationship between the land area and palm oil production each year. This positive relationship suggests that as the land area increases, palm oil production tends to increase simultaneously. It also reflects that the larger the area used, the higher the production will be. Conversely, if production increases, the land area used also tends to need expansion. Therefore, the conclusion is that there is a related relationship between the land area and annual palm oil production.

However, in the calculation of the significance value (sig.), the results indicate that the sig. value is 0.55 is greater than the standard significance level of 0.05. This indicates that although there is a correlation between the land area and palm oil production, this relationship is not statistically significant.

The insignificant level in the correlation between land area and annual palm oil production in the case of the palm oil plantations in Kabupaten Paser indicates the existence of other contributing factors that have a stronger influence on annual palm oil production. According to research by (Siswanto et al., 2020) and also research by (Arsyad & Maryam, 2017), there are several significant factors influencing annual palm oil production. These factors include:

1. Land area
2. Oil palm seedlings
3. Fertilizers
4. Labor force
5. Age of oil palm trees

According to the research, besides land area, oil palm seedlings are a factor that needs to be considered when seeking correlation with the growth rate of oil palm, as certified seedlings and the optimal quantity of planted seedlings can influence palm oil production volume.

Regarding the next factor, fertilizer, it was found that fertilizers with nutrient elements applied in the right type, dosage, timing, method, and target can impact the annual production yield of oil palm.

Labor, mentioned as a significant factor, is influenced by both the quality and quantity of the workforce in the oil palm plantation. If the optimal number of workers is employed in the oil palm fields, the production volume of oil palm can be increased.

Lastly, oil palm trees at productive ages, typically between 15 and 30 years, yield high-quality and high-quantity palm oil production. However, at 25 years old, despite being in the productive age range, the quality and quantity of fruits produced by oil palm trees may decline.

In addition, there are other contributing factors to annual oil palm production, such as soil conditions. According to research by (Darlita et al., 2017), the nutrient content and soil type used in establishing oil palm plantations will affect the quality and quantity of palm oil production. Soil characteristics and other factors related to soil conditions, like nitrogen levels, soil pH acidity, cation exchange capacity, and organic carbon, likewise correlate and influence the volume of oil palm production (Purba et al., 2018).

4. Conclusion

Based on the discussion presented earlier, it can be concluded that the land area variable is correlated with annual palm oil production in Kabupaten Paser, but the relationship between them is not statistically significant.

Recommendations

The researcher recommends plantation owners and managers in Kabupaten Paser to also pay attention to soil quality, fertilizers, the workforce relied upon in land management, and the age of oil palms to enhance the annual palm oil production.

The researcher simultaneously suggests future researchers explore relationships with variables not included in this study, enabling the development of a more comprehensive and in-depth research study.

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