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Research Article

Examining the Impact of Production Factors on Palm Oil Production Levels

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ABSTRACT

This study aims to investigate the influence of various factors on oil palm production levels. Specifically, it seeks to analyze the effects of production range, fertilizer expenses, and labor on oil palm production. Furthermore, it intends to evaluate the impact of production variables, namely oil palm production zone, fertilizer costs, and labor, on oil palm production levels. Factors such as land area, fertilizer expenses, and workforce are critical variables affecting oil palm production, significantly influencing its productivity. Data was collected through observations, interviews, and surveys. The decision to conduct tests followed the purposive sampling approach, involving 26 respondents. The production components notably influence the production rate, particularly labor and fertilizer costs. However, the land area's production rate does not exhibit a significant effect. Approximately 92.5% of the production rate is attributable to the substantial contribution of production variables, with the remaining 7.5% influenced by other factors. Among these variables, fertilizer costs emerge as the most influential factor affecting oil palm productivity in Suliliran Baru.

INTRODUCTION

Agriculture holds considerable significance as a contributor to the Indonesian economy, stemming from its designation as an agricultural nation (Fajar Oktavia & Fathin, 2022). Agricultural plantations, along with the oil and gas sector, are pivotal in bolstering the country's foreign exchange reserves. Notably, oil palm cultivation significantly fosters Indonesia's economic prosperity (Mulya Pratama et al., 2023). In 2022, the Directorate General of Plantations of the Indonesian Ministry of Agriculture reported a total oil palm plantation area of 15.38 million hectares. This encompassed 6.37 million hectares of smallholder-owned plantations, 598.7 thousand hectares owned by large state companies, and 8.40 million hectares owned by private companies (Tasya Billa & Iswarini, 2021). Paser, situated in East Kalimantan, dedicates 18,575 hectares to oil palm cultivation, yielding 16,771 kg per hectare.

Despite the extensive palm oil production across 15.38 million hectares of land, the actual output from oil palm cultivation remains modest in Indonesia, as highlighted by Syahrul Yasin Limpo, the Minister of Agriculture (Irmeilyana et al., 2021). Primary challenges faced by Indonesian oil palm farms include insufficient revenue from community-owned estates and suboptimal utilization of agricultural inputs. Production factors, defined by Triesia (2020), encompass components exclusively utilized during the production process. These factors, such as land extent, labor, and the application of fertilizers and pesticides, often impact output levels (Enita et al., 2023). Optimizing the utilization of production inputs can significantly enhance oil palm yield and improve farmers' well-being.

The generation rate within the arrival zone directly correlates with the number of plants within its designated range. Siswanto et al.'s (2020) study titled *Analisis Faktor-Faktor yang Mempengaruhi Produksi Komoditas Kelapa Sawit Perkebunan Rakyat dengan Pola Swadaya di Kabupaten Aceh Tamiang* (Analysis of Factors Affecting Production of Palm Oil by People in Tebing Linggahara, West Bilah, Labuhanbatu) elucidates the substantial impact of the arrival zone component on palm oil yields in the investigated area. This impact is supported by a centrality level of 0.000 or a t-value of 11.668. Labor is a critical production factor, as examined in Mustari et al.'s (2020) study titled *Analisis Faktor-Faktor yang Mempengaruhi Produksi Komoditas Kelapa Sawit Perkebunan Rakyat dengan Pola Swadaya di Kabupaten Aceh Tamiang* (Analysis of Factors Affecting the Production of Palm Oil Commodities from Community Plantations with a Self-Help Pattern in Aceh Tamiang). Nasution et al. (2023) affirms the pivotal role of fertilization in influencing plant growth and development. Lastly, Rafidah et al.'s (2022) research on the generation rate of oil palm in Laburan, Paser Belengkong, Paser, underscores the significant impact of fertilizer costs on palm oil farmer income, indicated by a t-value of 2.381.

The study aims to address the impact of production components, namely the specific arrival zone, fertilizer cost, and labor simultaneously, on oil palm production levels in Kota Suliliran Baru. Additionally, it evaluates the relatively minor impact of production variables, namely arrival zone, fertilizer cost, and labor, on oil palm production in Kota Suliliran Baru. Furthermore, it assesses the capacity of production components, particularly the arrival zone, fertilizer cost, and labor, to contribute to palm oil production in Suliliran Baru. Finally, it identifies the factors influencing oil palm production in Suliliran Baru.

METHOD

The study was conducted between October and December 2023 in Suliliran Baru, Paser Belengkong, Paser. Two types of data were employed: primary data obtained through direct interviews with selected farmers at the research site, and secondary data, referring to information gathered indirectly from papers provided by relevant agencies (Kaharuddin, 2021).

Purposive sampling method was employed for sample selection, entailing the deliberate selection of research data sources based on careful evaluation and review. The criteria for inclusion comprised land ownership ranging from 1 to 5 hectares and plant age ranging from 7 to 20 years. Zaluchu (2020) highlights the importance of meticulous subject selection, especially when the sample size is less than 100. However, when the number of subjects exceeds 100, a selection ranging from 10% to 15%, 20% to 25%, or even more can be considered. In this study, a sample size of 26 independent oil palm plantation farmers was utilized, representing 10% of the total population of 260 farmers in Suliliran Baru, Paser Belengkong, Paser.

Data collection involves quantitative descriptive analysis procedures, which entail processing data through statistical tests and subsequently interpreting the acquired test findings. Multiple linear regression analysis and hypothesis testing techniques are employed. Several tests are utilized, including:

(i) The normality test on the regression model is conducted to determine if the residuals conform to a normal distribution. The Kolmogorov-Smirnov method is used for normality testing, comparing a significance level (α) of 0.05 to obtain a comparison (p). A p-value greater than 0.05 indicates a normal distribution, while a p-value less than or equal to 0.05 suggests a departure from normal distribution (Nursalam, 2020).

(ii) The autocorrelation test examines whether there is a link between the residual in period t and the residual in the previous period t-1 (Mardiatmoko, 2020). Autocorrelation is considered to occur when a relationship is found. The Durbin-Watson test (DW Test) is utilized in this experiment to assess the proximity of autocorrelation.

(iii) Various direct recurrence tests are employed to determine the impact of independent variables on dependent variables (Aryani & Gustian, 2020). Multiple independent variables are tested using a centrality threshold of 5%. Subsequent conditions on many direct recurrences are utilized.

$$Y = \alpha + b_1X_1 + b_2X_2 + b_3X_3 + e$$

where:
Y : Dependent variable
α : Constant (Y value if X1, X2,..., e = 0)
$X_1, ..., X_3$: Independent variable
$b_1,..., b_2$: Regression coefficient (value of increase or decrease)
e : Error

The correlation coefficient, a measure quantifying the degree of linear correlation between variables (Soedyafa et al., 2020), indicates significant correlation when the obtained result is affirmative. An increase in variable X corresponds with a rise in production generated by Y, and vice versa. Conversely, a negative result suggests no correlation between these variables; an increase in variable X leads to a reduction in the output generated by Y.

The coefficient of determination (R2) test, commonly employed to assess the model's ability to explain variations in the dependent variable, is calculated using a specific formula (Soedyafa et al., 2020). A regression model is deemed of high quality if the coefficient of determination (R2) is defined as follows:

$$R^2 = (ESS/TSS0 = 1 – (RSS/TSS)$$

where:
R^2 : Coefficient of determination
ESS : *Explained sum of squares*
TSS : *Total sum of squares*

The F test is frequently utilized to demonstrate the collective association between all independent variables in the model and the dependent variable. The null hypothesis posits that the coefficients β1, β2, ..., βk are equal to zero, indicating a lack of direct proportionality (Zaki & Saiman, 2021). The subsequent test steps are as follows:

a) H0: β1 = β2 = ... = βk = 0; The null hypothesis being tested suggests that the overall effect of the independent variables in the model equals zero, implying that none of the independent factors significantly impact the dependent variable.
b) Ha: β1 ≠ β2 ≠ ... ≠ βk ≠ 0; The alternative hypothesis asserts a substantial relationship between the independent factors and the dependent variable, indicating that not all coefficients are equal to zero and that the independent variables collectively explain the dependent variable.
c) Hypothesis testing using F statistics, with the F calculation results obtained through the formula displayed below:

$$F_{count} = R^2/(k-1) \ / \ (1-R^2)/ \ (1-R^2) \ (n-k)$$

Where:
n : Number of observations
k : Number of parameters (including intercept) in the model.

The process of selecting options (decision-making) or reaching conclusions involves several steps:

1) If the F-count value exceeds the F-table value, the null hypothesis (H0) is rejected, signifying that all independent factors can simultaneously influence the dependent variable.
2) Conversely, if the F-count is less than the F-table value, the null hypothesis (H0) is accepted, indicating that none of the independent factors significantly influence the dependent variable.

The t-test is commonly utilized to evaluate the individual impact of each independent variable on the dependent variable to ascertain their explanatory power (Yam & Taufik, 2021). The testing phases are as follows:

a) H0: bi = 0; The null hypothesis suggests that the parameter (bi) has a value of zero, indicating no significant impact of the independent variable on the dependent variable.

b) Ha: bi ≠ 0; The alternative hypothesis posits that the parameter (bi) has a value not equal to zero, indicating a significant impact of the independent variable on the dependent variable.
c) The determination of the variable under examination is based on comparing the t-count value with the t-table using a specific formula.

$$t_{count} = bi / Sbi$$

Where:
Bi : i-th independent coefficient
Sbi : Standard deviation of the i-th independent variable

The process of decision-making or drawing conclusions involves the following criteria:
1) If the t-count value exceeds the t-table value, the null hypothesis (H0) is rejected, signifying a significant correlation between the independent variable and the dependent variable (Mutryarny & Rizal, 2022).
2) Conversely, if the t-count value is less than or equal to the t-table value, the null hypothesis (H0) is accepted, indicating an insignificant correlation between the independent variable and the dependent variable (Mutryarny & Rizal, 2022).

RESULTS AND DISCUSSION

The effect of production factors (such as land area, fertilizer costs, and labor) on the level of oil palm production in Suliliran Baru

To address the increasing demand for palm oil, various initiatives are underway to enhance the revenue generated from its production. Key production factors, such as land acreage, fertilizer, labor, and pesticides, typically exert significant influence on revenue (Masroni et al., 2023). Optimizing the utilization of these production inputs holds promise for enhancing oil palm productivity and improving the livelihoods of oil palm plantation farmers in Suliliran Baru Village, situated in Paser Belengkong District, Paser Regency. The income derived from oil palm farming is impacted by several production factors, including land area, energy consumption, labor input, and fertilizer expenses. Data analysis was performed using SPSS version 25, resulting in the following findings:

Table 1. Analysis Results of Simultaneous F Test

	Model	Sum of a Squares	Df	Mean Square	F	Sig.
1	Regression	8385.724	3	2795.241	90.577	.000b
	Residual	678.930	22	30.860		
	Total	9064.654	25			

The table data reveals an F-count value of 90.577 and an F-table value of 3.05. With the F-count value (90.577) surpassing the F-table value (3.05), the null hypothesis (H0) is rejected, and the alternative hypothesis (Ha) is accepted, indicating a robust influence of the variables in question. X1, X2, and X3 concurrently impact variable Y in Suliliran Baru Village. As per Yanita and Suandi (2021), the study underscores the significant influence of tree quantity, NPK fertilizer, super dolomite fertilizer, and pesticides on oil palm productivity. This contradicts the findings of Mas et al. (2023), Monita & Zebua (2023), and Rafidah et al. (2022), who suggested that factors such as land area, labor, and plant age have negligible effects on oil palm productivity.

The indirect effect of production factors (such as land area, fertilizer costs and labor) on the level of oil palm production in Suliliran Baru.

To evaluate the individual impact of each independent variable on the dependent variable, a significance level test is conducted by comparing the t-count findings with the t-table for the correlation coefficient of each independent variable separately. Subsequently, the T test is performed using SPSS version 25, resulting in the following outcomes:

Table 2. Analysis Results of T-Test

Model		Unstandardized Coefficient		Standardize Coefficient	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	13.142	2.995		4.388	.000
	X1_ Land Area	.009	.021	.053	.424	.675
	X2_ Labor	.429	.125	.424	3.430	.002
	X3_ Fertilizer Cost	1.928E-6	.000	.540	5.169	.000

Based on the data processing results presented in the table above, the t-count value for land area (X1) is 0.424, corresponding to a probability result (sig value) of 0.675. The t-table result is 2.07387. Since the significance level of 0.675 is greater than or equal to 0.05, the null hypothesis (H0) is accepted, and the alternative hypothesis (Ha) is rejected. This indicates that the land area variable (X1) does not exert a significant effect on the variable (Y), specifically the level of oil palm production in Suliliran Baru (Ariesca et al., 2023). Additionally, the productivity of oil palm plantations is significantly influenced by various soil types, such as peat soil and mineral soil, as noted by previous studies (Atikah et al., 2022). Expanding the size of oil palm plantations is crucial for maximizing productivity and meeting the demand for palm oil (Wan Shahidan & Nadzri, 2020). The availability of land area significantly influences the productivity and growth of the palm oil sector.

Upon analyzing the data, the t-count value for labor (X2) is found to be 3.430, exceeding the t-table value of 2.07387. Consequently, the null hypothesis (H0) is rejected, and the alternative hypothesis (Ha) is accepted, indicating that the labor variable (X2) has a significant impact on the level of oil palm production in Suliliran Baru Village. Previous research by Sophia (2022) and Wahab & Dollah (2023) suggests that factors such as age, job experience, remuneration, and motivation of harvesters influence their productivity in oil palm output. The workforce plays a critical role in palm oil production, highlighting the importance of addressing labor-related issues to enhance productivity in the sector.

Furthermore, the t-count value for fertilizer costs (X3) is 5.169, surpassing the t-table value of 2.07387. Hence, the null hypothesis (H0) is rejected, and the alternative hypothesis (Ha) is accepted. This indicates that the fertilizer cost variable (X3) significantly affects the variable (Y), specifically the level of oil palm production in Suliliran Baru. Oil palm productivity in various regions has been enhanced through the application of phosphorus, potassium, and magnesium fertilizers. The high cost associated with synthetic fertilizers in the palm oil sector has led to the exploration of alternative approaches to mitigate production expenses (Lima et al., 2022). Sustainable oil palm production hinges on effective soil and fertilizer management to preserve soil fertility and reduce production costs. However, prolonged use of chemical fertilizers has been found to deplete soil nitrogen and organic carbon levels, as well as alter the composition of beneficial soil microorganisms (Salamat et al., 2021).

The contribution of production factors such as land area, fertilizer costs, and labor to oil palm production in Suliliran Baru.

To evaluate the combined influence of the independent variables on the dependent variable, the Adjusted R-Square value is computed. This entails employing the coefficient of determination (R2) test, as delineated by Sari et al. (2022). A low coefficient value implies restricted capability of the independent variables. Conversely, a value nearing 1 and diverging from 0 indicates that each independent variable can furnish all requisite information for predicting the dependent variable. Subsequently, scrutiny is directed towards analyzing the resulting coefficient of determination.

Table 3. Results of Determination Coefficient Analysis (R2)

Model	R	R Square	Adjusted R Square	Stad. Error of Estimate
1	.962a	.925	.915	5.555

The coefficient of determination (R2) stands at 0.915, signifying that 91.5% of the fluctuations in oil palm production are accounted for by alterations in land area, labor, and fertilizer costs. The residual 8.5% is influenced by other variables not encompassed in this study. Monita & Zebua (2023b) and Ramadan* & Hasmarini (2023) examined additional factors such as plant count, precipitation, and plant maturity in their investigations.

CONCLUSION

The preceding analysis has led to the following conclusions: Production parameters, namely land area (X1), labor (X2), and fertilizer expenses (X3), collectively wield a substantial influence on oil palm production in Suliliran Baru Village (Y). Both the labor variable (X2) and the fertilizer cost variable (X3) significantly affect the level of oil palm production (Y) in Suliliran Baru Village, as evidenced by their t-count values surpassing the t-table value. Conversely, the land area variable (X1) shows no tangible or significant impact on oil palm production (Y) in Suliliran Baru Village. The fertilizer cost variable (X3) emerges as the most influential among the three variables X1, X2, and X3, with a t-value of 5.169.

REFERENCES

Ariesca, R., Sau, A. A. W. T., Adinugroho, W. C., Setiawan, A. A. R., Ahamed, T., & Noguchi, R. (2023). Land Swap Option for Sustainable Production of Oil Palm Plantations in Kalimantan, Indonesia. *Sustainability*, *15*(3), 2394. https://doi.org/10.3390/su15032394

Aryani, Y., & Gustian, D. (2020). Sistem Informasi Penjualan Barang dengan Metode Regresi Linear Berganda dalam Prediksi Pendapatan Perusahaan. *Jurnal Sistem Informasi Dan Teknologi Informasi*, *2*(2), 39–51.

Atikah, A., Sumaryoto, S., & Susilastuti, D. (2022). Pengaruh Luas Lahan dan Produksi CPO Terhadap Pertumbuhan Industri Kelapa Sawit Indonesia Tahun 2000-2020. *ECo-Buss*, *5*(1), 338–348. https://doi.org/10.32877/eb.v5i1.479

Enita, E., Uliya, U., & Laksono, B. J. (2023). Studi kreatif: Pengaruh faktor produksi terhadap produksi kelapa sawit. *JCAC Journal of Creative Attitudes Culture*, *4*(1).

Fajar Oktavia, H., & Fathin, S. (2022). Start Up Pertanian di Indonesia. *JURNAL AGRISIA*, *14*(2), 51–60.

Irmeilyana, I., Ngudiantoro, N., & Rodiah, D. (2021). Correspondence Analysis pada Hubungan Faktor-Faktor yang Mempengaruhi Pendapatan Petani Kopi Pagaralam. *BAREKENG: Jurnal Ilmu Matematika Dan Terapan*, *15*(1), 179–192. https://doi.org/10.30598/barekengvol15iss1pp179-192

Kaharuddin. (2021). Ciri dan Karakter Sebagai Metodologi. *Equilibrium : Jurnal Pendidikan*, *IX*(1), 1–8. http://journal.unismuh.ac.id/index.php/equilibrium

Lima, J. V., dos Santos, M. A. S., Tinoco, R. S., Chia, G. S., Olivares, F. L., Silva, J. P. M. da, & da Silva, G. B. (2022). Oil palm production with reduced economic costs and environmental impacts through the use of rhizobacteria. *Archives of Phytopathology and Plant Protection*, *55*(17), 1998–2008. https://doi.org/10.1080/03235408.2022.2086193

MARDIATMOKO, G. (2020). Pentingnya Uji Asumsi Klasik pada Analisis Regresi Linier Berganda. *BAREKENG: Jurnal Ilmu Matematika Dan Terapan*, *14*(3), 333–342. https://doi.org/10.30598/barekengvol14iss3pp333-342

Mas, A. D. R., Kurniati, D., & Aritonang, M. (2023). Faktor-Faktor yang Mempengaruhi Produksi Kelapa Sawit di PT Perkebunan Nusantara XIII. *Mimbar Agribisnis : Jurnal Pemikiran Masyarakat Ilmiah Berwawasan Agribisnis*, *9*(1), 864. https://doi.org/10.25157/ma.v9i1.9124

Masroni, M., Kristiana, A., & Sholeha, A. (2023). Analysis of Factors Affecting Onion Production in Sengon Village, Tanjung District, Brebes Regency. *JECMER: Journal of Economic, Management and Entrepreneurship Research*, *1*(2), 11–20.

Monita, C. F., & Zebua, D. D. N. (2023a). Faktor-Faktor yang Mempengaruhi Produktivitas Kelapa Sawit di PT. Mustika Agung Sentosa. *JURNAL MANAJEMEN AGRIBISNIS (Journal Of Agribusiness Management)*, *11*(01), 231. https://doi.org/10.24843/JMA.2023.v11.i01.p18

Monita, C. F., & Zebua, D. D. N. (2023b). Faktor-Faktor yang Mempengaruhi Produktivitas Kelapa Sawit di PT. Mustika Agung Sentosa. *JURNAL MANAJEMEN AGRIBISNIS (Journal Of Agribusiness Management)*, *11*(01), 231. https://doi.org/10.24843/JMA.2023.v11.i01.p18

Mulya Pratama, B., Ihsan Ali, M., Herlina Wati, M., Wulandari, S., Ekonomi Dan Bisnis Islam, F., & Islam Negeri Sumatera Utara, U. (2023). *Kontribusi Subsektor Perkebunan Dalam Mendukung Pertumbuhan Ekonomi Masyarakat di Sumatera Utara*. *4*(6).

Mustari, M., Yonariza, Y., & Khairati, R. (2020). Analisis Faktor-Faktor Yang Mempengaruhi Produksi Komoditas Kelapa Sawit Perkebunan Rakyat Dengan Pola Swadaya Di Kabupaten Aceh Tamiang. *Jurnal Ilmiah MEA (Manajemen, Ekonomi, Dan Akuntansi)*, *4*(3), 1524–1542.

Mutryarny, E., & Rizal, M. (2022). Korelasi Kareteristik Kuantitatif Morfologi Dengan Jumlah Buah Tanaman Pepaya (Carica pepaya). *Jurnal Agrotela*, *1*(2), 21–27.

Nasution, Z. P. S., Mulatsih, S., & Rahma, H. (2023). Penilaian Keberlanjutan Sosial Kemitraan Usaha Perkebunan Kelapa Sawit Rakyat dan Kaitannya terhadap Pencapaian Tujuan Pembangunan Berkelanjutan: Studi Kasus di Provinsi Sumatera Utara. *J. Pen. Kelapa Sawit*, *31*(1), 55–69.

Nursalam, N. (2020). Analisis Produksi dan Efisiensi Alokatif Usahatani Lada di Desa Ameroro Kecamatan Tinondo Kabupaten Kolaka Timur. *AGRIMOR Jurnal Agribisnis Lahan Kering*, *5*(3), 57–59. https://doi.org/10.32938/ag.v5i3.1043

Rafidah, R., Juliansyah, H., Murtala, M., Trisniarti, N., & Afrilla, D. (2022). Faktor-Faktor yang Mempengaruhi Produksi Minyak Sawit di Indonesia. *Jurnal Ekonomi PertanianUnimal*, *5*(1), 7–15. http://ojs.unimal.ac.id/index.php/pertanian

Rafidah, R., Juliansyah, H., Murtala, M., Trisniarti, N., & Aprillia, D. (2022). Faktor-Faktor yang Mempengaruhi Produksi Minyak Sawit di Indonesia. *Jurnal Ekonomi Pertanian Unimal*, *5*(1), 7. https://doi.org/10.29103/jepu.v5i1.8164

Ramadan*, V. E., & Hasmarini, M. I. (2023). Analysis of Factors Affecting Palm Oil (Elaesis Guineensis Jacq) Production in Central Kalimantan Region. *Riwayat: Educational Journal of History and Humanities*, *6*(2), 433–438. https://doi.org/10.24815/jr.v6i2.30525

Salamat, S. S., Hassan, M. A., Shirai, Y., Hanif, A. H. Mohd., Norizan, M. S., Mohd Zainudin, M. H., Mustapha, N. A., Mat Isa, M. N., & Abu Bakar, M. F. (2021). Effect of inorganic fertilizer application on soil microbial diversity in an oil palm plantation. *BioResources*, *16*(2), 2279–2302. https://doi.org/10.15376/biores.16.2.2279-2302

Sari, M., Rachman, H., Juli Astuti, N., Win Afgani, M., & Abdullah Siroj, R. (2022). Explanatory Survey dalam Metode Penelitian Deskriptif Kuantitatif. *Jurnal Pendidikan Sains Dan Komputer*, *3*(01), 10–16. https://doi.org/10.47709/jpsk.v3i01.1953

Shodiq, W. M. (2021). Perbandingan Perusahaan Perkebunan Sawit Berdasarkan Kinerja Keuangan Periode 2015-2019. *Jurnal Sosial Ekonomi Pertanian*, *17*(1), 1–18. https://doi.org/10.20956/jsep.v16i3.11930

Siswanto, Y., Lubis, Z., & Akoeb, E. N. (2020). The Analysis of Factors Affecting People's Palm Oil Production in Tebing Linggahara Village, West Bilah District, Labuhanbatu Regency. *Jurnal Ilmiah Magister Agribisnis*, *2*(1), 60–70. http://jurnalmahasiswa.uma.ac.id/index.php/agrisains

Soedyafa, D. A., Rochmawati, L., & Sonhaji, I. (2020). Koefisien Korelasi (R) dan Koefisien Determinasi (R2). *Jurnal Penelitian Politeknik Penerbangan Surabaya Edisi XXX*, *5*(4), 289–296.

Sophia, S. (2022). The Influence Of Harvest Labor Productivity Factors On Palm Oil Production At PTPN VI Business Unit Batang Hari. *Baselang*, *2*(1), 1–9. https://doi.org/10.36355/bsl.v2i1.27

Tasya Billa, M., & Iswarini, H. (2021). Faktor yang Mempengaruhi Produktivitas Tenaga Kerja Buruh Panen Kelapa Sawit di PT. Patri Agung Perdana Estate Rambutan Desa Suka Pindah Kabupaten Banyuasin. *Societa*, *2*(78), 78–85.

Triesia, D. (2020). Sistem Pengolahan Data Hasil Panen Buah Sawit Pada CV. XYZ. *Jurnal Ilmu Komputer*, *1*(1).

Wahab, A., & Dollah, R. (2023). Child labor and unfree labor: Evidence from the palm oil sector in Sabah (East Malaysia). *Journal of Human Rights*, *22*(3), 351–366. https://doi.org/10.1080/14754835.2022.2115289

Wan Shahidan, W. N., & Nadzri, N. A. (2020). Sustainable Palm Oil Production Through Optimizing of Planted Area. In *Charting the Sustainable Future of ASEAN in Science and Technology* (pp. 519–528). Springer Singapore. https://doi.org/10.1007/978-981-15-3434-8_45

Yam, J. H., & Taufik, R. (2021). Hipotesis Penelitian Kuantitatif. *PERSPEKTIF : Jurnal Ilmu Administrasi*, *3*(2), 96–102.

Yanita, M., & Suandi. (2021). What Factors Determine the Production of Independent Smallholder Oil Palm? *Indonesian Journal of Agricultural Research*, *4*(1), 39–46. https://doi.org/10.32734/injar.v4i1.5379

Zaki, M., & Saiman, S. (2021). Kajian tentang Perumusan Hipotesis Statistik Dalam Pengujian Hipotesis Penelitian. *JIIP-Jurnal Ilmiah Ilmu Pendidikan*, *4*(2), 115–118.

Zaluchu, S. E. (2020). Strategi Penelitian Kualitatif dan Kuantitatif di dalam Penelitian Agama. *Evangelikal: Jurnal Teologi Injili Dan Pembinaan Warga Jemaat*, *4*(1), 28–38.