Volume 11, No 1, June 2025
ISSN : 2460-5204 eISSN : 2986-2639

Indonesia's Crude Palm Oil (CPO) Export Dynamics: A 2000–2024 Perspective

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ABSTRACT

Indonesia is the world's leading exporter of palm oil, fulfilling approximately 52% of global demand. The export of Crude Palm Oil (CPO) serves as a strategic component of the country's agro-based industry and remains the largest contributor to non-oil and gas foreign exchange earnings. Despite its significance, there remains limited empirical research examining the impact of Foreign Direct Investment (FDI), Domestic Investment (DI), and the exchange rate on Indonesia's CPO export value, particularly over the period 2000 to 2024. This study aims to fill that gap by employing secondary time series data sourced from the World Bank, Statistics Indonesia (Badan Pusat Statistik), and Bank Indonesia. The research applies a multiple linear regression analysis using the EViews 12 statistical software. The results reveal that FDI has a positive and statistically significant effect on Indonesia's CPO export value. In contrast, Domestic Investment and the exchange rate show no significant partial influence. However, when analyzed simultaneously, FDI, DI, and exchange rate collectively exert a significant impact on CPO export performance. Furthermore, the analysis of export value trends from 2000 to 2024 shows a generally positive trajectory, highlighting the continued importance of policy support and investment in maintaining Indonesia's dominance in the global palm oil market.

Keywords : Crude Palm Oil, export, foreign direct investment, domestic investment, exchange rate

I. INTRODUCTION

Indonesia is a developing country with an agrarian economic system, where the majority of the population derives their livelihoods from the agricultural sector (Nurmalita & Prasetyo, 2019). Among various agricultural commodities, palm oil has emerged as a strategic industry within the agro-based sector, particularly in tropical regions (Ewaldo, 2015). The extract from oil palm processing, known as Crude Palm Oil (CPO), has become a vital agricultural commodity that absorbs a significant portion of the labor force and contributes substantially to foreign exchange earnings from the non-oil and gas sector (Pratomo & Olivia, 2022). According to Statistics Indonesia (BPS, 2024), approximately 80% of non-oil and gas export value in 2024 was dominated by industrial sectors, including CPO.

As the world's largest producer of oil palm, Indonesia plays a pivotal role in supplying palm

oil for both domestic and international markets (Pratomo & Olivia, 2022). This role is particularly significant given the interdependence of nations in fulfilling their economic and consumer needs (Darain & M. Rusmin, 2023), thereby fostering the growth of international trade activities, such as exports and imports. Data from the Council of Palm Producing Countries (CPOP, 2025) indicates that over the past decade, Indonesia has consistently held the position of the world's leading CPO exporter. In fact, according to the International Production Assessment Division (IPAD, 2025), Indonesia accounted for 52% of global CPO exports in 2024— the highest among all producing countries. This trend is illustrated in Figure 1.

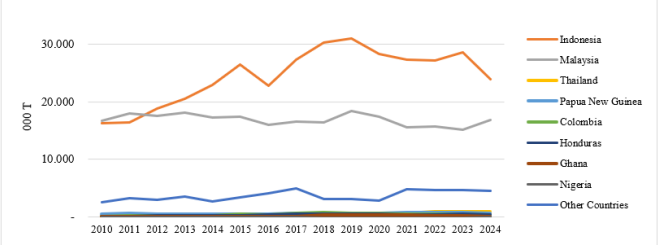

Figure 1. CPO Exports of Major Producing Countries (000 T), 2010–2024
Source: CPOP Palm Oil Database, 2025

Despite occasional fluctuations, the volume of Indonesia's CPO exports has shown a generally increasing trend in recent years. This growth corresponds with expanding production capacity and the continuous enlargement of oil palm plantations (Triyowati & Julmina, 2020). Responding to rising global demand, both large-scale enterprises and smallholder farmers have significantly increased palm oil cultivation areas. According to data from Our World in Data, the total land area devoted to oil palm plantations rose dramatically by 144% from 2010 to 2023, growing from 5.78 million hectares to 14.17 million hectares. This expansion is shown in Figure 2.

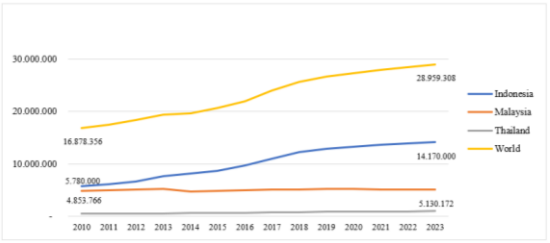

Figure 2. Total Oil Palm Plantation Area (Hectares) in Indonesia, 2010–2023
Source: Our World in Data, 2025

This rapid expansion has led to reduced cultivation of other agricultural commodities as farmers shift their focus to oil palm (Ministry of Defense, 2024). In 2024, data on the composition of Indonesia's CPO production showed that 68% (28.66 million tons) was contributed by private large-scale plantations, 34.46% (16.22 million tons) by smallholder plantations, and only 4.67% (2.20 million tons) by state-owned enterprises (BPS, 2024), reflecting the dominant role of the private sector in national CPO production.

The development of a country's export sector is influenced by various factors, including exporter expertise, foreign market conditions, and the investment climate created by the government (Astuti, 2019). Investment, both Foreign Direct Investment (FDI) and Domestic Investment (DI), plays a key role in supporting economic growth and enhancing export competitiveness (Darain & M. Rusmin, 2023). A conducive business environment fosters investor confidence and supports productive investments (Lestari & Hidayat, 2014). According to the World Bank (2023), countries with stable and efficient business environments are more likely to attract

consistent inflows of investment. Investment directly affects capital supply and indirectly contributes to industrial quality. As a result, an increase in production capacity leads to higher export volume and value (Hidayat et al., 2011). The trend of investment in Indonesia from 1990 to 2024 can be observed in Figure 3.

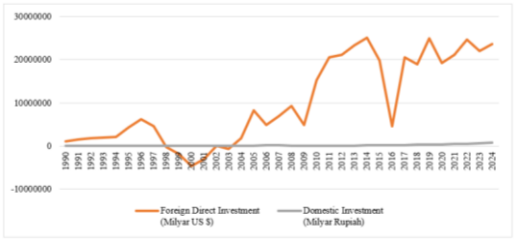

Figure 3. Realized Foreign Direct Investment and Domestic Investment in Indonesia, 1990–2024
Source: World Bank and Statistics Indonesia, 2025

In addition to investment, macroeconomic variables such as the exchange rate also influence export performance. The exchange rate, particularly the value of the rupiah against the US dollar, is a key determinant of export competitiveness (Nurmalita & Prasetyo, 2019). A depreciation in the exchange rate can make export commodities more competitive in global markets, although excessive volatility can introduce risks and uncertainty for exporters (Maygirtasari et al., 2015). Historical movements in Indonesia's exchange rate between 2000 and 2024 are presented in Figure 4.

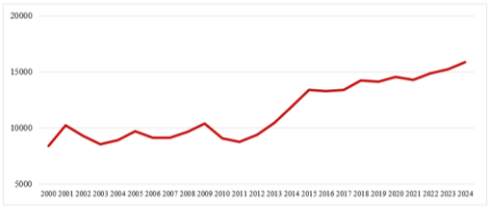

Figure 4. Exchange Rate of the Indonesian Rupiah Against the US Dollar, 2000–2024
Source: Bank Indonesia, 2025

Over the past two decades, from 2000 to 2024, Indonesia has faced numerous economic dynamics, including trade liberalization, investment reform, the global financial crisis, the COVID-19 pandemic, and geopolitical conflicts—all of which have affected palm oil prices and demand (Ministry of Finance, 2022). These conditions have shaped the relationship between FDI, DI, the exchange rate, and CPO export performance. However, a comprehensive empirical study analyzing the influence of these three variables on Indonesia's CPO exports over a long time horizon remains scarce. Most existing studies tend to focus on general economic growth rather than sector-specific export performance.

Therefore, this study is timely and relevant. First, it aims to fill the gap in the literature by integrating investment and macroeconomic variables in explaining national CPO export performance. Second, the findings are expected to serve as empirical evidence for policy formulation to optimize investment and stabilize macroeconomic conditions in support of export competitiveness. Third, given the significant contribution of the palm oil sector to national development and revenue, understanding its export determinants is essential for formulating sustainable agribusiness development strategies. Based on the above rationale, this research aims to analyze the influence of Foreign Direct Investment, Domestic Investment, and the Exchange Rate on Indonesia's Crude Palm Oil (CPO) exports over the period 2000 to 2024.

II. LITERATURE REVIEW

Recent literature on Indonesia's Crude Palm Oil (CPO) export dynamics increasingly emphasizes the roles of Foreign Direct Investment (FDI), Domestic Investment (DI), and the exchange rate (XR) as key macroeconomic variables influencing export performance. However, empirical studies reveal mixed findings, often shaped by differences in methodology, observation periods, and specific economic conditions. According to Pradina and Adhitya (2023), fluctuations in international CPO prices and the rupiah exchange rate have significant effects on Indonesia's CPO export volumes, particularly in the short and long term. Their study, which used an error correction model from 2014 to 2022, also noted that the prices of substitute vegetable oils tend to dampen CPO exports. These findings affirm that Indonesia's palm oil exports are sensitive to global price movements and currency valuation, highlighting the need to manage macroeconomic stability to maintain export competitiveness.

Further supporting this perspective, Pratiwi (2021) employed a gravity model to examine the determinants of Indonesian CPO export competitiveness to major trading partners. Her results indicated that variables such as the exchange rate, GDP per capita of destination countries, trade agreements, and non-tariff measures significantly affect export performance. This suggests that beyond domestic factors, international economic linkages and trade policy frameworks are also influential. Similarly, a study by Nugraheni et al. (2021) found that macroeconomic indicators such as the exchange rate and inflation did not significantly affect Indonesia's exports when analyzed collectively. This highlights the possibility that global demand and trade policy may sometimes outweigh traditional macroeconomic determinants.

Investment, particularly FDI and DI, is often viewed as a primary driver of economic growth and export enhancement. Widjajanto et al. (2020) demonstrated through multiple regression analysis that both FDI and DI had significant positive impacts on Indonesia's non-oil and gas export value. Their study, covering the period from 2007 to 2022, emphasized that sustained capital inflows contribute to industrial productivity and export readiness. Similar conclusions were drawn by Tondolambung et al. (2021), who analyzed the relationship between investment and export performance in the agricultural sector and found a significant positive influence from both foreign and domestic investments. In line with this, Darain and Rusmin (2023) highlighted that productive investment in palm oil plantations increases processing efficiency and export-oriented capacity, which in turn enhances the trade balance.

However, these findings are not universally accepted. Widyawati et al. (2021), using a similar regression approach, found that only DI significantly influenced non-oil export values, while FDI did not show any significant effect. Mahendra and I Wayan (2015) supported this result in their earlier study on export determinants from 1992 to 2012, where they also found that only DI had a significant role. These inconsistencies may be explained by the different sectors under study, the nature of the capital inflow, or institutional absorption capacity. Furthermore, sector-specific research by Cahyanata and Utama (2022) showed that while international CPO prices and the exchange rate significantly affected Indonesia's current account, FDI did not have a measurable impact on palm oil export growth during the study period.

When examining the role of the exchange rate alone, a wide variation in findings is evident across recent studies. Nurmalita and Prasetyo (2019) reported that the exchange rate did not significantly affect CPO export volume, even suggesting a weak or negative relationship. Likewise, Triyowati and Julmina (2020) observed that the impact of the rupiah-dollar exchange rate on palm oil exports was statistically insignificant over several years. In contrast, Putri and Akhmad (2023) suggested that while short-term exchange rate volatility introduces risk for exporters, long-term depreciation trends can improve export competitiveness by making

Indonesian products more affordable in global markets. Supporting this view, Widjajanto et al. (2020) concluded that a depreciated rupiah had a statistically significant positive effect on non-oil exports, including palm oil.

Beyond statistical findings, several studies have explored structural mechanisms linking macroeconomic variables to export outcomes. For example, Mustofa and Faizin (2023) used a vector error correction model to evaluate the long-run relationship between FDI, the exchange rate, inflation, interest rates, and GDP. Their results indicated that FDI had a significant positive long-run effect on exports, whereas the exchange rate exhibited both negative short-run and positive long-run effects. This suggests that exchange rate fluctuations can temporarily hinder export performance, but over time, currency depreciation may boost competitiveness.

In more recent literature, Sitorus et al. (2025) focused on the combined influence of CPO consumption, international prices, and the exchange rate on Indonesian exports. Their findings demonstrated that these variables collectively had a significant impact, underscoring the importance of examining macroeconomic indicators as a system rather than in isolation. Saputera et al. (2022) also pointed out that appreciation of the rupiah led to a decline in export performance, while depreciation was associated with increased export volumes. These results indicate the asymmetric influence of exchange rate movements and support the argument that a managed depreciation policy may be beneficial for Indonesia's export-driven sectors.

Another important dimension relates to the scale and type of investment. Hassudungan et al. (2024) found that in Sumatra and Kalimantan, regions with expansive palm oil plantations, foreign investment often flowed through vertically integrated supply chains. While such investments improved infrastructure and processing capacity, they also raised concerns about land use and displacement of food crops. These structural consequences suggest that although FDI contributes to export enhancement, it should be evaluated not only by volume metrics but also in terms of broader sustainability and equity implications.

In summary, the literature from 2020 to 2025 provides mixed but generally supportive evidence that FDI, DI, and the exchange rate are crucial to Indonesia's CPO export performance. While some studies affirm the significant roles of all three variables, others emphasize that only domestic investment or international prices matter. The variability in results reflects the complexity of Indonesia's agricultural export system, which is influenced not just by macroeconomic indicators, but also by global demand, institutional quality, and sectoral dynamics. Therefore, continued empirical investigation using updated data and robust models is essential to clarify the relationships among these variables and to guide future policy interventions aimed at strengthening Indonesia's position in the global palm oil market.

III. METHODS

The research employs a quantitative approach, which is designed to provide answers to the stated problem formulation through the measurement and analysis of various interrelated variables. This approach is widely used to understand the relationship between variables and to estimate models using regression analysis for hypothesis testing. The study focuses on Indonesia over a 25-year period, from 2000 to 2024, using a library research method. All data utilized are secondary in nature, systematically documented and obtained from reputable institutional sources. To test the validity of the proposed hypotheses, the study applies multiple linear regression analysis, which serves to measure the strength and direction of the relationship between independent and dependent variables using time series data. Hypothesis testing is conducted using both the t-test (for partial significance) and the F-test (for simultaneous significance) at a significance level of 5% ($\alpha = 0.05$). The analysis is carried out using EViews 12 as the statistical software tool.

The operational variables used in this study consist of the CPO export value as the dependent variable, while the independent variables include Foreign Direct Investment (FDI), Domestic Investment (DI), and the exchange rate (Kurs). These variables are measured using quantitative scales: the CPO export value is recorded in billion US dollars and obtained from Statistics Indonesia; FDI is measured in US dollars and sourced from the World Bank; DI is measured in billion Rupiah and also sourced from Statistics Indonesia; while the exchange rate is measured in Rupiah per US dollar and obtained from Bank Indonesia.

The econometric model used in this study is presented in the following log-linear equation:

$$LnCPO = \beta_0 + \beta_1 LnFDI + \beta_2 LnDI + \beta_3 LnK + e.$$

In this model, LnCPO represents the natural logarithm of Indonesia's crude palm oil export value, LnFDI is the logarithm of foreign direct investment, LnDI is the logarithm of domestic investment, and LnK represents the logarithm of the exchange rate (Rupiah to USD). β_0 is the constant term, while e denotes the error term capturing other unobserved influences.

In addition to the regression model, the study also employs a trend analysis method to examine the temporal movement of Indonesia's CPO export value throughout the study period. The trend model is expressed as Y = a + bX, where Y refers to the variable fluctuating over time (in this case, the export value of CPO), X denotes the time period expressed as deviations from the base year, a represents the constant, and b indicates the trend coefficient, which shows the direction and magnitude of change per time unit. This dual-method approach enables a comprehensive analysis of both the structural determinants and long-term patterns in Indonesia's CPO export performance.

IV. RESULTS AND DISCUSSION

This study employs multiple linear regression analysis to examine the effect of Foreign Direct Investment (FDI), Domestic Investment (DI), and the exchange rate on Indonesia's Crude Palm Oil (CPO) export value from 2000 to 2024. The regression results, as shown in Table 2, demonstrate that FDI has a statistically significant positive effect on CPO export value with a significance level less than 0.05, while DI and the exchange rate do not show statistically significant effects. This implies that among the three independent variables, only FDI exerts a measurable and reliable impact on CPO exports during the study period. The result underscores the importance of foreign capital as a determinant in enhancing export performance in the palm oil sector. The limited significance of DI and exchange rate indicates the presence of other mediating or moderating factors that may influence export trends.

Table 2. Multiple Linear Regression Results

Dependent Variable: LNCPO
Method: Least Squares
Date: 05/23/25 Time: 16:40
Sample: 2000 2024
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-17.87104	7.246394	-2.466198	0.0223
LNFDI	0.475605	0.115294	4.125152	0.0005
LNDI	-0.156869	0.215815	-0.726869	0.4753
LNK	1.940622	0.967641	2.005519	0.0580
R-squared	0.693190	Mean dependent var		9.263645

Adjusted R-squared	0.649360	S.D. dependent var	0.954294
S.E. of regression	0.565084	Akaike info criterion	1.841960
Sum squared resid	6.705709	Schwarz criterion	2.036981
Log likelihood	-19.02451	Hannan-Quinn criter.	1.896051
F-statistic	15.81544	Durbin-Watson stat	1.108119
Prob(F-statistic)	0.000013		

Source: EViews 12 Analysis Results

The estimated regression equation is:

LnCPO = -17.87104 + 0.475605LnFDI - 0.156869LnDI + 1.940622*LnK

This model implies that in the absence of FDI, DI, and exchange rate influence, the export value of CPO would decline by approximately 17.87%. The positive coefficient of FDI (0.475605) suggests that a 1% increase in FDI will increase the export value of CPO by 0.47%. The exchange rate also shows a positive coefficient (1.940622), indicating that a 1% depreciation in the rupiah against the US dollar could increase CPO exports by 1.94%, albeit not statistically significant. Meanwhile, the coefficient for DI is negative (-0.156869), suggesting that a 1% increase in DI would potentially reduce CPO exports by 0.15%. These coefficients offer insight into the relative strengths and directions of the variables' effects on CPO exports.

The F-test result (F-statistic = 0.000013) confirms that FDI, DI, and exchange rate jointly exert a significant simultaneous effect on CPO export value. The coefficient of determination (R-squared = 0.649360) indicates that 64.94% of the variation in CPO export value is explained by the three independent variables, while the remaining 35.06% is influenced by other factors not included in this model. This strong explanatory power suggests that the model is robust in capturing the key dynamics affecting Indonesia's CPO export performance. However, it also emphasizes the necessity to investigate additional variables such as international demand, trade barriers, and domestic productivity. Overall, the model validates the relevance of macroeconomic and investment indicators in shaping export outcomes.

This finding supports the second hypothesis of the study, confirming that all three variables together significantly affect the export value of CPO. However, the first hypothesis is rejected, as only FDI exerts a significant partial influence. The inconsistency between partial and simultaneous results highlights the complexity of economic interactions in the export sector. This implies that while FDI stands out individually, DI and exchange rate may interact with other variables to produce cumulative effects. Future research should consider incorporating interaction terms or mediation effects to uncover these layered relationships.

Figure 5. Trend Nilai Ekspor CPO Indonesia Tahun 2000-2024

Sumber: Badan Pusat Statistik, diolah

Trend analysis further strengthens the understanding of Indonesia's CPO export dynamics. The data show a consistently positive export trend with a slope of 1.073.641,83 million US dollars per year, implying an average annual increase of approximately 1.07 billion US dollars. While the overall trend is upward, significant fluctuations—particularly a sharp decline post-2022—were

observed, driven by external factors and policy interventions. Despite short-term volatility, the long-term trend validates the third hypothesis of this study. This suggests that Indonesia's CPO export sector remains resilient and capable of growth amidst changing global and domestic contexts.

The strong positive and significant relationship between FDI and CPO exports highlights the crucial role of foreign capital in boosting Indonesia's palm oil industry. FDI not only provides capital but also transfers technology, managerial expertise, and access to global markets. These contributions facilitate the development of export-oriented infrastructure and enhance the quality standards required by international buyers (Hassudungan et al., 2024; Pradina & Adhitya, 2023). Additionally, FDI is associated with increased production efficiency and capacity expansion in high-demand markets. Thus, foreign capital emerges as a strategic driver of export competitiveness in Indonesia's CPO sector.

Moreover, foreign investors typically possess global trade networks that can expand market reach for Indonesian CPO. These strategic benefits explain why FDI emerges as the most consistent positive driver of CPO export growth in this model. Similar findings are echoed by Darain and Rusmin (2023) and Tondolambung et al. (2021), who emphasize the enabling role of FDI in enhancing the global competitiveness of Indonesia's agro-industrial sectors. Policymakers should recognize the importance of maintaining an attractive investment climate for foreign capital. Doing so will reinforce Indonesia's long-term position as a leading CPO exporter.

In contrast, DI demonstrates a negative and statistically insignificant impact on CPO export value. This outcome may reflect structural challenges in the allocation and orientation of domestic capital. Much of the DI is reportedly funneled into upstream or small-medium scale businesses with a domestic market focus, which limits its contribution to export growth. Bureaucratic inefficiencies, inadequate logistics infrastructure, and regulatory uncertainty further hinder DI's integration into global value chains (Saputera et al., 2022). Addressing these structural constraints may improve the effectiveness of domestic capital in supporting export performance.

Similarly, the exchange rate, while theoretically expected to boost exports during periods of depreciation, does not display a significant empirical effect in this study. This finding aligns with previous research by Putri and Akhmad (2023) and Triyowati and Julmina (2020), who argue that CPO exports are more sensitive to global demand and commodity prices than to short-term currency fluctuations. In addition, most CPO trade contracts are long-term and denominated in US dollars, reducing the real-time influence of exchange rate volatility. Therefore, the exchange rate may play a more limited role in influencing immediate changes in export value.

Although a depreciated rupiah should theoretically enhance price competitiveness, the dominance of external factors such as global CPO demand, trade policies, and international price benchmarks tend to overshadow the role of currency in determining export outcomes. This reinforces the notion that macroeconomic tools like exchange rate manipulation may offer limited leverage in the context of commodity-based exports. Export strategies should thus prioritize structural competitiveness and market access over short-term monetary adjustments. This aligns with findings from Darain and Rusmin (2023) and Putri and Akhmad (2023) who underscore the limited role of exchange rates in driving sustained export growth.

In conclusion, this study identifies FDI as the most influential variable in increasing Indonesia's CPO export value over the 2000–2024 period. The statistical insignificance of DI and exchange rate in the partial analysis suggests that policy efforts should prioritize attracting high-quality foreign investments with strong backward linkages to the domestic economy. Strategic

alignment of domestic investment towards export-oriented and globally integrated activities remains a critical challenge. These insights should inform future trade and investment policies to sustainably enhance Indonesia's competitiveness in the global palm oil market. By understanding and addressing the differentiated roles of investment and macroeconomic factors, Indonesia can build a more resilient and inclusive export strategy for the future.

V. CONCLUSION

This study demonstrates that Foreign Direct Investment (FDI) has a positive and statistically significant partial effect on Indonesia's Crude Palm Oil (CPO) export value, underscoring the critical role of foreign investment in supporting the government's efforts to boost the export of this strategic commodity. In contrast, Domestic Investment (DI) and the exchange rate of the rupiah against the US dollar do not exhibit significant partial effects. However, when examined simultaneously, the combined influence of FDI, DI, and the exchange rate is statistically significant, indicating their collective importance in shaping CPO export performance. The trend analysis of Indonesia's CPO export value from 2000 to 2024 shows a consistently positive trajectory, reinforcing the notion of long-term sectoral resilience and growth.

The findings imply the urgency of government policies that attract and sustain foreign investment in the domestic palm oil sector. These policies should focus on enhancing the investment climate and offering globally competitive incentives. To complement the role of foreign capital, it is equally important to strengthen domestic investment so that it contributes more significantly to the export of CPO. This can be achieved through targeted fiscal incentives, improvement of logistics infrastructure, human capital development through technological training, and the facilitation of partnerships between domestic enterprises and foreign investors to enable technology transfer and broader market access.

Nevertheless, this study has several limitations. It relies on macro-level time series data and does not account for structural variables such as tariff barriers, infrastructure quality, or export-import regulations. Therefore, future research should adopt a more comprehensive framework by incorporating sectoral and spatial analyses and considering external variables such as global demand and international commodity prices that critically influence Indonesia's CPO export performance.

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