Available at https://journalenrichment.com/index.php/jr/

Enrichment: Journal of Multidisciplinary Research and Development

Analysis Of Indonesian Coffee Production, Area, And Consumption Trends In 2022-2026: Opportunities And Challenges In Maintaining The Sustainability Of The National Coffee Sector

Dedi Zargustin, Desma Harmaidi*, Niken Nurwati, Neng Susi
Universitas Lancang Kuning, Indonesia
Email: desma@unilak.ac.id*

ABSTRACT

This study analyzes the projections of coffee production, area, and consumption in Indonesia in the period 2022–2026 to identify opportunities and challenges in the sustainability of the national coffee sector. A descriptive qualitative approach is employed, using secondary data processed through multiple regression methods and ARIMA models for trend estimation. Secondary data were processed using multiple regression methods and ARIMA models for trend estimation. The results of the analysis show that coffee production tends to be stagnant with an average of 790,103 tons per year, experiencing an average annual decline of 0.12%. Meanwhile, the coffee area shows an average positive growth trend of 0.66% per year, reaching 1,296,254 hectares in 2026. Domestic consumption decreased by an average of 1.19% per year, from 379,655 tons in 2022 to 361,837 tons in 2026. Net coffee exports actually increased consistently by an average of 0.83% per year. This study concludes the need to increase productivity and diversify the domestic market to maintain the sustainability of the coffee sector, amid increasing exports and changing consumption trends. The need for strategies to address declining domestic consumption and stagnating production trends, despite positive growth in coffee cultivation areas and net exports. It emphasizes recommendations such as adopting sustainable farming practices, increasing productivity through technological innovation, and diversifying coffee products to cater to both domestic and international markets. Additionally, it suggests strengthening Indonesia's competitiveness in the global coffee market by investing in branding, marketing, and value-added products.

Keywords: *coffee, production, consumption, area area, export, sustainability*

INTRODUCTION

Indonesia is one of the largest coffee-producing and exporting countries in the world. The coffee commodity is one of Indonesia's mainstay export prima donna in the plantation sector ("Analisis Daya Saing Ekspor Kopi Indonesia Di Pasar Internasional," 2022; Eliani et al., 2023; Jamil, 2019; Utami & Dewi, 2018). However, the competitiveness of Indonesian coffee exports in the international market faces quite severe challenges due to competition with other coffee-exporting countries such as Brazil, Vietnam, and Colombia (Anggraini et al., 2022; Tantika et al., 2018).

According to BPS (2024) Ministry of Agriculture, Indonesian coffee traded on the world market consists of two types of coffee, namely Arabica coffee and robusta coffee. Global coffee production reached 170 million bags per 60 kg of coffee in 2022/2023. This number increased by 2.8% from the previous period (year-on-year/yoy), which was recorded to have produced 165.37 million bags of coffee in 2021/2022. Indonesia is recorded as the 3rd largest coffee-producing country in the world in 2022/2023, producing 11.85 million bags of coffee (Muhlis & -, 2023; Riris Loisa, 2019). In fact, Indonesia produces 1.3 million bags of Arabica coffee and 10.5 million bags of robusta coffee. As much as 75% of the coffee produced by Indonesia comes from low-lying areas in South Sumatra and Jawa (Jamil, 2019; Nabillah & Ranggadara, 2020; Nugroho, 2014; Rafly et al., 2023; Siahaan et al., 2020; Suprehatin & Al Naufal, 2021). Meanwhile, Brazil, the largest global coffee producer, produced 62.6 million bags of coffee in 2022/2023. This number increased by 4.5 million bags from the previous period (yoy), which had produced 58.1 million bags of coffee. Vietnam is in second place, with 29.75 million coffee bags produced throughout 2022/2023 (Anggraini et al., 2022; Hamzah et al., 2020; Rachmaningtyas et al., 2021; Riris Loisa, 2019; Sinta et al., 2018).

Based on data from BPS (2024), the role and development of Indonesia's non-oil and gas exports by sector for December 2023 compared to November 2023. Exports of agricultural, forestry, and fishery

products fell by 4.86 percent, contributed by a decline in coffee exports. Then, during January-December 2023, exports of agricultural, forestry, and fishery products decreased by 10.04 percent due to a decline in coffee exports. Various factors, both internal and external, influence the competitiveness of Indonesia's coffee exports. Internal factors include aspects of production, quality, and efficiency of the national coffee industry (Nugroho, 2014). Meanwhile, external factors include global market demand conditions, international trade policies, and climate and environmental change (Rafly et al., 2023). Given the importance of the coffee sector to the Indonesian economy, an in-depth analysis of competitiveness and factors affecting the volume of Indonesian coffee exports in the international market is very important.

Research on the competitiveness of agricultural products such as coffee has been carried out a lot, especially those that are directly related to products that have an important impact on the economy of a country, such as research conducted by Rachmaningtyas et al. (2021), Hamzah et al. (2020), Sinta et al. (2018), Anggraini et al. (2022), and Azizi (2023). The purpose of these studies is to measure the level of competitiveness of coffee, which is a superior product in each country, so that later, the coffee commodity is expected to continue to be able to compete in the international market. The measurement of competitiveness is quite diverse depending on the unit of analysis. The analysis tool used in the above research regarding competitiveness is the Revealed Comparative Advantage (RCA) to find the comparative advantage (Suprehatin & Al Naufal, 2021). The results of the RCA analysis obtained positive to negative values from infinity, so later, it will be difficult to compare comparative advantages between countries with the same product.

Unlike previous studies, which primarily relied on the Revealed Comparative Advantage (RCA) method to assess the competitiveness of Indonesian coffee, this study employs a combination of supply and demand analysis and advanced econometric modeling techniques, such as ARIMA and VAR models. These methods allow for a more dynamic and comprehensive examination of economic interactions affecting coffee production, trade, and consumption trends.

Additionally, the research introduces a Model Conformity Test using metrics like MAPE to validate its forecasting models, ensuring robust and accurate predictions. This approach is distinct from earlier studies, which often lacked rigorous predictive validation. Furthermore, the study incorporates household-level data to estimate domestic coffee consumption, providing a nuanced understanding of consumption patterns alongside export trends. By addressing both production sustainability and market dynamics, this research offers a holistic perspective on maintaining the competitiveness and sustainability of Indonesia's coffee sector, which is becoming increasingly challenging. This study uses an analysis different from the existing research, namely supply and demand analysis. A Model Conformity Test is carried out to see if this method can answer research problems. The Conformity Model test is the MAPE model, followed by the economic criteria and classroom assumption tests.

METHOD

This study utilizes secondary panel data to analyze the supply and demand of coffee commodities from 2001 to 2023. Panel data, which combines time series and cross-sectional elements, enhances parameter estimation accuracy and allows for a more comprehensive analysis of economic effects. The study collects data from sources such as Trademap and the World Bank, covering export volume and value, GDP, exchange rates, inflation, and export prices. The analysis applies a multivariate regression model, where coffee production is estimated based on factors like cultivated area, productivity, and producer prices. The supply function is modeled using past production data, while the ARIMA method forecasts coffee production trends. Additionally, the VAR model treats all variables as endogenous, allowing for a dynamic interpretation of economic interactions. The study also examines coffee consumption by considering household-level data from the Susenas Survey, estimating total national consumption using a net export-import approach.

Statistical tests such as MAPE, ANOVA, and coefficient of determination (R^2) are used to evaluate the accuracy and predictive power of the regression models. R^2 measures how well independent variables explain variations in the dependent variable, while adjusted R^2 accounts for the number of explanatory variables, preventing overfitting. The predicted R^2 value is considered crucial in assessing whether the model generalizes well to new data. A model with high R^2 and adjusted R^2 but a low predicted R^2 may suffer from overfitting, where excessive complexity distorts real-world applicability. The study highlights that incorporating predictive validation measures ensures robust econometric modeling, enabling accurate forecasting of coffee production, trade, and consumption trends.

The methodological approach was clarified, particularly regarding secondary data sources, which now include detailed references to Trademap, World Bank, Susenas Survey, and BPS for comprehensive panel data analysis. The econometric modeling techniques, such as ARIMA and VAR models, were further validated through statistical tests like MAPE, ANOVA, and R^2 to ensure robust predictive accuracy. Additionally, the projection results for coffee production, area expansion, and consumption trends in Indonesia from 2022 to 2026 were refined to provide more precise estimates. These revisions emphasize the challenges of maintaining production sustainability amidst declining domestic consumption (-1.19% annually) and stagnant production trends (-0.12% annually). However, positive growth in the coffee area (0.66% annually) and net exports (0.83% annually) reflect opportunities for international market expansion. Overall, the revisions strengthen the study's analytical rigor and its ability to address sustainability challenges in Indonesia's coffee sector effectively.

RESULTS AND DISCUSSION

Estimated Production and Area of Indonesian Coffee Area in 2022-2026

The projection of coffee production in Indonesia in 2022 – 2026 is carried out using the Transfer Function method (ARIMA (0.1.1 Xreg = world coffee price), with MAPE data training of 2.18% and MAPE data testing of 1.78%. The results of the estimation are as follows:

Table 1. Estimated Coffee Production in Indonesia, 2022-2026

Year	Production (tons)	Growth (%)
2022**	793.193	
2023	789.609	-0,45
2024	789.233	-0,05
2025	789.220	-0,002
2026	789.260	0,01
Average	790.103	-0,12

Information: 2022**) : Estimated Figures of the Dirjenbun
2023-2026 : Processed Figures, 2024

From 2022 to 2023, there was a decrease in production of around 0.45%, so that production in 2023 will be 789,609 tons. 2024 shows a very small downward trend, with production reaching 789,233 tons or a decrease of 0.05% from the previous year. By 2025, production will almost stagnate with a slight decline to 789,220 tons, a minimal decrease of 0.002%. The year 2026 shows a slight improvement, with production increasing to 789,260 tons, recording a growth of 0.01%. Coffee production in Indonesia shows relatively stable figures but tends to decline from 2022 to 2025. Although there are small signs of recovery in 2026, long-term growth needs attention to maintain the sustainability of coffee production in Indonesia.

Table 2. Estimated Coffee Area, 2022-2026

Year	Area Area (Ha)	Growth (%)
2022**	1.262.590	
2023	1.288.844	2,08
2024	1.283.541	-0,41
2025	1.294.219	0,83
2026	1.296.254	0,16
Average	1.262.590	0,66

Information: 2022**) : Estimated Figures Ditjenbun
2023-2026 : Processed Figures, 2024

The estimated coffee area in the 2022–2026 period shows a fluctuating trend with a dominance of positive growth. The total coffee area is estimated to increase from 1,262,590 hectares in 2022 to 1,296,254 hectares in 2026, with a growth rate that tends to slow down at the end of the period. The decline occurred in 2024 (-0.41%), while 2023 recorded the highest growth (2.08%). Overall, the area of coffee increased from 1,262,590 hectares (2022) to 1,296,254 hectares (2026), with an average

annual growth of 0.66%. This trend reflects opportunities in the expansion of coffee fields, although future growth may require more efforts to maintain or increase the expansion rate.

Estimated Coffee Consumption in Indonesia in 2022-2026

The calculation of Indonesia's total coffee consumption is approached by the calculation of production minus Net export-import (export volume minus import volume). The prediction model of net export-import (net export) of coffee uses the trend analysis model (Trend Analysis) as follows:

$$Yt = 265021*(1{,}01028^{**}t)$$

Where **Yt** is the net export-import of coffee
Coffee consumption is a calculation of coffee production minus the net export-import of coffee.

$$\text{Consumption (t)} = \text{production (t)} - \text{net exports (t)}$$

Net coffee exports show a reduction in export volume and import volume. In 2022, Indonesia's net exports amounted to 413.54 thousand tons. In 2023, net exports increased by 0.84% to 417.01 thousand tons. In 2024, net coffee exports are expected to continue to increase by 0.83% to 420.48 thousand tons. Until 2026, net coffee exports are expected to continue to rise to 427.42 thousand tons, an increase of 0.82% from the previous year.

Table 3. Estimated Net Coffee Exports, 2022-2026

Year	Net Export (ton)	Growth (%)
2022	413.538	
2023	417.009	0,84
2024	420.481	0,83
2025	423.952	0,83
2026	427.423	0,82
Average	420.481	0,83

Source: Processed data, 2024

The estimated domestic consumption is the remnant of production minus net export-import. Coffee consumption, in this case, is household and non-household consumption. It is estimated that domestic coffee consumption from 2022-2026 is expected to increase by an average of 0.83% per year.

Table 4. Estimated Production, Net Exports, and Coffee Consumption, 2022-2026

Year	Production (tons)	Growth (%)	Net Export (ton)	Growth (%)	Consumption (tons)	Growth (%)
2022	793.193		413.538		379.655	
2023	789.609	(0,45)	417.009	0,84	372.600	(1,86)
2024	789.233	(0,05)	420.481	0,83	368.752	(1.03)
2025	789.220	(0,002)	423.952	0,83	365.268	(0.94)
2026	789.260	0,01	427.423	0,82	361.837	(0.94)
Average						
2022-2026	790.103	(0.12)	420.481	0,83	369.622	(1,19)

Source: Processed data, 2024

Based on the data above, although Indonesia's coffee production is stable at 789,000–793,000 tons, coffee production shows a slight decline overall. This may reflect challenges in increasing production yields. Net Coffee exports experienced positive growth every year, with an average of 0.83%, indicating an increase in international market demand. Meanwhile, domestic consumption tends to decline, with an average annual decline of -1.19%. This may be due to changes in consumer preferences or other economic factors. Overall, although exports continue to increase, the decline in domestic consumption and production stagnation are points that need to be considered to maintain the sustainability of the national coffee sector.

CONCLUSION

This study shows that Indonesia's coffee sector in the 2022–2026 period faces challenges in maintaining domestic production and consumption sustainability despite growth in area and net exports. Coffee production was relatively stagnant, with an average of 790,103 tons per year, showing an average annual decline of 0.12%. The area of coffee increased by an average of 0.66% per year, reflecting opportunities in land expansion despite the slowdown in growth. Domestic consumption experienced an average decline of 1.19% per year, indicating changes in consumer preferences or other economic challenges. In contrast, net exports showed consistent growth of 0.83% per year, underscoring the high demand in the international market. To maintain the sustainability of the national coffee sector, a strategy to increase productivity, innovate coffee products for the domestic market, and strengthen competitiveness in the global market is needed. Supportive policies in the agribusiness sector and investment in agricultural technology are also key to facing future challenges.

It emphasizes that while Indonesia's coffee sector has shown positive growth in cultivation areas and net exports, it faces significant challenges in maintaining production sustainability and reversing the decline in domestic consumption. The study recommends adopting sustainable agricultural practices and technological innovations to boost productivity, diversifying coffee products to cater to domestic preferences, and strengthening global competitiveness through branding and value-added products. Additionally, it underscores the importance of supportive agribusiness policies and investments in infrastructure to ensure long-term sustainability. These recommendations aim to balance domestic and international market demands while securing the future of Indonesia's coffee industry.

REFERENCES

Analisis Daya Saing Ekspor Kopi Indonesia Di Pasar Internasional. (2022). *Ekonomikawan: Jurnal Ilmu Ekonomi Dan Studi Pembangunan*, *22*(2). https://doi.org/10.30596/ekonomikawan.v22i2.10987

Anggraini, D. M., Aminudin, I., & Muhib, A. (2022). Daya Saing Kopi Indonesia Di Pasar Internasional. *Sharia Agribusiness Journal*, *2*(1). https://doi.org/10.15408/saj.v2i1.26469

Azizi, E. S. (2023). Daya Saing Kopi Indonesia di Pasar Internasional dalam 3 Dekade Terakhir. *Journal of Agribusiness Science and Rural Development*, *3*(1). https://doi.org/10.32639/jasrd.v3i1.728

BPS. (2024). Perkembangan Ekspor dan Impor Indonesia. *Berita Resmi Statistik No. 30/04/Th. XXII, 15 April 2019*, *64*.

Eliani, E., Rais, R., & Fadjryani, F. (2023). Grouping Analysis of Maternal and Child Health Degree in Indonesia, Using Structural Equation Modeling Partial Least Square-Prediction Oriented Segmentation (Sem Pls-Pos). *Jurnal Matematika, Statistika Dan Komputasi*, *19*(3). https://doi.org/10.20956/j.v19i3.22060

Hamzah, Y. I., Ibrahim, J. T., Baroh, I., & Mufriantie, F. (2020). Analisis Daya Saing Kopi Indonesia di Pasar Internasional. *Agriecobis : Journal of Agricultural Socioeconomics and Business*, *3*(1). https://doi.org/10.22219/agriecobis.vol3.no1.17-21

Jamil, A. S. (2019). Daya Saing Perdagangan Kopi Indonesia di Pasar Global. *Agriekonomika*, *8*(1). https://doi.org/10.21107/agriekonomika.v8i1.4924

Muhlis, A., & -, S. (2023). ANALISIS DAYA SAING KOPI INDONESIA DI PASAR INTERNASIONAL. *AGRIBIOS*, *21*(1). https://doi.org/10.36841/agribios.v21i1.2807

Nabillah, I., & Ranggadara, I. (2020). Mean Absolute Percentage Error untuk Evaluasi Hasil Prediksi Komoditas Laut. *JOINS (Journal of Information System)*, *5*(2). https://doi.org/10.33633/joins.v5i2.3900

Nugroho, A. (2014). The Impact of Food Safety Standard on Indonesia's Coffee Exports. *Procedia Environmental Sciences*, *20*. https://doi.org/10.1016/j.proenv.2014.03.054

Rachmaningtyas, A., Winarno, S. T., & Hidayat, S. I. (2021). Daya Saing Ekspor Kopi Indonesia Di Pasar Internasional. *Agrilan : Jurnal Agribisnis Kepulauan*, *9*(3). https://doi.org/10.30598/agrilan.v9i3.1284

Rafly, M., Maulana, A., Deskar, D., Rahman, A. F., Ramadhan, I. F., Adha, A., & Attala, V. D. (2023). Analysis of the Effects of Globalization and Climate Change on a Sustainable Indonesian Economy. *Publiciana*, *16*(1).

Riris Loisa, F. P. D. (2019). Analisis Daya Saing Ekspor Kopi Indonesia Di Pasar Internasional. *Jurnal Manajemen Bisnis Dan Kewirausahaan*, *2*(4). https://doi.org/10.24912/jmbk.v2i4.4863

Siahaan, T. R., Santoso, R., & Prahutama, A. (2020). Peramalan Jumlah Kunjungan Wisatawan Mancanegara Di Kepulauan Riau Dengan Menggunakan Model Fungsi Transfer. *Jurnal Gaussian*, *9*(2). https://doi.org/10.14710/j.gauss.v9i2.27817

Sinta, N. M., Alamsyah, Z., & Elwamendri, E. (2018). Analisis Daya Saing Ekspor Kopi Indonesia Dan Vietnam Di Pasar Asean. *Jurnal Ilmiah Sosio-Ekonomika Bisnis*, *20*(1). https://doi.org/10.22437/jiseb.v20i1.5028

Suprehatin, S., & Al Naufal, H. (2021). Daya Saing Produk Kelapa Indonesia Dan Eksportir Kelapa Utama Lainnya Di Pasar Global. *Jurnal Penelitian Pertanian Terapan*, *21*(1). https://doi.org/10.25181/jppt.v21i1.2073

Tantika, H. N., Supriadi, N., & Anggraini, D. (2018). Metode Seasonal ARIMA untuk Meramalkan Produksi Kopi Dengan Indikator Curah Hujan Menggunakan Aplikasi R di Kabupaten Lampung Barat. *Matematika*, *17*(2). https://doi.org/10.29313/jmtm.v17i2.3831

Utami, N. M. A. W., & Dewi, R. K. (2018). Analisis Daya Saing Dan Faktor-Faktor Yang Mempengaruhi Ekspor Kopi Indonesia Di Pasar Internasional. *Jurnal Manajemen Agribisnis (Journal Of Agribusiness Management)*, *6*(1). https://doi.org/10.24843/jma.2018.v06.i01.p02