

## Mapping Coffee Base Countries in the World: Case Studies from Three Continents (Africa-America-Asia)

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### Abstract

The agricultural sector has an important role in the world economy, including the coffee commodity in the plantation subsector. More than 80 countries on the continents of Africa, America and Asia produce coffee and involve more than 100 million people in the process. The growth rate of coffee on these three continents also shows positive values. The aim of this research was to map the countries that are the basis for coffee in the world and look at the prospects for coffee in these countries. The novelty of the research lies in comparing coffee production during the 2017-2022 period in coffee producing countries on three continents, namely Africa, America and Asia. The analysis used to achieve research objectives is Location Quotient (LQ), Dynamic Location Quotient (DLQ) analysis and a combination of both. The research results show that there are 30% of countries on the African continent that have LQ values > 1.31% on the American continent and 16% on the Asian continent. The DLQ value which shows the prospects for coffee commodities in the future can be seen that on the African continent there are 11 countries that have a DLQ value > 1, while on the American continent there are 13 countries and on the Asian continent there are 9 countries. The American continent has more countries in the -mainstay category (39%), compared to other continents, this indicates that the prospects for coffee commodities on the American continent are quite good in the future.

**Keywords:** Coffee, location quotient, dynamic location quotient, mapping

### INTRODUCTION

The agricultural sector is one of the most sensitive economic sectors worldwide; however, the export products from the agricultural sector have several economic benefits. This can help stimulate various industries related to agriculture, including processing, transportation, and agricultural input suppliers (Abrham *et al.*, 2021; Mighty & Granco, 2022). Furthermore, the agricultural sector plays a crucial role as a provider of food, industrial raw materials, a source of income for millions

of farmers, and a significant source of foreign exchange for many developing countries, following the oil and gas sector (Faidah *et al.*, 2016). The development of the agricultural sector should be directed towards the establishment of sustainable agriculture that focuses on three dimensions: economic business sustainability (profit), sustainability of human social life (people), and sustainability of natural ecology (planet) (Furqon *et al.*, 2019; Duguma *et al.*, 2019). The agricultural sector encompasses several sub-sectors, namely food crops, plantations, forestry, livestock, and fisheries.

The agricultural sub-sectors consist of numerous commodities and are crucial for human life, especially in developing countries and countries in the Asian continent. Staple commodities such as rice, corn, wheat, etc., hold a significant position in meeting the daily consumption needs of humans (Bandumula, 2017; Lara & Saldivar, 2019). In addition to the food crops sub-sector, another equally important sub-sector for supporting the global economy is the plantation sub-sector. Several main plantation commodities with significant commercial value in international trade include coffee (Abafita & Tadesse, 2021), cacao (Abu *et al.*, 2021), pepper (Karmawati *et al.*, 2019), rubber (Singh *et al.*, 2021), tea (Li *et al.*, 2019), cloves (Arimalala *et al.*, 2018), coconut (Nuwarapaksha *et al.*, 2022) and sugarcane (Bordonal *et al.*, 2018).

Focusing on the coffee commodity, the international coffee market has become increasingly complex, with more and more countries participating in coffee trade. Some non-producing countries are also increasing coffee production and exports, as well as developing coffee-derived products (Catalan *et al.*, 2022). Coffee is one of the internationally traded agricultural commodities and holds significant value (Fitriani *et al.*, 2021). More than 80 countries in Central and South America, Africa, and Asia are coffee producers. The coffee farming and processing industry worldwide involve more than 100 million people, with 70% of them being small-scale farmers (Cabrera *et al.*, 2020; Wagner *et al.*, 2021).

Based on data from the Food and Agriculture Organization (FAOSTAT), the average coffee production from 2017 to 2022 in Africa was 1.6 million tons, in the Americas was 5.5 million tons, and in Asia was 3.2 million tons. Over the past five years, these continents experienced varying fluctuations in coffee production. The average growth in coffee production in Africa during 2017-2022 was

8.46%, in the Americas was 0.89%, and in Asia was 3.58%. Africa had the highest average coffee production growth compared to the other continents.

Coffee is a crucial component of the commodities market, and therefore, it is essential to understand the dynamics within it (Umar *et al.*, 2021). In order to map countries and continents as coffee or non-coffee bases and to evaluate the prospects of coffee commodities in each country, a thorough analysis is required concerning production, consumption, exports, and other factors influencing the coffee market in each region. Several considerations that can be taken into account involve coffee production data, market share, innovations in farming methods, sustainability, and the local economic dynamics.

The prospects of coffee commodities in a country can be influenced by climatic conditions, government policies, agricultural infrastructure, technological innovations, and international market demand. Countries with the potential for growth in coffee production, sustainability in farming practices, and responsiveness to global market trends may have opportunities to become coffee bases in the future. It is important to note that such analyses require accurate data and a deep understanding of the factors affecting the coffee industry at the national and regional levels. By considering all these aspects, mapping and evaluating which countries and continents can be considered as coffee bases or non-coffee bases, as well as their future prospects, can be conducted.

## MATERIALS AND METHODS

This research employs a quantitative descriptive approach. The descriptive method involves explanations of the variables under investigation through comprehensive definitions

and detailed descriptions based on various references. The descriptive method in this research includes explanations related to the production data of several plantation commodities in the continents of Africa, America, and Asia. The quantitative approach is conducted by collecting production data from 8 plantation commodities, namely, coffee, cocoa, pepper, rubber, tea, cloves, coconut, and sugarcane. Oil palm as also the main plantation commodity was not included in this study because its data was not present for the year 2022. Research data is extracted from the Food and Agriculture Organization (FAO) website for the years 2017-2022. Production data consists of the output of each commodity in a given year measured in tons. Subsequently, the data is analyzed using the Location Quotient (LQ) and Dynamic Location Quotient (DLQ) analyses.

### Location Quotient

The Location Quotient (LQ) analysis is used to identify base and non-base sectors, serving as an initial step in understanding the growth of a sector in a specific region. Essentially, this technique provides a relative comparison between the capabilities of a sector in the investigated area and the capabilities of the same sector in a broader region. (Nasiroh & Muslinawati, 2019). The theory of economic base is based on the notion that a region must enhance the direct flow from outside the area to grow effectively, namely by increasing exports (Negara & Putri, 2020). The calculation of LQ is used to assess the potential of coffee commodities compared to other plantation sectors across three continents. The formula to find the Location Quotient (LQ) analysis is as follows:

$$LQ = \frac{v_i/v_t}{V_i/V_t}$$

Explanation:

$v_i$  : Total production of coffee in a country

$v_t$  : Total production of coffee in a continent

$V_i$  : Total production of 8 plantation commodities in a country

$V_t$  : Total production of 8 plantation commodities in a continent

From the formula, the results can be classified as follows:

- a.  $LQ > 1$  means that coffee is the leading subsector in the country and has the potential to be developed as a driver of the continent's economy (base).
- b.  $LQ < 1$  means that coffee is not a leading subsector in the country and has less potential to be developed as a driver of the continent economy (non-base) (Nazir *et al.*, 2020).

### Dynamic Location Quotient (DLQ)

The Dynamic Location Quotient (DLQ) analysis is used to complement the LQ analysis. The purpose of this analysis is to determine whether a sector's capability in the future can become a base sector or not (Djelantik & Dewi, 2020). The difference between LQ and DLQ analysis lies in the calculation of the growth rate of a subsector. It is assumed that the production value in a specific sector or subsector has an average growth rate per year over a period of time (0) and year (t). DLQ analysis is generally similar to LQ, but the focus is not on the comparison of total production of a specific sub-sector or sector; instead, DLQ places greater emphasis on the growth rate (Kurniawan, 2016). In its calculation, the formula for Dynamic Location Quotient (DLQ) is as follows. (Hakim *et al.*, 2020):

$$DLQ = \left[ \frac{\frac{1 + g_{ij}}{1 + g_j}}{\frac{1 + G_i}{1 + G_p}} \right] \times t$$

Explanation:

$g_{ij}$  : average growth rate of coffee in a country

$g_j$  : average growth rate of plantation commodities in a country

$G_i$  : average growth rate of coffee on a continent

$G_p$  : average growth rate of plantation commodities on a continent

$t$  : number of years analyzed

The concept of DLQ analysis is as follows:

- a.  $DLQ > 1$ , means the proportion of the growth rate of coffee commodities to the growth rate of other plantation commodities in a country is faster than the growth rate of that sector to coffee commodities on a continent, it can still be expected to be a basis in the future.
- b.  $DLQ < 1$ , means the proportion of the growth rate of coffee to the other plantation commodities in a country is lower than the growth rate of that sector's coffee commodities on a continent. In the future, this sector will lose competitiveness to the same sector with other commodities (other plantation commodities) at the continental level, and coffee commodities cannot be expected to be a basis in the future (Kumiawan, 2017).

After determining the values of LQ and DLQ, these two values can be combined, resulting in four different quadrants. These four quadrants consist of the Superior Quadrant ( $LQ > 1$  and  $DLQ > 1$ ), Mainstay Quadrant ( $LQ < 1$  and  $DLQ > 1$ ), Prospective Quadrant ( $LQ > 1$  and  $DLQ < 1$ ) and Left Behind Quadrant ( $LQ < 1$  and  $DLQ < 1$ ). The superior quadrant shows that a co sub-sector in the future. The mainstay quadrant shows that a country is not a coffee sector base but could become a coffee base in the future. The prospective quadrant shows that a country is the basis of the coffee sector, but in the future this sector will lose competitiveness to the same sector with other plantation commodities. The left behind quadrant shows that a country is not the basis of the coffee sector and in the future this sector will lose competitiveness to the same sector with other plantation commodities.

The division into these four quadrants can be seen in the diagram below:

	$LQ > 1$	$LQ < 1$
$DLQ > 1$	Superior	Mainstay
$DLQ < 1$	Prospective	Left behind

Figure 1. LQ and DLQ combination classification (Hidayat & Supriharjo, 2014)

## RESULTS AND DISCUSSIONS

### Location Quotient (LQ)

The Location Quotient (LQ) analysis tool is a comparison of the significance of a sector/industry in a specific area to its significance nationally or in a country relative to the global significance of that sector/industry. This study compares the potential of coffee with several other commodities such as cocoa, pepper, rubber, tea, cloves, coconut, and sugarcane. Based on Figure 2, it can be observed that the coffee production from three continents during the years 2010-2022 experienced a positive and upward trend. Coffee production in the continent of America ranked first in terms of the highest coffee production compared to the other two continents. The highest coffee production in the Americas occurred in 2020, reaching 6 million tons. It then experienced a production decline in 2021 to 5.1 million tons per year and increased again in 2022 to 5.3 million tons, with the production trend to rise ( $R^2 = 0.38$ ).

Similarly, coffee production in the Asian continent consistently increased during the years 2010-2022. The highest coffee production occurred in 2022, amounting to 3.5 million tons, while the lowest production occurred in 2010 at 2.4 million tons. The production trend of coffee in Asia also experienced a positive change, tending to rise ( $R^2 = 0.99$ ).

Compared to the other two continents, Africa has lower coffee production. A significant increase in production occurred in 2019-2020, reaching 1.9 million tons of coffee, and remained stable until 2022. Similar to other continents, the coffee production trend in Africa is positive or tends to rise ( $R^2 = 0.83$ ). Positive production trends can be used as an initial indication that a region has a good ability to increase economic growth in one of its sectors, namely the coffee sub-sector.

LQ analysis is used to assess the significance of a sector (coffee production) in a country relative to the role of the coffee sector on the continental level or the role of the coffee sector in a continent relative to the global level. Coffee sector in each continent (Africa, America, and Asia) has LQ values  $> 1$  (Table 1). The highest LQ value is found in the Asian continent, specifically at 2.17. An LQ value  $> 1$  indicates that the coffee sector is a leading subsector on that continent and can drive the global economy.

Each continent has a different number of countries producing plantation commodities such as coffee, cocoa, pepper, rubber, tea, cloves, coconut, and sugarcane. Africa has

33 producing countries, America has 26 producing countries, and Asia has 25 producing countries. Some countries have an LQ value of 0, which can occur when the country does not produce coffee during the period from 2017 to 2022. Based on Table 2, it is known that there are 10 countries (30%) with LQ values  $> 1$ , indicating that coffee is the leading sub-sector in those countries and has the potential to be developed as a driver of the continent's economy. Meanwhile, there are 23 countries (70%) with LQ values  $< 1$ , meaning that coffee commodities in those countries have not been able to become a leading subsector to boost the economy of the African continent.

Burundi, Ethiopia, Rwanda and Uganda are four countries that have LQ values  $> 1$ , indicating good potential for these countries to develop coffee agriculture as a support for the global economy. Coffee is an important commodity for economic growth in Ethiopia, capable of supporting 15% of the population there. Ethiopia is one of the largest coffee producing and exporting countries in Africa, so it is not surprising that Ethiopia is a coffee base country in Africa (Muhie, 2022). Coffee

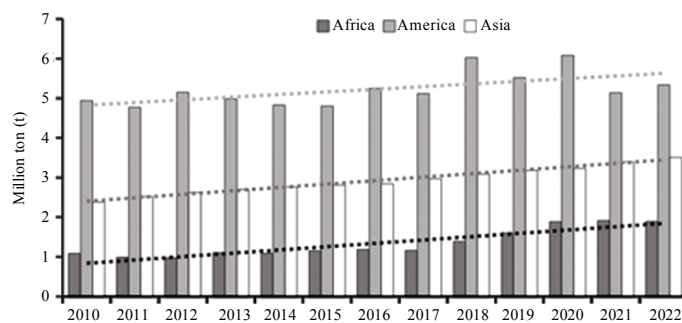


Figure 2. Coffee production from three continents 2010 - 2022 (Source: FAO, 2024)

Table 1. Results of LQ calculations for coffee commodities from various continents

Continent	2017	2018	2019	2020	2021	2022	Average	Criteria
Africa	1.80	1.73	1.54	1.53	1.74	2.17	1.75 ± 0.23	Base
America	1.84	1.53	1.68	1.45	1.73	1.59	1.63 ± 0.14	Base
Asia	1.78	1.93	2.24	2.27	2.47	2.35	2.17 ± 0.26	Base

Source : Secondary data processing, 2024.

Notes : Base = coffee is the leading subsector in the continent; Non-base = coffee is not a leading subsector in the continent.

Table 2. Results of LQ analysis of coffee from African countries

Country	2017	2018	2019	2020	2021	2022	Average	Criteria
Angola	2.14	1.76	1.48	1.23	0.82	1.22	1.44	Base
Benin	0.06	0.05	0.05	0.05	0.05	0.05	0.05	Non Base
Burundi	5.49	5.01	4.49	5.64	5.55	5.60	5.30	Base
Cabo Verde	0.13	0.14	0.12	0.13	0.11	0.13	0.13	Non Base
Cameroon	1.76	1.89	1.85	1.54	1.39	1.39	1.64	Base
Chad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Congo	0.43	0.40	0.39	0.36	0.34	0.35	0.38	Non Base
Côte d'Ivoire	0.66	2.13	1.53	1.26	0.88	1.00	1.24	Base
Democratic Republic of the Congo	1.77	1.93	1.84	1.55	1.59	2.01	1.78	Base
Djibouti	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Egypt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Eswatini	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Ethiopia	26.21	23.78	20.70	24.41	32.02	45.71	28.81	Base
Gabon	0.03	0.03	0.03	0.03	0.03	0.03	0.03	Non Base
Ghana	0.04	0.04	0.04	0.04	0.03	0.03	0.04	Non Base
Kenya	0.53	0.47	0.56	0.30	0.25	0.39	0.42	Non Base
Liberia	0.16	0.15	0.14	0.13	0.13	0.13	0.14	Non Base
Madagascar	1.71	1.45	1.71	1.05	1.12	1.25	1.38	Base
Malawi	0.27	0.31	0.30	0.25	0.24	0.28	0.27	Non Base
Mali	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Mauritius	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Morocco	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Mozambique	0.02	0.02	0.02	0.02	0.02	0.02	0.02	Non Base
Nigeria	0.08	0.08	0.08	0.07	0.07	0.07	0.07	Non Base
Rwanda	11.64	12.20	9.55	6.36	5.83	5.64	8.54	Base
Senegal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Somalia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
South Africa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Sudan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Uganda	4.79	4.01	4.40	4.76	5.32	4.93	4.70	Base
United Republic of Tanzania	1.14	1.02	1.35	1.15	1.40	1.33	1.23	Base
Zambia	0.19	0.16	0.16	0.15	0.14	0.15	0.16	Non Base
Zimbabwe	0.02	0.01	0.02	0.01	0.01	0.02	0.02	Non Base
LQ > 1							10	
LQ < 1							23	
Percentage LQ > 1							30.30	
Percentage LQ < 1							69.69	

Source : Secondary data processing, 2024.

Notes : Base = coffee is the leading subsector in the country; Non-base = coffee is not a leading subsector in the country.

commodities in Uganda have a significant influence on household consumption expenditures (Nugroho & Lakner, 2022). This is in line with research findings stating that Uganda is classified as a coffee base country in Africa.

The continent of America has 8 countries with LQ values > 1 (Table 3), equivalent to 31%, while the remaining 69% have LQ values < 1. The country with the highest LQ value is Honduras, at 13.46. This means that coffee commodities in Honduras can be a base subsector and can be developed to drive the economy in the Americas. Other countries with LQ values > 1 include Colombia (4.32),

Costa Rica (3.74), Guatemala (1.53), Jamaica (1.73), Nicaragua (3.86), Peru (6.16), and Venezuela (3.12). There are four countries with LQ values = 0, which is because these countries (Argentina, Bahamas, Barbados, and Uruguay) did not produce coffee during the period from 2017 to 2022. Brazil is the largest producer and exporter of coffee in the world (Santos *et al.*, 2021). However, Brazil has an LQ value < 1, which may be attributed to the production and contribution of other plantation commodities that have a larger impact compared to coffee, such as sugarcane.

Table 3. Results of LQ analysis of coffee from American countries

Country	2017	2018	2019	2020	2021	2022	Average	Criteria
Argentina	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Bahamas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Barbados	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Belize	0.01	0.01	0.01	0.01	0.01	0.01	0.01	Non Base
Bolivia	0.48	0.39	0.48	0.39	0.44	0.44	0.44	Non Base
Brazil	0.70	0.79	0.74	0.82	0.79	0.80	0.77	Non Base
Colombia	6.94	3.97	4.72	3.77	3.07	3.42	4.32	Base
Costa Rica	4.23	3.77	3.47	3.42	3.88	3.66	3.74	Base
Cuba	0.07	0.10	0.09	0.09	0.17	0.11	0.10	Non Base
Dominican Republic	0.51	0.49	0.48	0.45	0.51	0.61	0.51	Non Base
Ecuador	0.16	0.11	0.16	0.08	0.08	0.18	0.13	Non Base
El Salvador	1.13	1.03	0.81	0.78	1.02	0.72	0.92	Non Base
Guatemala	1.70	1.45	1.34	1.49	1.67	1.58	1.53	Base
Guyana	0.04	0.07	0.11	0.08	0.09	0.10	0.08	Non Base
Haiti	0.51	0.46	0.55	0.51	0.61	0.62	0.55	Non Base
Honduras	16.24	13.41	14.94	11.41	14.72	10.04	13.46	Base
Jamaica	1.00	1.05	1.46	1.70	2.50	2.65	1.73	Base
Mexico	0.53	0.46	0.51	0.54	0.59	0.59	0.54	Non Base
Nicaragua	3.53	3.20	4.06	3.65	4.55	4.17	3.86	Base
Panama	0.53	0.35	0.64	0.42	0.52	0.59	0.51	Non Base
Paraguay	0.01	0.01	0.01	0.01	0.01	0.01	0.01	Non Base
Peru	6.81	5.73	5.92	5.43	6.66	6.42	6.16	Base
Suriname	0.01	0.01	0.01	0.01	0.01	0.01	0.01	Non Base
United States of America	0.01	0.01	0.01	0.01	0.01	0.01	0.01	Non Base
Uruguay	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Venezuela	2.66	2.80	3.15	2.55	3.04	4.52	3.12	Base
LQ > 1							8	
LQ < 1							18	
Percentage LQ > 1							30.77	
Percentage LQ < 1							69.23	

Source : Secondary data processing, 2024.

Notes : Base = coffee is the leading subsector in the country; Non-base = coffee is not a leading subsector in the country.

The continent of Asia has the fewest number of countries with LQ > 1 compared to the continents of Africa and America, with only 4 countries (16%), while the remaining 84% have LQ values < 1 (Table 4). Laos and Vietnam are two countries with the highest LQ values, namely 23.64 and 23.77, respectively. Coffee is a major export commodity and plays a significant role in the economy of Vietnam (Phung & Nguyen, 2022; Atmadji *et al.*, 2018), this is in line with the LQ values > 1, which means that coffee is the leading subsector in Vietnam and has the potential to be developed as a driver of the continent's economy. Based on Wongpit *et al.* (2023), coffee in Laos is the third largest export commodity after sweet potatoes and bananas, with the export country being China. The ability of Laos to export coffee indicates that

Laos is self-sufficient in coffee and has become one of the coffee base countries.

### Dynamic Location Quotient

The Dynamic Location Quotient (DLQ) analysis is an advanced analysis of LQ that takes into account the growth factor of a subsector over time. The results of DLQ values can indicate the potential of a subsector to become the economic base in the future (Fatihin *et al.*, 2023). This method is highly time-sensitive, meaning that, when viewed through DLQ analysis over time, a sector that initially was considered as a base or non-base sector may undergo repositioning due to an increase in values, or it may remain in place if there is no increase in sector/subsector values (Apriliana, 2022).

Table 4. Results of LQ analysis of coffee from Asian countries

Country	2017	2018	2019	2020	2021	2022	Average	Criteria
Afghanistan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Azerbaijan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Bangladesh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Bhutan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Cambodia	0.10	0.10	0.11	0.09	0.08	0.08	0.09	Non Base
China	0.26	0.28	0.28	0.24	0.23	0.24	0.25	Non Base
Taiwan	0.44	0.43	0.45	0.42	0.36	0.40	0.42	Non Base
India	0.25	0.23	0.21	0.20	0.20	0.20	0.22	Non Base
Indonesia	3.73	4.19	4.16	3.82	3.73	3.83	3.91	Base
Iran	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Japan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Laos	19.96	21.12	26.54	24.03	27.31	22.90	23.64	Base
Malaysia	1.61	0.84	0.82	0.95	0.97	0.96	1.02	Base
Maldives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Myanmar	0.19	0.19	0.19	0.17	0.18	0.18	0.18	Non Base
Nepal	0.04	0.04	0.04	0.02	0.02	0.03	0.03	Non Base
Oman	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Pakistan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Philippines	0.38	0.44	0.48	0.40	0.38	0.40	0.41	Non Base
Republic of Korea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Singapore	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Sri Lanka	0.33	0.43	0.30	0.37	0.26	0.28	0.33	Non Base
Thailand	0.07	0.05	0.06	0.07	0.08	0.05	0.06	Non Base
Türkiye	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Non Base
Vietnam	17.12	19.93	22.47	25.86	27.96	29.26	23.77	Base
LQ > 1							4	
LQ < 1							21	
Percentage LQ > 1							16.00	
Percentage LQ < 1							84.00	

Source : Secondary data processing, 2024.

Notes : Base = coffee is the leading subsector in the country; Non-base = coffee is not a leading subsector in the country.

There are 11 countries in the African continent with DLQ values > 1, namely Burundi, Cabo Verde, Côte d'Ivoire, Democratic Congo, Ethiopia, Malawi, Mauritius, Senegal, Sudan, Uganda, and Tanzania (Table 5). There are 5 countries that experienced a change in values, from LQ < 1 to DLQ > 1, meaning that these 5 countries have the potential to become coffee bases in the coming years. These countries include Cabo Verde, Malawi, Mauritius, Senegal, and Sudan. In the American continent, there are 13 countries that have DLQ values > 1 and 13 countries with DLQ values < 1. Meanwhile, in the Asian continent, there are 9 countries with DLQ values > 1 and 16 countries with DLQ values < 1.

The combination of LQ and DLQ values is crucial to determine the classification of a subsector, whether it falls into the Superior, Mainstay, Prospective, or Left Behind subsector. The African continent has 6 countries classified as Superior, meaning that these countries have LQ values > 1 and DLQ values > 1. Thus, these countries are considered coffee base countries, and coffee commodities will become the economic basis in these nations in the coming years and are capable of contributing to economic growth in the African continent. Table 6 shows that there are 4 countries classified as Prospective for coffee commodities, meaning LQ > 1 and DLQ < 1, these countries include Angola, Cameroon, Madagascar, and Rwanda.



Table 5. Results of DLQ analysis from three continents

African		American		Asian	
Country	DLQ	Country	DLQ	Country	DLQ
Angola	0.75	Argentina	1.01	Afghanistan	0.59
Benin	0.92	Bahamas	0.90	Azerbaijan	0.80
Burundi	1.08	Barbados	1.05	Bangladesh	1.13
Cabo Verde	1.12	Belize	0.84	Bhutan	0.29
Cameroon	0.87	Bolivia	0.91	Cambodia	0.81
Chad	0.83	Brazil	1.17	China	0.95
Congo	0.88	Colombia	0.57	Taiwan	0.91
Côte d'Ivoire	3.45	Costa Rica	0.88	India	0.81
Democratic Republic of the Congo	1.15	Cuba	1.32	Indonesia	1.03
Djibouti	0.95	Dominican Republic	1.18	Iran	0.95
Egypt	0.92	Ecuador	1.34	Japan	1.03
Eswatini	0.92	El Salvador	0.74	Laos	1.09
Ethiopia	1.50	Guatemala	0.92	Malaysia	0.84
Gabon	0.94	Guyana	1.80	Maldives	2.72
Ghana	0.83	Haiti	1.14	Myanmar	0.96
Kenya	0.83	Honduras	0.68	Nepal	0.93
Liberia	0.95	Jamaica	2.11	Oman	0.99
Madagascar	0.89	Mexico	1.06	Pakistan	0.93
Malawi	1.10	Nicaragua	1.11	Philippines	1.04
Mali	0.78	Panama	1.19	Republic of Korea	0.99
Mauritius	1.37	Paraguay	0.73	Singapore	1.01
Morocco	0.82	Peru	0.93	Sri Lanka	0.97
Mozambique	0.95	Suriname	0.99	Thailand	0.66
Nigeria	0.92	United States of America	0.96	Türkiye	1.01
Rwanda	0.63	Uruguay	0.66	Vietnam	1.53
Senegal	1.03	Venezuela	1.42		
Somalia	0.93				
South Africa	0.92				
Sudan	1.27				
Uganda	1.08				
United Republic of Tanzania	1.27				
Zambia	0.86				
Zimbabwe	0.85				

Source : Secondary data processing, 2024.

Note : DLQ = Dynamic location quotient.

Table 7 shows the number of countries classified as Mainstay in the Americas, totaling 10 countries. This indicates that many countries in the Americas will become coffee bases in the coming years. This situation should be employed by local governments to develop the coffee commodity in their respective countries. To enhance productivity, several measures need to be taken, including R & D for seeds and inputs, property rights, fertilizer, irrigation, credit, agricultural extension, connection to markets, credit, and rural infrastructure (Dethier & Effenberger, 2012). Meanwhile there are three countries that fall into the Superior category for coffee commodities are Jamaica, Nicaragua, and Venezuela.

The Asian continent is predominantly classified as Left Behind for coffee cultivation. There are 15 countries included in the Left Behind category (Table 8), indicating that the prospects and contributions of coffee commodities are less significant to the economy in Asia. Local governments should no longer focus on cultivating coffee in their countries and should shift to other plantation commodities. However, there are 6 countries classified as Mainstay, meaning that coffee commodities will become the basis in these countries in the future. This potential should be utilized to continue developing coffee production in Bangladesh, Japan, Maldives, Philippines, Singapore, and Turkey. According to research

Table 6. Classification of coffee sector in African countries

Country	LQ	DLQ	Class
Angola	LQ > 1	DLQ < 1	Prospective
Benin	LQ < 1	DLQ < 1	Left Behind
Burundi	LQ > 1	DLQ > 1	Superior
Cabo Verde	LQ < 1	DLQ > 1	Mainstay
Cameroon	LQ > 1	DLQ < 1	Prospective
Chad	LQ < 1	DLQ < 1	Left Behind
Congo	LQ < 1	DLQ < 1	Left Behind
Côte d'Ivoire	LQ > 1	DLQ > 1	Superior
Democratic Republic of the Congo	LQ > 1	DLQ > 1	Superior
Djibouti	LQ < 1	DLQ < 1	Left Behind
Egypt	LQ < 1	DLQ < 1	Left Behind
Eswatini	LQ < 1	DLQ < 1	Left Behind
Ethiopia	LQ > 1	DLQ > 1	Superior
Gabon	LQ < 1	DLQ < 1	Left Behind
Ghana	LQ < 1	DLQ < 1	Left Behind
Kenya	LQ < 1	DLQ < 1	Left Behind
Liberia	LQ < 1	DLQ < 1	Left Behind
Madagascar	LQ > 1	DLQ < 1	Prospective
Malawi	LQ < 1	DLQ > 1	Mainstay
Mali	LQ < 1	DLQ < 1	Left Behind
Mauritius	LQ < 1	DLQ > 1	Mainstay
Morocco	LQ < 1	DLQ < 1	Left Behind
Mozambique	LQ < 1	DLQ < 1	Left Behind
Nigeria	LQ < 1	DLQ < 1	Left Behind
Rwanda	LQ > 1	DLQ < 1	Prospective
Senegal	LQ < 1	DLQ > 1	Mainstay
Somalia	LQ < 1	DLQ < 1	Left Behind
South Africa	LQ < 1	DLQ < 1	Left Behind
Sudan	LQ < 1	DLQ > 1	Mainstay
Uganda	LQ > 1	DLQ > 1	Superior
United Republic of Tanzania	LQ > 1	DLQ > 1	Superior
Zambia	LQ < 1	DLQ < 1	Left Behind
Zimbabwe	LQ < 1	DLQ < 1	Left B-ehind

Notes: LQ: Location Quotient; DLQ: Dynamic Location Quotient; Superior: Coffee is leading subsector and still competitive in the future; Mainstay: Coffee is not leading subsector but could become a coffee leading subsector in the future; Prospective: Coffee is leading subsector but will lose competitiveness in the future, Left behind: Coffee is not leading subsector and lose competitiveness in the future.

conducted by Luat *et al.* (2021), it is mentioned that in 2014, coffee production in the Philippines reached the figure of USD 3.2 million and contributed 0.009% to global trade supplies. This condition indicates that the Philippines indeed have a promising prospect in the coffee commodity in the future, supported by DLQ results > 1.

Based on the data presented in Table 9, it can be observed that 55% of African countries fall into the Left Behind category, 18% belong to the Superior and 15% of Mainstay categories, and the rest are classified as Prospective (Angola, Cameroon, Madagascar, and Rwanda). Coffee commodities in Rwanda

have indeed become increasingly prospective since the Rwandan government designated the country as a coffee specialist nation in 2002 (Ngarukiye, 2023). The seriousness of the Rwandan government is evident from the LQ value of Rwanda being more than 1, indicating that Rwanda is a coffee base country in the African continent.

The continent of America is dominated by countries in the Mainstay category, accounting for 38%, followed by countries in the Left Behind category at 31%. There are only a few countries classified as Superior in coffee commodities, namely just three countries (12%). Similarly, like Africa, the

Table 7. Classification of coffee sector in American countries

Country	LQ	DLQ	Class
Argentina	LQ < 1	DLQ > 1	Mainstay
Bahamas	LQ < 1	DLQ < 1	Left Behind
Barbados	LQ < 1	DLQ > 1	Mainstay
Belize	LQ < 1	DLQ < 1	Left Behind
Bolivia	LQ < 1	DLQ < 1	Left Behind
Brazil	LQ < 1	DLQ > 1	Mainstay
Colombia	LQ > 1	DLQ < 1	Prospective
Costa Rica	LQ > 1	DLQ < 1	Prospective
Cuba	LQ < 1	DLQ > 1	Mainstay
Dominican Republic	LQ < 1	DLQ > 1	Mainstay
Ecuador	LQ < 1	DLQ > 1	Mainstay
El Salvador	LQ < 1	DLQ < 1	Left Behind
Guatemala	LQ > 1	DLQ < 1	Prospective
Guyana	LQ < 1	DLQ > 1	Mainstay
Haiti	LQ < 1	DLQ > 1	Mainstay
Honduras	LQ > 1	DLQ < 1	Prospective
Jamaica	LQ > 1	DLQ > 1	Superior
Mexico	LQ < 1	DLQ > 1	Mainstay
Nicaragua	LQ > 1	DLQ > 1	Superior
Panama	LQ < 1	DLQ > 1	Mainstay
Paraguay	LQ < 1	DLQ < 1	Left Behind
Peru	LQ > 1	DLQ < 1	Prospective
Suriname	LQ < 1	DLQ < 1	Left Behind
United States of America	LQ < 1	DLQ < 1	Left Behind
Uruguay	LQ < 1	DLQ < 1	Left Behind
Venezuela	LQ > 1	DLQ > 1	Superior

Note: LQ = Location Quotient; DLQ = Dynamic Location Quotient; Superior = Coffee is leading subsector and still competitive in the future; Mainstay = Coffee is not leading subsector but could become a coffee leading subsector in the future; Prospective = Coffee is leading subsector but will lose competitiveness in the future, Left behind = Coffee is not leading subsector and lose competitiveness in the future.

Table 8. Classification of coffee sector in Asian countries

Country	LQ	DLQ	Class
Afghanistan	LQ < 1	DLQ < 1	Left Behind
Azerbaijan	LQ < 1	DLQ < 1	Left Behind
Bangladesh	LQ < 1	DLQ > 1	Mainstay
Bhutan	LQ < 1	DLQ < 1	Left Behind
Cambodia	LQ < 1	DLQ < 1	Left Behind
China	LQ < 1	DLQ < 1	Left Behind
Taiwan	LQ < 1	DLQ < 1	Left Behind
India	LQ < 1	DLQ < 1	Left Behind
Indonesia	LQ > 1	DLQ > 1	Superior
Iran	LQ < 1	DLQ < 1	Left Behind
Japan	LQ < 1	DLQ > 1	Mainstay
Laos	LQ > 1	DLQ > 1	Superior
Malaysia	LQ > 1	DLQ < 1	Prospective
Maldives	LQ < 1	DLQ > 1	Mainstay
Myanmar	LQ < 1	DLQ < 1	Left Behind
Nepal	LQ < 1	DLQ < 1	Left Behind
Oman	LQ < 1	DLQ < 1	Left Behind
Pakistan	LQ < 1	DLQ < 1	Left Behind
Philippines	LQ < 1	DLQ > 1	Mainstay
Republic of Korea	LQ < 1	DLQ < 1	Left Behind
Singapore	LQ < 1	DLQ > 1	Mainstay
Sri Lanka	LQ < 1	DLQ < 1	Left Behind
Thailand	LQ < 1	DLQ < 1	Left Behind
Türkiye	LQ < 1	DLQ > 1	Mainstay
Vietnam	LQ > 1	DLQ > 1	Superior

Note: LQ = Location Quotient; DLQ = Dynamic Location Quotient; Superior = Coffee is leading subsector and still competitive in the future; Mainstay = Coffee is not leading subsector but could become a coffee leading subsector in the future; Prospective = Coffee is leading subsector but will lose competitiveness in the future, Left behind = Coffee is not leading subsector and lose competitiveness in the future.

Table 9. Frequency distribution of coffee sector classification in every continent

Classification	Africa		America		Asia	
	Country number	Percentage	Country number	Percentage	Country number	Percentage
Superior	6	18.18	3	11.54	3	12.00
Prospective	4	12.12	5	19.23	1	4.00
Mainstay	5	15.15	10	38.46	6	24.00
Left Behind	18	54.54	8	30.77	15	60.00
Total	33	100	26	100	25	100

continent of Asia is also dominated by countries in the Left Behind condition for coffee commodities, accounting for 15 countries (60%). There are three countries (12%) classified as Superior (Indonesia, Laos, and Vietnam), and only one country (4%) falls into the Prospective category. Coffee production in Indonesia contributes 16.15% to GDP and serves as a major export commodity, ranking third after oil palm and rubber (Wulandari *et al.*, 2022; Duque & Blair, 2022). This condition indicates that coffee commodities play a crucial role in the economy of Indonesia as a coffee base country in Asia.

Continents with many countries classified as Mainstay and Superior should start producing coffee commodities or enhance existing coffee production through agricultural intensification and better farming mechanization to increase production. For countries in the Prospective category, caution should be exercised in developing coffee production, as coffee commodities may potentially not become the economic base in the future. Meanwhile, countries classified as Left Behind should abandon coffee farming as a source of economic development and begin transitioning to other plantation commodities.

## CONCLUSIONS

The primary coffee base in the world is in the continent of America, as 31% of countries in the Americas have LQ values

> 1. This indicates that the coffee commodity plays a crucial role in the economic growth of the Americas. The potential for developing coffee commodities, as seen from DLQ values > 1, is also present in the Americas. This can be considered by countries in the Americas to continue developing coffee as a contributor to economic growth in their respective countries and in the Americas as a whole, especially for countries in the Mainstay category. Only a few countries fall into the prospective category, and these countries should continue to increase their coffee production as coffee commodities in these countries may potentially become non-base in the future. Countries classified as Left Behind should consider transitioning to other plantation commodities to boost the economy in their respective countries.

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