

**Open Access****Can Banana be a Success Story for Malaysia?**Boon Chin Tan<sup>a\*</sup><sup>a</sup>Centre for Research in Biotechnology for Agriculture, Universiti Malaya, Malaysia\*Correspondence: [boonchin@um.edu.my](mailto:boonchin@um.edu.my)**ABSTRACT:**

Bananas are an important commercial fruit and a major export commodity in the tropics. The growing global demand for bananas has caused its harvested area to expand. However, the production of bananas in Malaysia has decreased, probably due to adverse environmental conditions and pests and diseases. Nevertheless, the Malaysian government recognised the importance and potential of fruit crops, including bananas, and has developed national agrofood policies and strategies to support and accelerate food production growth. This study aimed to understand the current scenario of banana production in Malaysia and determine if local bananas have a comparative advantage over their rivals. Based on the Revealed Comparative Advantage (RCA) analysis, Malaysia has a competitive edge in bananas over regional countries, although some challenges remain to overcome. Hence, to sustain its competitive position in the banana market, an intensive effort and interdisciplinary collaboration between policymakers, industrial players, growers, and scientists is desirable to address those issues and challenges described in this study.

**KEYWORDS:** Agriculture, Agrofood, Banana, Fruits, Market**MANUSCRIPT TYPE:**

Research Notes

**PUBLICATION DETAILS:**

Received: 8 June 2022

Revised: 1 July 2022

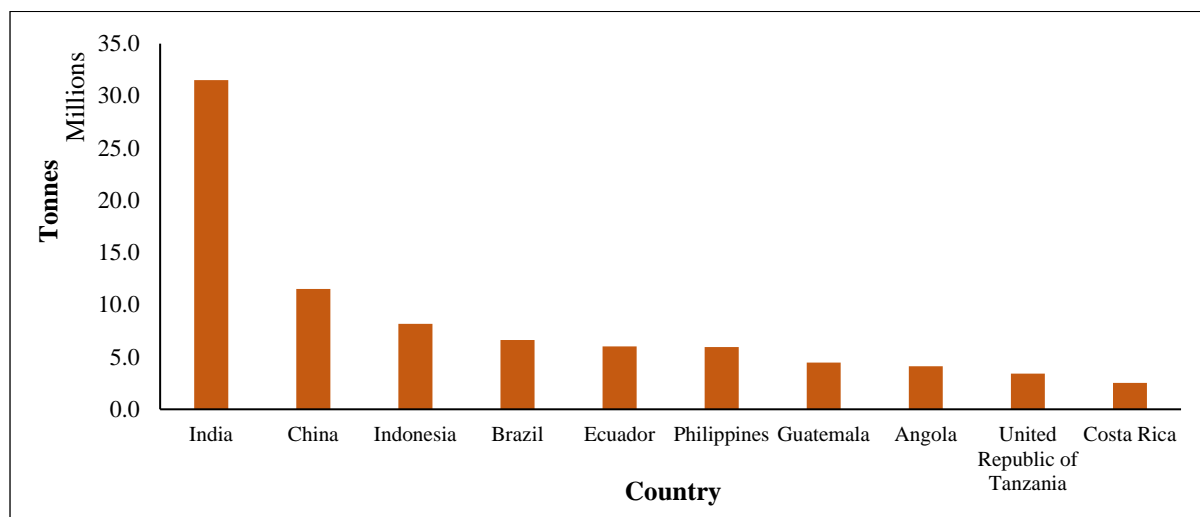
Accepted: 4 July 2022

**INTRODUCTION**

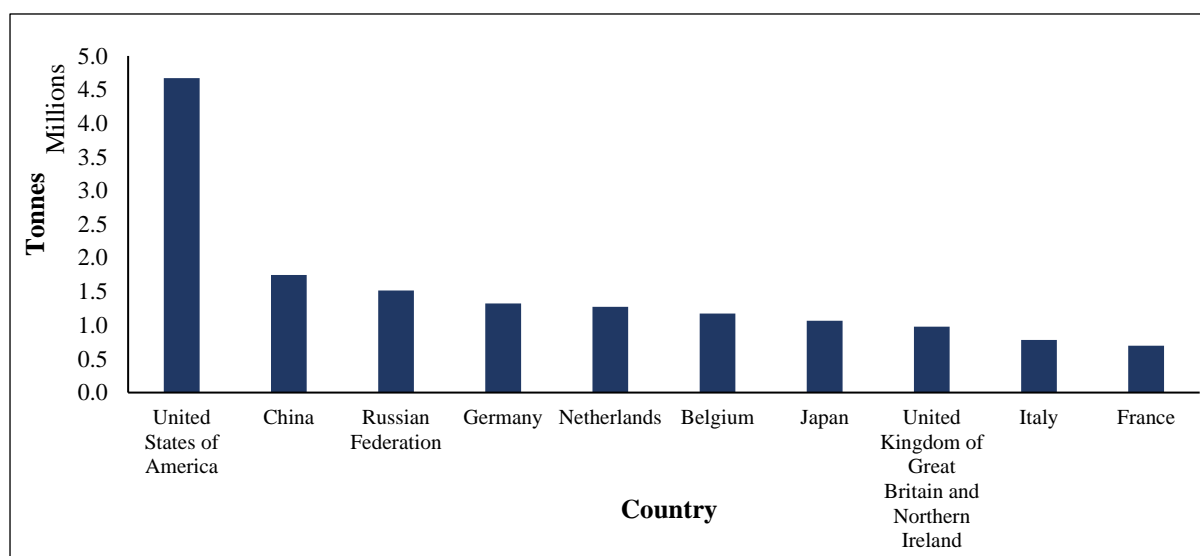
Banana (Musaceae family) is an important fruit crop as its nutritional status is higher than other common tropical fruits (Chin et al., 2014; Khalid & Tan, 2016). Banana fruits, either ripen or unripened, are eatable. Other plant parts, including leaves, stems, and flowers, have been reported to have medicinal value. Besides, the banana wastes from fruits or plants (e.g., peels) could be produced into value-added by-products (e.g., fibre-rich powder and animal feed), thus contributing to small-medium enterprise businesses.

Banana is ranked fourth after rice, wheat, and maize as the most important food crop in developing countries (Zhang et al., 2022; FAO, 2022). The world production of bananas has exceeded 100 million tonnes since 2009, with a total production of about 119.8 million tonnes recorded in 2020 (FAOSTAT, 2022). However, these data may not precisely represent the global banana production as local smallholder farmers conduct most banana cultivations, and such data might be challenging to obtain. Currently, India is the largest banana producing country, contributing nearly 26% of total global production, followed by China, Indonesia, and

Brazil (Figure 1). The United States of America, China, and the Russian Federation are the major importer of bananas (Figure 2).



**Figure 1: The Top 10 Banana Producing Countries in 2020. Source: FAOSTAT 2022**



**Figure 2: The Top 10 Banana Importing Countries in 2020. Source: FAOSTAT 2022**

The harvested area of banana crops has recently expanded to satisfy the growing global import demand (Figure 3). For instance, the total harvested area in India has increased from 776,000 hectares in 2012 to 878,000 hectares in 2020 (FAOSTAT, 2022). In Indonesia, the total harvested area has increased from 103,158 hectares in 2012 to 158,147 hectares in 2020 (FAOSTAT, 2022).

At present, more than 1,000 varieties of bananas are being produced and consumed globally (Vaca et al., 2020). The Cavendish banana is the most popular commercial banana cultivar, accounting for about 47% of total production (Vaca et al., 2020). Cavendish banana fruits have a clean yellow peel, soft flesh-sweet taste, and are rich in nutrients. A hundred grams of banana Cavendish contains about 18.7 mg vitamin C, 3-12.4 mg (retinol activity equivalent) vitamin A, and 450–467 mg potassium (Wall, 2006; Pareek, 2016). In addition, they have also been reported to be more resilient to the effects of transportation.

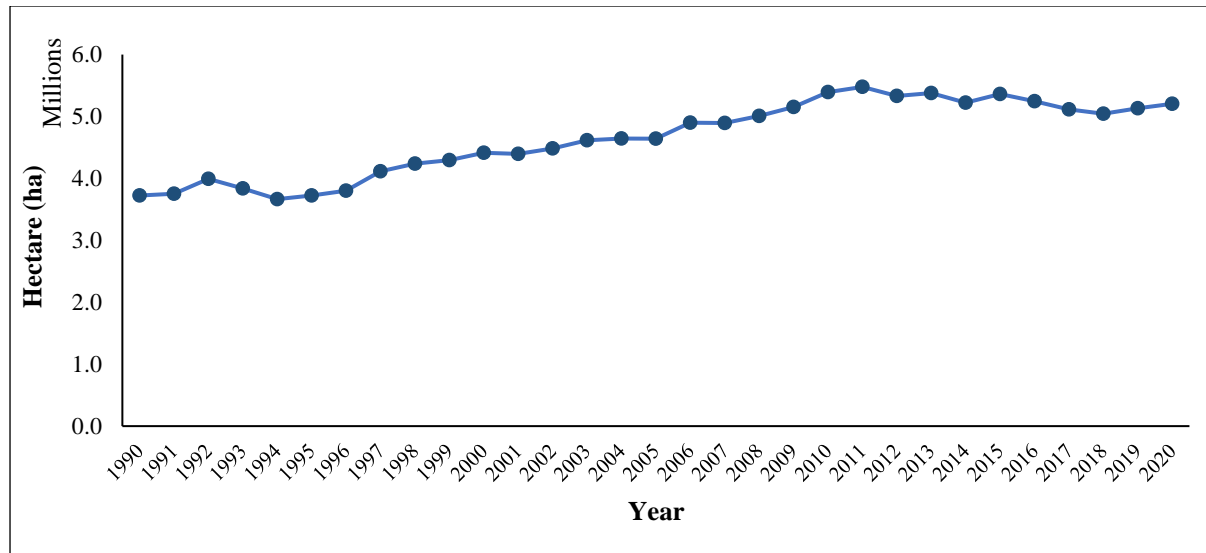


Figure 3: The World Harvested Area from 1990 to 2020. Source: FAOSTAT 2022

### Global Banana Trade

The prices of bananas in international markets remain fairly stable since banana production is not seasonal. However, occasional disruptions in supply might happen due to various factors. These include the supply and demand of bananas, climate change, diseases, the continuing COVID-19 pandemic, and war or violent conflicts. Consequently, the global export quantities in 2020 decreased by 305,867 tonnes from about 24 million tonnes in 2019. This figure is estimated to fall by 1.5 million tonnes in 2021, probably the most significant annual drop in global banana shipments (FAO, 2022). In addition, with the ongoing pandemic, several sanitary measures protecting workers from the COVID-19 virus will be necessary, continued causing additional costs to growers and those involved in the supply chain. Other concerns include the climate-related production challenges, such as severe floods, drought, and extreme temperatures, and the recent introduction of new maximum residue levels on pesticides used in the fresh banana industry in importing markets. If the products do not meet these new requirements, they cannot be imported. However, on the other hand, if the maximum residue levels for the commonly used pesticides are reduced before alternatives can be developed, the banana industry will be affected.

### Malaysian Agriculture

Before looking at how the Malaysian banana industry performed, it would be useful to understand the current agricultural scenario in Malaysia. Malaysia's economic development was heavily dependent on the agricultural sector since the 1950s, but since then, its role has declined, as reflected by the exports of the agricultural industry. The exports of agricultural products in 2018 decreased by 9.5% compared to RM126,492 million in 2017 (Department of Statistics Malaysia, 2019). Although the total agricultural exports showed an increase in 2019 (RM115.5 billion) and 2020 (RM118.6 billion), total imports of the agricultural sector also increased (Department of Statistics Malaysia, 2020).

Agriculture is an important sector of the Malaysian economy, contributing to an overall Gross Domestic Product (GDP) of 7.4% in 2020 (Department of Statistics, Malaysia, 2021a). However, despite its importance, the percentage of growth for the agricultural sector has declined by 2% compared to the previous year. The decline was mainly due to the negative growth in the oil palm and other subsectors. In addition, several factors affect the agricultural sector and food production systems, such as climate change, land degradation, water

availability, the COVID-19 pandemic and, more recently, war or violent conflicts. These factors could significantly threaten Malaysia's agricultural sectors, directly or indirectly impacting Malaysia's plantations and associated communities by decreasing productivity, crop damage, and yield losses. This ultimately results in seasonal unemployment and loss of income by smallholders and plantation companies. Hence, given the significant impacts of these factors on agrofood production and prices, it is imperative to revisit the challenges and potential of this sector.

### *Malaysia's Agrofood and Policy Landscape*

As the world economy becomes more dynamic and competitive while experiencing the impacts of the COVID-19 pandemic and war or violent conflicts, ensuring food and nutrition security has become vital for the nation's long-term development. Recognising the importance and potential of the agrofood sector in achieving the goal of food security, the Malaysian government has developed national agrofood policies, aiming to enhance the national food security level from a multifaceted point of view: economic contribution, social wellbeing, and environment. The focus of each policy has evolved from its first inception in 1948 (Table 1).

**Table 1: The National Agrofood Policies**

<b>Policy</b>	<b>Focus</b>
Pre-independence Policy (1948-1957) and The Malaya / Malaysia Economic Plan (1957-1983)	The pre-independence policy focused on the primary commodity, such as rubber and spices, and incorporated into national plans, such as the First Malaya Plan (1956-1960), the Second Malaya Plan (1961-1965), and the First Malaysia Plan (1966-1970).
First National Agricultural Policy (1984-1991)	This is a long-term policy focused on rural poverty, aiming to close the income gap between commercial and traditional farmers.
Second National Agricultural Policy (1992-1997)	Continuing from the previous policy, this edition emphasised increasing the contribution of the agricultural sector to the national economic growth. The focus areas include productivity, competitiveness, research and development, human capital development, and private sector participation.
Third National Agricultural Policy (1998-2010)	This edition was a revised version of the Second National Agricultural Policy following the events of the 1997-1998 Asian Financial Crises. This revised policy aimed to address the newly realised importance of agriculture as a food provider to the nation. The focus areas include enhancing food supply, productivity, intersectoral linkages, and sustainable development.
National Agrofood Policy (2011-2020)	The National Agrofood Policy was developed to provide attention to the development of food commodities that contributes strongly toward food security. Other focuses include improving value-adding processes and higher value of agricultural export earnings.

Source: National Agrofood Policy 2021-2030 (NAP 2.0)

The recently launched National Agrofood Policy 2021-2030 has identified four critical subsectors for food security, hoping to support agrofood sector development for the next ten years. One of the key subsectors is fruits and vegetables, which is vital to Malaysia's economy. However, between 2010 and 2019, the self-sufficiency level (SSL) of fruits and vegetables was only 76.3-81.9% and 44.6-58.4%, respectively, mainly hindered by high production costs, limited technology adoption, decreased arable land, and adverse effects of environmental conditions. Banana growers also face similar challenges. Hence, in line with the government initiatives to increase the SSL for fruits and vegetables for domestic and export markets, an analysis of the current performance of the banana sector is indispensable.

In this context, this study aimed to better understand the current scenario of Malaysia's banana, with two specific objectives: (1) to examine the current banana production and (2) to determine the comparative advantage or disadvantage of Malaysia's bananas to its rivals. In addition, several potential internal (strengths and weaknesses) and external factors (opportunities and threats) of the banana industry in Malaysia have also been discussed.

### *Banana Production in Malaysia*

Banana has been identified as one of the important fruits for export markets together with papaya, starfruit, and mango under the previous National Agrofood Policy (2011-2020). In fact, Malaysia exported USD10.3 million in bananas, making it the 53rd largest global exporter of bananas (Observatory of Economic Complexity, 2020; Simoes & Hidalgo, 2011). Most of the locally produced bananas are exported to Singapore (USD8.68 million), Brunei (USD1.48 million), United Arab Emirates (USD165,000), and Nigeria (USD1,600) in 2020 (Observatory of Economic Complexity, 2020). The increase in bananas exports was mainly due to the increase in exports to Brunei.

In Malaysia, banana production peaked in 2017 at 350,493 tonnes (Table 2). Nevertheless, its production decreased from 331,255 tonnes in 2018 to 325,447 in 2019. According to FAOSTAT (2022), the production of bananas was 312,968 tonnes in 2020. About 32% of the nation's banana production is from Johor (Table 3).

**Table 2: The Planted Area and Production of Banana from 2014 to 2019**

	2014	2015	2016	2017	2018	2019
Planted Area (Hectare)	28,911	30,711	28,036	34,894	30,486	26,079
Production Area (Hectare)	24,873	24,858	22,294	27,565	24,231	21,542
Average yield (Tonnes/hectare)	12.2	12.7	13.9	12.7	13.7	15.1
Production (Tonnes)	303,107	315,500	309,508	350,493	331,255	325,447
Production Value (RM '000)*	471,330.85	513,563.24	541,638.38	606,352.18	553,195.25	579,295.49

\* Based on ex-farm price. Source: Ministry of Agriculture and Food Industries, Malaysia (2019)

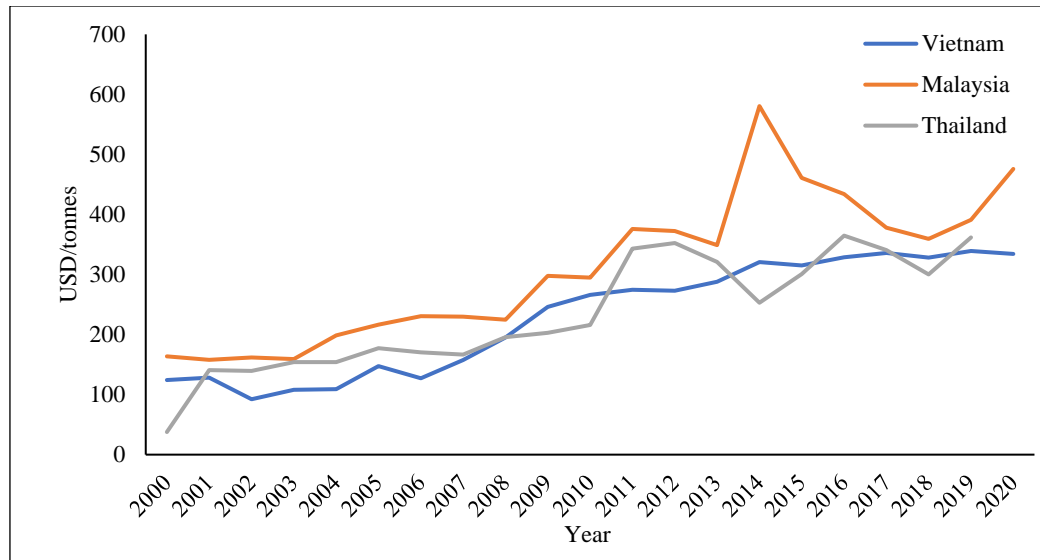
**Table 3: The Planted Area and Production of Banana in the Different States of Malaysia in 2018**

State	Planted Area (Hectare)	Production (metric tonnes)
Johor	8,304	116,966
Pahang	4,975	62,421
Sabah	3,602	43,825

Source: Ministry of Agriculture and Food Industries, Malaysia (2019)

The average yield of bananas in Malaysia was estimated at 144,692 tonnes per ha in 2020, decreasing by 2.2% compared to 2019. The decrease in banana production might be due to adverse environmental conditions and reduced agricultural lands. For example, in 2016, a temperature change of 1.7 was recorded throughout the meteorological year (FAOSTAT, 2022), causing a decrease in planted area for bananas from 34,894 hectares in 2017 to 26,079 hectares in 2019 (Table 2).

The self-sufficiency ratio for bananas is 100.1% (between 2016 and 2020), indicating that domestic banana production is sufficient to meet domestic needs (Department of Statistics, Malaysia (2021b)). However, between 2010 and 2020, the producer price of bananas increased by about 23% (Figure 4). The increased prices might be due to declining banana supply because of diseases or increased production costs, such as fertilisers.



**Figure 4: The Producer Price of Bananas for the Selected Countries. Source: FAOSTAT 2022**

The main threat to banana production is *Fusarium* wilt, caused by the fungal pathogen *Fusarium oxysporum* f. sp. *cubense* (Foc) Tropical Race 4 (TR4). The *Fusarium* fungus is challenging to control because of its long survival potential in the soil. In the 1990s, the spread of *Fusarium* disease reported in the main growing regions disrupted the banana production and risked the livelihood of growers (Mostert et al., 2017). Furthermore, more than 50% of bananas (cultivars Berangan and Cavendish) planted in Malaysia are highly susceptible to *Fusarium* diseases (Wong et al., 2019). Since this disease could potentially eliminate all banana farms, searching for viable disease treatment is imperative.

## METHODS

Several methods could be used to examine the trade prospects and indicate a country's specialisation of specific commodities. This paper adopted the most commonly used method, i.e., Balassa's (1965) index of Revealed Comparative Advantage (RCA), to identify the comparative advantage or disadvantage of Malaysia's fruits with its rivals between 2017 and 2021. The RCA index is defined as follows:

$$RCA = \ln (X_{iB} / X_B) / (X_{iA} / X_A)$$

where,

$X_{iB}$ : Malaysia's exports of produce  $i$  to the world

$X_B$ : Malaysia's total fruit exports to the world

$X_{iA}$ : Rival country's exports of produce  $i$  to the world

$X_A$ : Rival's country total fruit exports to the world

The trade data (2017-2021) used for calculation were obtained from the United Nations Commodity Trade Statistics Database (UN COMTRADE) following the Harmonized Code System (HS) classification, i.e., 0801-0814 have been used for fruits and banana was 0803. A positive RCA value represents Malaysia's comparative advantage in exporting bananas against its rival countries, whereas a negative value may be interpreted otherwise. A higher positive value indicates that Malaysia has a higher competitiveness level, whereas a higher negative value indicates otherwise.

## Results

Over the past five years, Malaysia has shown a comparative advantage over Indonesia and Thailand (Table 4). On the other hand, the Philippines demonstrated a greater comparative advantage over Malaysia in the global banana trade. These findings indicated that Malaysia started to gain momentum in exporting bananas compared to the previous study conducted by Nik Rozana et al. (2017). Nik Rozana et al. (2017) reported that Malaysia lost its comparative advantage to the Philippines and Thailand and only showed a slight increase over Indonesia between 2009 and 2014. Similarly, Suntharalingam et al. (2011) also reported that Malaysia was at a disadvantage in exporting bananas to the world compared to Thailand between 2000 and 2008.

**Table 4: Revealed Comparative Advantage (RCA) Index of Malaysia and its rivals on banana (2017-2021)**

Banana	2017	2018	2019	2020	2021
Malaysia vs Indonesia	2.2	1.4	1.7	2.7	n.a.
Malaysia vs Thailand	2.1	1.7	1.8	2.9	n.a.
Malaysia vs Philippines	-1.8	-2.0	-0.07	-1.8	-2.6

n.a.: not available.

As a tropical country, Malaysia is known for its fruit crops banana, watermelon, papaya, pineapple, starfruit, and mango. This study shows Malaysia's comparative advantage over Indonesia and Thailand in the banana market since 2017. Nevertheless, the Philippines remains the top export of bananas among its ASEAN neighbours. About 31% of its banana production (5.9 million metric tons) was exported to other countries in 2020 (FAOSTAT, 2022). In contrast, although Indonesia produced more bananas than the Philippines in 2020 (about 8.1 million metric tons), it only exported about 17 thousand tonnes of bananas. Singapore remains the top importer of bananas (most of this is Cavendish variety) in the ASEAN region, although Thailand has been increasing its import of bananas since 2018 (FAOSTAT, 2022). Although Malaysia only exported about 9% of its bananas in 2020, the bananas produced by Malaysia have advantages over other countries in terms of different varieties and tastes. Hence, Malaysia should continue improving productivity by increasing yields in limited lands, developing post-harvest technologies, and venturing into downstream processing of bananas into high-value products to sustain its competitive position in the banana market.

### *Strengths, Weaknesses, Opportunities, and Threats of the Banana Sector in Malaysia*

The banana industry is an important source of income for local growers and continuously plays a crucial role in economic and social impact in Malaysia. Several strengths and opportunities could make Malaysia a world banana exporter. Nevertheless, a few weaknesses and threats should be addressed. These elements could be grouped into strengths, weaknesses, opportunities, and threats (SWOT) to help policymakers, industrial players, and researchers identify and prioritise their goals and strategies for achieving them (Figure 5).



**Figure 5: SWOT Analysis of the Malaysian Banana Industry (created using TemplateLab)**

## CONCLUSION

Bananas are certainly among the most popular fruits for growers and consumers in Malaysia. The RCA analysis showed that Malaysia has a competitive edge in bananas over regional countries. To sustain its competitive position in the banana market, Malaysia should address the issues and challenges and overcome the weaknesses, including

- growing good and economically viable bananas,
- developing disease- or climate-resistant cultivars,
- adopting technology and sustainable approaches for banana production,
- ensuring affordable tissue culture planting materials,
- exploring and developing banana downstream products or industries, and
- monitoring the problem of pricing and marketing.

Achieving these goals requires an intensive effort and interdisciplinary collaboration between policymakers, industry, growers, and scientists. In addition, continued investments and government supports are also crucial drivers in this realm. In summary, it is time for Malaysia to adopt effective and sustainable strategic approaches to remain relevant and competitive in the global fruit exports. Perhaps, bananas could be the one?

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