Analysis of Indonesia's Soybean Competitiveness

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ABSTRACT: The current national soybean demand is reaching 4 million tons, but domestic production only meets 1/16 of that demand. The increasing domestic soybean demand, coupled with a decreasing national soybean production each year, has led to Indonesia's dependence on imports. There are numerous issues with the soybean commodity that have resulted in the weak competitiveness of Indonesian soybeans in the international market. However, several soybean production centers show that soybean cultivation is still viable for development. This research aims to analyze the competitiveness level of Indonesian soybean commodities. Revealed Comparative Advantage (RCA) analysis is utilized to assess the competitiveness level of Indonesian soybeans in the international market. The research findings that The RCA value is less than 1, indicating that Indonesian soybeans lack competitiveness or have weak competitiveness.

KEYWORDS: soybean, competitiveness, RCA

I. INTRODUCTION

The fact that no country is capable of meeting its own population's needs provides strong motivation for a nation to engage in international trade. This has led to numerous efforts to remove barriers in export and import activities. International trade is the exchange of goods and services between countries based on mutual agreements (Manik, 2022). International trade is essential not only because of free trade and economic globalization but also due to the fact that no country in the world can meet all its needs without engaging in trade with other nations (Dhipayana, 2018). International trade is one of the instruments to promote a country's economic growth. It occurs primarily because there is a scarcity of resources in each country (Herdiansyah, 2018). International trade benefits a country's balance of payments when its exports exceed imports. Based on this assumption, many countries open themselves up to international trade to expand their exports. Strengthening trade liberalization presents both opportunities and new challenges for farmers and business entities. Market openness aligns with the elimination of various trade barriers between nations, but trade liberalization can also create issues when domestically produced commodities cannot compete globally (Saptana et al., 2021).

One of the sectors in Indonesia with great potential for development and competition with other countries is the agricultural sector. The agricultural sector's contribution has played a significant role in Indonesia's economy, accounting for approximately 13.28 percent of the Gross Domestic Product (GDP) based on data from BPS in 2021, making it the second-largest contribution. The agricultural sector consists of five sub-sectors: food crops, plantations, livestock, fisheries, and forestry. One of the commodities under the food crop sub-sector is soybean.

After rice and corn, soybean holds significant importance as a commodity in Indonesia, according to the Central Statistics Agency's report in 2021. In Indonesia, soybean plays a crucial strategic role as it serves as a primary raw material for diverse processed products, including tofu, tempeh, and more. According to the Regulation of the Minister of Agriculture of the Republic of Indonesia Number 47/Permentan/SM.010/9/12016, national strategic agricultural commodities refer to commodities that have been designated as priorities at the national level due to their crucial role in achieving national food security. In other words, strategic agricultural commodities are those that hold high economic value and play a vital role in maintaining price stability and preventing inflation. The primary focus in developing strategic commodities is to enhance the welfare of the community and meet the market demand for those commodities. Globally, soybean ranks as the fourth most produced crop by volume. The primary factor propelling global soybean trade is the population's growth, resulting in a higher demand for soybean. Additionally, the policies implemented by importers and exporters also play a role in shaping the dynamics of global soybean trade.

Indonesia is classified as one of the soybean-importing countries in the world. According to the data from the Strategic Food

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Commodity Balance of the Ministry of Agriculture in 2022, domestic soybean production was only 200,315 tons, while the demand for soybeans reached 2,983,511 tons. This means that domestic production can only meet around 6.8 percent of the national demand. The high population leads to a significant increase in the consumption of processed soybean food product such as tempeh, tofu, soy sauce, and others (Karmila et al., 2020). This similar situation is not limited to 2022 but has also beenobserved in previous years, as presented in the following Figure 1.
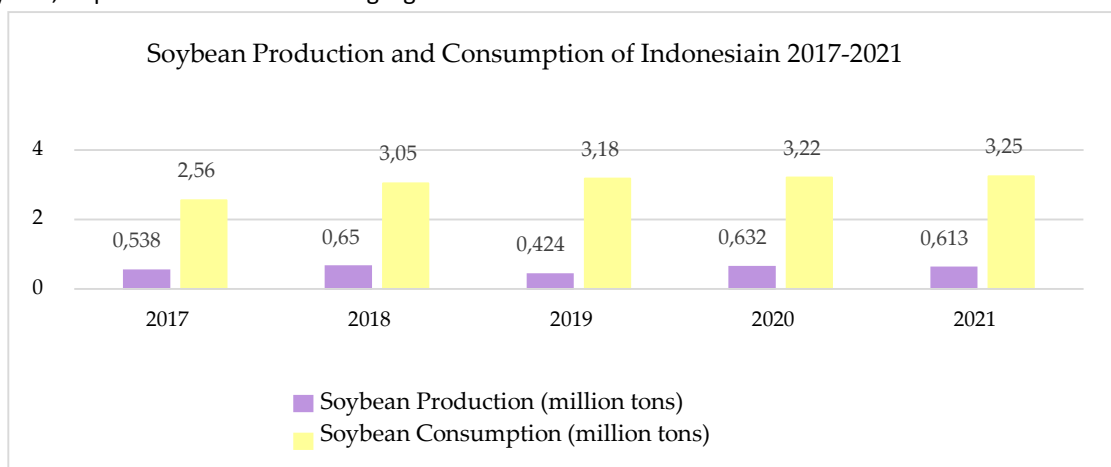

Figure 1. Soybean Production and Consumption of Indonesia in 2017-2021
Source: Central Statistics Agency, 2022 (processed)

The uneconomical soybean prices are one of the reasons why many farmers are reluctant to cultivate soybeans and prefer other commodities. In 2016, soybean farmers received an R/C Ratio of 1.73, which then decreased to 1.57 in 2019. In 2022, the R/C Ratio received by soybean farmers became 1.54. Based on the feasibility study of soybean farming, it shows that the input costs for soybean farming are increasing while soybean farmers' earnings are declining (Farikin & Suharyono, 2016; Somantri et al., 2019; Wibisonya et al., 2022). Additionally, the preference of many tofu and tempeh producers for imported soybeans over local ones further exacerbates the plight of soybean farmers (Hurek, 2021). As a result, soybean production continues to experience a decline. Soybean production has a significantly negative impact on imports, which means that if domestic soybean production decreases, it can lead to an increase in soybean imports (Mahdi & Suharno, 2019). Indonesia heavily relies on soybean imports, Indonesia imports the majority of its soybeans from the United States, Brazil, and Argentina.
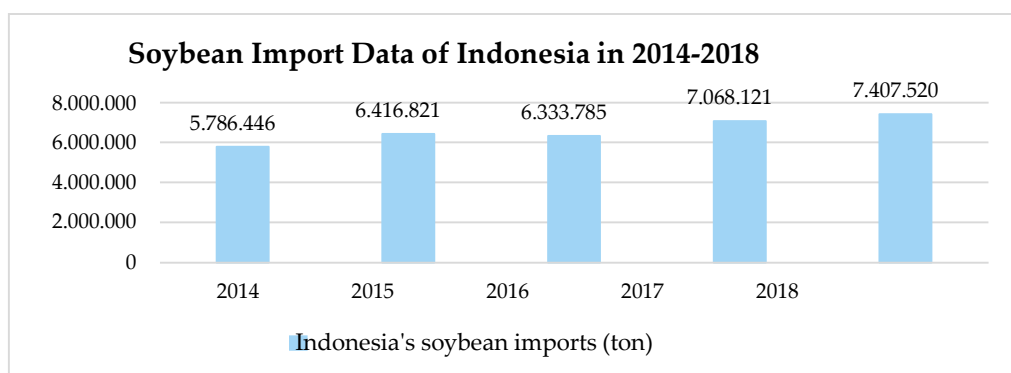

Figure 2. Soybean Import Data of Indonesia in 2014-2018
Source: Food and Agriculture Organization, 2021 (processed)

Figure 2. shows that Indonesia's soybean imports fluctuate and tend to increase each year. Indonesia's dependency on imports to meet national demand leads to fluctuations in global soybean prices. The surge in soybean prices in 2008 resulted in economic instability for domestic soy-based food producers, particularly for tofu and tempeh, which are essential staples for most Indonesians (FAO, 2021). The annual increase in soybean prices causes scarcity of tofu and tempeh in the domestic market.Tofu and tempeh producers frequently express concerns over the steep rise in soybean prices, which sometimes occurs up to three times a year (Mubarysah, 2022). As a consequence, many producers have initiated production strikes (Hakim, 2022). Nevertheless, the government has made various efforts to improve local soybean productivity by providing subsidies for seeds, fertilizers, land to farmers, and offering a soybean price subsidy of Rp 1,000/kg to tofu and tempeh producers. Soybean is a crucial strategic

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commodity for Indonesia, and without a competitive advantage, the country will continue to depend on imports from other countries (Tarigan et al., 2020).

However, despite the numerous issues surrounding soybean commodity, there are still several soybean production centers in Indonesia that remain fairly competitive. Research on the competitiveness of soybean in Indonesia has been extensively conducted. Some studies have shown that local soybean possesses comparative and competitive advantages and is worthy of cultivation (Chanifah et al., 2020; Kata et al., 2020). Based on the research problem stated above, the objectives of this study is to analyze the competitiveness (comparative advantage) of soybean commodity in Indonesia

II. RESEARCH METODOLOGY

The objective of this research is analyzed using Revealed Comparative Advantage (RCA). The RCA analysis was first introduced by Bela Balassa in 1965. The purpose of using RCA is to measure the comparative advantage of Indonesia's soybean commodity. The soybean used in this research is soybean with HS code 120100. If the RCA calculation have two possibilities. If the RCA value is >1, it means that Indonesian soybean has a comparative advantage above the world average, indicating strong competitiveness. If the RCA value is <1, it means that Indonesian soybean has a comparative advantage below the world average, indicating weak competitiveness.

RCAijt = (Xijt Xsjt) / (Xiwt Xswt)

Where:
- RCAijt = Revealed Comparative Advantage of soybean (i) in Indonesia (j) in year t
- Xijt = Value of soybean exports (i) from Indonesia (j) in year t
- Xsjt = Total value of all exports (s) from Indonesia (j) in year t
- Xiwt = Value of soybean exports (i) in the world (w) in year t
- Xswt = Total value of all exports (s) in the world (w) in year t
  - t = 2010, ..., 2021

The RCA Index is a comparison between the current RCA value and the RCA value of the previous year. The formula for the RCA Index is as follows:

RCA Indexijt = (RCAijt) / (RCAijt-1)

Where:
- RCA Indexijt = Change in the comparative advantage of soybean (i) in Indonesia (j) in year t
- RCAijt = RCA value of soybean (i) in Indonesia (j) in the current year (t)
- RCAijt-1 = RCA value of soybean (i) in Indonesia (j) in the previous year (t-1)
  - t = 2010, ..., 2021

The RCA Index value is divided into three criteria as follows:

1. The RCA Index value ranges from zero to infinity. A value of one means that there is no change in RCA, or the performance of Indonesia's soybean exports in the international market in the current year is the same as in the previous year.
2. A value of the RCA Index less than one indicates a decrease in RCA, or the performance of Indonesia's soybean exports in the international market in the current year is lower than in the previous year.
3. A value of the RCA Index greater than one indicates an increase in RCA, or the performance of Indonesia's soybean exports in the international market in the current year is higher than in the previous year.

III. RESULT AND DISCUSSION

The analysis of RCA will indicate the level of competitiveness of Indonesia's soybean commodity. After obtaining the level of competitiveness of soybean commodity, an RCA Index analysis is conducted to observe changes in the competitiveness of soybean commodity from year to year. The analysis of Indonesia's comparative advantage in soybean commodity with HS code 120100 is measured using Revealed Comparative Advantage (RCA), which was first introduced by Bela Balassa in 1965. The results of the RCA calculation have two possibilities: if the RCA value is >1, it means that Indonesian soybean has a comparative advantage above the world average, indicating strong competitiveness. Conversely, if the RCA value is <1, it means that Indonesian soybean has a comparative advantage below the world average, indicating weak competitiveness.
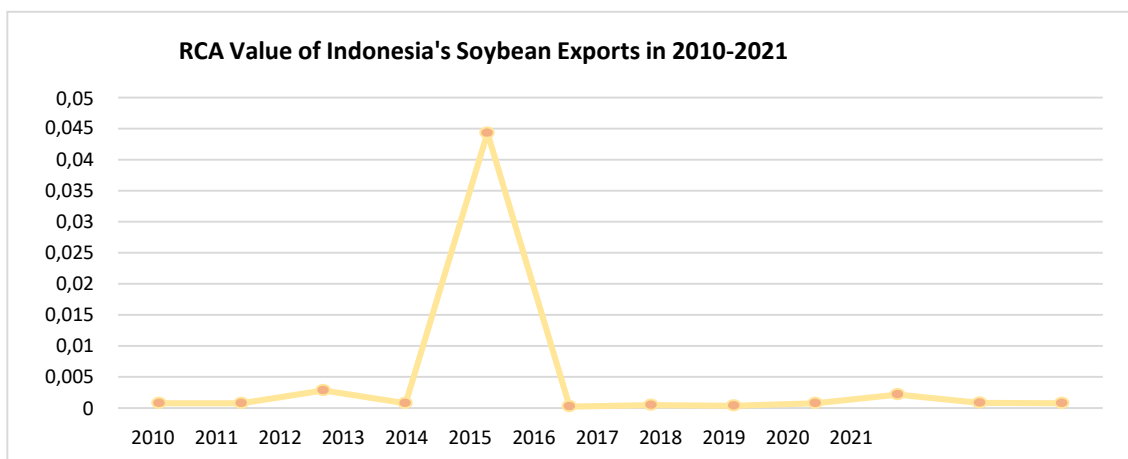
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Figure 3 RCA Value of Indonesia's Soybean Exports in 2010-2021
Source: UN Comtrade, 2022 (processed)

The RCA value of Indonesia's soybean commodity fluctuates but tends to decrease. In 2014, the RCA value reached 0.044315741, which was the highest RCA value with an export value of USD 24,414,890. The surge in 2014 was due to a significantly larger export volume of 41,303.543 tons compared to other years. The export value in 2014 was the highest during the period 2010-2021. This was a result of the successful implementation of the Upsus Pajale program, leading to a substantial increase in soybean production and exports in Indonesia. However, in the following year, 2015, the RCA value dropped dramatically to 0.000379880, which was the lowest RCA value for Indonesia's soybean commodity during the period 2010-2021, with an export value of USD 177,955. Overall, Indonesian soybean has been very weak in competitiveness during the period 2010-2021.

Table 1 RCA Index of Indonesian Soybean in 2010-2021

| Year	RCA Index	Year	RCA Index
2010	-	2016	2,00
2011	1,04	2017	0,76
2012	3,38	2018	1,88
2013	1,00	2019	3,00
2014	53,65	2020	1,00
2015	0,01	2021	0,90

Source: UN Comtrade, 2022 (processed)

The calculation results using the RCA Index method show that Indonesia has experienced fluctuations during the period 2010-2021. The RCA Index calculation results are consistent with the RCA value calculation, which indicates a significant difference in 2014, amounting to 53.65. In the following years, the RCA Index experienced a decline, starting from 2019-2021, where the RCA Index decreased consecutively from 3.0 to 1.0 and then further decreased to 0.9. The weak competitiveness of soybean commodities is caused by the low level of exports carried out by Indonesia. Factors influencing the low soybean exports from Indonesia include the low and declining level of domestic soybean production. According to Pakpahan et al., (2022) production has a significant impact on export volume. An increase in production will be followed by an increase in the quantity of goods offered by producers.

A. Comparison of Soybean RCA Values of Indonesia with the USA and Brazil in the International Market.

The comparison of soybean RCA values between Indonesia, Brazil, and the USA shows that Brazil has the highest average value at 34. The United States has an average value of 5, while Indonesia has an average value of 0.004665488. This indicates that Indonesia has the lowest average RCA value compared to its competitors, Brazil, and the United States. Brazil and the United States were chosen as benchmark countries because they are the world's largest soybean exporters. This means that the productivity level of soybeans in both countries is very high, and they have strong competitiveness. As one of the soybean-producing countries, Indonesia can learn from how these two countries have achieved their positions, enabling Indonesia to meet its own national soybean needs.

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RCA Value of Indonesia, Brazil and
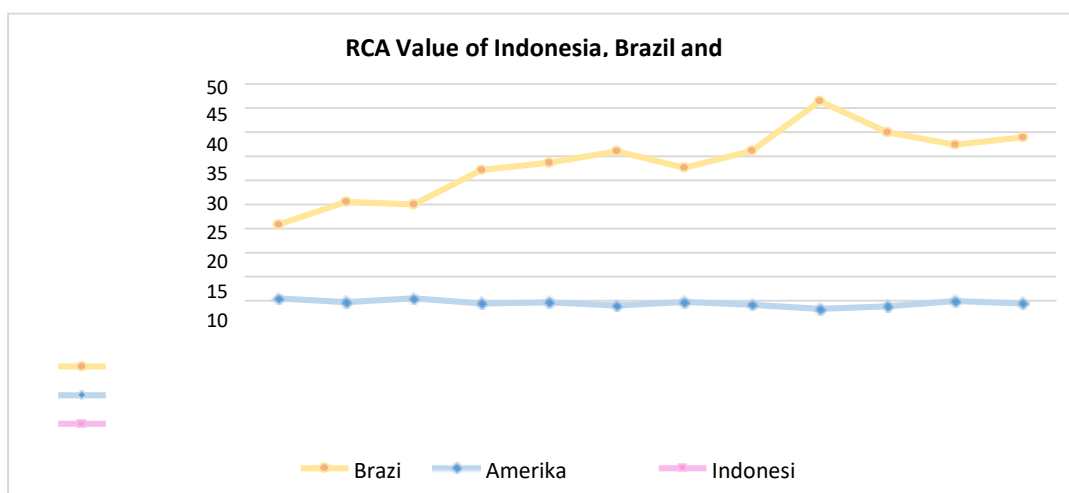
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Brazil	20,86	25,58	25,06	32,2							33,67	36,06
	32,64	36,19	46,49	40							37,42	38,97
Amerika Serikat	5,52	4,73	5,53	4,49	4,72	4,05	4,78	4,21	3,36	3,86	4,95	4,45
Indonesia	0,0008	0,0008	0,0028	0,0008	0,0443	0,0003	0,0005	0,0004	0,0008	0,0022		
					0,0009	0,0008						

Figure 4 RCA Value of Indonesia, Brazil and USA
Source: UN Comtrade, 2022 (processed)

The RCA value of Brazil has consistently been the highest among Indonesia and the United States every year. Brazil is the world's largest soybean exporter, as evidenced by its high RCA value, which indicates a very high level of competitiveness compared to the United States, the second-largest soybean exporter in the world. Both countries demonstrate their comparative advantage in the soybean commodity. The United States and Brazil have adequate logistics infrastructure, which plays a significant role in international trade. Additionally, cultural factors, technology, land availability, and logistics costs also influence the competitiveness performance of soybeans in both countries (Reis et al., 2020). Based on research findings, Indonesia has weak competitiveness compared to its competitors, Brazil and the United States, which have strong competitiveness.

Based on Figure 4, it can be observed that Indonesia is significantly lagging behind its competitors. It means that Indonesia's soybean commodity lacks competitiveness or has weak competitiveness in the international market. This indicates that Indonesia, as a soybean-producing country, has not yet maximized its potential. As per the findings of the research related to the first objective, the decreasing soybean cultivation area each year is due to farmers' lack of interest in cultivating soybeans. There are several reasons why farmers are reluctant to cultivate soybeans, including inadequate profitability of soybean farming, vulnerability of soybean plants to pests and diseases, and the competition disadvantage of soybean farming compared to other crops, especially corn (Swastika, 2022). Although the planting time for corn and soybeans is the same, it is more profitable for farmers to grow corn, resulting in a trade-off between corn and soybeans in land use (Sumastuti, 2019). Soybean plants are often grown as intercrops or in a less effective manner due to farmers' limited adoption of technology, leading to a continuous decline in domestic soybean production. All these issues contribute to Indonesia losing to soybean imports from competing countries.

CONCLUSIONS

Indonesia's soybean commodity lacks competitiveness or has weak competitiveness, as indicated by the RCA (Revealed Comparative Advantage) analysis, which shows an RCA value less than 1.

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