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Comparative Advantage of Myanmar's Selected Fruits in the Global Market

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ABSTRACT
The objective of the paper is to measure the comparative advantages of Myanmar's selected fruits, namely bananas, dates, mangoes, oranges, plums and watermelon using the United Nations Comtrade yearly data during the period 2011 to 2020. The methods of Balassa revealed comparative advantage (RCA), symmetrical revealed comparative advantage (SRCA), and normalized revealed comparative advantage (NRCA) were applied to analyse the levels of fruit exports competitiveness. The results revealed that Myanmar has a high RCA, SRCA and NRCA score in watermelon, medium score in bananas, whereas a loss score in dates, mangoes, oranges, and plums. An important implication of this paper is the need for marketing, value-added processing and export policy reviews that would improve the development of Myanmar's agricultural sector. This study suggests that Myanmar should focus on improving the ability to produce and maintain market share of the selected fruits in order to increase international competitiveness.

Keywords: *Fruits, Myanmar, NRCA, RCA, RSCA, Revealed Comparative Advantage.*

1. INTRODUCTION

Agriculture is the back bone of Myanmar economy, contributing 25.6% of the Gross Domestic Product (GDP), 61.2% of the labor force and 24.4% of total export earnings [17]. Myanmar has three distinct seasons, namely the rainy season from mid-May to mid-October, the cold season from mid-October to mid-February and the hot season from mid-February to mid-May with three agro-climatic conditions: tropical, subtropical and sub temperate climate. Myanmar has been trade with international countries through shipments either by sea or by air, and neighboring countries: Bangladesh, China, India, Lao PDR and Thailand through border trade points by road. Myanmar has eighteen border trade points in which Muse-Ruili (bordering China) has the most fruits trade point [18]. Some 150,783 tonnes of bananas were exported in 2020, comparing with the other fruits 149,517 tonnes of watermelon, 8,183 tonnes of guavas, mangoes and mangos teens, 8,210 tonnes of plums, 3,351 tonnes of oranges and 359 tonnes of dates in the same year [21].

Myanmar agricultural institutional structure was reformed by the approval of Cabinet Meeting No.5/2016 on 9th June 2016. One objective of the ministry of agriculture, livestock and irrigation (MOAI) is to promote competitiveness and value-added production of exportable commodities. Since 2018, in order to achieve the agricultural vision and objectives, the agricultural development strategy (SDG) was officially launched for over the next 5 years (2018-2019 to 2022-2023) in Nay Pyi Taw [17]. However, there are remaining many needs for providing an attractive environment to promote new investment in the agricultural sector and new trade promotion strategy in the global market [23]

The total value of Myanmar's selected fruits exports, import and net trade as shown in Figure 1. For all years except 2012, the total export value of bananas, watermelon, mangoes, plums, dates and oranges was greater than the total import value. The net trade gains grow larger through 2015 to 2020. The outliner in 2013 creates to the fruits exports very high total export value, mainly come from exporting oranges in this year. An increasing trend in the total export value of selected fruits is shown in Figure 1, however, a stable trend of the total import value of selected fruits. In 2020, the total export value of these fruits accounted for US$ 451.15 million with 81.43% of bananas, 12.73% of watermelon, 4.22%

of mangoes, 1.34% of plums, 0.21% of oranges and 0.06% of dates. As the same year, the total import value of these fruits records US$ 23.37 million with 98.71% of oranges, 0.67% of dates, 0.38% of mangoes, 0.12% of bananas, 0.07% of plums and 0.04% of watermelon. The highest total import value of these fruits is US$ 39.87 million in 2016.

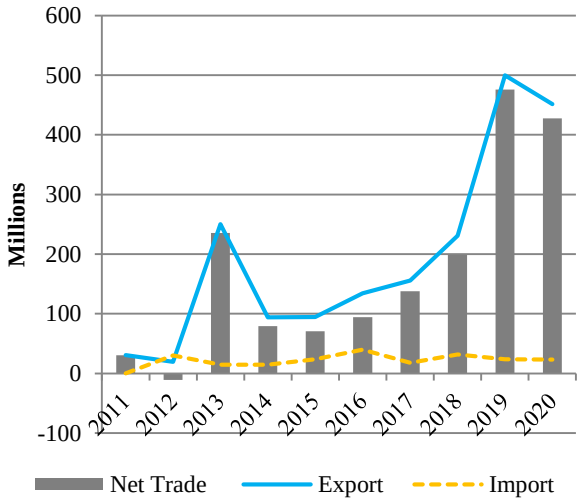

Fig. 1. Export and import trends of Myanmar's selected fruits (US $ million)

Table 1 shows the export destinations of Myanmar's fruits in the world market. Watermelon is the highest export fruits in Myanmar, accounts for 3.74% of the global total watermelon export. Between 2011 and 2019, the export value of watermelon increases from US$ 26.79 million to US$ 78.16 million, and then starts to decline US$ 57.43 million in 2020. Watermelons achieve more export destinations than bananas, dates and oranges. This sector provided a new income-earning for participating Myanmar famers (larger landholder, not small landholder), with the very high risk in revenue depending on their positions [15].

Banana is the second most important export fruits in Myanmar. In 2020, the export value of Myanmar's banana is US$ 367.37 million with 8.75% of the world total banana exports. The export value of Myanmar's banana is US$ 367.37 million in 2020. In Myanmar, two types of bananas exported to the world market, namely traditional banana and tissue-culture banana. Traditional bananas produce for local market, but there have been exported to China. Tissue-culture banana is mainly cultivated in Kachin State, Myanmar and all products are exported to China [8].

Mango is the third most export potential fruits. Myanmar has more than 300 kinds of Mango. The most marketable mangoes are Sein Ta Lone, Shwe Hin Tha, Yingwe and Myakyauk [17]. The price of Shwe Hin Tha mango variety performed better than Sein Ta Lone in the international market (Soe, 2017). Over the five years to 2020, the value of mangoes exports increases from US $ 10.16 million to US $ 19.04 million in the global market. In 2020, the largest mangoes export destination is China, accounts for 96.09% of Myanmar's mangoes total export.

Dates fruits are an export potential fruits in Myanmar. The value of dates exports increased from US $ 0.11 million in 2016 to US $ 0.28 million in 2020. However, all dates products goes to India. In 2020, the value of dates exports is more 1.8 times than its import value.

Between 2011 and 2020, the value of Orange exports decreased by 59% from US $ 2.35 million to US $ 0.95 million. Over the past five years, Myanmar's orange has faced trade deficit. In 2020, the value of oranges import is more 24.06 times than its exports value in Myanmar.

Table 1. Export destinations of Myanmar's selected fruits in 2020

Fruits	Export Destinations	%
Watermelons	China	99.60
	Rep. of Korea	0.002
	India	0.13
	Singapore	0.0001
	Thailand	0.22
	UAE	0.01
	USA	0.03
Bananas	China	99.89
	Malaysia	0.02
	Singapore	0.0003
	Thailand	0.09
Mangoes	China	96.09
	Japan	0.06
	Rep. of Korea	0.02
	Malaysia	0.0004
	Russian	0.70
	Singapore	1.89
	USA	1.24
Plums and Sloes	Bangladesh	13.51
	Canada	0.001
	China	85.58
	India	0.91
	USA	0.001
Dates	India	100
Oranges	China	33.16
	Thailand	66.84

Source: (UNComtrade, 2021)

Note(s): UAE; United Arab Emirate, USA; United States of America

In previous studies, the researchers [3], [11] carried out the export competitiveness in Myanmar through applying revealed comparative advantage (RCA) method. Furthermore, Zhang and Chen (2019) used normalized revealed comparative advantage (NRCA) method to compare Myanmar agricultural trade and its

main competitors. Zhang and Chen's research showed that Myanmar agricultural export sector had not very competitive when comparing with its major competitors, and this sector has been challenged by a smaller number of exportable commodities, mainly are land intensity products. This research contributes to complementing the previous research on the export of agricultural products in the international market. However, the present paper focused mainly on the fruits export. This paper applied the original Balassa's RCA index and two extended indices for the selected fruits to have more precise analysis. In fact, it is intend to improve the development of agricultural sub-sectors in Myanmar.

The main objective of this study is to provide a better understanding of Myanmar's fruits export in the world market. Two specific objectives are: 1. to examine export pattern and trends of Myanmar's selected fruits; and 2. to measure the comparative advantages of Myanmar's selected fruits.

2. DATA AND METHOD

Since 2011, the new democratic government made up of reforms to all sectors of the economy including agricultural marketing, value-added processing and export policy. The competition policy has been enforced since February, 2015. Researchers are interested in comparing the export competitiveness of major fruits before and after enforcement. Therefore, the data are observing at the United Nation's Commodity Trade database for the period 2011-2020. To understand selected Myanmar's fruit trade, this study focused on six Harmonized Code System (HS), major export fruits based on the year of 2019. The data were collected for bananas (0803), watermelon (080711), guavas, mangoes and mangosteens (080940), plums and sloes (080450), dates (080410) and oranges (080510).

Ricardo (1871) argued that the concept comparative advantage is not absolute but comparative advantages are responsible for international trade between nations. Based on the international trade, Balassa (1965) initiated the concept of "revealed comparative advantage (RCA). Balassa's RCA is the broadly used to indicate the export competitiveness in the literature [1, 5, 11]. RCA is presented as follows:

$$RCA_i^k = (E_i^k / E_i) / (E^k / E^W) \quad (1)$$

Where, E_i^k denotes country *k*'s export of commodity *i*; E_i refers to world export of commodity *i*; E^k tells total exports of country *k*; E^W denotes total world export.

Although RAC method is interesting, in certain commodity, its magnitude has neither the ordinal property nor the cardinal property [9, 22]. Consequently, several alternative RCA indices have been proposed to improve Balassa's RCA index such as symmetrical RCA index (SRCA) by Laursen (1998), primarily focusing on addressing the asymmetric property. SRCA is defined as:

$$SRCA_i^k = (RCA_i^k - 1) \ / (RCA_i^k + 1) \quad (2)$$

In addition, the normalized revealed comparative advantage (NRCA) method is generated by Yu, Cai and Leung (2009). The key derivation of the NRAC index is the comparative-advantage-neutral situation point. Under the situation of comparative-advantage-neutral, country *k*'s export of commodity *i* would equal to $(E^k E_i)/E^W$. Country *k*'s actual export of commodity *i* in the real world would be E_i^k and the difference would be stated as

$$\Delta E_i^k = E_i^k - (E^k E_i)/E^W \quad (3)$$

Normalizing ΔE_i^k by the world export market, NRCA index is obtained as follows

$$NRCA_{ik} = (E_i^k / E^W) - (E^k E_i / E^W \ E^W) \quad (4)$$

Where E_i^k refers to country *k*'s export of commodity *i*; E^k denotes total exports of country *k*; E_i refers to world export of commodity *i*; E^W denotes total world export. An NRCA value greater than zero indicates that a country has comparative advantage in particular commodity, while a less than zero indicates a revealed comparative disadvantage. The higher the NRCA value shows the stronger the comparative advantage. There are two reasons because this is important. First, NRCA can be compared across the commodity within a country and across the countries in a commodity. The cross-commodity comparison within a country is the difference between the NRCA scores of commodity 1 and 2. Second, the results of NRCA are more precisely and coherently than RCA [22]. In this paper, RCA, SRCA and NRCA methods were selected to measure the comparative advantage of selected Myanmar's fruits.

3. RESULTS

The export of watermelon reveals strong competitive advantages in Table 2. The score of Balassa's index ranges from 1.19 to 12.91 with the highest value in 2011. The mean score of RSCA and NRCA are 0.62 and 351 respectively. It clearly indicates that Myanmar has strong comparative advantage in watermelon fruits. However, the score of RCA and SRAC are decreasing in watermelon through 2016 to 2020. It means that Myanmar has declined its competitive advantages in watermelon as that period. On the other hand, NRCA score reveals that Myanmar has decreased its comparative advantage in watermelon from 2019 to 2020. In this sub-sector, three challenges for growers are high cost of production, lack of cultivation skills, and lack of distribution channels for perishable fruit [13]. Zhang and Chen (2019) have revealed that Myanmar watermelon gained and lost the comparative advantage between 2007 and 2016. Kobu *et al.* (2021) have been

suggested that Myanmar's watermelon sub-sector needed to consider the extra-regional actors control the vital levers of value-capture. During the study period, the mean score of all indices reveal that Myanmar has strong comparative advantage in watermelon.

Table 2. RCA Score of Myanmar in Watermelon

Year	RCA	RSCA	NRCA
2011	12.9	0.9	229
2012	8.3	0.8	96
2013	2.1	0.4	259
2014	10.4	0.8	470
2015	8.9	0.8	432
2016	6.9	0.7	438
2017	6.5	0.7	433
2018	4.3	0.6	394
2019	2.2	0.4	417
2020	1.2	0.1	340
Mean	6.37	0.62	351
SD	3.90	0.26	120
Min	1.19	0.08	96
Max	12.91	0.86	470

Source: (UNComtrade, 2021)

The indices score of bananas indicates unstable comparative advantages in Table 3. The score of RSCA indicates that Myanmar revealed no comparative advantages in bananas from 2011 to 2018, but gained the competitiveness between 2019 and 2020. NRCA score indicates that Myanmar has increased its comparative advantage in bananas from 2016 to 2020. The mean score of RCA and RSCA are 0.77 and -0.36 which mean Myanmar is showing the lost comparative advantage in bananas. Myanmar clearly gains comparative advantage in bananas with the score of 2.8 (RCA) and 0.5 (RSCA) in 2020. Similarly, Zhang and Chen (2019) have revealed that Myanmar lost comparative advantage in bananas between 2007 and 2016. Other studies in China have reported that China did not competitive in exporting bananas between 2000 and 2016 [7, 10]. An interesting result, the mean score of NRCA is greater than 1, which indicates Myanmar has comparative advantage in bananas.

Table 3. RCA Score of Myanmar in Bananas

Year	RCA	RSCA	NRCA
2011	0	-1.0	-8
2012	0	-1.0	-5
2013	0	-1.0	-59
2014	0.1	-0.8	-18
2015	0.4	-0.4	-5
2016	0.7	-0.2	16
2017	0.9	0.0	29
2018	1.2	0.1	67
2019	1.6	0.2	213
2020	2.8	0.5	783
Mean	0.77	-0.36	101
SD	0.90	0.56	251
Min	0.00	-1.00	-59
Max	2.79	0.47	783

Source: (UNComtrade, 2021)

Table 4. RCA Score of Myanmar in Mangoes

Year	RCA	RSCA	NRCA
2011	0.4	-0.5	5
2012	0.5	-0.3	5
2013	1.0	-0.01	114
2014	0.7	-0.2	29
2015	1.0	-0.01	43
2016	0.8	-0.1	42
2017	0.6	-0.3	29
2018	0.3	-0.5	21
2019	0.3	-0.6	24
2020	0.3	-0.6	45
Mean	0.58	-0.30	36
SD	0.27	0.22	31
Min	0.26	-0.59	5
Max	0.99	-0.01	114

Source: (UNComtrade, 2021)

The results in Table 4 are interesting. The export value of mangoes rages from US $ 0.94 million in 2012 to US $ 23.47 million in 2013, which year is the highest market share (1.26%) of the Myanmar mangoes exports in the international market. The NRCA mean value is 36;

the value indicates Myanmar has the competitive ability in the global mangoes market. The means score of RCA and RSCA are 0.58 and -0.30. Myanmar has no comparative advantage in mangoes. Myanmar mangoes sub-sector needed to provide the potential ways such as the coordination firms, logistics management, post-harvest handling of fruits, particularly sorting and grading, treatment for pest and disease control in order to improve the competitiveness of mangoes exports in the global market [14].

Table 5 highlights unstable competitiveness of plums export. In 2012 and 2013, Myanmar has strong comparative advantage in exporting plums, however lost the competitiveness through 2014 to 2020. The score of RCA and RSCA indicate that Myanmar has comparative disadvantage in plums. According to Jing (2018) Chain revealed no comparative advantage in plums between 2000 and 2014. Astaneh et al. (2014) also found noncompetitive in export of plums fruits between 1997 and 2010.

Table 5. RCA Score of Myanmar in Plums and Sloes

Year	RCA	RSCA	NRCA
2011	0.3	-0.5	5
2012	8.9	0.8	102
2013	3.2	0.5	412
2014	0.4	-0.4	17
2015	0.4	-0.5	16
2016	0.2	-0.7	8
2017	0.0	-1.0	-1
2018	0.6	-0.2	56
2019	0.3	-0.6	50
2020	0.3	-0.6	74
Mean	1.46	-0.31	74
SD	2.77	0.55	123
Min	0.02	-0.96	-1
Max	8.87	0.80	412

Source: (UNComtrade, 2021)

As shown in Table 6 Myanmar's dates comparative advantages lost across the ten years. The RCA (0.15) and RSCA (-0.86) mean score are less than one, the original index score and the negative value. For all years except 2014, the score of NRCA indicate the negative values. It evidently reveals that Myanmar has no comparative advantage in dates. In contract, other studies in Pakistan, Ahmad et al. (2021) and Kousar et al. (2019) have revealed that Pakistan gained comparative advantage in dates between 2001 and 2018.

Table 6. RCA Score of Myanmar in Dates

Year	RCA	RSCA	NRCA
2011	0	-1	-0.9
2012	0	-1	-0.6
2013	0	-1	-8
2014	1.3	0.1	58
2015	0	-1	-3
2016	0	-1	-3
2017	0.1	-0.9	-1
2018	0	-1	-5
2019	0	-1	-4
2020	0	-1	-11
Mean	0.15	-0.86	2
SD	0.42	0.35	20
Min	0.00	-1.00	-11
Max	1.34	0.14	58

Source: (UNComtrade, 2021)

Table 7. RCA Score of Myanmar in Oranges

Year	RCA	RSCA	NRCA
2011	0.3	-0.6	0
2012	0	-1.0	-3
2013	2.3	0.4	266
2014	0.0	-1.0	-9
2015	0.0	-1.0	-10
2016	0.0	-1.0	-13
2017	0.0	-1.0	-14
2018	0.1	-0.9	-15
2019	0.0	-1.0	-36
2020	0.0	-1.0	-110
Mean	0.27	-0.79	5.38
SD	0.73	0.44	97.10
Min	0.00	-1.00	-110.46
Max	2.33	0.40	266.14

Source: (UNComtrade, 2021)

Table 7 shows that Myanmar lost the ability of oranges export across the ten years. In 2013, the score of RCA, RSCA and NRCA are 2.3, 0.4 and 266 respectively. It indicates that Myanmar gains its competitiveness of oranges export. However, the mean

score of RCA and RSCA for the ten years are 0.27 and -0.79. It clearly reveals that Myanmar has no comparative advantage in oranges. In 2020, the import value of Myanmar's oranges is more 24 times than export value. Orange is an importable fruit in Myanmar. Similarly, in other studies, China revealed no comparative advantages in oranges during 2000 and 2016 [7, 10].

Based on the above findings, Myanmar' selected fruits trade concentrates in more border trade points than oversees trade. Myanmar's watermelon reveals strong comparative advantage in the international market. However, bananas indicate an unstable competitiveness of export. Mangoes, plums, dates and oranges indicate no comparative advantages. NRAC score reveals that mangoes and plums gain comparative advantages. This paper used secondary data only. It may be one possible limitation of the study.

4. CONCLUSION

Myanmar's selected fruits exported through the border trade points, 99.89% of bananas, 99.60% of watermelon, 96.09% of mangoes, 85.58% of plums to China, 66.84% of oranges to Thailand and 100% of dates to India. The results indicated that Myanmar has a higher comparative advantage in watermelon, has competitive in bananas, whereas a comparative disadvantage is revealed in mangoes, plums, dates, and oranges. One objective of the Ministry of agriculture, livestock and irrigation (MOALI) is unachievable competitiveness for mangoes, plums, dates, and oranges fruits during the study period. An important implication of this paper is the need for marketing, value-added processing and export policy reviews that would improve the development of agricultural sub-sectors in Myanmar. The findings of the study suggests that all stakeholders in Myanmar's fruits value chain need to consider the specific firm planning, postharvest management, logistic of fruits, export and import policy in both national and international market. Myanmar should focus on improvement of the ability to produce and maintain market share of the selected fruits in order to increase the international competitiveness. International fresh fruits and vegetables export is a crucial to improve in food security between trade nations.

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