Investigating the Competitiveness of Pakistan Agricultural Products

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Abstract

In a world where the free-market economy prevails, there is significant emphasis placed on the competitiveness of countries, companies, products, and individuals. This topic is widely discussed among academic, commercial, and public authorities. Competitiveness plays a crucial role in development, growth, commercial expansion, income generation, socio- economic welfare, and other important parameters. In fact, countries with high competitiveness tend to offer better socio-economic welfare to their populations, making it a top priority in their agendas and objectives.

Competitive strategies vary depending on factors such as the product, region, time, and market structure. The market structure for agricultural products differs from that of other products, and ecological factors pose significant limitations on agricultural production. The primary goals of countries are to internationally market their products beyond ecological limitations at a favorable price, while also procuring goods they cannot produce without disrupting the domestic market. In order to achieve this, it is crucial to establish and maintain a competitive advantage in foreign trade. Consequently, the functioning of the free-market economy, which involves approximately 174 countries, is widespread worldwide. It is known that multiple countries produce the same product, and each country possesses competitive advantages such as price, quality, location, cultural and political relations, and economic power.

This study focuses on examining the competitiveness of important agricultural products grown in the province of Pakistan. The reduction of trade barriers creates competitive pressures and has the potential to lead to productivity gains, allowing for the restructuring of an economy towards its comparative advantage. To accomplish this, import and export data from the past 20 years will be utilized. In determining the competitiveness of Pakistan's agricultural products, various formulations explaining absolute and relative competitive advantages, such as RCA, RXA, RMA, and RTM, will be employed.

1. Introduction

The competitiveness of agricultural products is a critical determinant of a nation's economic prosperity and food security (FAO, 2020). In the case of Pakistan, an agricultural powerhouse in South Asia, the examination of its agricultural product competitiveness is of paramount importance. This research paper aims to investigate the competitiveness of Pakistan's agricultural products, shedding light on various essential aspects, including trade dynamics and recent studies on the competitiveness of its agri-food products.

Pakistan's agriculture sector plays a pivotal role in its economy, contributing significantly to its GDP and providing employment to a substantial portion of the population (World Bank, 2021). The country's agri-food sector encompasses a wide range of products, including staple crops, fruits, vegetables, livestock, and more. Pakistan's strategic geographical location, agro-ecological zones, and a rich variety of agricultural products position it as an essential player in the global agricultural trade (UNCTAD, 2019).

In recent years, Pakistan has been actively engaged in the international trade of agricultural products. Key commodities include rice, wheat, cotton, sugarcane, citrus fruits, and livestock. These products not only cater to domestic consumption but also find their way to international markets, contributing to the country's foreign exchange earnings (State Bank of Pakistan, 2020). The examination of trade dynamics, including export and import trends, competitiveness, and market access, is crucial in understanding Pakistan's standing in the global agricultural marketplace.

To gain insight into the competitiveness of Pakistan's agricultural products, recent studies in this field have offered valuable findings and assessments. These studies have analyzed various dimensions, including production efficiency, quality standards, value chains, and market access challenges (Irshad et al. 2018). By building on the knowledge generated by these research endeavors, this paper seeks to provide an updated and comprehensive evaluation of Pakistan's agricultural product competitiveness.

The current investigations embarks on a journey to explore the competitiveness of Pakistan's agricultural products, considering trade dynamics and recent studies in the field. By doing so, it aims to contribute to the understanding of Pakistan's position in the global agricultural trade arena and offers insights into potential areas of improvement to enhance the competitiveness of its agri-food sector.

2. Literature Review

Pakistan's agricultural sector is a cornerstone of its economy, contributing significantly to its GDP and employment (World Bank, 2021). This sector encompasses a wide range of products, including staple crops, fruits, vegetables, and livestock. Pakistan's unique agro-ecological diversity and geographical positioning have established it as a prominent player in global agricultural trade (UNCTAD, 2019). To evaluate the competitiveness of Pakistan's agricultural products,

it is crucial to examine the trade dynamics governing these commodities.

In recent years, Pakistan has actively participated in international agricultural trade, with key commodities such as rice, wheat, cotton, sugarcane, citrus fruits, and livestock playing a pivotal role. These products not only cater to domestic consumption but also significantly contribute to the nation's foreign exchange earnings (State Bank of Pakistan, 2020). A comprehensive assessment of trade dynamics, encompassing export and import trends, competitiveness factors, and market access conditions, is essential for gaining insights into Pakistan's positioning in the global agricultural landscape.

Several recent studies have delved into the competitiveness of Pakistan's agri-food products. These investigations have explored various dimensions, including production efficiency, quality standards, value chain integration, and market access challenges. One notable study by Iqbal et al. (2018) focused on Pakistan's rice exports and employed the Revealed Comparative Advantage (RCA) approach to assess the nation's comparative advantage in this product category. This study yielded valuable insights into the competitiveness of Pakistan's rice exports on the international stage. The foundational concept of comparative advantage, originally posited by Ricardo (1817), remains central to international trade theory. It advocates that nations should specialize in producing goods where they possess a comparative advantage and engage in trade to maximize overall economic welfare. Within the context of agriculture, competitiveness pertains to a nation's ability to efficiently produce and market agricultural products, ensuring that they meet international quality and cost standards (Porter, 1990). A comprehensive understanding of comparative advantage and competitiveness is indispensable for evaluating Pakistan's agri-food products in the global context.

Trade theories, including those developed by economists such as Ricardo and Heckscher-Ohlin (1933), furnish the theoretical framework for comprehending how countries can derive mutual benefits through the exploitation of their comparative advantages. Competitive advantage, building upon these theories, underscores a country's capacity to enhance and sustain its position in international markets (Porter, 1990). The processes of globalization and trade openness have intensified competition, emphasizing the need for countries to continually enhance their competitive advantage in sectors, including agriculture (Mellor, 2015). The Revealed Comparative Advantage (RCA) index, pioneered by Balassa (1965), represents a widely employed quantitative tool for assessing a country's comparative advantage in specific products. RCA is calculated by comparing a country's share of a particular product's exports to its overall exports, with values exceeding one indicating a comparative advantage (Balassa, 1965). Additional mathematical ratios such as the Revealed Symmetric Comparative Advantage (RSCA) and the Revealed Competitiveness Index (RCI) are used to provide nuanced insights into a country's competitiveness within specific sectors (Lall, 2001).

In recent research, these mathematical ratios have been extensively utilized to evaluate Pakistan's comparative advantage and competitiveness concerning various agricultural products, offering valuable quantitative insights into its global standing. This literature review encapsulates critical aspects related to Pakistan's agricultural trade dynamics, recent studies on the competitiveness of its agri-food products, foundational concepts of comparative advantage and competitiveness, relevant trade theories, and the significance of mathematical ratios like RCA in

evaluating competitiveness. These insights provide a strong foundation for your research paper, allowing for a comprehensive exploration of Pakistan's agricultural product competitiveness on the global stage.

3. Method

We investigate the competitiveness of some important products grown and called wheat, Maize (corn), sugar cane, cotton, and rice in Pakistan, China, United Arab Emirates, Afghanistan, Malaysia, Saudi Arabia, and also World within the scope of this study. For this purpose, import and export data of the last 20 years were used. Within the scope of the study, some agricultural production and trade data of some countries were not available. The analysis results obtained with the available data were interpreted. The purpose of this research is examining the power of competitiveness of Pakistan agricultural products. To achieve this aim, secondhand sources were used from food and agriculture organization (FAO) and international trade center (ITC). Analysis results were received by using these data.

Formulations explaining absolute and Thomas Vollrath's and Balassa's relative competitive advantage such as RCA, RXA, RMA and RTA were used to determine the competitiveness of Pakistani agricultural products.

$$RCA_{ir} = \frac{\frac{X_{ir}}{X_r}}{\frac{X_i}{X}}$$

In the equation, X_{ir} is the value of exports of agricultural product i from country r , X_r is the value of exports of all goods from country r, X_i is the value of global exports of agricultural product i , and X is the value of global exports of all goods. A comparative advantage is "revealed", if RCA >1. If RCA is less than unity, the country is called to have a comparative disadvantage in the agricultural product. It is contended that the RCA index is biased because of the omission of imports specially while country-size is critical (Greenaway and Milner, 1993).

Vollrath (1991) conceptualizes three RCA indexes: the Relative Trade Advantage (RTA) index, the Relative Export Advantage (REA) index and the Revealed Competitiveness (RC) index (see also Vollrath (1987; 1989)). Let J be a set of countries (the "trade area", i.e. the world or the members of some regional trade agreement), K a set of commodities, and T a set of time periods. X_{ikt} denotes the exports of agricultural product $k \in K$ by country $i \in J$ toward the other countries in J in time period t. Thereafter:

$X_{i\mathcal{K}t}$ denotes the exports of all commodities except k by i in t; that is, $X_{i\mathcal{K}t} = \sum_{l\epsilon\mathcal{K}} X_{ilt}$, where $\mathcal{K} = K\backslash\{k\}$.

$X_{\mathcal{J}kt}$ represents the exports of k by all countries except i in t; that is, $X_{\mathcal{J}kt} = \sum_{j\epsilon\mathcal{J}} X_{jkt}$, where $\mathcal{J} = J\backslash\{i\}$.

Lastly, we write as $X_{\mathcal{J}\mathcal{K}t}$ the exports of all commodities except k by all countries except i in t; that is, $X_{\mathcal{J}\mathcal{K}t} = \sum_{j\epsilon\mathcal{J}} \sum_{l\epsilon\mathcal{K}} X_{jlt}$.

In addition, let M_{ikt}, $M_{i\mathcal{K}t}$, $M_{\mathcal{J}kt}$ and $M_{\mathcal{J}\mathcal{K}t}$ be the same types of variables defined for imports. Lastly, RTA_{ikt}, REA_{ikt} and RC_{ikt} denote the RTA, REA and RC indexes associated with (i, k, t), $respectively$[2]. Thereafter:

$$\begin{cases} RTA_{ikt} = RXA_{ikt} - RMA_{ikt} \\ \text{with } RXA_{ikt} = \dfrac{X_{ikt}/X_{i\mathcal{K}t}}{X_{\mathcal{J}kt}/X_{\mathcal{J}\mathcal{K}t}} \text{ and } RMA_{ikt} = \dfrac{M_{ikt}/M_{i\mathcal{K}t}}{M_{\mathcal{J}kt}/M_{\mathcal{J}\mathcal{K}t}} \end{cases}$$

The RTA index computes the value of X_{ikt} normalized by $X_{i\mathcal{K}t}$, which is the exports

of k by i normalized by the exports of products other than k by i. Similarly, the RTA index computes the value of $X_{\jmath kt}$ normalized by $X_{\jmath \mathcal{K}t}$, which is the exports of k by the countries other than i normalized by the exports of products other than k by the countries other than i. The normalized values of M_{ikt}, and $M_{\jmath kt}$ are calculated in the same way. If the normalized value of X_{ikt} is greater than the normalized value of $X_{\jmath kt}$, then $i$has a higher propensity to export k than the other countries. This could be seen as the consequence of comparative advantages. Therefore, the ratio of $X_{ikt}/X_{i\mathcal{K}t}$ to $X_{\jmath kt}/X_{\jmath \mathcal{K}t}$, which is named the ratio of relative export advantage (RXA), is greater than 1. However, the normalized value of M_{ikt} may be greater than the normalized value of $M_{\jmath kt}$. Furthermore, the difference between the normalized value of M_{ikt} and the normalized value of $M_{\jmath kt}$. may be greater than the corresponding difference in exports. If so, the ratio of $M_{ikt}/M_{i\mathcal{K}t}$ to $M_{\jmath kt}/M_{\jmath \mathcal{K}t}$, which is named the ratio of relative import advantage (RMA), will be greater than the RXA ratio, and there should not exist comparative advantages for i even if RXA_{ikt}>1. Consequently, if the RMA index value is greater than 1, it means that the country has a disadvantage in the product, and if it is less than 1, the country is in an advantageous state (Zhang, W., & Wilson, A. 2023).

We categorize the RTA index in three categories: RTA < 0 refers to all those product groups with an absence of relative trade advantage or to products with relative trade disadvantage. RTA = 0 refers to all those product groups at a break-even point without relative trade advantage or relative trade disadvantage. RTA > 0 refers to all those product groups with a relative trade advantage. These boundaries are consistent with a theoretical interpretation appropriate for cross-country comparisons. Recently, the RXA index, the RMA index and RTA index have become popular tools to analyze both the merchandise trade (e.g., Amiti, 1998; Proudman and Redding, 2000; Hinloopen and Van Marrewijk, 2001; Redding, 2002)

4. Result and Discussion

When we look at human history, trade is always important for countries and after the Covid-19, we have comprehended imports and exports are also necessary for countries. Even if there is not covid-19, in any year there could find out any change in the agricultural field as regard production, and that would affect imports and exports too.

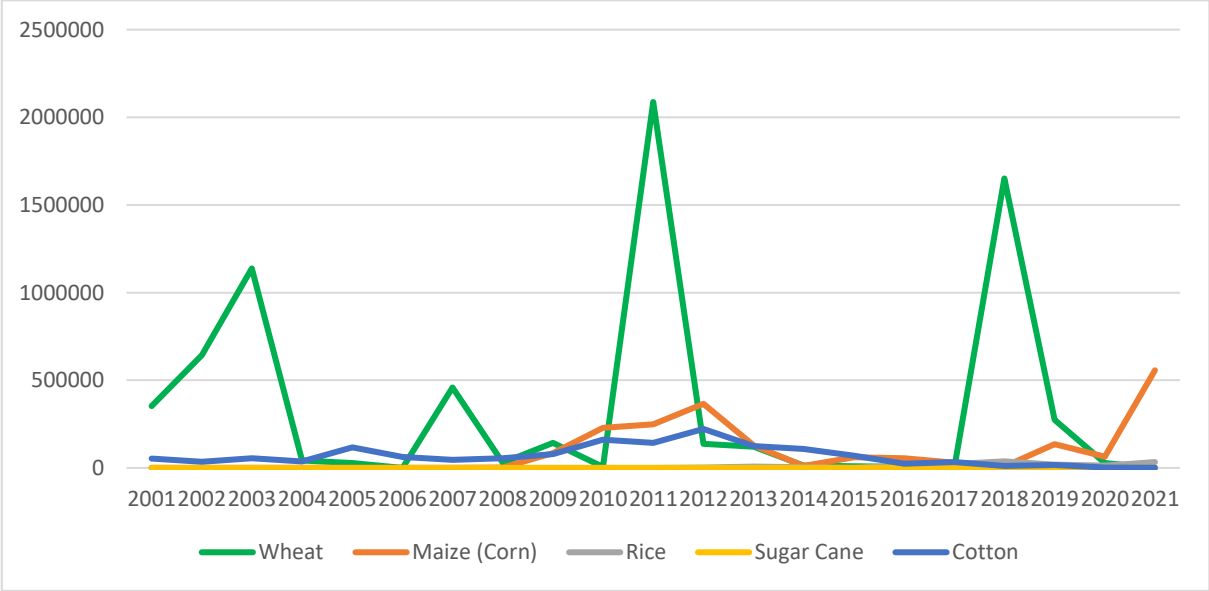

Figure 1. Fundamental Agricultural Products as Regard Pakistan Export

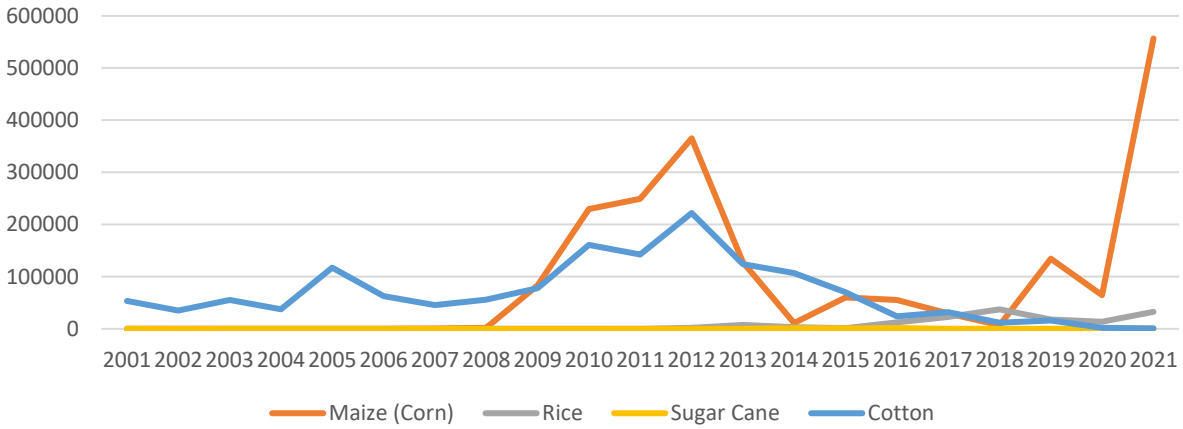

Figure 2. Fundamental Agricultural Products as Regard Pakistan Export without Wheat

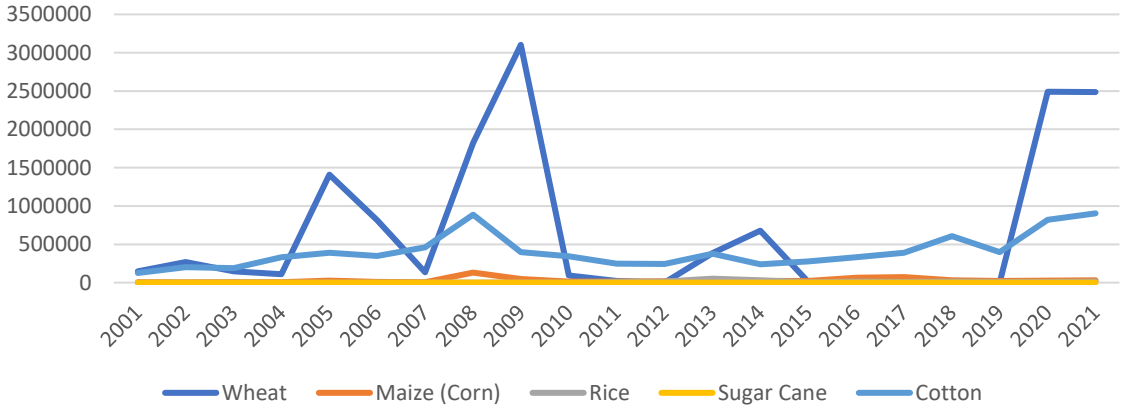

Figure 3. Fundamental Agricultural Products as Regard Pakistan Import

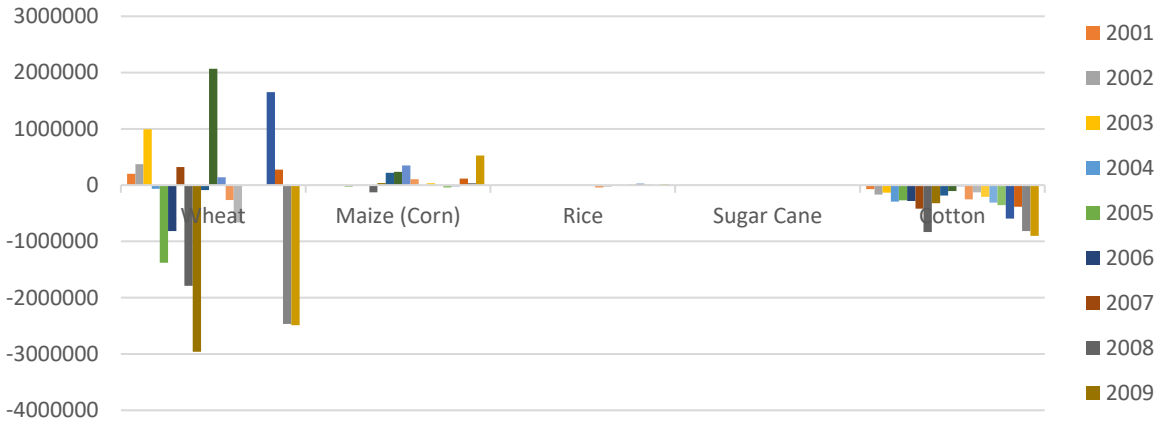

Figure 4. Pakistan's Trade Surplus and Deficit

The empirical results presented in Figure 1 shed light on Pakistan's foreign trade dynamics, with a specific focus on its trade relationships with the top five countries, including China, the United Arab Emirates, and Afghanistan, in both the import and export sectors. Additionally, the study highlights the significance of five key agricultural commodities wheat, maize (corn), rice, sugar cane, and cotton by evaluating their import and export volumes. By the number of imports and exports, we evaluated the top 5 commodities products

which are wheat, maize (corn), rice, sugar cane, and cotton. Wheat is the main exported agricultural product for Pakistan, maize (corn) and cotton are second and third export agricultural products respectively. As for imports, the first agricultural product that Pakistan imports is wheat, cotton follows it as a second agricultural product. Between 2001 and 2021, Pakistan had a decreasing rate of foreign trade, and for cotton, there was always a deficit from 2001 to 2021.

The findings underscore the importance of understanding Pakistan's trade relations in a global context. For instance, Ghauri (2020) emphasizes the growing trade ties between Pakistan and China, highlighting the need for further exploration of these trends. Furthermore, Mustafa and Asghar (2019) provide insights into Pakistan's trade relationship with the United Arab Emirates, showcasing the potential for continued collaboration in various sectors. In terms of agricultural exports, it is evident that wheat stands out as Pakistan's primary agricultural product for export. Kiani et al. (2018) discuss the determinants of wheat exports from Pakistan, shedding light on the factors influencing this crucial trade. Additionally, Haider et al. (2019) offer an empirical analysis of factors affecting cotton exports, highlighting the challenges and opportunities in this sector. Moreover, Maqbool et al. (2020) delve into the export competitiveness of maize in Pakistan, providing valuable insights into its role as the second-largest agricultural export. On the import front, wheat emerges as the leading agricultural product imported by Pakistan. Farooq et al. (2000) and Ali et al. (2001) analyze the implications of wheat imports, considering the country's self-sufficiency goals and the impact of foreign imports. Furthermore, Anwar et al. (2010) discuss the dynamics of cotton imports in Pakistan and the implications for domestic cotton production, offering valuable perspectives on trade deficits in this critical sector.

These associated findings provide a comprehensive backdrop for understanding Pakistan's trade relationships and the dynamics of its top agricultural commodities. They emphasize the need for continued research and policy considerations to enhance Pakistan's trade competitiveness and mitigate trade deficits, particularly in the context of key agricultural products.

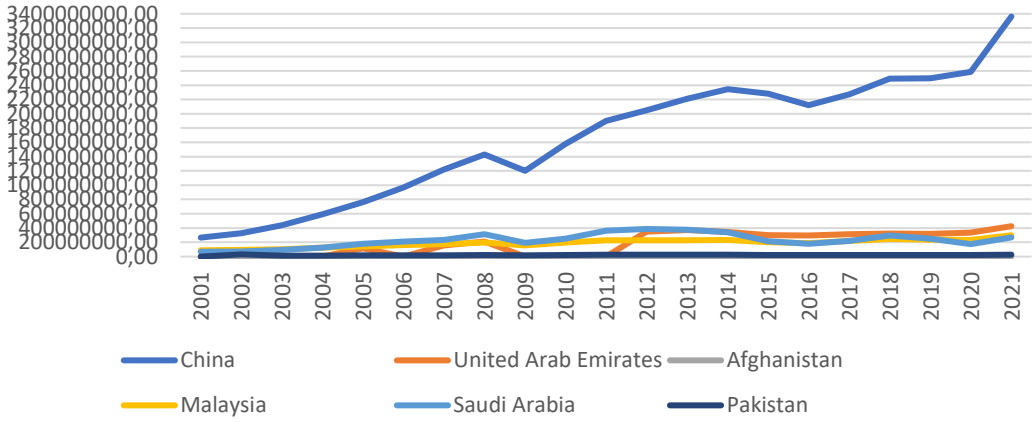

Figure 5. World Total Export

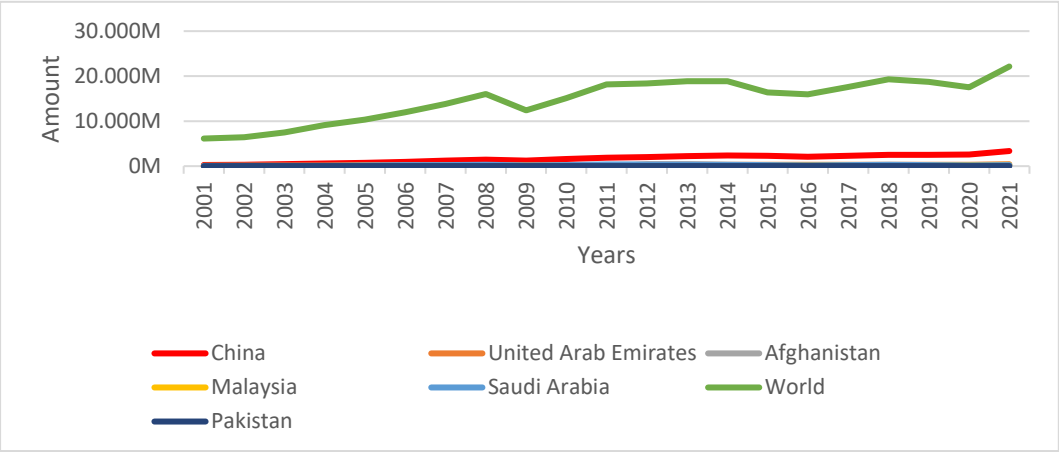

Figure 6. Total Export Based on 6 Countries

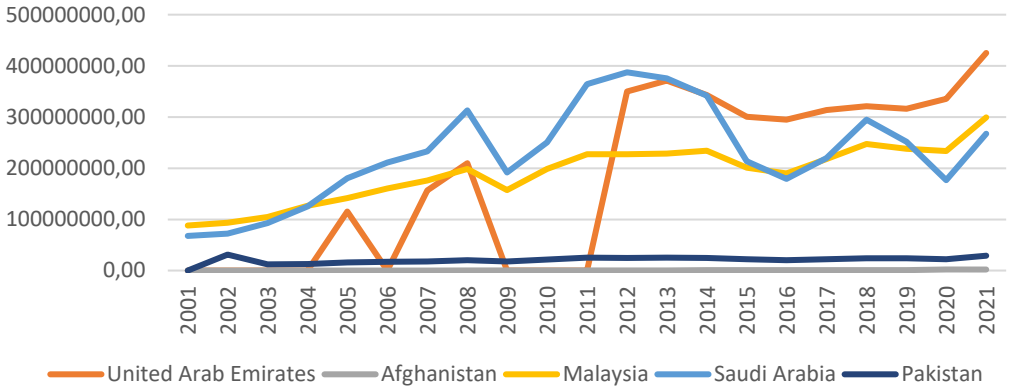

Figure 7. 5 Total Export Based on 5 countries

As for total export, as we knew, every passing year all country's export and import has been grown up. Therefore, when we look at the graph of total exports, we clearly see this result. Moreover, China has followed world trend in total export. We examined all countries except China and world total, Malaysia and Saudi Arabia have a fluctuation in total export value, but it is upward trend. United Arab Emirates had a peaked in 2012 and then it has been a leader in this field since 2013.

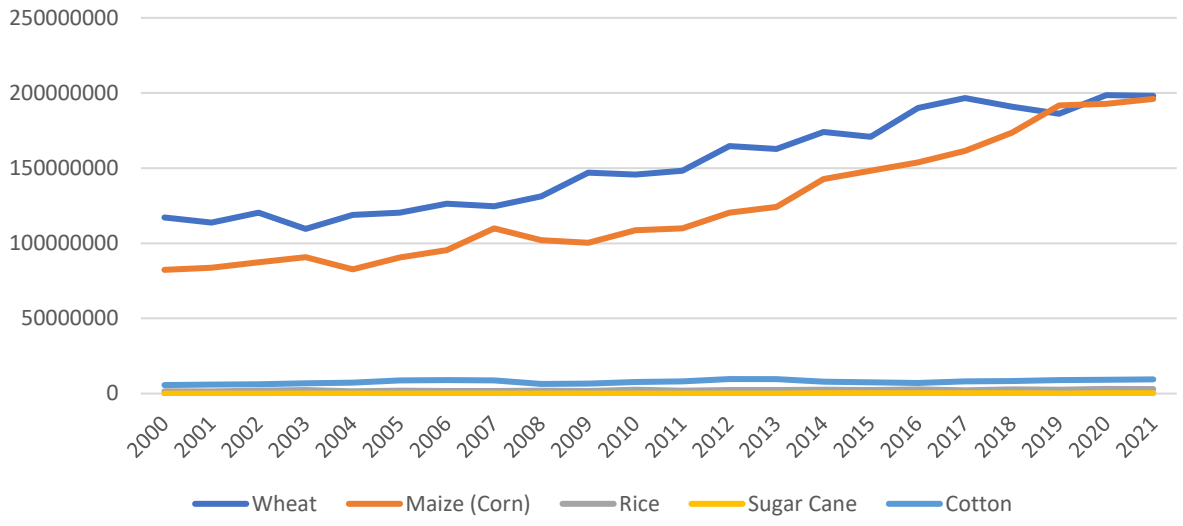

Figure 8. World Export Based on Agricultural Products

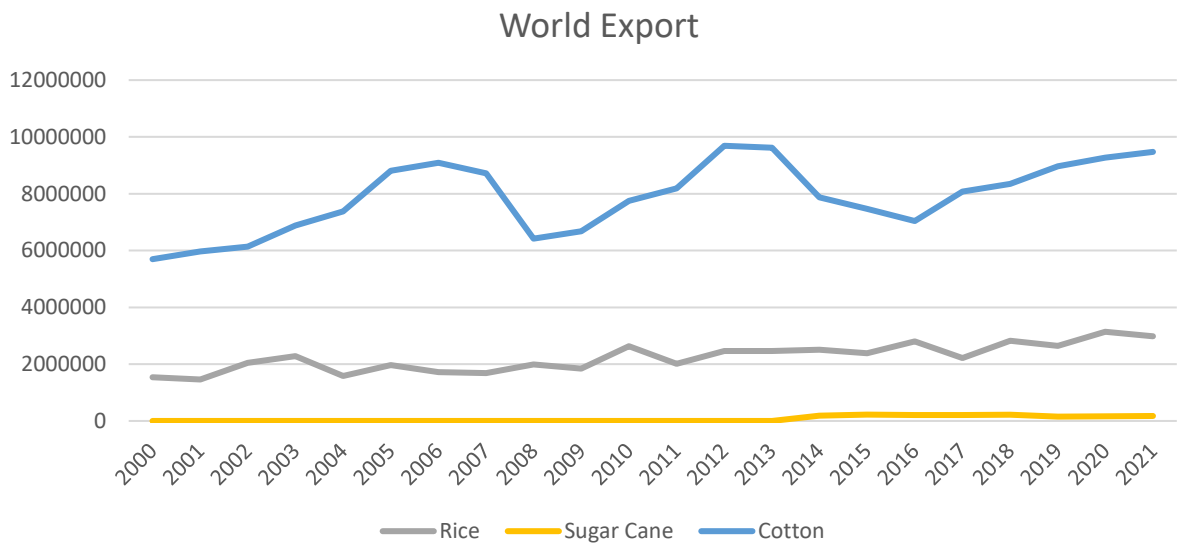

Figure 9. World Export Based on 3 Agricultural Products

As regards world export value by five commodities, wheat and maize (corn) have almost the same number of exported values in all years, but maize (corn) had taken place leader in 2019, and then wheat is the most value of exported agricultural product in 2021. When rice has kept its value, cotton has had an upward trend with fluctuations. An interesting thing is that there is no export sugar cane value until 2013.

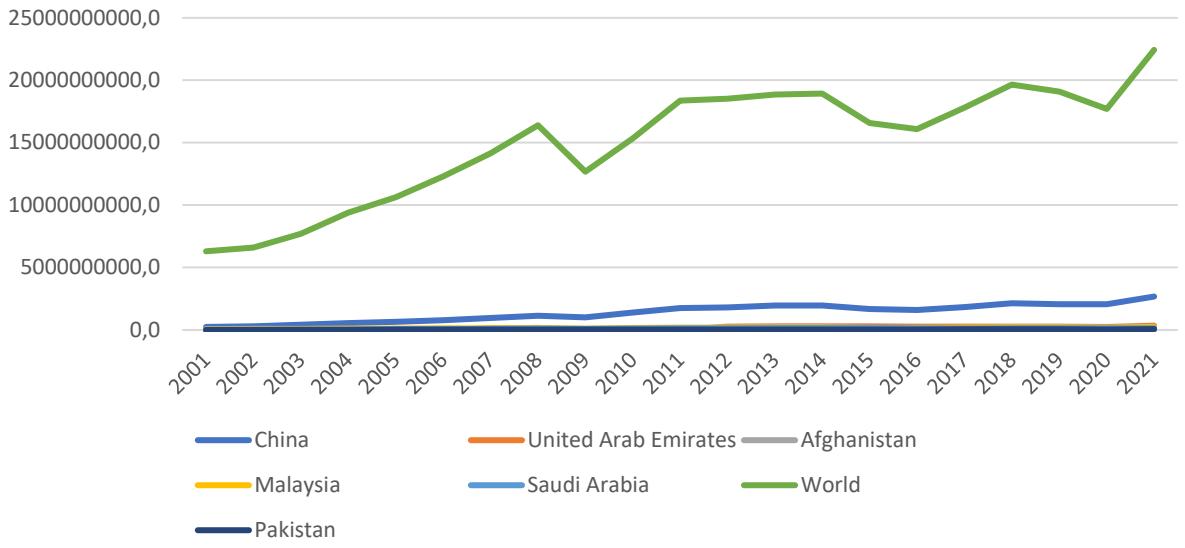

Figure 10. Total Import Based on 6 Countries and World

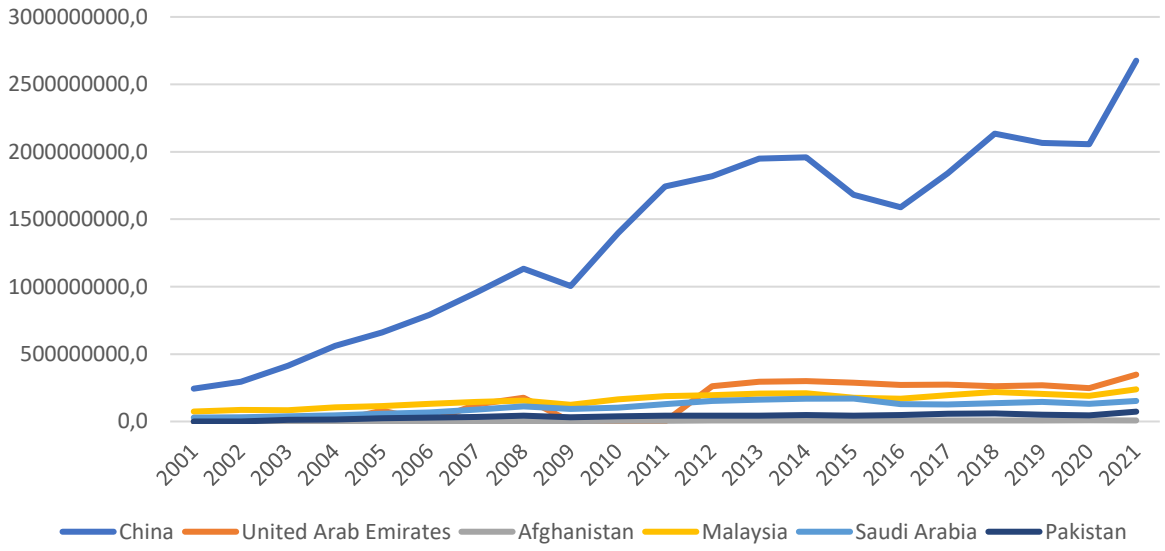

Figure 11. Total Import Based on 6 Countries

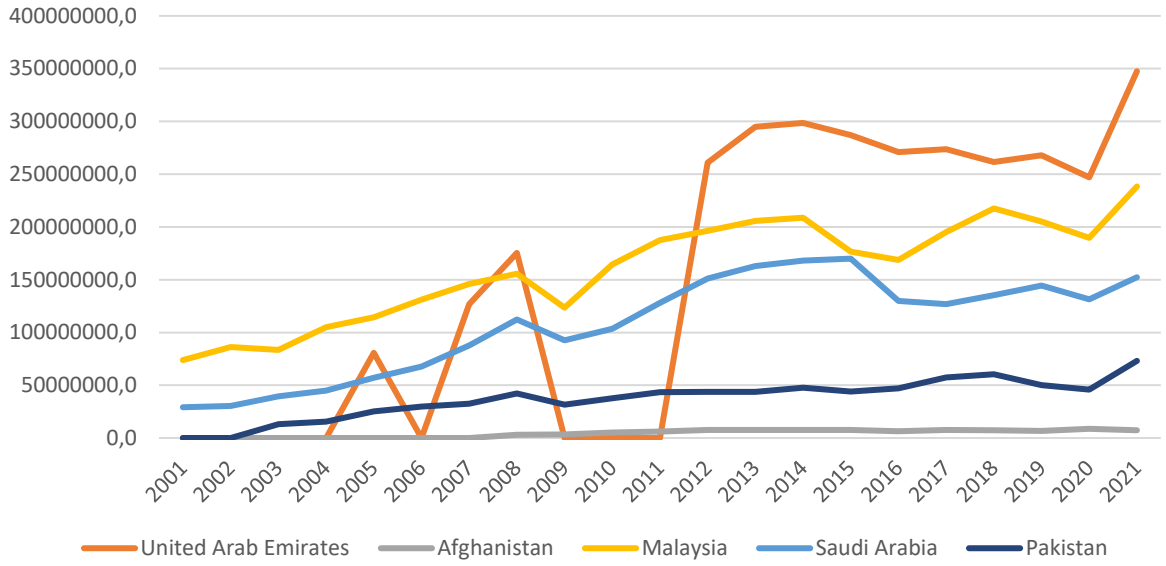

Figure 12. Total Import Based on 5 Countries

For total imports all five countries and the world, as export, the amount of total import value has been extended, although there were some decreases in some years. Although the values are different, all five countries except United Arab Emirates have upward trend like following the trend of world. United Arab Emirates has an upward trend but, in these years, it has a fluctuation.

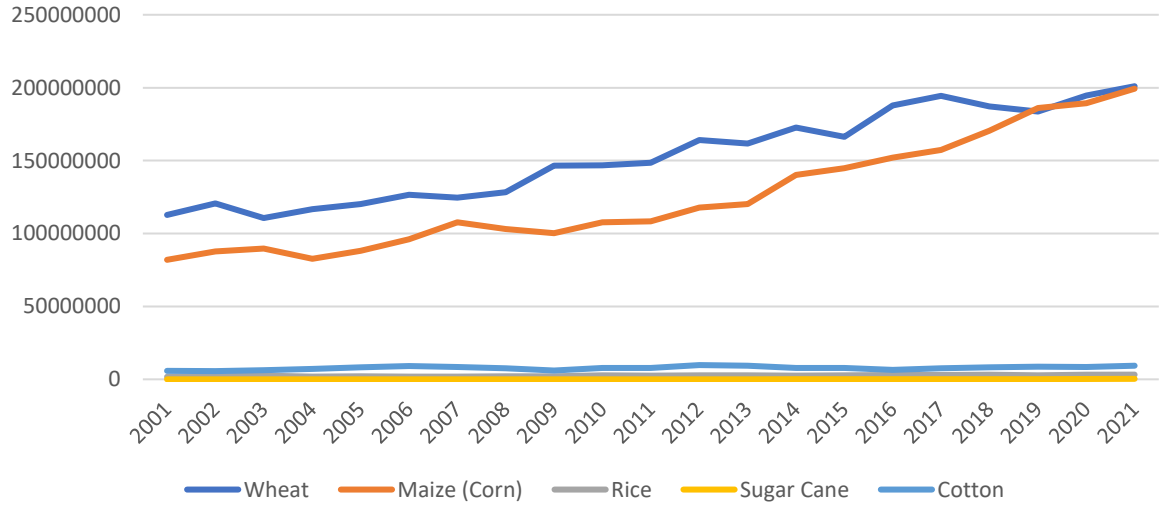

Figure 13. World Import Based on Agricultural Products

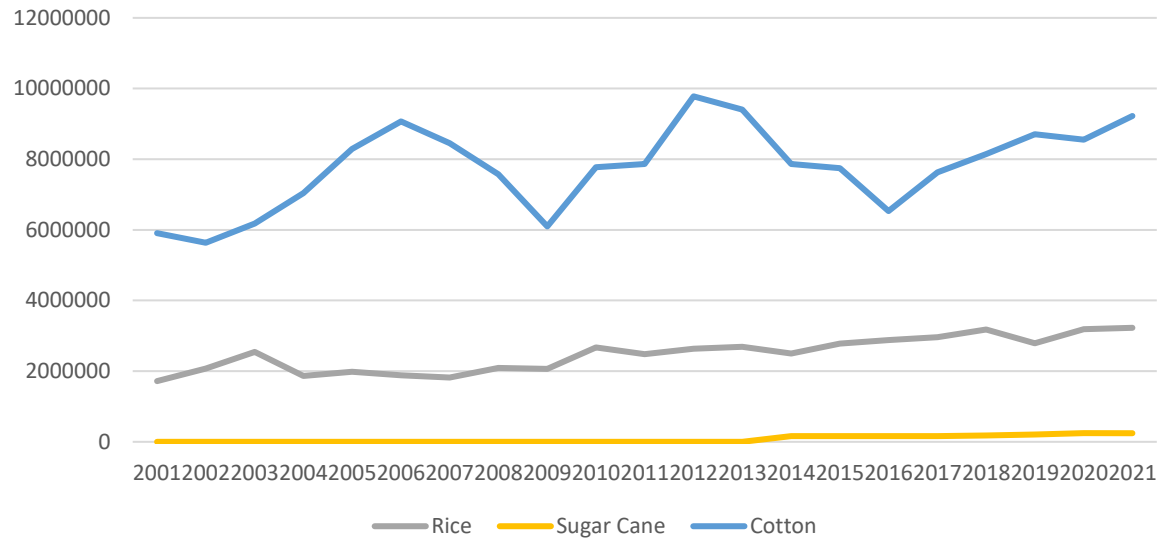

Figure 14. 3 World Export Based on 3 Agricultural Products

As regards world import value by five commodities, wheat and maize (corn) have almost the same number of imported values in all years, but maize (corn) had taken place leader in 2019, and then wheat is the most value of imported agricultural product in 2021. When rice has kept its value, cotton has had an upward trend with fluctuations. The data reveals that both wheat and maize (corn) consistently maintained a significant share of world import values throughout the years under consideration. Maize (corn) temporarily emerged as the leader in 2019, underscoring its role as a vital agricultural commodity in the global market. This observation aligns with the research of Tanumihardjo et al. (2020),, who highlight the increasing importance of maize (corn) in global food security due to its diverse applications in food, feed, and industrial processes. Additionally, the work of Garcia and Mendoza (2019) delves into the factors influencing maize (corn) trade dynamics, emphasizing its growing role in international agricultural trade. Conversely, wheat regained its position as the most valuable imported agricultural product in 2021, illustrating its enduring significance in global food supply chains. Research by Grote et al. (2021) discusses the resilience of wheat as a staple food crop and its contribution to food security worldwide. Furthermore, the findings coincide with the observations of Khan and Ahmad (2017), who emphasize the role of wheat as a staple food in many countries, necessitating consistent import volumes.

Rice, on the other hand, has maintained relatively stable import values over the years, indicating its consistent demand in international markets. The stable trend in rice imports resonates with the research of Akter and Alam (2018), who underscore the enduring global demand for rice as a staple food source. Additionally, their work discusses the factors driving rice trade dynamics, including production, consumption patterns, and market access. Cotton, while exhibiting fluctuations, has shown an overall upward trend in world import values. This trend aligns with the insights provided by Ouyang and Tang (2017), who discuss the global cotton trade dynamics and emphasize the importance of cotton as a raw material in the textile industry.

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Table 1. RCA and RXA for Pakistan as Regards Fundamental Agricultural Product

Years	RCA for Wheat	RXA for Wheat	RCA for Maize (Corn)	RXA for Maize (Corn)	RCA for Rice	RXA for Rice	RCA for Sugar Cane	RXA for Sugar Cane	RCA for Cotton	RXA for Cotton
2001	1.073912	-18715056.34	0.000008	-144	0,0002	-4190.6	345.6	***	3.11	-55550832,3
2002	1.101210	-33705591.7	0.000002	-72	0.0001	-3134.5	206.3	***	1.18	-36638679.8
2003	6.528132	-77435128.4	0.000998	-11739	0.0003	-3273.2	628.4	***	5.04	-60407693.0
2004	0.260882	-3237097.3	0.000543	-6760	0.0005	-5748.7	723.8	***	3.66	-46223918.7
2005	0.145968	-2312458.9	0.000385	-6115	0.0003	-5252.9	645.2	***	8.58	-139192693.8
2006	0.000006	-93.6	0.000237	-3978	0.0004	-6940.3	707.4	***	4.87	-82922693.5
2007	2.850587	-50513031.2	0.003427	-60567	0.0005	-8161.7	774.3	***	4.05	-72411111.5
2008	0.178677	-3589946.3	0.014326	-288297	0.0004	-8020.5	789.3	***	6.88	-140571472.7
2009	0.684489	-11868122.8	0.587980	-10232214	0.0459	-804054.1	705.9	***	8.27	-146557171.8
2010	0.023949	-507172.0	1.487642	-31647719	0.0005	-11457.4	705.1	***	14.63	-319254996.1
2011	10.072305	-256464229.6	1.623806	-40939905	0.0004	-8983.9	715.8	***	12.45	-320404027.3
2012	0.622726	-15182704.6	2.266455	-55515402	0.6852	-16856258.0	747.5	***	17.13	-430826064.0
2013	0.560574	-13952299.2	0.772752	-19278456	2.3572	-59314233.5	750.7	***	9.70	-246373041.6
2014	0.054631	-1336469.7	0.058241	-1427165	1.0357	-25603014.0	4.3	-107604231.8	10.38	-259727454.7
2015	0.041369	-903116.0	0.303667	-6640837	0.3294	-7268665.3	2.6	-58579308.6	6.97	-155137724.9
2016	0.020767	-420798.2	0.278637	-5660863	3.4252	-70540509.1	5.9	-121366998.5	2.68	-55141304.4
2017	0.012875	-278606.4	0.146392	-3174764	8.3183	-183926318.9	0.8	-17634306.7	3.20	-70252267.7
2018	7.030055	-166765146.7	0.031713	-746415	10.7465	-258603830.4	0.6	-13580502.6	1.14	-27124338.7
2019	1.156361	-27274927.2	0.553117	-13032418	5.3845	-128954535.7	1.2	-29211278.1	1.39	-33037501.3
2020	0.110928	-2436884.7	0.263780	-5797799	3.4067	-76003824.1	0.9	-18944629.6	0.15	-3346533.7
2021	0.000004	-110.6	2.176367	-62393535	8.4281	-245754494.5	3.5	-102314745.5	0.07	-1903390.4

***variables related to these years could not reached.

4.1. Relative comparative advantage (RCA)

It can be observed that there is a slight fluctuation in the RCA index for wheat, although the data of some years are outlie but it could be said that Pakistan has a relative comparative disadvantage (RCD) too. This index is generally around 0.5. in 2001,2003,2011, and 2018 there was a jump in the relative comparative advantage (RCA) index for wheat produced in Pakistan. Therefore, in these years it has an RCA because this index is higher than 1. As regards maize (corn), it is obviously seen that Pakistan experienced RCD. In 2010,2011,2012, and 2021 the same thing was happening as wheat. As for rice, Pakistan had an RCA since 2013 except in 2015, because from 2002 to 2012, this index was starting from 0.0001 to 0.6. Pakistan performed RCA in sugar cane without some years which are 2017, 2018, and 2020. In the last two years, there has been RCD in cotton Pakistan has produced. However, before 2020, It had an RCA, especially between 2010 and 2012 this index was around 14.73.

4.2. Revealed comparative export advantage *(RXA)*

It is interesting that in all periods, whole agricultural products produced in Pakistan we took care of experienced revealed comparative disadvantage (RXA <1) since this index is negative. Sugar cane products, due to a lack of accessible RXA index could not be created from 2001 to 2013.

Table 2. RMA and RTA for Pakistan as Regards Fundamental Agricultural Product

Years	RMA for Wheat	RTA for Wheat	RMA for Maize (Corn)	RTA for Maize (Corn)	RMA for Rice	RTA for Rice	RMA for Sugar Cane	RTA for Sugar Cane	RMA for Cotton	RTA for Cotton
2001	0	0	0	0	0	0	***	***	0	0
2002	0	-33702142.94	0	-72.16684677	0	-3134.544525	***	***	0	-36638479.51
2003	-10167449.24	-67255730.36	-348834.8568	337096.2648	-60588.39292	57315.23909	***	***	-242295473.5	181888225.5
2004	-8589207.863	5352125.998	-396175.5722	389415.9255	-5024.981998	-723.6887694	***	***	-462087294.1	415863565.1
2005	-124211405	121898952.2	-3260493.517	3254378.419	-5340.174305	87.22960749	***	***	-519535701.2	380344584.9
2006	-78699636.5	78699542.9	-956515.2887	952537.4643	-6512.297866	-428.0478506	***	***	-486185293	403263034.2
2007	-15273207.35	-35238128.08	-826326.6778	765759.6372	-194084.2713	185922.5832	***	***	-814086908.9	741676036.8
2008	-233520082.1	229930142.5	-20648846.39	20360549.44	-7825.891069	-194.6410103	***	***	-2167347228	2026776247
2009	-270827637.1	258959652.6	-5946268.332	-4285875.904	-16907056.62	16103002.5	***	***	-881863358.5	735307113.8
2010	-9723764.903	9216593.106	-1740526.868	-29906706.73	-16849695.95	16838238.51	***	***	-705899445.6	386647857.2
2011	-2673151.763	-253761286.2	-2203139.332	-38736198.56	-61772445.12	61763461.18	***	***	-598616131.1	278214623
2012	0	-15182590.24	-2757025.597	-52757265.8	-104901811.8	88045555.91	***	***	-470110235.4	39289380.61
2013	-44761645.41	30809437.01	-3795176.744	-15483147.43	-367304042.8	307989833.7	***	***	-782837772.6	536466358.4
2014	-73714968.04	72378499.27	-3112102.486	1684938.344	-241519073.3	215916064	-116853.1136	-107487372.6	-588186669.2	328460691.9
2015	-931854.102	28738.65918	-2699893.849	-3940918.688	-36646649.72	29377984.93	-101238.6613	-58478067.14	-609239788.4	454102726.7
2016	-3457.605152	-417340.4788	-6555201.002	894357.4259	-85330219.15	14789764.89	-98313.861	-121268672.3	-860172901.5	805031681.5
2017	-235.4222699	-278370.9024	-7945366.754	4770608.317	-56430492.01	-127495585.4	-8575.229125	-17625731.26	-950999835.5	880747696.9
2018	-103.7503613	-166750640.6	-3216647.115	2470232.851	-72893653.23	-185709676.8	-108738.3286	-13471764.17	-1574881756	1547757434
2019	-102.7283482	-27274421.81	-2046871.556	-10985451.65	-71716627.6	-57237783.62	-92069.87755	-29119207.82	-915230450.9	882192977.5
2020	-226431147.9	223994267.1	-2325873.785	-3471903.434	-52109787.81	-23893977.14	-720173.4988	-18224455.86	-1869219187	1865872653
2021	-277522350.1	277522239.5	-3221245.588	-59170704.32	-81064100.01	-164690029.9	-91803.30308	-102222938.3	-2426715765	2424812375

***variables related to these years could not reached.

4.3. Relative import advantage (RMA)

All products we took care of have an RMS value less than 1. Therefore, Pakistan has recorded a pronounced relative import advantage (RMA). In 2001 and 2002, Pakistan had a relative import disadvantage (RMD) for all 5 agricultural products, especially in 2012 for wheat it had a RMD by 0 index point.

4.4. Relative trade advantage (RTA)

A value of the RTA equal 0 indicates that product groups at a break-even point without relative trade advantage or relative trade disadvantage. All the products we took care of are like this in 2001. For just sugar cane, RTA value has been always negatives starting from -107487378.6 to -102222942.2 that means Pakistan has relative import advantage. In the other hand, for cotton, this index was positive for all periods except 2002. In this year, it was -36638679.83. Therefore, it could be said Pakistan had a RTD for cotton products. There was a fluctuation in rice products for relative trade advantage, in recent years, this index has shown negatives value. Hence, for rice production, Pakistan had an RTA. Maize (corn) Pakistan produced had a relative trade advantage from 2009 to 2013. However, between 2003 and 2008, it had had a RTD because this index was around 4343318.85. In wheat product, there have been fluctuations in every 3 years, but in last two years this index has been positive so it could be said Pakistan had a relative trade disadvantage between 224026549.8 and 277553375.

5. Conclusion

As it is known, a country's self-sufficiency in production and how it uses the products produced have an important place for the country. The products produced are generally used in two ways. The first one is used in the domestic market and the other one is exported. In this study, Pakistan's trade power was evaluated. When we examined this subject, we took 5 different fundamental agricultural products which are wheat, rice, maize (corn), sugar cane, and cotton. We used some analysis index such as Relative comparative advantage (RCA), Revealed comparative export advantage (RXA), Relative import advantage (RMA), and Relative trade advantage (RTA).

When we consider RCA in this context, it can be said that Pakistan has a share in the world production of sugar cane and cotton products. Recently, rice has been added to these products. For Revealed comparative export advantage (RXA), Pakistan does not use the products it produces in foreign trade but instead uses them in the domestic market, and therefore the RXA index of all products was obtained as negative, whereas, in RMA index, Pakistan seems to be more consistent regarding imports. Since all index values are negative, these basic agricultural products which are wheat, rice, maize (corn), sugar cane, and cotton of Pakistan are more sensitive in terms of imports.

It could be said these agricultural products Pakistan produced have relatives import advantage (RMA) in some of years which are from 2001 to 2021. For sugar cane, Pakistan is self-sufficient because it imports small amounts and does not export too much. We can say the same thing for wheat as well in recent years. We can interpret it with the help of Relative trade advantage (RTA). It shows us the difference between RXA and RMA.

References

Akter, S., & Alam, M. J. (2018). Global Demand for Rice: Trends and Determinants. Journal of Rice Research, 6(2), 1-10.

Ali, A., & Ali, M. (2001). Wheat self-sufficiency in different policy scenarios and their likely impacts on producers, consumers, and the public exchequer. The Pakistan Development Review, 203-223.

Amiti, M. (1998). New trade theories and industrial location in the EU: a survey of evidence. Oxford review of economic policy, 14(2), 45-53.

Anwar, S., Shaukat, F., & Hussain, Z. (2010). Impact of trade liberalization on export of cotton from Pakistan: a time series analysis. Sarhad Journal of agriculture, 26(2), 297-304.

Balassa, B. (1965). Trade Liberalisation and 'Revealed' Comparative Advantage. The Manchester School, 33(2), 99-123.

FAO. (2020). Competitiveness in the Agriculture and Agribusiness Sector. Food and Agriculture Organization. https://www.fao.org/3/cb0044en/cb0044en.pdf

Farooq, U., Iqbal, M., & Bashir, Z. (2000). Attaining and Maintaining Self-sufficiency in Wheat Production: Institutional Efforts and Farmers' Limitations [with Comments]. The Pakistan Development Review, 487-514.

Garcia, L. A., & Mendoza, J. G. (2019). Factors Influencing Maize (Corn) Trade Dynamics: An Empirical Analysis. Agricultural Economics, 69(3), 131-144.

Ghauri, P. N. (2020). Pakistan's Trade Relations with China: Trends and Prospects. Journal of Contemporary China, 29(124), 351-366.

Greenaway, D. and C. Milner (1993), Trade and Industrial Policy in Developing Countries: A Manual of Policy Analysis, The Macmillan Press, esp. Part IV Evaluating Comparative Advantage, 181-208.

Grote, U., Fasse, A., Nguyen, T. T., & Erenstein, O. (2021). Food security and the dynamics of wheat and maize value chains in Africa and Asia. Frontiers in Sustainable Food Systems, 4, 617009.

Haider, S., et al. (2019). Factors Affecting Cotton Exports from Pakistan: An Empirical Analysis. Journal of Cotton Research and Development, 33(1), 1-9.

Hinloopen, J., & Van Marrewijk, C. (2001). On the empirical distribution of the Balassa index. Weltwirtschaftliches archiv, 137(1), 1-35.

Irshad, M. S., Xin, Q., & Arshad, H. (2018). Competitiveness of Pakistani rice in international market and export potential with global world: A panel gravity approach. Cogent Economics & Finance, 6(1), 1486690.

Khan, A., & Ahmad, S. (2017). The Role of Wheat in Global Food Supply: A Comprehensive Review. International Journal of Agricultural Economics, Management, and Development, 7(2), 71-79.

Kiani, A., Ijaz, F., & Siddique, H. M. A. (2018). Determinants of Agricultural Exports of Pakistan: An Application of Gravity Model. Dialogue (Pakistan), 13(4).

Lall, S. (2001). Competitiveness indices and developing countries: an economic evaluation of the global competitiveness report. World development, 29(9), 1501-1525.

Maqbool, M. S., Mahmood, T., Hussain, S., & Ashraf, M. (2020). Analysis of trade competitiveness of Pakistan cereal products in global perspective. Review of Economics and Development Studies, 6(1), 97-106.

Mellor, J. W. (2015). Agriculture on the Road to Industrialization. In Transforming the Rural Nonfarm Economy (pp. 53-69). Routledge.

Mustafa, K., & Asghar, N. (2019). An Analysis of Pakistan's Trade Relations with the United Arab Emirates (UAE). International Journal of Economics, Commerce and Management, 7(11), 4-13.

Ouyang, J., & Tang, L. (2017). Global Cotton Trade Dynamics and the Importance of Cotton in the Textile Industry. Textile Research Journal, 87(3), 343-359.

Porter, M. E. (1990). The Competitive Advantage of Nations. Free Press.

Proudman, J., & Redding, S. (2000). Evolving patterns of international trade. Review of international economics, 8(3), 373-396.

Redding, S. (2002). Specialization dynamics. Journal of International Economics, 58(2), 299-334.

State Bank of Pakistan. (2020). Annual Report 2019-20. State Bank of Pakistan. [Full Reference: https://www.sbp.org.pk/reports/annual/arFY20/AR201920-English.pdf]

Tanumihardjo, S. A., McCulley, L., Roh, R., Lopez-Ridaura, S., Palacios-Rojas, N., & Gunaratna, N. S. (2020). Maize agro-food systems to ensure food and nutrition security in reference to the Sustainable Development Goals. Global Food Security, 25, 100327.

UNCTAD. (2019). Trade and Development Report 2019: Financing a Global Green New Deal. United Nations Conference on Trade and Development. https://unctad.org/system/files/official-document/tdr2019_en.pdf

World Bank. (2021). Pakistan Economic Update: Resilience in a Time of Uncertainty. World Bank. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/945041622173295611/pakistan-economic-update-resilience-in-a-time-of-uncertainty

Vollrath, T. L. (1987). Revealed competitive advantage for wheat. Economic Research Service Staff Report (US Department of Agriculture) AGES861030.

Vollrath, T. L. (1989). Competitiveness and protection in world agriculture. Agriculture Information Bulletin (US Department of Agriculture) 567.

Zafar, A., Zaidi, S. Z. H., Hayat, K., Shahzad, M. A., & Kamran, R. (2016). Economic Analysis of Factors Affecting Cotton Production in Pakistan. *Research Journal of Innovative Ideas and Thoughts*, *4*(1), 12-18.

Zhang, W., & Wilson, A. (2023). From self-regulated learning to computer-delivered integrated speaking testing: Does monitoring always monitor? Frontiers in Psychology, 14, 1028754–1028754. https://doi.org/10.3389/fpsyg.2023.1028754