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Export Competitiveness of Major Agricultural Products in Pakistan: An Assessment Through Revealed Comparative Advantage Indices

Imran Ahmad[1], Abdul Saboor[2], Safdar Hussain[3], Fayyaz ul Hassan[4]

[1] PhD Scholar, Department of Economics & Agri Economics, PMAS Arid Agriculture University, Rawalpindi, Pakistan. Email: raoimranahmad@gmail.com
[2] Professor/Dean, Department of Economics & Agri Economics, PMAS Arid Agriculture University, Rawalpindi, Pakistan. Email: drabdul.saboor@uaar.edu.pk
[3] Assistant Professor, Department of Economics & Agri Economics, PMAS Arid Agriculture University, Rawalpindi, Pakistan. Email: ranasafdar@uaar.edu.pk
[4] Professor/Dean, Department of Agriculture, PMAS Arid Agriculture University, Rawalpindi, Pakistan. Email: fayyaz.sahi@uaar.edu.pk

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ABSTRACT

In today's era, nations are excelling in trade competitiveness and a paradigm shift has already taken place from the narrative of comparative advantage to competitive advantage. A profitable opportunity is present for the agriculture-driven economy to incorporate product diversification & repositioning of agri. commodities to transform competitiveness into a sustainable positional asset. Pakistan is underperforming as far as its export potential is concerned. This study uses revealed competitive advantage (RCA), relative competitiveness (RC) & relative trade advantage index (RTA) to examine different categories of agri. export from 2001 to 2021, using secondary data from credible trade data sources. Rice, dates, mangoes & citrus have demonstrated strong competitive advantages whereas maize, millet & dairy have disadvantages. The blessed comparative advantage in agricultural products marks the untapped potential of foreign earnings. The realignment of agricultural exports on modern footing is needed for export expansion. The study suggested incorporating modern techniques of harvesting and improved SPS measures to avoid unnecessary post-harvest marketable surplus losses. Value addition, structural changes in crop management and provision of marketing extension services are vital for improving export share, generating business opportunities and reducing trade deficit. The current study concludes that Pakistan, as an agriculturally based economy, has a great potential for higher growth of these products; as a result, Pakistan may be able to generate more foreign exchange from these agricultural products.

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1. Introduction

The paradigm has already shifted from the narrative of comparative advantage to competitive advantage. The countries making their mark in the global trade have successfully incorporated the elements of competitive advantage into their whole value discipline. Comparative advantage is an ability to produce at a lower opportunity cost than trading partners (Park et al., 2022). Whereas competitive advantage is advantage over competitors to outperform them (Porter, 1990). The competitive edge is infact the indicator reflected in the export performance of the commodity based on the Ricardian comparative advantage concept. International trade narrative shifting from comparative to competitive, especially after the WTO regime. The core competencies of the organizational skills, cost cutting technologies and demanded products are produced economically and better than the major trade players in international arena. Ahmad, Anwar, Badar, Mehdi, and Tanwir (2021) endorsed the fact that Vietnam, China, South Korea and other Asian countries have transformed their production lines in keeping with this competitive edge ingredients.

Agriculture sector contributes 18.23% of GDP, employs 38.5% of labour Force, 70% export earnings from agriculture sector (Government of Pakistan, 2023). Pakistan ranked 43rd economy with respect to GDP across globe, where current GDP is 0. 65th in total world export 49th in total world import 168th in GDP per capita, 108th ease of doing business, 93rd most complex economy (economy complexity index) ECI value of total exports (FOB), 25.3 billion US$ value of total import (CIF) 56.3 billion US$. At HS 6-digit level, 2,824 products exported to 194 countries, 4,039 products imported from 208 countries. Pakistan got EU GSP+ status in 2007 (20% on zero tariff and 70% on preferential rates) still share in world export is 0.12% fallen 40% from 1995 which is alarming. The underperformance of the Pakistan's export is attuned to missing marketing element in particular. The production status of major crops and agricultural products is impressive despite all odds but the good quality products are not developed on marketing lines and our products could not promises good earnings (Maqbool, Atiq-ur-Rehman, Khushbakhet, & Bashir, 2021). The other countries in the world with much lesser production volume of same crops managed to get substantial export earnings because of improved appeal and promotional activities and modern marketing and customer retention and intimacy techniques (Mustafa & Hussain, 2023).

The world ranking of major agricultural products exported from Pakistan is impressive on the ranking pedestal but the same is not translated into impressive foreign exchange earnings (Khan, Ahmed, & Ashiq, 2004). Pakistan's export value has only 22.5% value addition and total 4.1 billion US $ agro-food exports recorded in the last financial year. Export-led growth is the need of Pakistan to capitalize this blessed potential. One of the studies clearly articulates an interesting finding that we have a poor agricultural growth rate of 4.1% and is the lowest in the region and would need to grow at the same rate as Vietnam's for 10 years or Bangladesh's for 13 years to match its potential (WITS, 2021).

Historically over the last two decades the trade balance of Pakistan is very poor and negative i.e. imports are much higher than the exports of the country. The imports are growing at much faster rates than exports. The exports are limited and concentrated in few countries. The dependency of food items like palm oil and wheat and other food items is growing every year and affecting the import bill of the country (Nawaz, Kamran, Saleem, Ali, & Asad, 2023). The exports are of primary nature with minor value addition and not enough to counter the import bills. Further, the crude oil and petroleum are the major imports of Pakistan and textile products, food items and sports and surgical items are major exports of the country Majeed and Malik (2019) the two-decade position is shown in the Figure 1 below clearly indicting that the trade balance is growing negatively at a much faster rate.

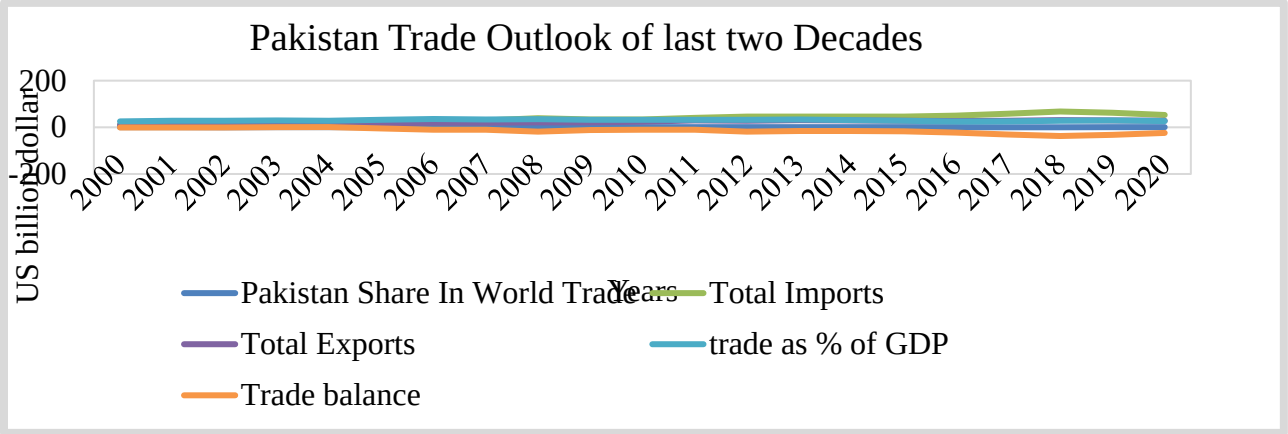

Figure 1: Two-decade trade outlook of Pakistan (source: TDAP 2022)

The production status of major crops and agricultural products is impressive despite all odds but the good quality products are not developed on marketing lines and our products could not promises good earnings. The other countries in the world with much lesser production volume of same crops managed to get substantial export earnings because of improved appeal and promotional activities and modern marketing and customer retention and intimacy techniques (Akhtar, Sharif, & Shah, 2009). The annual export potential of Pakistan is 88.1 billion US$. Opportunity cost of missing export is 893,000 Jobs,1.74 billion US $ tax, 1,52,000 jobs could have been created in agriculture sector alone. The main reason is that we are exporting primary and raw products in a fierce competition and not developing the product lines and value addition in the products (SBP, 2023).

Additionally, making the most of blessed competitive advantage is not attainted. Tapping this potential and repositioning can do wonders for agricultural exports. In-depth analysis of categories of agricultural commodities competitiveness: to reap benefits of free trade is a need of time (Baig, Ullah, & Nasir, 2023). Likelihood to increase export performance by incorporating competitive advantage is quoted frequently in the standard trade literature however, the same is not testified in case of Pakistan by any previous research and thus making this enadavour unique. This is the real rationale of the study as well.

The research at hand is about the competitiveness of agricultural products in the international market. The patterns of trade and the performance of commodities in international trade is the mainstay of this research. The detailed account of analysis is done using Blassa index and its extensions to evaluate the performance of the different categories of the agricultural products in international market. The categorization of the agricultural products make the study unique. The outcome and findings will help formulate the inclusive policies for redesigning agriculture export sector and claiming better returns in international markets.

2. Literature Review

The performance of the products in international market is relative to the rivals. International competiveness is the fuel that empowers the engine of international trade for economic growth of the nation. Optimal utilization of the resources and enhancing the ability to outperform the competitor with better performance is required (Ahmad et al., 2021). The narrative of competitiveness evolved from the classical economist's theories right from the era of classical economists. Due to the continuously evolving worldwide situation as a result of free trade around the world, Porter (1990) has proposed a famous "diamond model" which consists of four factors. The country's modern-day trade system and exports are too complex to explain through conventional classical trade theories that originated with (Smith, 1776). The founder of modern marketing, Michael Porter, outlined a framework that focuses on why some

nations are more competitive than others in his famous theory of the national competitive advantage of industries. What could be the reasons some companies manage to consistently innovate and differentiate their products, get better premium prices, and maintain their position in the market while others fail to do this? The Porter model explains the determinant factors responsible for the Competitive advantage of one country over another.

The difference between comparative and competitive advantage was first elaborated by Vollrath and Vo (1988). He distinguishes that where the market is experiencing no price and policy distortion comparative advantage term should be used and if both are persistent in the market functioning competitive advantage is a better option. Nziku, Dana, Clausen, and Salamzadeh (2024) argued that competitive advantage term in economics is better related to international marketing context and for domestic orientation and home production comparative advantage is the right term. Elumalai (2007) articulated the fact that competitive advantage is measured in terms of shadow process while the comparative advantage is measured in terms of market prices. The competitive advantage term is more concerned with the performance of the commodity in global trade and it provides a measure to estimate it while the comparative advantage is a measure of the ability of the country to produce a good within the country economically and with better utilization of the resources and missed the international sense and orientation. DRC, RCA, RTA & EMS are the very commonly used indices in the standard trade literature for measuring export competitiveness of the products. These indices infact measures the competitiveness in relative sense as compared to trading partners or countries competing with your product (Mustafa & Hussain, 2023).

The relative competitiveness is most commonly measured with RCA as stated by Zaka and Naseri (2021). He further pointed out that this measure also gives an indication of the country's competitiveness or comparative disadvantage as well. Further suggested that kinnow, dates, rice and dairy can be promoted as top-of-the-line trade products for premium market share, especially in regional markets. The author has customized the famous Balassa index for analysis of the competitiveness of agricultural products and further suggested that policy guidelines and policy narrative needed to be investigated in detail which is hindering the growth of export share a great deal.

Agricultural trade is still studied under the influence of the classical models and policy interventions and marketing and positional elements are not thoroughly investigated. Innovative problem-solving models and a shift from traditional market failure models to action models providing industry-level solutions to the identified problem in the agriculture sector should be a prime mandate of the new research in this area (Mufti & Ali, 2021).

Liew, Arip, and Puah (2021) stated that agricultural commodities have to be developed on the lines of modern-day marketing and positioning. If our commodity is unable to perform like a brand in international trade then essentially it is a product, then the price is the main decisive factor and if you are not cheaper enough with reasonable quality then you will be wiped out from the scene. This is a long way to go and can only be achieved by removing the structural impediments in the system of production, marketing and trade. Implementing and revamping the agricultural marketing policy narrative is necessary at all levels.

Juliana and Nyoman (2019) has pointed out that credible data availability and access in developing countries is a main issue in measuring and calculating the trade-related different indices for analyzing the competitiveness of the products in agricultural commodities. They further explained that poor documentation is the main reason and further large portion of the trade is not accounted for because it is done in the informal sector to avoid tax and other levies. They take the debate further and showed that the cost of production and factor prices cannot be calculated in the true sense owing to these data issues Liew et al. (2021); Usman, Wasim, and Yawar (2023) showed that macroeconomic factors can affect the performance of agricultural commodities positively, while microeconomic factors such as farmers knowledge,

financial services, government provided extension services have negative impact on agricultural output.

The different comparative indices introduced by Vollrath and Vo (1988) were employed by RASHID, SARWAR, and FAROOQ (2022) in their study and revealed that price reforms in the country have a positive correlation with the export potential of the country and its comparative advantage as well. When the tariffs and the prices of the agricultural commodities fall below the international benchmark then the GDP growth of the country will be positive and vice versa. A higher exchange rate negatively influences agricultural production and subsequently the growth of the GDP of the country.

Hamid and Aslam (2017)) and Hoang (2020) have studied and analyzed the determinant factors of the competitiveness of the ten east Asian countries and found that production system efficiency, price stability, good marketing, enabling environment cohesive and inclusive price policy and better government support are the main factors determining the competitiveness of the country.

Kamal, Shad, Khan, Ullah, and Khan (2022) in their report has reported the fact that climatic conditions, factors endowments, subsidized inputs, targeted subsidies and prices of agricultural produce are positively correlated with comparative advantage in the production of the country Javed, Rashid Ahmad, Awan, and Munir (2020) studied the competitive advantage of rice in the different regions of Sri Lanka and found out that the cost of irrigation in the regions is too high and thus has taken away the competitive advantage of the Sri Lankan rice production.

Hussain, Hussain, and Alam (2020) studied that government interventions can also change the trade pattern and factor endowments and resource allocation and thereby making some sectors better off and others deprived off. His study revealed that government intervention substantially impacts the factor endowment but has little or no impact on trade patterns Hussain et al. (2020) surveyed Hungary's production of agricultural commodities and trade variations in the volume of different eleven commodities and found little impact of government interventions. He suggested that better marketing and efficient production technology will pave the way for innovation and competitive advantage in turn.

Munir and Sultan (2019) in their study suggested that evidence-based quota system improved infrastructure and better market access to agricultural production will increase the chances of comparative advantage of the country. Ramos (2001) has shown in his study that the pioneer index for measuring trade competitiveness was invented by Balassa in 1965 however the same has undergone considerable changes since the time of its inception. The index is redesigned and reformed for better accounting. The original index has a built-in fault of double accounting therefore the index has an in-built error and might give misleading information. The problem was resolved by Vollrath in 1991 who introduced three indices extending and refining the work of Balassa and resolving the double accounting problem. He further said that the country is said to have a competitive advantage when the value of index is more than one and vice versa.

Akhtar et al. (2009) measured the competitive advantage of different agricultural commodities in the international market and also in the regional market and found that Pakistani dates, kinnow, rice, citrus and mango and some vegetables have a considerable advantage in production and trade of these commodities. He further explained that a healthy opportunity is there to gain from this competitiveness however a conducive environment, and positive and inclusive policy interventions are necessary for promising and maintaining this competitiveness in the market. The study also shows that consignment rejection is high in the case of Pakistani products as compared to other regional players and the reason is poor sanitary and phytosanitary measures, traces and poor standards. He suggested that Pakistan's

agricultural trade has to be shifted from raw products to more value-added products also coupled with the expansion of the product range it will help in capturing a diverse market and premium return on production and export. A brief account of the national and regional studies is produced in the Table 1 below showing the methodology, data used and conclusion.

Table 1
Export Competitiveness of Agricultural Commodities - National & Regional Studies

Title	Author/s	Estimation Technique	Data	Conclusion
Competitiveness among Asian exporters in the world rice market.	*Ilyas, Mukhtar, and Javed (2009)*	*Revealed comparative advantage index and White Index*	*Secondary 1985 - 2005 (FAO trade year book)*	Competitive advantage in rice over most Asian countries. Policy support for positioning & right market orientation.
Spatial patterns of revealed comparative advantage of Pakistan's agricultural exports.	*Riaz and Jansen (2012)*	*Revealed comparative advantage index*	*Secondary data 1995-2010 ITC*	Competitive advantage in fresh vegetables, citrus and mango in regional markets. Market efficiency, product differentiation, and market segmentation.
Export competitiveness of Pakistani horticultural products	*Akhtar et al. (2009)*	*Revealed comparative advantage index, relative export advantage index,*	*Secondary data 1997-2009 ITC & FAO*	Onion, dates and mango comparative advantage. Policy support recommended
The competitiveness and complementarities of agricultural trade among ASEAN-5 countries: An empirical Analysis	*Hamid and Aslam (2017)*	*Revealed comparative advantage index and Intra industry trade index*	*Secondary data 2000-2014 WITS data*	Integrated market and compliment with other trading nations and improving product differentiation will be useful.
Analyzing export competitiveness of major fruits and vegetables of Pakistan: An application of revealed comparative advantage indices.	*Ahmad et al. (2021)*	Revealed comparative index, revealed import and export Index, revealed trade index	Secondary data 2001-2018 ITC, FAO	Competitive advantage in mango, rice & citrus. Future research qualitative analysis of factors affecting the competitiveness.

Source: Author's Construction

Some of the relevant international studies are summarized here in Table 2 showcasing that RCA index its extension indices are the most common indices used by researchers across the world to evaluate the trade and export related performance of the agricultural commodities.

Table 2
Export Competitiveness of Agricultural Commodities- International Studies

Title	Author/s	Estimation Technique	Data	Conclusion
The competitiveness of Egyptian agricultural exports in the EU market; should Egypt diversify its trade pattern?	Torayeh (2013)	RCA of fruit & vegetables	Secondary Data 1998-2010 (FAO)	Egypt has progressive trend in competitive advantage however product diversification and meeting EU standards is a challenge.
Export competiveness of agricultural products and agricultural sustainability in China	Long (2021)	Revealed comparative Index (RCA) & trade competitiveness index (TC)	Secondary data 1994-2013(FAO)	China has competitive advantage in live animals, tea, chicken and apple. Need's product diversification.
The sustainable competitiveness of nations.	Thore and Tarverdyan (2016)	Sustainable competiveness index (SCI) adapted from World economic forum	Secondary	Criticized conventional index calculations and focused on calculating the weight of each individual contributing factor.
Export competitiveness: assessment through the Balassa index (the case of Armenia)	Sargsyan (2018)	RCA, & Balassa index	Secondary 2002 to 2016 (FAO)	Less advantage in international trade because of low yield. Improve infrastructure and mobilize private capital.

Source: Author's Construction

3. Methodology

The export performance of major categorized and selected agricultural products has been analyzed using different trade related indices which are used extensively around the world and quoted frequently in the economic literature. The main concept of assessing any country's competiveness of any product or sector through developing simple indices was first propagated by Liesner (1963). Balassa (1965) improved the computation process, and as a result, the index is now commonly referred to as the Balassa Index. The actual exports, imports, and trade balance, also known as revealed comparative advantage, reveal the country's strong industry sectors.

The term "revealed comparative advantage" (RCA), also known as the Balassa index that evaluates a country's comparative advantage, refers to this process of inferring comparative advantage from observed data. Balassa index has one notable characteristic that it merely examines incidence of trade advantage rather than relying on sources and variables that lead to comparative advantage.

According to Balassa, a country's export ratios indicate its relative comparative advantage. i.e.

$$RCAI = Xij / Xnj \quad (1)$$

Where, 'X' represents exports, 'i' is a country, 'j' is a commodity (or industry), and n is a set of countries. This widely accepted measure of RCA presented by Balassa (1965) can be written as:

$$B = RCAij = RXAij = (Xij / Xik) / (Xnj / Xnk) \quad (2)$$

Where "X" denotes exports, I is the target country, "j" denotes the commodity whose competitiveness is being tracked, and "n" denotes a group of other nations in the world. RCA assesses a country's exports of a commodity in relation to its overall exports and to the comparable export performance of a group of other countries. It is based on observable trade trends. Comparative advantage depends on the following RCA values for its existence:

RCA greater than 1 (comparative advantage)
RCA lesser than 1 (comparative disadvantage)
RCA equal to 1 (both competing countries are at par in exporting the good)

As total exports also include the export of each specific commodity, this indicator has a double counting issue.

3.1. Relative Export Advantage

Vollrath and Vo (1988) developed a new index called (RXA) Relative Export Advantage to resolve the issue of double accounting, which excludes the export of the studied commodity from overall export. The findings of this index can be interpreted in the same manner as the original Balassa's index.

$$\boldsymbol{RXA_{ij}} = \frac{\left(\frac{X_{ij}}{X_{ir}}\right)}{\left(\frac{X_{wj}}{X_{wr}}\right)} \quad (3)$$

- '*r'* is Pakistan's total export except *'j'*
- *'wr'* Rest of world's export of *'j'* commodity excluding Pakistan's export of 'j' commodity
- *'wj'* total export of world except Pakistan's total export.

Vollrath (1991) developed three more indices and are used in this study to calculate the competitive advantage of the categories of the selected agricultural commodities.

3.2. Relative Import Advantage

Relative Import Advantage $RMA_{ij} = \frac{\left(\frac{M_{ij}}{M_{ir}}\right)}{\left(\frac{M_{wj}}{M_{ws}}\right)}$ (4)

- M represent imports, 'i' refers to Pakistan, j is commodity
- 'r' rest of commodities
- Mwj total world import except j commodity
- Mws total world import except Pakistan.

The exports are replaced with imports in this index the interpretation is same as of RXA index.

3.3. Relative Trade Advantage Index

Relative Trade Advantage $RTA_{ij} = \left(\frac{\left(\frac{X_{ij}}{X_{ir}}\right)}{\left(\frac{X_{wj}}{X_{wr}}\right)}\right) - \left(\frac{\left(\frac{M_{ij}}{M_{ir}}\right)}{\left(\frac{M_{wj}}{M_{ws}}\right)}\right)$ (5)

RTA index is the difference between RXA and RMA. Positive values of RTA & RXA represent comparative advantage and vice versa. RTA and RXA scores that are positive

indicate comparative advantage, whereas those that are negative reveal comparative disadvantage. RTA was recommended by Vollrath because it depicts both supply and demand variables. However, there are numerous downsides, especially in the absence of exports or imports. Exports with positive RC values are more competitive, whereas those with negative values are less.

3.4. Relative Competiveness Index

The natural logarithmic transformation of relative trade advantage index is known as relative competiveness index

$$RC = ln(RXA) - ln(RMA) \quad (6)$$

Positive value of RC indicates competiveness of export while negative shows non-competiveness. For the purposes of this study, data on the exports and imports of the major categories of the agricultural products needed to calculate the aforementioned indices was compiled from online UNFAO (2022) and the International Trade Statistics ITC (2022) for the years 2001 through 2021. The above-mentioned fives indices are used to calculate the competiveness and performance of the agricultural commodities in international markets. These indices show the trend exhibited by these commodities in international market influenced or impacted by non-price factors. The measurement of the competiveness through simple indices is as good as through complicated econometric models. The local wisdom and understanding of the ground realities is essential in interpretation of the results of the indices.

3.5. Data Related Framework

The relevant information regarding the data and its sources are presented in this section. Our study uses secondary data for Pakistan from 2001 to 2021 for the competitiveness measurements. The Food and Agricultural Organization UNFAO (2022) and the International Trade Statistics ITC (2022) provided the overall volume and dollar value of the total exports and agricultural exports both. Further some data was missing on these sources so is computed from the State Bank of Pakistan International Financial Statistics year books. The imports and export values of the selected agricultural commodities were then recorded in the excel sheets and the data is further refined and classified into groups for better analysis. The data is made uniform all across by using current exchange rate. The competiveness of the agricultural commodities is measured through different trade related indices as discussed in the above section. This measure is attributed to non-price factors and policy distortion and disconnect.

3.6. Classification Standards of International Trade

The Standard international trade classification", also known as SITC, is a product categorization used by the United Nations (UN) for global trade data (goods quantities and values at export and import enabling cross-border comparisons of manufactured goods and raw materials." The SITC groupings take into account factors including production inputs, processing steps, marketing and product applications, the value of the products in international trade, and technical advancements.

The primary categories are: Food, drinks & live animals (section, 0 & 1). There are 2 970 commodity categories in the most detailed SITC classification level. The SITC classification allows for comparisons using longer time series because it is not revised annually. This study utilizes SITC classification of the commodities.

3.7. Harmonized Commodity Description and Coding Systems (Hs)

A universal nomenclature for categorizing products is called the Harmonized System. It enables trading partners to categories traded items uniformly for customs purposes. The Harmonized System (HS), a six-digit coding system, is used globally to classify items. The HS is made up of roughly 5,300 article/product descriptions that are organized into chapters and sections and appear as headers and subheadings. There are three components to the six digits. The first two numerals (HS-2) designate the chapter under which the items fall. The next two digits (HS-4) and (HS-6) are considerably more detailed, going up to the HS-6-digit level, and they indicate groups inside that chapter. HS 6 categorization is used for the analysis of the commodities.

3.8. Categories of Agricultural Commodities

The exports of Pakistan is dominated by primary items and unprocessed products in the international markets (Siddique, Irshad, e Ali, Khan, & Sajid, 2021). There was not a single study available covering different categories of the agricultural products. The reviewed literature domestic and international mostly investigated the competiveness over one or two commodities. Trade performance of the categories of the agricultural products is necessary to get understanding of the true picture of the competiveness of agricultural sector of Pakistan. The agricultural commodities are classified into different categories and then the crop is selected based on the performance and share of the crop in the agricultural exports of Pakistan. The categories and crop/ product selected for analysis of the competiveness as given in the objective of research are recorded as below in the Table 3.

Table 3
Categorization of Agricultural Commodities

Categories of Traded Agricultural Products			
Fruits	Citrus	Mango	Dates
Vegetables	Potato	Onion	Cabbages
Cash Crops	Cotton	Rice	Sugar cane
Cereals	Wheat	Millet	Maize
Others	Meat	Dairy	

Source: Author's construction

4. Results and Discussion

The present study applies different revealed comparative indices and its extension as explained earlier to estimate the competitiveness of the major groups of agricultural products in international market and the category wise results are summarized in this section.

4.1. Competitiveness of Categories of Agricultural Commodities

The agricultural commodities are dived into five sub group namely fruits, vegetables, cash crops, cereals and others. The graphical result visualization is shown in the graphs below category wise. The competitive advantage of the all 14 commodities falling under the five sub-sections is calculated using five trade competitiveness indices common in the standard trade literature of modern times. However, the most pertinent is revealed competitive index and the results of only this index are graphed. The index gives a general idea obit the performance of the commodity under consideration that whether it is performing or underperforming in the international market. The ratio of the commodity export in total export of the country is divided with the same world's ratio if the value is above 1 indicates that the commodity is above par and have competitive advantage. The higher the value the higher is the competitive advantage (Govındasamy, Bayramoğlu, Aziz, & Soysal, 2023). The results of RCA of different categories are shown below in the following section in detail.

4.2. Competitiveness of Fruits

The fruits category RCA results show that dates, mango and citrus all the three selected fruits possess good competitive advantage. The three selected fruits comprised of 78% of food items export of Pakistan. There is a rising trend in the Citrus and mango competitiveness because of better government support and profitability of the sector, whereas the dates' competitiveness is falling unfortunately the reason is poor value addition and less support to the growers and capacity building by the Sindh government. The fruits are performing well as shown in Figure 2, but at the same time the fruits are mostly exported in primary form without value addition and the dynamic demands of the customers in future is likely to change. The competitiveness can only be maintained with better marketing interventions and reducing the post-harvest losses (Maqbool et al., 2021).

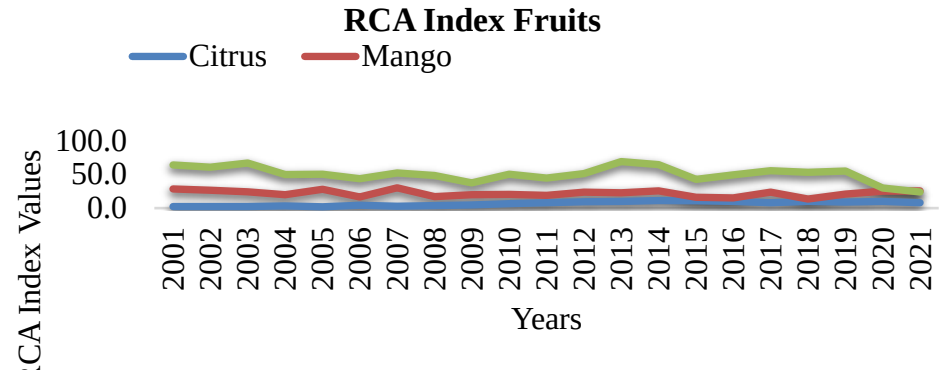

Figure 2: RCA Index Fruits

4.3. Competitiveness of Vegetables

The vegetables of Pakistan are very popular in domestic and international market owing to their taste, colour and texture (Ahmad et al., 2021). The Figure below 3 shows the competitiveness of the vegetables and the trend over the last two decades and it is evident from the results that cabbage RCA is just marginalized and just above zero has no competitive advantage. Potato and onion are now performing well in last five years owing to increasing demand and better prices. RCA of onion is well above 20 which indicate competitive advantage.

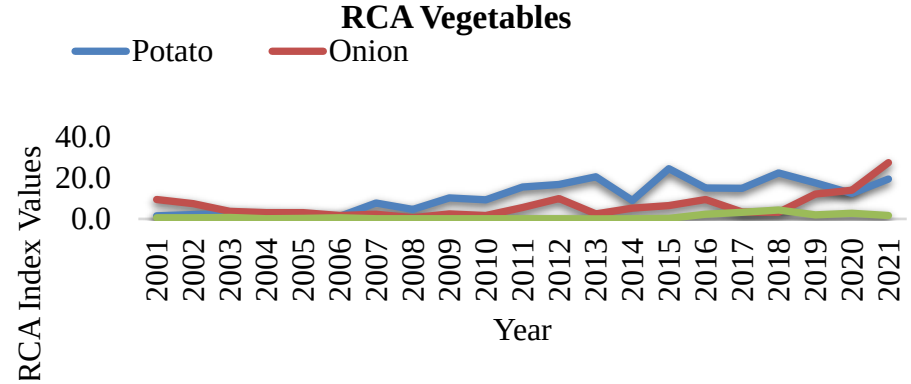

Figure 3: RCA Index Vegetables

4.4. Competitiveness of Cash Crops

The cash crop sector of Pakistan is performing below its true potential. Cotton has been great during 2004 to 2009 and lost the competitiveness thereafter abruptly owing to increased domestic consumption by the expanding textile sector (Baig et al., 2023). However, rice is the top performer in the cash crop sector with maximum RCA value of 90 in 2008 owing to enabling environment and government support. The RCA average value of rice is 64 which is a great sign of competitiveness, however the sustainability depends on the new market

exploration and repositioning of the rice crop in the international market as shown in Figure 4 below Sugar cane has no competitive advantage as the graph represent owing to less profitability and malpractices by mills owners.

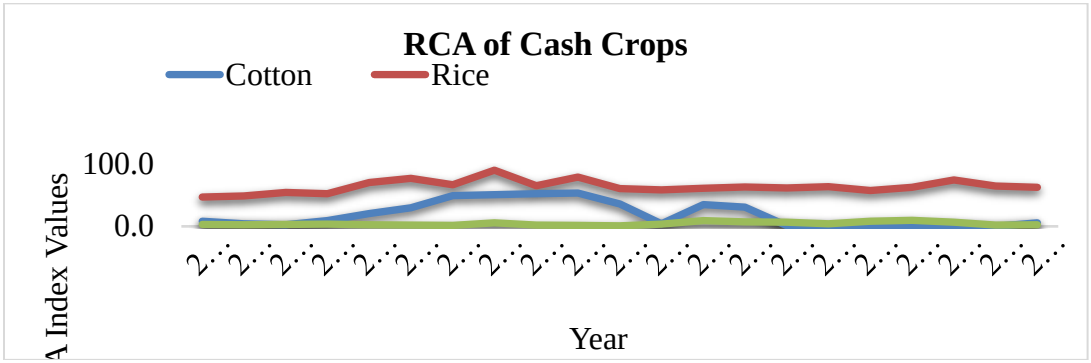

Figure 4: RCA Index Cash Crops

4.5. Competitiveness of Cereals

Wheat is the main staple food of Pakistan and its competiveness position is very grave. Wheat production and export is not competitive in Pakistan because of high cost of production and inputs prices and unstable returns of the crop (Mustafa & Hussain, 2023). Except for the years 2004 to 2008 the RCA of wheat is very low and does not offer self-sufficiency as shown in Figure 5 above. Maize and Millet are the crops grown for fodder and grain purpose but he averages production is very low as compared to world's average and therefore surplus left for export is negligibly small and no competitiveness and reasonable share is seen. Millet and maize are performing good from 2019 to 2021 in last three years and conducive policy support and market orientation is needed to maintain and increase the momentum.

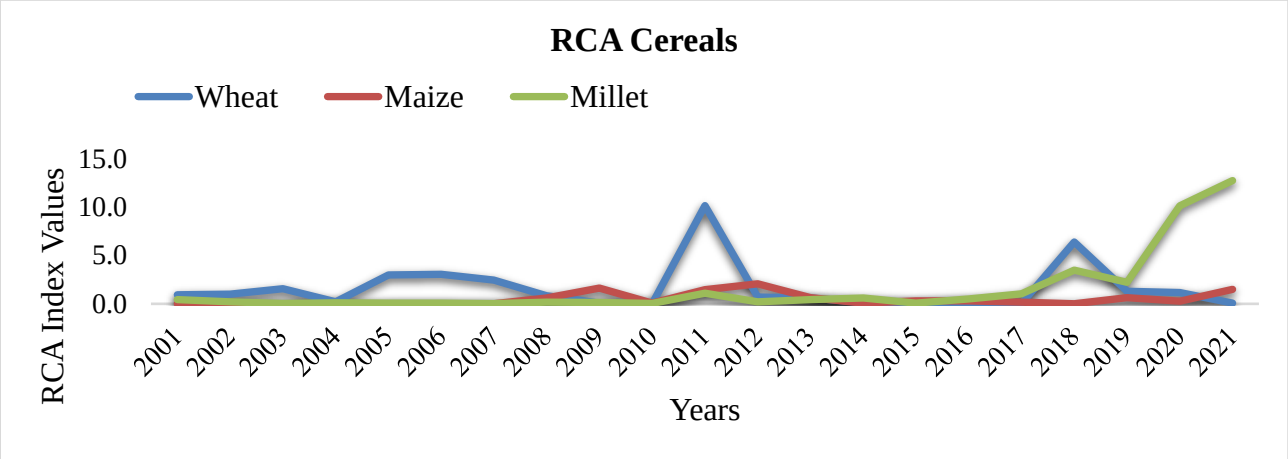

Figure 5: RCA Index Cereals

4.6. Competitiveness of Milk & Meat

Milk and meat are the non-traditional agricultural products and are put in the categories of others. The RCA of dairy products is very low and non-competitive whereas the RCA of meat is picking up right after 2007 to 2020 and again a decline is seen from 2021 as shown in Figure 6 below. The main reason is that the halal meat export is expanding after Qatar, UAE & Iran open its door for Pakistani meat. The share could be substantially increased by curbing the issues of food safety standards and phytosanitary issues.

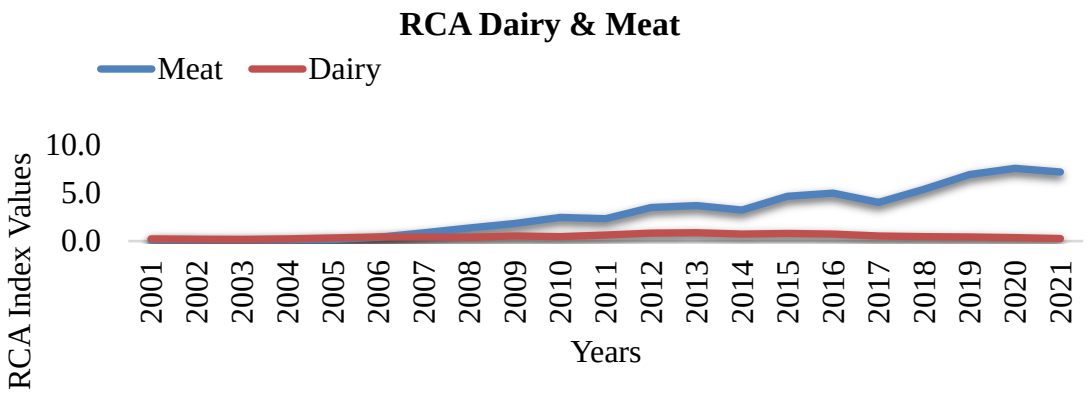

Figure: 6 RCA Index Dairy & Meat

4.7. Competitiveness of Agricultural Commodities National Trade Outlook

The analysis of the competitiveness of agricultural commodities in Pakistan shows promising results for rice, mango, dates, citrus and potato. Whereas on the other extreme Pakistan has no advantage in the production of cabbages, wheat, maize dairy and meat. The RCA , RTA and RC are the major trade related indices to measure the competitiveness of agricultural commodities, average value of last 20 years and current values of 2021 of the study period are shown in the Table 4 below. The summary of result shown below is the mean (two decade) and current value (2021) of the RCA , RTA and RC indices. Millet , meat and onion's current values are promising and these can be developed into growing valuable export commodities with value addition, climate smart varieties, provision of better infrastructural facilities and marketing extension services.

Table 4
National Competitiveness of Agricultural Commodities

Crops	RCA		RTA		RC	
	Mean	*Current*	*Mean*	*Current*	*Mean*	*Current*
Citrus	7	8.1	6.7	8.2	8	10.1
Mango	25.5	22	22.7	26.4	9.5	9.8
Dates	24	50.6	0.3	47.7	8.3	3.2
Potato	11	19.5	10.2	19.3	2.7	19.3
Onion	6.5	27.6	25.5	3.7	0.9	2.2
Cabbages	0.9	1.6	0.9	1.6	4.2	9.3
Cotton	18.8	5.7	19.7	5.7	5.1	5.8
Rice	64	62.5	76.1	73	6	5.1
Sugarcane	4.2	2.4	-35.1	16.7	-1.1	-2.1
Wheat	1.6	0.1	-0.3	-4	-4	-3.7
Maize	0.5	1.5	-0.1	1.1	-1.9	1.4
Millet	-1.6	12.8	-3.8	12.6	-1.2	3.5
Meat	2.9	7.2	1.1	7.3	0.3	1.4
Dairy	0.5	0.3	0.4	0.3	8.3	0.4

Source: Authors Analysis

4.8. Competitiveness of Agricultural Commodities

The blessed competitiveness of our agricultural commodities is estimated separately for the two provinces under study. The result indicates that Sindh has more competitive advantage in mango, onion, dates and meat and surprisingly has equal competitive advantage in the production of rice. The irri rice is the main rice crop Sindh and is consumed at small scale and

the large portion of it is exported after processing. Punjab is at advantageous position in the production and export of citrus, potato, rice and cotton as shown in Table 5 below Agricultural policies must address the core issues of the stakeholders for maintaining this competitive edge otherwise it will be very difficult to remain competitive in the changing scenario.

Table 5
Provincial Competitiveness Outlook

	Commodity	Competitiveness	RCA	Key Findings	Policy implications
Fruits	Citrus	National	7	Market concentration, post-harvest losses	✓ Expand product range ✓ Revamp marketing
		Punjab	8.5	Traditional marketing practices	
		Sindh	6	Less product range	
	Mango	National	22	Low R&D, area declining, SPSS, shelf life	
		Punjab	20	Alternate bearing, high cost of production	
		Sindh	24	Erratic weather, fruit dropping	
	Dates	National	51	Dried dates not in demand, no innovation	
		Punjab	1	Commercial production not developed	
		Sindh	58	Value addition, monsoon fruit dropping	
Vegetables	Potato	National	11	Low quality seed, value addition	✓ Value addition ✓ Climate smart varieties ✓ Agro export led growth
		Punjab	13	Archaic methods	
		Sindh	9	Intercropped, less commercialization	
	Onion	National	7	Low yield, storage issue, expensive certifications	
		Punjab	7	Low share, disconnect high end market	
		Sindh	9	Price volatility, pest attack	
	Cabbage	National	1	Very low yield, market orientation	
		Punjab	0.5	Less crop area, Low price	
		Sindh	2	-----do----	

Table 6
Provincial Competitiveness Outlook

	Commodity	Competitiveness	RCA	Key Findings	Policy implications
Cash Crops	Cotton	National	19	Reduction in area, protection	✓ Resilient varieties ✓ High-end market ✓ R&D gauged
		Punjab	22	Less profitability	
		Sindh	17	Humid conditions more pest attack	
	Rice	National	64	lengthy procedure & documentation, diplomacy	
		Punjab	65	No support price for farmers	
		Sindh	64	Hybrid & irri, poor seed	
	S. Cane	National	4.2	Low sugar recovery, low R&D	
		Punjab	5	Delayed payments, high COP	
		Sindh	5	-----do----	
Cereals	Wheat	National	1.6	High COP non-competitive at EPP	✓ Incentive schemes ✓ Promotional strategies
		Punjab	1	-----do----	
		Sindh	1.5	-----do----	
	Maize	National	0.5	No effective demand, poultry feed	
		Punjab	0.2	Low yield, poor value addition,	
		Sindh	0.1	Spring variety, alternate crop	
	Millet	National	1.6	Not developed as market, dual purpose	
		Punjab	1.8	High price, less yield, domestic needs	
		Sindh	1	-----do----	
Other	Meat	National	3	Traceability, safety standards, unstable supply	✓ Tech adoption ✓ Export cluster ✓ Capacity building
		Punjab	3	High COP, No documentation	
		Sindh	5	No technology in sight	
	Dairy	National	0.2	Standards, low yield, mixed crop-livestock system	
		Punjab	0.2	Smallholder subsistence,	
		Sindh	0.1	Informal, storage	

Source: Authors Analysis

5. Conclusion

The competitiveness of different categories of the agricultural products has been calculated using revealed competitive index, relative trade advantage and relative competitiveness index. The study at hand emphasize on figuring out the competitive potential of the groups of the agricultural commodities i.e. fruits, vegetables, cash crops, cereals and

other including milk and dairy products using traditional blassa index and it's extensions like RCA, RXA, RMA, RC & RT etc. using secondary data from ITC, Comtrade for the period of 2001-2021. The three main trade-related indices are used to assess how competitive agricultural commodities are, as well as their average over the last 20 years and their current values as of 2021. The competitiveness of Pakistani agricultural commodities was analyzed, and the findings for rice, mango, dates, citrus, and potatoes are encouraging. On the other hand, Pakistan has no edge when it comes to producing meat, dairy, wheat, cabbages, or maize. The results are consistent with the findings of Almas and Usman (2021); Shaheen, Almas, and Usman (2022), such studies concluded that wheat is one of the important crops for food security and save the comparative cost on food items. The present values of meat, onions, and millet are encouraging, and these commodities can be transformed into expanding and lucrative export commodities with value addition, climate-smart varieties, improved infrastructure, and marketing extension services.

The export performance of the fruits and vegetables is fluctuating over twenty years of data under study. The sustenance of comparative advantage of some agricultural commodities is attributed to constant innovation and realignment of the marketing system. Besides onion's current RCA index value the rest of the vegetables have shown comparative disadvantage. Amongst cereal group rice has shown high RCA value and has comparative advantage and to remain competitive new niche markets should be developed for aromatic basmati rice. Halal meat export performance is showing positive RCA and growing trend and can be channelized into sustainable export item. Millet surprisingly has shown a positive and healthy RCA , conducive environment of Pakistan and low maintenance cost of the crop are contributing factors, however with better value addition and product development millet exports can be doubled in four to five years. Competitiveness of the agricultural products could only retain in the coming years with increased R&D spending, developing climate smart varieties, improved marketing practices and inclusive government policies for trade , agriculture and investment. Improving market access, warehouses facility and increasing marketable surplus through better yield, improved farm practices and less post harvest losses should be first and foremost concern of policymakers.

The new dimensions to take further this research may concentrate on comprehensive qualitative and quantitative evaluations of the variables underlying export competitiveness. Investigating the challenges and trade barriers in potential target markets through primary data and effectiveness & evaluation of trade incentive schemes sectoral analysis.

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Imran Ahmad: Writing Original Draft, Methodology, Literature Reviewing & Editing data Analysis & Interpretations.
Abdul Saboor: Supervision and Conceptualization.
Safdar Hussain: Revising the Draft & Editing.
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