

Analysis of Competitiveness of Pakistan's Mango Exports in the World Market

Mohammad Rizwanulhassan¹, Shafiqurrehman²,

Assistant Professor, Department of Business Administration, Mohammad Ali Jinnah University.

Dean & Professor, Department of Business Administration, Mohammad Ali Jinnah University

Abstract:

Purpose: This paper analyses the global competitiveness of Pakistan's mango exports against leading exporters/competitors of the world.

Design/Methodology: To measure the competitiveness of Pakistan's mango exports, powerful exports indices, Revealed Comparative Advantages(RCA), Revealed Symmetric Comparative Advantage(RSCA) and Relative Export Advantage(RXA) are applied on secondary data of mango exports of Pakistan with those of global competitors for a period of 2004 to 2012.

Findings: The study reveals that the comparative advantages of Pakistan in global market for mango exports is declining during the period of study as well as India and Brazil are also on losing side but the other players like Mexico, Peru, Thailand and Philippines are gaining comparative advantage posing competition for Pakistani exports in world market.

Practical Implications: The declining trend of competitiveness of Pakistan's mango exports indicates that there is strong need to comply with safety and quality standards of WTO, resulting higher export earnings. JEL classification: F15, F17

Key words: Revealed Comparative Advantage, Competitiveness, Phytosanitary restrictions.

I. Introduction

Agricultural sector in Pakistan plays a prime role in its economy, contributing 21% of GDP and absorbs 43.7 % labor force and main source of livelihood of rural population which is 63.7% of total population(Pakistan Economic Survey 2013-2014). Pakistan possesses a leading position among top six in production of a number of agricultural commodities like buffalo milk, cotton, dates, mango and wheat (FAO-various reports)¹. This distinct position of Pakistan is due to agro-climatic environment which is conducive for the production of various horticultural crops and provides a strong comparative and competitive advantage in global export market (Hassan-201, Akhter-2009, Akhter-1999).

Mango consists of about 50% of all tropical fruits produced in the world and mango trade contributes to the welfare of the participating countries (Jedde-2003). Mango is an important fruit crop in which Pakistan holds 6th position in production and export in the world (FAO-2012).

Realizing the potential of mango exports, Pakistan government has taken various measures in many areas of mango production and exports with the collaboration of Trade Development Authority of Pakistan and Pakistan Horticulture Development and Export Board.(Ministry of Commerce-2009)²

In this context it is important to analyze the current global trade environment for horticultural exports, challenges Pakistani mangoes are facing in spite of huge potentials and demand.

The objective of the paper is to assess the level of competitiveness for Pakistani mangoes among other competitors and opportunities in world market as well as identify the major requirements from the importing countries. This insight is important to analyze whether Pakistan is successfully meeting the challenges of global mango export market and exploiting all potentials of its highly demanded mango crop.

This paper organizes into six sections. Section two reviews the literature related to analysis of competitiveness of a particular commodity. Section three presents an overview of production and export structure Pakistani mango crop with challenges and opportunities. Section four provides methodology and an in-depth investigation of degree of export competitiveness of Pakistani mangoes with major world players. Section five describes outcome of investigation and discussion which is followed by section six explaining necessary recommendations for policy makers and conclusion.

¹ The average value from yearly reports of Food and Agricultural Organization for 2004 to 2012

² Strategic Trade Policy Framework 2009-2012, presented by Minister of Commerce Mr Makhdom Amin Fahim and available as official document in the office of ministry of commerce.

II. Review of Literature

Economic literature provides many indices to measure competitiveness of export commodities. RCA index³ is widely used to investigate competitive or comparative advantage of exports. Yue (2001) analyzed export patterns of Chinese exports for various regions of the country and indicated distinct differences in export structures in coastal regions and interior regions of China. Export competitiveness was measured by Bender, Siegfried and Kui-Wai Li (2002) for Asian and Latin American region for a period of 1981-1997. They examined changes in export patterns among different regions. Using RCA index Ferto and Hubbard (2003) examined relative competitiveness of Hungary's agricultural and food products with EU for a period of 1992-1998 and concluded that eleven out of 22 aggregate product groups exhibited strong competitiveness.

Utku Utkulu and Dilek Seymen (2004) employed RCA index to examine competitiveness of Turkish exports with selected countries of EU at sectoral level. In their study Batra and Khan (2005) measured relative export performance at sector and product level between China and India for a period of 2000-2003 using commodity classification at two and six digit level of HS.

Mehmood (2005) used RCA index to measure relative export performance of non-agricultural export commodities at HS-4 digit level for 1990-2000. He concluded on the basis of RCA index some commodities are losing market while others are gaining market. Hanif and Jafri (2006) employed RCA index to measure export competitiveness for textile sector of Pakistan. Akhter and Zakir (2008) analyzed export competitiveness of Pakistani footwear exports for a period of 2003-2006 comparing Indian and Chinese exports in similar trade commodities by using RCA index. Shinoj and Mathur (2008) examined Indian agricultural export commodities, using RCA index and RSCA index, with major market players for a period from 1991 to 2004 and concluded that some of their exports are losing global markets after economic reforms.

Akhter and Sharif (2009) examined competitiveness of Pakistan's fruit exports (dates, mangoes and oranges) by employing RCA index and RXA index, comparing with major exporters of similar commodities.

Riaz (2012) used Balassa RCA index to calculate competitiveness a wide range of Pakistan agricultural exports commodities. To measure competitiveness of Pakistan's agricultural export commodities, Hassan (2013) employed RCA index for a period from 2001 to 2010 and concluded that rice exhibited very strong competitiveness in world export market.

III. Challenges and Opportunities for Pakistan's Mango Crop

Mango crop of Pakistan ranks 6th in production and 7th in export in terms of quantity and 8th in terms of value in the world (FAO reports 2004-2012). Its production raised from 1.05 million tons in 2004 to 1.95 million tons in 2012 along with increase in export earnings from \$18.1 million to \$60.7 million during same period (FAO-2012). Its major export markets are UAE, Saudi Arabia, EU, USA, and those countries where Pakistani expatriates constitute substantial demand of Pakistani mango (Ghafoor-2013)

Table-3.1 explains mango production and export structure as well as export share in global market in terms of value and quantity for the period from 2004 to 2012. Though production became almost double during the period under study but share of export against national production remained around 5% reflecting severe competition in global export environment or absence of appropriate measures from policy makers to boost mango export. As trade liberalization process accelerated all over the world, safety and quality standards especially for food commodities became more stringent. So to expand mango exports in world market it is essential to meet the demand of competitive prices but also technical safety measure like sanitary and phytosanitary requirements under WTO (Mustafa-2003).

Table-3.1 Mango production and export of Pakistan from 2004 to 2012 with indicating mango export share in world quantity and value wise.

Year	Production (millions MT)	Export (MT)	Share in Production (%)	World Export Share in quantity (%)	World export Share in value (%)
2004	1.055	82059	7.77	9.47	4.38
2005	1.673	48855	2.91	5.49	2.79
2006	1.753	105598	6.02	9.96	4.56
2007	1.719	62057	3.6	5.77	2.48
2008	1.756	69324	3.95	6.22	2.74
2009	1.727	73575	4.25	6.24	3.04
2010	1.845	85923	4.65	6.74	2.80
2011	1.888	105130	5.56	7.74	3.51
2012	1.951	127120	6.51	7.91	3.35

Source: FAO reports from 2004 to 2012

Presence of fruit fly, a disease creating small insect, in mangoes is a major concern of quarantine departments of all importing countries. Hot Water Treatment (HWT), Vapor Heat Treatment (VHT) and

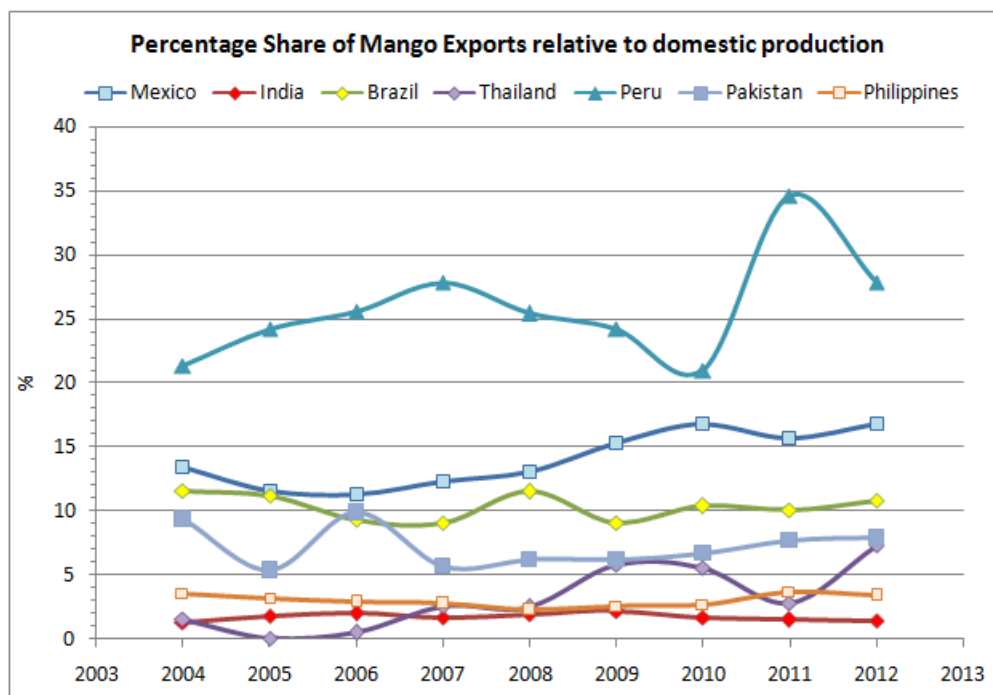
³Bela Balassa in 1965 presented a new concept of revealed comparative advantage calculated as RCA index

Irradiations are technical measures adopted to tackle the issue of fruit fly. In Pakistan there are only three hot water treatment plants which are insufficient for large supply of mango exports. So far Pakistan does not have vapor heat treatment plant and irradiation facility required by Japan and USA respectively for mango imports(Sind Board of Investment-2010).In 2014 EU imposed a ban on Indian mango imports on the issue of fruit fly found in many consignments. It is a mark of caution for Pakistani policy makers.

Table-3.1 pointed out another fact that share of mango export from Pakistan in world export is higher in terms of quantity and lower in terms of value indicating the price of Pakistan's mango exports in world market is lower than the price of mangoes supplied from other countries. Many times lowest price is paid to Pakistan's mangoes (FAO-various reports).Poor quality management, sanitary and phytosanitary restrictions and insufficient storage and processing capacity are main constraints for mango export from Pakistan (Shah-2006).Due to this very modest share of production is exported and about 30% to 40 % of the mango crop is wasted(PCSIR-2012)⁴

Mango export share in terms of domestic mango production of major world players is indicated in Fig-3.1.India and Philippines have maintained their mango export share out of domestic production while Mexico, Thailand and Peru have improved their export share relative to their domestic production after facing sharp fluctuation in their share of exports relative to production. . In case of Pakistan and Brazil share of export out of production declined indicating losing the export market. In the year 2006 Pakistan managed to improve its export share then it could not maintained.

Fig: 3-1 Share of mango exports relative to domestic production quantity wise for major world mango producers and exporters on the basis of FAO statistics for 2004 to 2012.



IV. Data and Methodology

Comparative advantage of a particular commodity/industry in theoretical models is expressed in terms of relative prices in absence of trade without factors and product market distortions. Pattern of trade can be distorted due to government policies interventions or trade restrictions from importers which may therefore misrepresent underlying comparative advantage. The concept of competitiveness by using post trade data under prevailing market distortions can approximate country's comparative advantage or disadvantage in a particular commodity/industry. Due to minimizing trade barriers under the process of trade liberalization now more emphasis is extended towards export competitiveness (Prasad-2004)

Revealed Comparative Advantage index or RCA index, originally developed by Balassa(1965)is a ratio of two shares. The numerator indicates the share of exports of particular commodity with total export of that country at give point of time. The denominator indicates share of exports of that particular commodity with total

⁴ Views expressed by Director of PCSIR in an interview

world exports. RCA index value can be zero to infinity. The value of RCA index >1 indicate revealed comparative advantage for that particular commodity/industry which is calculated as follows,

$$RCA = \frac{X_{ijt} / \sum X_{jt}}{\sum X_{iwt} / \sum X_{wt}}$$

Where, X_{ijt} = Exports of commodity "i" from country "j" at given time "t".

X_j = Total exports of country "j" at given time "t".

X_{iwt} = World's exports of commodity "i" at given time "t".

X_{wt} = Total world exports at given time "t".

The advantage of using RCA index is that it demonstrates the intrinsic advantage of a particular commodity/industry which is consistent with the change in factor endowment and productivity occurred in an economy. But however it cannot distinguish between improvement in factor endowment and trade policies of the government (Hassan-2013, Batra and Khan-2005)

RCA possesses the issue of asymmetry as the index indicates the value from zero to infinity and not comparable on both side of unity. The index has been transformed (Dalum et al 1998) to, "Revealed Symmetric Comparative Advantage" (RSCA) and expressed mathematically as

$$RSCA = (RCA - 1) / (RCA + 1)$$

Now the index ranges between -1 to +1 and a commodity exhibits competitive advantage if RSCA value is positive.

Vollrath (1991) introduced an improved and comprehensive Index RCA 1 which is considered more sophisticated measure of international competitiveness and eliminates the limitations of Balassa RCA index. The basic difference between RCA and RCA1 is that RCA1 prevents double counting. RCA1 is simply natural logarithm of Relative Export Index which is calculated as follows.

$$RXA_a^i = (X_a^i / X_n^i) / (X_a^r / X_n^r)$$

Where RXA_a^i = Relative export index of country "i" in commodity "a"

X_a^i = exports of country "i" in commodity "a"

X_n^i = all exports of country "i" except commodity "a"

X_a^r = exports of commodity "a" from the world except country "i"

X_n^r = exports of all commodities from the world except country "i"

$$RCA 1 = \ln (RXA)$$

The competitiveness of mango exports of Pakistan has been measured with major mango producers and exporters of the world for a period from 2004 to 2012 in terms of all three revealed comparative indices to make a better approximation. Data has been collected from various reports of FAO for the period 2004 to 2012, Economic Survey of Pakistan 2013-1014 and UNCOMTRADE.

V. Results and Discussion

In this study competitiveness of mango exports of Pakistan is measured with six major global exporters by applying Balassa RCA index, revealed symmetric comparative advantage (RSCA) and RCA 1 (lnRXA). All the seven exporters are among top ten according to FAO statistics for the period 2004 -2012. Three of them belong to Asia, India, Thailand and Philippines, posing strong competition to Pakistan as they operate in same export markets. The other three competitors are Mexico, Brazil and Peru creating a major threat for Pakistani mango export in USA and EU markets.

RCA indices of all seven countries from 2004 to 2012 on three years average basis are presented in Table: 4-1. As mentioned earlier RCA index presented first by B. Balassa in 1965 is the most widely used index in literature to analyze and compare competitiveness of a particular commodity or a group of commodities in export. These indices are mere numbers however illustrating an order of rising or falling pattern of competitiveness and are not comparable from one country to another. Countries are tabulated on the basis of volume of mango exports from top to bottom value wise, excluding Netherland which is among the top exporter of mangoes according to FAO statistics but it imports from various producers then exporting to various EU countries.

Table: 4-1 Balassa RCA indices of seven major world mango exporters for 2004 to 2012 on three years average basis.

Country	2004-2006	2007-2009	2010-2012
Mexico	7.93	7.34	8.41
India	22.62	18.59	10.38
Brazil	11.17	9.56	8.18
Thailand	1.67	4.57	6.45
Peru	50.95	36.27	35.53
Philippines	14.45	10.42	19.62
Pakistan	26.61	20.84	23.51

Note : Computation made by author on the basis of FAO and UNCOMTRADE statistics(2004-2012)

Table : 4-1 illustrates that India, one of the major competitors in the world is on declining side in competitiveness but Thailand and Philippines, regional competitors are improving their competitiveness as their RCA indices for the period under study are rising. This result is consistent with Fig:3-1 which shows their share of exports relative to domestic production increasing from 2004 to 2012. Similarly Pakistan and Brazil are on losing side in their competitiveness which matches with declining export share in domestic production indicated in Fig:3-1. RCA indices of Mexico do not fluctuate very sharply displaying its competitiveness maintained. In order to make better assessment of competitiveness for exporting commodities, improvement were made in RCA index, one is RSCA which is in between -1 to +1. For better analysis of competitiveness of major mango exporter in the world and to compare with Pakistan RSCA indices are also calculated and given in Table:4-2. Table: 4-2 elaborates RSCA indices for seven major world mango exporters for the period 2004 to 2012 on three years average basis. The results of RSCA indices are consistent with previous RCA indices indicating the power of assessing competitiveness of export commodities or group of commodities. There is significant decline in RSCA indices of India and Brazil. Thailand has substantially improved its competitiveness reflecting implementation of positive export policy measures and complying international quality standards. RSCA indices for other two countries, Peru and Pakistan are maintained indicating that no significant changes occurred during the period of study in their competitiveness. In case of Pakistan there is fall in RSCA index in

2007-2009 period which is due to the fact that there was a sharp fall in share of export to production mainly due to imposing stringent quality standards from importing countries. Mexico also improves RSCA index slightly and this causes substantial difference as it is the largest mango exporter supplying to USA, Canada and EU. There is slight improvement in RSCA index for Philippines from 2004 to 2012, as it has been mentioned, Thailand and Philippines are regional competitors for Pakistan supplying to almost same export market emerging as real threat for Pakistan.

Table: 4-2 RSCA indices of competitiveness of major world mango exporters for 2004 to 2012 on three years average basis

Country	2004-2006	2007-2009	2010-2012
Mexico	0.763	0.757	0.780
India	0.913	0.890	0.810
Brazil	0.830	0.803	0.773
Thailand	0.223	0.623	0.723
Peru	0.957	0.940	0.950
Philippines	0.865	0.816	0.886
Pakistan	0.917	0.907	0.913

Note: Computation made by author on the basis of FAO and UNCOMTRADE statistics(2004-2012)

Competitiveness is investigated for global mango exporters by another index, RCA1 which is natural logarithm of relative export index developed by T.L.Vollarath in 1991 eliminating the weaknesses of RCA index and to capture a robust approximation of competitiveness of export commodities. This index is extensively used by researchers of international trade to examine competitiveness for exports of commodities or group of commodities in export markets. Reason of calculating all three indices is to make more appropriate and comprehensive measurement of competitiveness of mango exporters. The consistent results of all three indices indicate their strength of measurement.

Table :4-3 displaying the RCA1 indices for all seven major mango producers and exporters of the world for the period 2004 to 2012 on three years average basis. The results of RCA1 are consistent with two previous RCA and RSCA indices. Thailand and Philippine reflect substantial improvement in their indices indicating rising competitiveness. Mexico maintained its competitiveness however RCA1 indices illustrating declining pattern for India, Peru, Brazil and Pakistan.

All three indices indicate a falling competitiveness for India, might be due to rising challenges in export markets of mangoes while rising pattern for two other regional competitors, Thailand and Philippines. Similarly a slight declining pattern is observed in indices of Brazil, Mexico and Peru posing a competitive challenge for Pakistan in US and EU markets.

On the basis of estimating all three competitive indices mango export scenario for Pakistan is not very encouraging in presence of a big competitor like India as well as two rising competitors in the shape of Thailand and Philippines. For other three competitors real threat for Pakistan exists from Mexico and Peru as they are among the largest mango producers and exporters but their share of exports relative to production is rising indicating their concrete efforts and effective policy measures related to mango export markets.

Table:4-3RCA1 indices of competitiveness of major world exporters for 2004 to 2012 on three years average basis.

Country	2004-2006	2007-2009	2010-2012
Mexico	2.237	2.127	2.303
India	3.317	3.173	2.490
Brazil	2.520	2.377	2.213
Thailand	1.013	1.537	1.940
Peru	4.003	3.680	3.637
Philippines	1.896	2.361	2.963
Pakistan	3.290	3.047	3.163

Note: Computation made by author on the basis of FAO and UNCOMTRADE statistics(2004-2012)

VI. Conclusion

The objective of this paper was to analyze the competitiveness of Pakistan mango crop in global export markets against major export players of the world during the period from 2004 to 2012.

The study reveals that the competitiveness of Pakistan mango exports is on declining side and its share of exports value wise and quantity wise has fallen during the period of study. Moreover new competitors like Thailand and Philippines have gained strength. A substantial part of the mango crop is reported to be wasted due to lack of proper storage arrangements. On the demand side significant market of Pakistani mangoes exists in the countries of Middle East, USA, EU and Japan. It indicates huge potential for mango crop in world market. In global export market climate quality and safety standards pose serious challenge for which concrete policy options in terms of storage, processing, packaging and pricing are needed from related public and private institutions. Some potential markets for mango crop have not been exploited only because of specific quarantine requirement.

The results also show that mango export markets getting increasingly competitive with the entry of new regional players like Thailand and Philippines with improving their RCA indices. Their export destinations mostly are same as Pakistan so our policy makers need to expedite their efforts to meet market requirements given under WTO rules to maintain and expand our exports in terms of volume and value.

In global export market of mangoes, unit price of Pakistani mangoes are lowest (FAO-reports) owing to substandard packing and quality. Concrete measures in compliance to quality and safety standards of importing countries and WTO can enhance Pakistani mango exports as well as unit price in world markets.

As Pakistan is among six largest mango producers, its production requires large scale human resource which is involved at different stages from production to packaging and export. Expansion of mango exports in terms of quantity and price will transform into improving welfare and raising GDP of the country.

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