# EXPORT COMPETITIVENESS OF PAKISTANI HORTICULTURAL PRODUCTS

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**ABSTRACT:- This paper examines Pakistan's competitiveness in export of selected horticulture commodities by employing set of revealed comparative advantage (RCA) and revealed competitive advantage indices with respect to global trade. Results demonstrate that Pakistan has comparative and competitive advantage over the period under analysis and indicates a transition from comparative and competitive disadvantage to comparative and competitive advantage during the period under analysis. Tangerines, mandarins, clem have maintained relatively higher revealed comparative advantage as compared to other categories for the whole period under analysis. Onion export has revealed comparative advantage with some fluctuations over time. The research indicates that Pakistan's comparative and competitive advantages have been increasing in all the selected commodities during period under analysis which indicates the potential of horticulture exports for foreign exchange earnings. There is need to strengthen comparative and competitive advantage in horticulture sector by policy support and facilitating role by all stakeholders.**

*Key Words: Horticulture; Products; Revealed Comparative Advantage; Trade, Pakistan.*

## INTRODUCTION

Horticulture in Pakistan has emerged an important sector contributing to the national agricultural GDP with 12% share during the last decade and produce large number of horticultural products to fulfill domestic demand of fruit and vegetables for ever increasing population. The demand for fruits and vegetables is continuously increasing in local and export markets. Global horticulture exports reached at $124 billion and Pakistan marginally contributed with worth of $0.24 billion with far less than one percent share in world export (FAO, 2009). Looking at the size and growing demand of horticulture exports in the world market there is great potential for increasing export of premium quality horticultural produce, from Pakistan if unachieved potential is realized. However it is an established fact that Pakistan is under performing as far as its horticulture exports are concerned.

Pakistan horticulture sector is facing some basic issues like small-holding, poor export infrastructure and lack of processing facilities which are sources of limitation in improving horticulture industry from local base to export oriented. In the globalized world competitiveness of the sector is

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real issue which needs attention of policy makers. Besides competitiveness and comparative advantage, some emerging issues on standard, quality compliance for horticulture commodities in global markets are of concern.

Pakistan as founding member of GATT and signatory of World Trade Organization (WTO) has accepted both the opportunities and challenges of trade liberalization (Akhtar, 1999). Trade liberalization creates competitive pressures and the potential for technology transfer to lead productivity gains and restructuring of an economy (Batra and Khan, 2005). The proponents of free trade argue that it is an avenue for economic gain and prosperity. Agreement on Agriculture (AoA) compelled nations to focus on the benefits realizing from comparative and competitive advantage in the international economy.

Pakistan's agriculture sector remained an important source of foreign exchange earnings through exports of agricultural commodities and agriculture based products but far below its potential. Pakistan trade deficit has widened over time because growth in imports has outpaced export growth. In total fruit and vegetable trade Pakistan also has a negative trade balance over the entire period under consideration despite the fact that Pakistan fruit and vegetable export have continued to rise each year (FAO, 2009). There is need to reduce the negative trade balance in horticulture through enhancing foreign exchange earning through promotion of value added horticulture products.

Fruits can be a source of higher export earnings, which advocates the need for strengthening the country's competitiveness in their exports (Akhtar et al., 2009). To harness the export potential of horticultural commodities, however, there is need to focus on compliance of international standards during production and post harvest handling. This research is targeted towards solving this problem and tries to answer the question whether Pakistan has export competitiveness in the selected horticulture commodities.

Recognizing horticulture as important sub-sector, government has already declared priority area for future development but the perishability of horticultural products requires efficient processing and marketing infrastructure that is largely deficient in Pakistan (Khan, 2000). Due to this in general exports of horticulture products are very low as compared to its production in country (GoP, 2011). Expansion of Pakistan's share in overseas export markets is crucial for further development of the country's agricultural sector (Riaz and Jansen, 2012).

In modern economic literature the concept of competitiveness is widely used. In spite of the various definitions and perceptions of competitiveness, one aspect of competiveness remarking the activity in an international free market and acquiring the market share and profit from the common border of all. From the trade theory, competitive advantage is a more useful concept than comparative advantage. It is argued that competitiveness includes market distortions while comparative advantage assumes undistorted markets (Vollrath, 1985; Vollrath and De Huu, 1988). According to Yeats (1992) study on comparative advantage can

broadly be categorized into two the Revealed Comparative Advantage (RCA) pioneered by Balassa (1965) and Heckscher-Ohlin thoughts, which mainly concerned with relative labor and capital inputs of specific goods.

There have been many studies that investigated Pakistan's competitiveness by revealed comparative advantage (Mahmmod, 2004; Hanif and Jafri, 2008; Mehmood et al., 2012). Only a few studies have attempted to analyze actual comparative advantage for Pakistan's agricultural exports. For example, Akhtar et al. (2009) constructed RCA index for Pakistan's fruit exports. Samaratunga et al. (2007) and CARIS (2008) considered the country's revealed comparative advantage for a few broad categories of agricultural products. Riaz (2009) and Riaz and Jansen (2012) estimated RCA indices for a fairly wide range of agricultural products, including some horticulture products.

Increasing competition would force resources to be allocated more efficiently and it become more competitive than in the past. Faruqee (1995) suggested that trade policy in Pakistan should be based upon comparative advantage. With the gradual reduction in trade barriers led by the process of globalization, more emphasis is now being placed on promoting export competitiveness (Prasad, 2004). So the gain from free trade depends upon competitiveness. The estimation for export competitiveness and analysis of changing export specialization is a significant scientific problem Saboniene (2009). Determination of export competitiveness, export data has been utilized in recent literature by Nachum et al. (2001), Utkulu and Seymen (2004), Lall and Albaladejo (2004). Rifin (2010) has investigated the export competitiveness of Indonesian palm oil product.

Horticulture sector is recognized as labor intensive venture and offering multiple employment opportunities throughout the supply chain, particularly in rural areas. Development of this sector will have multiple positive effects on economy. In Pakistan, very limited research has been carried out on revealed comparative advantage of horticulture produce. Price hike of horticulture crops and its profitability is pursuing the farmer and other stakeholders.

The objective was to evaluate the export competitiveness of Pakistani horticulture in the international markets. Therefore, horticulture is grouped into three categories: Tangerines, mandarins, clem and onion as individual commodities and total fruits and vegetable were taken to analyze the export competitiveness of horticulture.

## MATERIALS AND METHOD

To calculate relevant indices, export values of selected horticulture commodities for Pakistan and world were taken from Food and Agricultural Organization (FAO, 2009). Several indicators can be used to analyze competitive and comparative advantage. To get a clear picture Revealed Comparative Advantage (RCA), Relative Export Advantage Index (RXA), Revealed Symmetric Comparative Advantage (RSCA), Revealed Imports Penetration Index (RMP) and Relative Trade Advantage

Index (RTA) indices, were employed for Pakistan. These indices offer useful measures to analyze comparative advantage on the bases of actual trade performance.

These indices were used by several researchers to determine comparative and competitive advantage (Balassa, 1989; Scott and Vollrath, 1992; Ferto and Hubbard, 2004; Hsu and Wann, 2004; Laursen, 1998). This study considers both Balassa's and Vollrath's indices in the analysis of comparative and competitive advantage of the Pakistan horticulture with respect to global trade. All these indicators are briefly explained and discussed as follows.

**Revealed Comparative Advantage (RCA) Index**

Balassa's Revealed Comparative Advantage (RCA) method is an ex-post measure of competitiveness which is widely used in economic literature to evaluate the patterns of trade and specialization of countries in commodities which they have a competitive edge. An RCA index which reveals the comparative advantage of a nation from its past trade data can be calculated yearly and trends in competitiveness in a sector or commodity can be identified. Balassa (1965) assumed that in the absence of comprehensive data on factor costs, export performance could be used to reveal the comparative advantage of individual countries. More specifically, the pattern of commodity exports reflects relative costs as well as differences in non-price factors that can be expected to determine the structure of exports. Thus, using only export data, the RCA index (also known as the Balassa Index) is defined as:

$$RCA_{ijt} = (X_{ijt} / X_{ajt}) / (X_{iwt} / X_{awt}) \ldots (1)$$

where,

$RCA_{ijt}$ = Revealed Comparative Advantage index value for product i in country j in year t

$X_{ijt}$ = Export of product i in country j in year t

$X_{iwt}$ = Total world exports of product i in year t

$X_{ajt}$ = Total exports in country j in year t

$X_{awt}$ = Total world exports in year t

On the basis of observed trade patterns, RCA index reveals a comparative advantage (disadvantage) in export of commodity i by country j if the index's value is greater (less) than one, with respect to the world or a set of reference countries.

**Revealed Symmetric Comparative Advantage (RSCA) Index**

To overcome the problem of upward-biased RCA index values, Laursen (1998) adjusts the RCA index to make it symmetric, such that the adjusted index values are between –1 and +1. Dalum et al. (1998) also proposed a Revealed Symmetric Comparative Advantage index (RSCA) which enables symmetric index value of RCA, ranging from -1 to +1. Laursen (1998) identifies this index as RSCA is calculated using following equation:

$$RSCA_{ijt} = (RCA_{ijt} - 1) / (RCA_{ijt} + 1) \ldots (2)$$

The positive (negative) values of RSCA show a competitive advantage (disadvantage) in exporting product i in country j. In the economics literature, the RSCA is often interpreted as

an index of specialization.

**Relative Trade Advantage Index (RTA)**

Another index is the Relative Trade Advantage Index (RTA), which shows the net trade advantage / disadvantage. It is given by the difference between the Relative Export Advantage Index (RXA) and the Relative Import Penetration Index (RMP): where, X and M = exports and imports.

The RXA was used by Balassa (1989) and Scott and Vollrath (1992) who considered it a more sophisticated and comprehensive measure of international competitiveness. The index is defined as the ratio of a country's export share of a certain product in the world market to the same country's share in world export of all other commodities. While estimating this indicator, the world "total" must be always taken as the sum of all countries except the country under study. This avoids double counting countries and commodities in both the numerator and the denominator. Thus, instead of including all exports in the summations of equation (3), the commodity and the country considered are excluded when total exports are summed up. This aspect is especially relevant if a country is fairly important in trade on international markets, and/or if the commodity considered is important in total trade (Frohberg and Hartmann, 1997). RXA is defined as:

$$RXA_{ij} = \left(X_{ij} / \sum_{l,l \neq j} X_{il}\right) / \left(\sum_{k,k \neq i} X_{kj} / \sum_{k,k \neq i, l,l \neq j} X_{kl}\right) \ldots (3)$$

It is greater than one when the area analyzed has a competitive advantage and less than one when it has a competitive disadvantage.

The RMP is defined in the same way as the RXA, but involves imports. It has a value lower than one when the area has a competitive advantage in imports and higher than one when there is a competitive disadvantage. These two indicators are also calculated with reference to world. In this case the trade advantage / disadvantage is measured with respect to the total merchandized trade of the area under analysis.

$$RMA_{ij} = \left(M_{ij} / \sum_{l,l \neq j} M_{il}\right) / \left(\sum_{k,k \neq i} M_{kj} / \sum_{k,k \neq i, l,l \neq j} M_{kl}\right) \ldots (4)$$

The RTA is the difference between RXA and RMP. It can be greater or less than zero. The former case expresses a situation of net competitive advantage in selected commodity trade, while the latter a net competitive disadvantage.

$$RTA_{ij} = \left(X_{ij} / \sum_{l,l \neq j} X_{il}\right) / \left(\sum_{k,k \neq i} X_{kj} / \sum_{k,k \neq i, l,l \neq j} X_{kl}\right) - \left(M_{ij} / \sum_{l,l \neq j} M_{il}\right) / \left(\sum_{k,k \neq i} M_{kj} / \sum_{k,k \neq i, l,l \neq j} M_{kl}\right) \ldots (5)$$

## RESULTS AND DISCUSSION

Balassa (1965) RCA index of revealed comparative advantage was used to gauge the revealed comparative advantage in horticulture sector of Pakistan. Pakistan has values of the RCA less than one during 1990-1998 showing a revealed comparative disadvantage in overall fruit and vegetable however Pakistan has experienced a revealed comparative advantage since 1999 (Table 1). This implies that Pakistan attained and maintained the level of comparative advantage in overall fruits and vegetable up to the 2009 having RCA greater than 1.

Pakistan is net exporter of tangerines, mandarins, clem. The results revealed that tangerines, mandarins, clem revealed comparative advantage increased over time during the period under analysis. RSCA trend depicted that Pakistan has increased specialization in export of tangerines, mandarins, clem. Relatively higher and consistent comparative advantage for tangerines, mandarins, clem relative to other categories studied in this study was observed.

Onion is an important cash crop for the farmers as well as among the main exportable horticulture commodities from the country. PHDEB (2007) argued that development of onion crop will improve farm incomes and foreign exchange earnings for country. During the period under analysis Pakistan was net exporter of onion. Results of analysis exhibit that Pakistan shows comparative disadvantage RCA value less than 1 during 1991-93 and 1995-96 (Table 1). However, Pakistan gained comparative advantage in onion export in 1997 and maintained it up to 2009 where the value of RCA exceeds 1. The trend of indicators showed a transition from comparative disadvantage

**Table1. Revealed comparative advantage indicators for selected horticulture commodities in Pakistan**

| Year | Fruits and vegetables | | Tangerines, mandarins, clem | | Onion | |
|---|---|---|---|---|---|---|
| Indicators | RCA | RSCA | RCA | RSCA | RCA | RSCA |
| 1990 | 0.86 | -0.08 | 1.91 | 0.31 | 8.17 | 0.78 |
| 1991 | 0.57 | -0.27 | 1.77 | 0.28 | 0.66 | -0.20 |
| 1992 | 0.56 | -0.28 | 1.85 | 0.30 | 0.82 | -0.10 |
| 1993 | 0.59 | -0.26 | 1.76 | 0.28 | 0.12 | -0.79 |
| 1994 | 0.59 | -0.26 | 1.97 | 0.33 | 2.43 | 0.42 |
| 1995 | 0.52 | -0.31 | 2.05 | 0.35 | 0.41 | -0.42 |
| 1996 | 0.58 | -0.26 | 2.16 | 0.37 | 0.98 | -0.01 |
| 1997 | 0.93 | -0.03 | 6.08 | 0.72 | 1.61 | 0.23 |
| 1998 | 0.95 | -0.03 | 3.27 | 0.53 | 7.57 | 0.77 |
| 1999 | 1.19 | 0.09 | 5.05 | 0.67 | 21.43 | 0.91 |
| 2000 | 1.33 | 0.14 | 6.82 | 0.74 | 9.61 | 0.81 |
| 2001 | 1.10 | 0.05 | 8.42 | 0.79 | 7.42 | 0.76 |
| 2002 | 1.03 | 0.01 | 8.96 | 0.80 | 3.75 | 0.58 |
| 2003 | 1.09 | 0.04 | 6.99 | 0.75 | 3.01 | 0.50 |
| 2004 | 1.11 | 0.05 | 9.77 | 0.81 | 3.12 | 0.51 |
| 2005 | 0.92 | -0.04 | 5.59 | 0.70 | 1.70 | 0.26 |
| 2006 | 1.39 | 0.16 | 11.91 | 0.85 | 2.34 | 0.40 |
| 2007 | 1.03 | 0.01 | 9.07 | 0.80 | 0.58 | -0.27 |
| 2008 | 1.01 | -0.03 | 11.57 | 0.84 | 2.43 | 0.42 |
| 2009 | 1.09 | 0.04 | 9.16 | 0.80 | 1.67 | 0.25 |

*Source: Authors Calculations, RCA=Revealed Comparative Advantage, RSCA=Revealed Symmetric Comparative Advantage.*

to comparative advantage in onion exports. These results are consistent with recent findings by Riaz and Jansen (2012) that Pakistan has strong revealed comparative advantage at regional level in selected fruits and fruit and vegetable juices, preserved fruits and fruit preparations.

Pakistan's competitive advantage in horticulture is examined by using an alternative index introduced by Vollrath (1985). Positive values of the RXA index (Table 2) indicated a revealed competitive advantage in exports of all three categories of horticulture products selected for the study. In overall fruits and vegetables imports, Pakistan have a competitive advantage from 1990 to 1998 and after this Pakistan has a competitive disadvantage. However positive values of the RTA indicates that Pakistan has a net revealed competitive advantage in net exportable commodities namely, tangerine mandrine, clem and onion. In overall fruits and vegetable category Pakistan has shown net revealed competitive disadvantages in most of the years under consideration. The results showed that comparative advantage time span cover almost one decade and

**Table 2. Revealed competitive advantage indicators for selected horticulture commodities in Pakistan**

| Year | Fruits and vegetables | | | Tangerines, mandarins, clem | | | Onion | | |
|---|---|---|---|---|---|---|---|---|---|
| Indicators | RXA | RMA | RTA | RXA | RMA | RTA | RXA | RMA | RTA |
| 1990 | 0.86 | 0.51 | 0.35 | 1.92 | 0 | 1.92 | 8.26 | 0 | 8.26 |
| 1991 | 0.57 | 0.47 | 0.10 | 1.77 | 0 | 1.77 | 0.66 | 0 | 0.66 |
| 1992 | 0.56 | 0.59 | -0.03 | 1.86 | 0 | 1.86 | 0.82 | 0 | 0.82 |
| 1993 | 0.59 | 0.77 | -0.18 | 1.76 | 0 | 1.76 | 0.12 | 0 | 0.12 |
| 1994 | 0.59 | 0.68 | -0.09 | 1.97 | 0 | 1.97 | 2.43 | 0 | 2.43 |
| 1995 | 0.52 | 0.89 | -0.36 | 2.06 | 0 | 2.06 | 0.41 | 0.01 | 0.40 |
| 1996 | 0.58 | 0.95 | -0.37 | 2.16 | 0 | 2.16 | 0.98 | 0 | 0.98 |
| 1997 | 0.93 | 0.70 | 0.23 | 6.13 | 0 | 6.13 | 1.61 | 0 | 1.61 |
| 1998 | 0.95 | 1.09 | -0.14 | 3.29 | 0 | 3.29 | 7.65 | 0 | 7.65 |
| 1999 | 1.19 | 1.29 | -0.10 | 5.08 | 0 | 5.08 | 22.07 | 0 | 22.07 |
| 2000 | 1.33 | 1.64 | -0.31 | 6.87 | 0 | 6.87 | 9.72 | 0.01 | 9.72 |
| 2001 | 1.10 | 1.54 | -0.44 | 8.52 | 0 | 8.52 | 7.49 | 0.01 | 7.48 |
| 2002 | 1.03 | 1.63 | -0.60 | 9.07 | 0 | 9.07 | 3.76 | 0.01 | 3.75 |
| 2003 | 1.09 | 1.16 | -0.07 | 7.06 | 0 | 7.06 | 3.02 | 0 | 3.02 |
| 2004 | 1.11 | 0.62 | 0.49 | 9.90 | 0 | 9.90 | 3.13 | 0 | 3.13 |
| 2005 | 0.92 | 0.78 | 0.14 | 5.63 | 0 | 5.63 | 1.70 | 0 | 1.70 |
| 2006 | 1.38 | 0.94 | 0.44 | 11.73 | 0 | 11.73 | 2.72 | 0 | 2.72 |
| 2007 | 1.38 | 1.21 | 0.17 | 8.98 | 0 | 8.98 | 2.33 | 0 | 2.33 |
| 2008 | 1.03 | 0.84 | 0.19 | 11.42 | 0 | 11.42 | 0.58 | 0 | 0.58 |
| 2009 | 1.02 | 1.26 | -0.32 | 9.06 | 0 | 9.06 | 2.42 | 0 | 2.42 |

*Source: Authors Calculations, RXA=Relative Export Advantage Index, RMP=Relative Import Penetration Index, RTA=Relative Trade Advantage Index*

then followed by the continuous disadvantage, revealing that no proper attention is given regarding the policy making of the fruits and vegetables trade.

In conclusion, Pakistan has a high degree of comparative and competitive advantage in tangerines, mandarins, clem and onion based on the Balassa's revealed comparative advantage index and Vollrath's revealed competitive advantage index. Pakistan's strong comparative and competitive position in horticulture produce will help to reduce overall trade deficit for the country.

Present analysis concluded that Pakistan has comparative and competitive advantage during 1990-2009 and indicated a transition from comparative and competitive disadvantage to comparative and competitive advantage during the period under analysis. Thus there is possibility to increase competitive advantage of export to the world market. The empirical analysis on revealed comparative and competitive advantage of Pakistan, in the selected horticulture commodities demonstrated that Pakistan has relatively higher comparative and competitive advantage for tangerines, mandarins and clem during the period under analysis. Overall in fruits and vegetables, Pakistan experienced comparative and competitive disadvantage during first part of the period (1990-1998) and transformed into comparative and competitive advantage during the remaining period under analysis. An increase in RSCA indicated that Pakistan increased its specialization which implies that Pakistan is more likely to continue its comparative and competitive advantages in exports of all commodities under consideration. To increase and retain competitiveness in horticulture exports investment is needed in scientific research for technology development to produce quality marketable surplus, devise international marketing strategies so that the horticulture can make a significant contribution to reduce overall negative trade balance of Pakistan.

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