

## Research Article



## Competiveness of Pakistan's Selected Fruits in the World Market

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**Abstract** | The study in hand provides analysis of Pakistan's comparative and competitive advantage in production of top three fruits, namely mango, citrus and dates by using Revealed Comparative Advantage, Revealed Symmetric Comparative Advantage, Relative Export Advantage Index and Log of Relative Export Advantage Index. For this purpose, time series data has been collected for the period 2001-2018 from Food and Agricultural Organization Statistics, International Trade Centre map, and World Banks' World Integrated Trade Solutions, Trade Development Authorities of Pakistan, and Pakistan's Economic Surveys. It was found that Pakistan comparative advantage in production of all three fruits as values of the Revealed Comparative Advantage were greater than one and Revealed Symmetric Comparative Advantage values remained positive throughout the study period. Despite having comparative advantage, results of Relative Export Advantage Index and log of Relative Export Advantage Index revealed that Pakistan do not have export competitiveness and competitive advantage in case mango, citrus and dates. Value of Relative Export Advantage Index is less than one which illustrates that Pakistan is having competitive disadvantage of Pakistan in case of production of mango, citrus and dates throughout the study period. In a similar token results of log of Relative Export Advantage Index in all years under consideration, reveals competitive disadvantage of Pakistan as value of this index remained negative in case of all the three fruits. If value of Revealed Comparative Advantage is compared in case of these three fruits, dates have higher value of the index, hence comparatively higher comparative advantage than other two fruits. Pakistan should focus on improvement of quality of its top three important fruits in order to increase international competitiveness and retain the comparative advantage in production of mango, citrus and dates.

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### Introduction

Process of globalization and trade openness continuously increasing the competition of commodities at global level and Pakistan is facing challenges of competitiveness due to lack of value addition, liquidity constraints and poor institutional arrangement. Competitiveness refers to efficient

utilization of domestic resources to produce commodities that compete with the global standards. The principle of comparative advantage is important economic tool for the allocation of scarce resources, price stability, identifying and prioritizing potential export markets, and designing trade policies.

Within agriculture sector, the horticulture is a

key sub-sector in Pakistan. Climatic diversity and ecological environment of Pakistan favor to produce fruits. Among fruits, the most commonly cultivated fruits are mangoes, citrus, apple, grapes, banana, dates etc. Fruits contribute almost 2.48% value addition to agricultural GDP (GOP, 2019) and has tremendous export potential (PHDEC, 2017). This study takes into consideration tope three famous fruits for checking their competitiveness by using the concept of comparative advantage.

‘Mango’ is one of the most commercialized fruit of tropical countries and is considered as the king of fruits (Pulido et al., 2017). Pakistani mangoes are very famous owing to its special taste and characteristics. It is the second largest fruit crop of Pakistan in term of production. During FY 2001-2017, average production of mango in Pakistan was almost 1.6 million tons, with an average area coved of 147 thousand hectares and an average yield of 10 tons per hectare (see Figure 1). Area covered under mango has remained almost constant throughout the study period. Yield has also remained stagnant during the period. Pakistan’s mango export increased from \$ 45.37 million in 2016-17 to \$ 73.16 million in 2017-18 which constitute almost 2.66 percent share of total world mango export in year 2018 (ITC map (<https://www.trademap.org>); GOP, 2019).

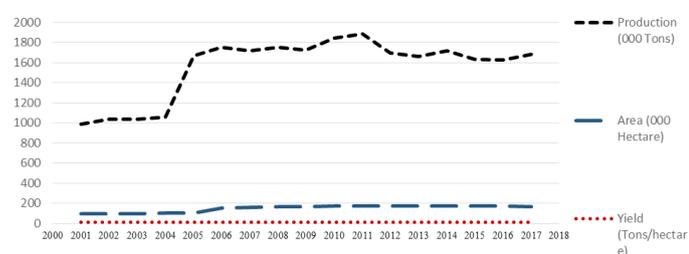


Figure 1: Pakistan's Production, area and yield of Mango.

Citrus stands at 1<sup>st</sup> position in the production and exports of fruits in Pakistan. Kinnow is largest exportable commodity among citrus which constitutes about 95% of mandarin export from Pakistan. Pakistan holds a prominent position among top ten Kinow (mandarin) exporting countries in the world (GOP, 2018; Ahmad et al., 2018). The export of citrus increased from \$ 139.59 million in 2016-17 to \$ 177.85 million in 2017-18. The share of citrus export in global citrus export is around 1.2 percent (ITC map; GOP, 2019).

Dates are highly nutritious fruit being grown in tropical parts of the world. Pakistan stands among the

top five exporters of dates (FAO, 2018). Balochistan is the top producer of dates among Pakistani provinces. More than half of production of dates comes from this province. The export of dates from Pakistan in year 2016-17 were around \$ 107.49 million and raised to 112.73 million in 2017-18. The share of export of dates of Pakistan is 5.78% of its global (ITC map; GOP, 2019).

According to the trade theory, estimating the competitive advantage is more useful than comparative advantage. The concept of competitiveness refers to market distortions whereas, comparative advantage includes undistorted markets (Akhtar et al., 2009). Moreover, with the reduction of trade barriers and increasing trend of globalization, export competitiveness is gaining importance. This paper estimated both competitive advantage and comparative advantage to compare results.

These fruit crops may tend to pay significant contribution in GDP of country by making them in line to world market through value addition. Export of fruits to world market was always been amorous for Pakistan because there is huge room for Pakistan in term of comparative and competitive advantage. Pakistan’s competitiveness however is still needed to get improved. Therefore, the present study was designed to estimate export competitiveness and comparative advantage of three Pakistani fruits (mangoes, dates, citrus) in international market.

Numbers of studies have investigated the export competitiveness of Pakistani’ commodities by using Revealed Comparative Advantage (RCA), Revealed Symmetric Comparative Advantage (RSCA), Chi-Square and CTB measure etc. Javed et al. (2006) examined the comparative advantage of Pakistani’ cotton by employed Domestic Resource Cost (DRC), Nominal Protection Coefficient (NPC) and Effective Protection Coefficient (EPC) for the data of period 1998-2003. Akhtar et al. (2009) analyzed the international competitiveness of mangoes, dates and oranges of Pakistan during the period 1995-2005 by employing revealed comparative advantage (RCA). Shoufeng et al. (2011) investigated the export competitiveness of agricultural commodities among central Asian countries and China. They employed RCA index and trade competitiveness index in the study. Almodarra and Saghaian (2016) used RCA to analyze the comparative advantage of KSA in

producing and exporting dates into global market. Naseer et al. (2018) analyzed the competitiveness of the mandarin industry for top 15 exporters of mandarin by calculating RSCA. Sardar et al. (2019) investigated the export potential, potential market and importance of beef industry of Pakistan. Keeping in view of the trade potential of Pakistani fruits, the present study is designed to investigating the comparative and competitive advantage of fruits by employing  $RCA_m$ , RSCA, RXA and  $RCA_l$ .

## Materials and Methods

This study has utilized the  $RCA_m$ , RSCA, RXA and  $RCA_l$  mentioned as equations (2-5), for investigating the comparative and competitive advantage of Pakistan in selected fruits namely mango, citrus and dates. For this purpose, time series data has been collected for the period 2001-2018 from Food and Agriculture Organization of the United Nations (<http://www.fao.org/faostat/en/#data>), International Trade Center map ([www.trademap.org](http://www.trademap.org)), and WITS World Bank (<http://wits.worldbank.org>), Trade development Authority of Pakistan, and Economic Survey of Pakistan (various editions).

In order to analyze the trade performance of certain country in a specific commodity a number of indices and instruments are available including Revealed Comparative Advantage (RCA), Revealed Symmetric Comparative Advantage (RSCA), Revealed Imports Penetration Index (RMP), Relative Export Advantage Index (RXA) and Relative Trade Advantage (RTA) index. These indices rank countries accordingly to estimate their relative competitiveness in a certain commodity.

Comparative advantage is a concept derived from two theories of International Economics, namely the Ricardian theory and the Heckscher-Ohlin (H-O) theory. According to the Ricardian theory, comparative advantage is a country's capability of producing a certain commodity based on having better technology as compared to other countries. Whereas, the H-O theory assumes same technologies in all countries and attributes comparative advantage to cost differences in producing certain commodity based on the factor endowment.

The Revealed Comparative Advantage most commonly known as Balassa index was first

introduced by Balassa and Noland (1965). It measures the relative advantage/disadvantage of a nation in trade of a specific commodity. This index is based on 'comparative advantage' concept of David Ricardo. A large number of researchers prefer using Balassa's Revealed Comparative Advantage over other measures in order to determine comparative and competitive advantage in certain commodity for a specific country enjoying competitive edge (Balassa (1989); Ferto and Hubbard (2004); Hsu and Wann (2004); Laursen (1998); Almodarra and Saghaian (2016); Javed et al. (2017)). An RCA index provides trend of competitiveness in a certain commodity or sector on the basis of time series data of trade in that commodity.

The RCA index is mostly calculated for each past year, as in most of the countries past trade data is available on yearly basis. This index need information on the structure of export only and it does not require any other information including relative costs and non-price factors that might affect export of a commodity under consideration. Formula for simple RCA index is given as below:

$$RCA_s = X_{ij}/X_{nj} \quad \dots(1)$$

Where;

X= exports; i= a country; j= commodity and n is number of countries. A modified form of RCA is as follows:

$$RCA_m = (X_{ij}/X_{it})/(X_{nj}/X_{nt}) = (X_{ij}/X_{nj})/(X_{it}/X_{nt}) \quad \dots(2)$$

Where;

X= exports; i= a country; j= a commodity; t= number of commodities and n= number of countries.  $RCA_{ijt}$  provides relative measure of a commodity's export to total exports and to the corresponding exports of a set of countries. In this way a comparative advantage becomes "revealed". If it is less than one, the nation under consideration is said to be in a comparative disadvantage in the commodity under consideration.

Revealed Symmetric Comparative Advantage (RSCA) Index is modified form of RCA, using this index enables researcher to normalize very high values of RCA. Value of this measurement ranges between -1 and +1 Dalum et al. (1998) and Laursen (1998). RSCA index is formulated using the following formula:

$$RSCA_{ijt} = (RCA_m - 1) / (RCA_m + 1) \dots(3)$$

RSCA index measuring more than '0' reveals a competitive advantage of i<sup>th</sup> product being exported by j<sup>th</sup> country in year 't' and vice versa. It provides information to how much extent a country is specialized in exporting certain commodity.

Another important scale is Relative Export Advantage Index (RXA) mostly utilized for evaluating a country's export competitiveness in international market Balassa (1989) and Scott and Vollrath (1992). This is an index measured as the ratio of a nation's export portion of a certain product in the world market divided by its share in total global export. If a country meets criteria set by this index, it is considered competitive in international market for export of certain commodity (Frohberg and Hartmann, 1997). RXA is defined as:

$$RXA = (X_{ni} - X_{ij}) / (X_{nij} - X_{ni}) \dots(4)$$

Where;

X<sub>nj</sub> is total export of i<sup>th</sup> country, X<sub>ij</sub> is its export of j<sup>th</sup> Product, X<sub>nij</sub> is total global exports and X<sub>ni</sub> is total export of that nation. Value of this index needs to be more than '1' for a country to get the status of being competitive internationally and vice versa.

Another measure utilized in the literature for analyzing competitive advantage is RCA<sub>1</sub>. It utilizes the following formula:

$$RCA_1 = Ln RXA \dots (5)$$

Value of this index higher than '0' is desirable for the status of having competitive advantage and a negative value means a competitive disadvantage.

## Results and Discussion

Following the formulae mentioned in Equation 2 to equation 5, RCA<sub>m</sub>, RSCA, RXA and RCA<sub>1</sub> were calculated, respectively, for analyzing comparative advantage and competitive advantage of Pakistan in case of selected fruits namely mango, citrus and dates.

### Pakistan's comparative advantage and competitiveness in 'Mango'

Mango due to having high nutritional benefits, unique taste, and captivating aroma is known as 'King of fruits'. Pakistan is seventh largest producer

of mango while third largest exporter of mango in the world markets (Table 2). Pakistan also falls in top ten exporters of this fruit (Table 3). Mango exports from Pakistan was 11.62 million USD in 2002 and this exports value for mango exports is the lowest value earned from exports of mango from Pakistan in the study period. There was steady growth in exports of mango from Pakistan per year.

**Table 1:** Globally major producers of 'mango, mangosteen and guava' in the world.

S.No.	Country	Production in million tons
1	India	19.51
2	China	4.94
3	China, Mainland	4.79
4	Thailand	3.82
5	Indonesia	2.57
6	Mexico	1.96
7	Pakistan	1.69

Source: FAOSTAT.

**Table 2:** Major exporters of 'mango, mangosteen and guava' in the world.

S.No.	Country	Export in million USD
1	Mexico	378.50
2	Netherlands	287.25
3	India	202.57
4	Peru	197.74
5	Brazil	180.33
6	Thailand	165.85
7	Spain	70.43
8	Philippines	66.87
9	Pakistan	65.84

Source: FAOSTAT.

As discussed in the previous section on methodology, indices available to analyze comparative advantage (RCA<sub>m</sub> and RSCA) and export competitiveness (RXA and RCA<sub>1</sub>) have different merits in analyzing comparative advantage and competitive advantage of a country in production of a certain commodity. This study therefore, utilized RCA<sub>m</sub>, RSCA, RXA and RCA<sub>1</sub> to analyze Pakistan's competitiveness in exporting selected fruits (mango, citrus and dates).

Results reveal that Pakistan has values of the RCA<sub>m</sub> greater than one throughout study under consideration (2001 to 2018) in case of export of 'mango'.

**Table 3: RCA index results for Pakistan's comparative advantage in 'mango'.**

Year	Pakistan's export of mango (million USD)	Pakistan total exports (million USD)	Global export of mango (million USD)	Global total export (million USD)	RCA	RSCA	RXA	RCA <sub>1</sub>
2001	12.74	9202	1164.48	7057589.29	8.39	0.79	0.001302	-6.6437
2002	11.62	9135	1178.82	6833244.32	7.37	0.76	0.001335	-6.6185
2003	14.33	11160	1328.37	7213694.69	6.97	0.75	0.001545	-6.4725
2004	15.78	12313	1383.86	8299353.32	7.69	0.77	0.001482	-6.5144
2005	17.89	14391	1276.36	10208887.94	9.94	0.82	0.001408	-6.5655
2006	19.41	16451	1495.06	11496674.39	9.07	0.80	0.001429	-6.5505
2007	12.04	16976	1436.53	13357547.74	6.59	0.74	0.00127	-6.6686
2008	17.44	19052	1569.13	15324995.89	8.94	0.80	0.001242	-6.6909
2009	23.07	17688	1573.47	17555991.69	14.55	0.87	0.001006	-6.9015
2010	25.22	19290	1748.31	13817035.11	10.33	0.82	0.001394	-6.5753
2011	37.69	24810	1703.63	16810972.69	14.99	0.87	0.001474	-6.5200
2012	38.58	23624	1804.07	20087865.87	18.18	0.90	0.001174	-6.7472
2013	52.35	24460	1438.83	20153797.58	29.98	0.94	0.001211	-6.7162
2014	57.20	25110	1937.27	20867697.99	24.54	0.92	0.001201	-6.7249
2015	57.00	23667	2161.84	20788288.01	23.16	0.92	0.001136	-6.7804
2016	64.90	20787	2382.70	15583231.63	20.42	0.91	0.00133	-6.6226
2017	45.37	20422	2944.11	16929204.02	12.77	0.85	0.001204	-6.7222
2018	73.16	23212	2747.45	15112894.50	17.34	0.89	0.001531	-6.4816
Average	33.10	18430.56	1737.46	14305498.15	13.96	0.87	0.001286	-6.6561

Source: ITC map (<https://www.trademap.org>) and Economic Survey of Pakistan.

Value of RSCA should be positive for a country to have comparative advantage in production of a specific commodity. In case of mango, Pakistan has maintained positive RSCA throughout the period (see Table 3). Results of both indices reveal that Pakistan has comparative advantage in case of mango.

Findings of this study regarding Pakistan's comparative advantage in mango are in line with findings of previous studies. Where, Pakistan is having comparative advantage in all the horticultural crops (Akhter et al., 2009) including fruits (Abbas and Waheed, 2017), mango has comparative advantage in markets of several regions including South Asian Association for Regional Cooperation (SAARC), European Union (EU) and Gulf (Riaz et al., 2010) and the international market as a whole (Riaz et al., 2012). Despite having comparative advantage, results of RXA and RCA<sub>1</sub> reveal that Pakistan do not have export competitiveness and competitive advantage in case mango. Value of RXA is less than one which illustrates that Pakistan is having competitive disadvantage of Pakistan in case of production of mango throughout the study period (as mentioned in Table 3). In a similar token results of RCA<sub>1</sub> in all years

under consideration, reveal competitive disadvantage of Pakistan as value of RCA<sub>1</sub> remained negative.

Figure 2 reveals the comparative overview of results of all the indices measured in order to reveal Pakistani mango despite having comparative advantage has export disadvantage and competitive disadvantage.



Figure 2: Pakistan's comparative advantage and competitiveness in export of Mango.

*Pakistan's comparative advantage and competitiveness in 'Citrus'*

In Pakistan, Citrus is grown on an area of 0.192 million hectares with 2180 thousand tons, which has consistently increased since FY 2000-2001 (see Figure 3). Most of citrus is grown in Punjab province of Pakistan. Citrus is high in nutrients, particularly,

vitamin C. Among all countries Pakistan is at thirteenth rank in production of citrus (Table 4). In overall global export of citrus, Pakistan falls in top countries (Table 5). Export of citrus consistently increased during the study period (Table 6).

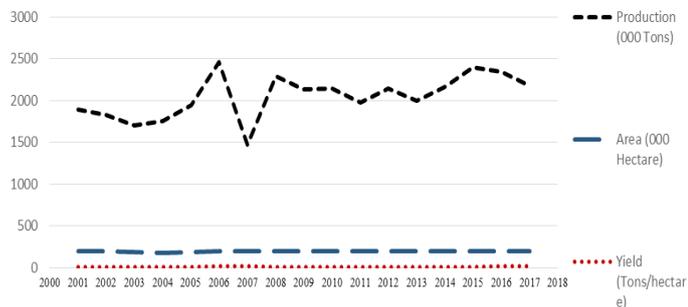


Figure 3: Pakistan's production, area and yield of citrus.

Table 4: Globally major producers of citrus ('Tangerines, Mandarins, Clementines, Satsumas').

S. No.	Country	Production in 000 tons
1	China	18187.69
2	China, mainland	18026.02
3	Spain	1967.02
4	Turkey	1550.47
5	Morocco	1278.35
6	Egypt	1038.75
7	Brazil	965.35
8	USA	937.12
9	Japan	741.30
10	Republic of Korea	688.07
11	Italy	683.14
12	Iran	656.03
13	Pakistan	590.75
14	Mexico	492.50

Source: FAOSTAT

Table 5: Major global exporters of citrus ('Tangerines, Mandarins, Clementines, Satsumas').

S. No.	Country	Export in million USD
1	Spain	1439.39
2	China	939.84
3	China, mainland	916.07
4	Turkey	321.87
5	Morocco	299.66
6	South Africa	189.22
7	Pakistan	157.97
8	Peru	135.39
9	Netherlands	124.40

Source: FAOSTAT

As done in case of mango,  $RCA_m$ ,  $RSCA$ ,  $RXA$  and  $RCA_1$  were calculated Pakistan's competitiveness in producing and exporting citrus. Results of  $RCA_m$  index reveals that Pakistan got comparative advantage in production of citrus, as the value of index is greater than one throughout study under consideration (2001 to 2018).

Value of  $RSCA$  should be positive for a country to have comparative advantage in production of a specific commodity. In case of citrus, Pakistan has maintained positive  $RSCA$  throughout the period (see Table 6). Results of both indices reveal that Pakistan has comparative advantage in case of citrus.

Findings of this study regarding Pakistan's comparative advantage in citrus are in line with findings of previous studies. Where, Pakistan is having comparative advantage in all the horticultural crops (Akhter et al., 2009) including fruits (Abbas and Waheed, 2017), citrus has comparative advantage in markets of several regions including SAARC, the EU and Gulf (Riaz et al., 2010) and the international market as a whole (Riaz et al., 2012).  $RSCA$ 's results support that Pakistan is one of top five countries having comparative advantage in mandarin production (Naseer et al., 2018). However, Pakistan has export disadvantage and competitive disadvantage as obvious from the results of  $RXA$  and  $RCA_1$ , where the value of  $RXA$  is less than one and value of  $RCA_1$  remained negative throughout the study period.

Figure 4 reveals the comparative overview of results of all the indices measured in order to reveal Pakistani citrus despite having comparative advantage has export disadvantage and competitive disadvantage.



Figure 4: Pakistan's comparative advantage and competitiveness in export of Citrus.

Pakistan's comparative advantage and competitiveness in 'Dates'

In Pakistan, 'Dates' are grown on an area of 93.78 thousand hectares with 487.4 thousand tons, which has consistently increased since FY 2000-2001

**Table 6: RCA Index Results for Pakistan's Comparative Advantage in 'Citrus'.**

Year	Pakistan's export of citrus (000 USD)	Pakistan total exports (million USD)	Global export of citrus (000 USD)	Global total export (million USD)	RCA	RSCA	RXA	RCA <sub>1</sub>
2001	16.3	9202	4708.21	7057589.29	2.66	0.45	0.001302	-6.6435
2002	20.9	9135	5071.50	6833244.32	3.08	0.51	0.001335	-6.6190
2003	22.67	11160	6074.97	7213694.69	2.41	0.41	0.001545	-6.4726
2004	30.72	12313	6637.29	8299353.32	3.12	0.51	0.001481	-6.5150
2005	21.48	14391	6971.11	10208887.94	2.19	0.37	0.001409	-6.5652
2006	42.90	16451	7181.56	11496674.39	4.17	0.61	0.001428	-6.5514
2007	33.78	16976	8669.24	13357547.74	3.07	0.51	0.001269	-6.6694
2008	48.63	19052	10481.86	15324995.89	3.73	0.58	0.001241	-6.6919
2009	69.40	17688	10249.74	17555991.69	6.72	0.74	0.001004	-6.9036
2010	106.09	19290	11342.41	13817035.11	6.70	0.74	0.00139	-6.5788
2011	138.65	24810	11922.36	16810972.69	7.88	0.77	0.001469	-6.5234
2012	155.88	23624	11934.51	20087865.87	11.11	0.83	0.001169	-6.7516
2013	171.38	24460	13100.69	20153797.58	10.78	0.83	0.001206	-6.7205
2014	192.58	25110	13138.11	20867697.99	12.18	0.85	0.001195	-6.7298
2015	184.79	23667	12659.01	20788288.01	12.82	0.86	0.00113	-6.7853
2016	171.47	20787	13492.17	15583231.63	9.53	0.81	0.001324	-6.6270
2017	139.59	20422	13930.97	16929204.02	8.31	0.79	0.001199	-6.7262
2018	177.85	23212	14780.50	15112894.50	7.83	0.77	0.001526	-6.4853
Average	96.95	18430.56	10130.35	14305498.15	6.57	0.74	0.001282	-6.6590

Source: ITC map (<https://www.trademap.org>) and Economic Survey of Pakistan.

(see Figure 5). Highest production of dates is received from Balochistan province of Pakistan. Among all countries Pakistan is ranked sixth largest producer of dates in the world (Table 7). In overall global export of dates, Pakistan is on rank of fifth position (Table 8). Export of dates consistently increased during the study period (Table 9).

**Table 7: Globally major producers of dates.**

S. No.	Country	Production in 000 tons
1	Egypt	1590.41
2	Iran	1185.17
3	Algeria	1058.56
4	Saudi Arabia	754.76
5	Iraq	618.82
6	Pakistan	524.04
7	UAE	475.29
8	Sudan	439.36
9	Oman	360.92
10	Egypt	688.07

Source: FAOSTAT.

As performed in case of mango and citrus, RCA<sub>m</sub>, RSCA, RXA and RCA<sub>1</sub> were also calculated Pakistan's

competitiveness in producing and exporting citrus. Results of RCA<sub>m</sub> index reveals that Pakistan got comparative advantage in production of dates, as the value of index is greater than one throughout study under consideration (2001 to 2018).

**Table 8: Globally major exporters of dates.**

S. No.	Country	Export in million USD
1	Tunisia	226.61
2	UAE	160.22
3	Israel	141.54
4	Saudi Arabia	107.77
5	Pakistan	102.60
6	Iran	97.52
7	USA	58.67
8	Iraq	50.00
9	France	37.62
10	Tunisia	226.61

Source: FAOSTAT.

Value of RSCA should be positive for a country to have comparative advantage in production of a specific commodity. In case of dates, Pakistan has maintained positive RSCA throughout the period (see Table 9).

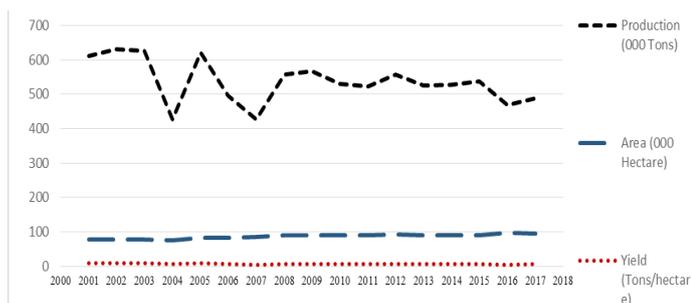
**Table 9: RCA index results for Pakistan's comparative advantage in 'dates'.**

Year	Pakistan's export of dates (000 USD)	Pakistan total exports (million USD)	Global export of dates (000 USD)	Global total export (million USD)	RCA	RSCA	RXA	RCA <sub>1</sub>
2001	13.24	9202	231.11	7057589.29	43.94	0.96	0.001302	-6.6438
2002	22.68	9135	222.27	6833244.32	76.33	0.97	0.001334	-6.6199
2003	24.95	11160	298.57	7213694.69	54.02	0.96	0.001544	-6.4736
2004	27.80	12313	282.90	8299353.32	66.24	0.97	0.00148	-6.5155
2005	30.39	14391	440.19	10208887.94	48.98	0.96	0.001407	-6.5665
2006	37.66	16451	439.01	11496674.39	59.95	0.97	0.001428	-6.5517
2007	38.69	16976	641.92	13357547.74	47.43	0.96	0.001268	-6.6703
2008	39.80	19052	698.90	15324995.89	45.81	0.96	0.001241	-6.6921
2009	50.37	17688	697.72	17555991.69	71.65	0.97	0.001005	-6.9031
2010	52.41	19290	833.82	13817035.11	45.02	0.96	0.001392	-6.5767
2011	64.08	24810	956.55	16810972.69	45.39	0.96	0.001472	-6.5211
2012	80.84	23624	1156.63	20087865.87	59.43	0.97	0.001172	-6.7490
2013	85.72	24460	1259.68	20153797.58	56.07	0.96	0.001209	-6.7176
2014	79.98	25110	1310.95	20867697.99	50.70	0.96	0.0012	-6.7258
2015	83.21	23667	1407.34	20788288.01	51.93	0.96	0.001135	-6.7815
2016	102.60	20787	1449.74	15583231.63	53.05	0.96	0.001327	-6.6245
2017	107.49	20422	1648.28	16929204.02	54.06	0.96	0.0012	-6.7254
2018	112.73	23212	1948.31	15112894.50	37.67	0.95	0.001529	-6.4834
Average	58.59	18430.56	884.66	14305498.15	53.76	0.96	0.001284	-6.6575

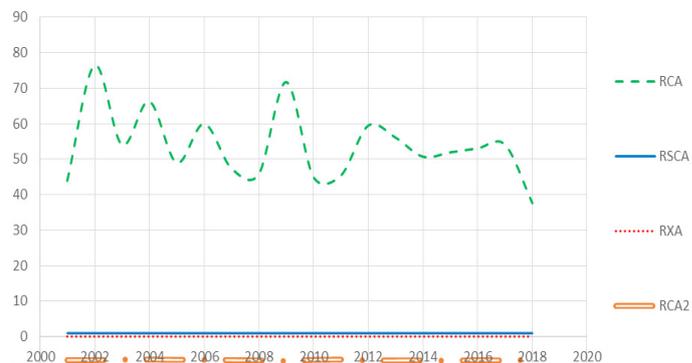
Source: ITC map (<https://www.trademap.org>).

Results of both indices reveal that Pakistan has comparative advantage in case of dates.

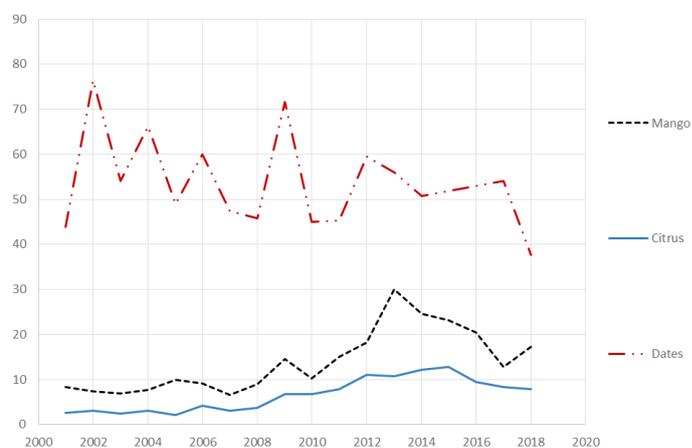
Findings of this study regarding Pakistan's comparative advantage in dates are in line with findings of previous studies. Where, Pakistan is having comparative advantage in all the horticultural crops (Akhter et al., 2009) including fruits (Abbas and Waheed, 2017), dates has comparative advantage in markets of several regions including SAARC, the EU and Gulf (Riaz et al., 2010) and the international market as a whole (Riaz et al., 2012). However, Pakistan has export disadvantage and competitive disadvantage as obvious from the results of RXA and RCA<sub>1</sub>, where the value of RXA is less than one and value of RCA<sub>1</sub> remained negative throughout the study period.



**Figure 5: Pakistan's Production, area and yield of dates.**



**Figure 6: Pakistan's comparative advantage and competitiveness in export of dates.**



**Figure 7: Pakistan's comparative advantage in Mango, Citrus and dates.**

Figure 6 reveals the comparative overview of results of all the indices measured in order to reveal Pakistani dates despite having comparative advantage has export disadvantage and competitive disadvantage.

If we compare the RCA of mango, citrus and dates, it reveals that dates have comparatively higher RCA than other two fruits. However, it has declined during past few years (as obvious from Figure 7).

## Conclusions and Recommendations

Pakistan is seventh largest producer of 'mango', thirteenth largest producer of 'citrus' and sixth largest producer of dates in the world. In case of export of mango, citrus and dates, Pakistan's rank is third, seventh and fifth, respectively. Export of all these fruits has kept increasing over the study period (2001 to 2018). This study utilized  $RCA_m$ , RSCA, RXA and  $RCA_1$  to analyze Pakistan's competitiveness in exporting these three fruits. Results reveal that Pakistan has values of the  $RCA_m$  greater than one throughout study under consideration (2001 to 2018) in case of export of 'mango', 'citrus' and 'dates. Value of RSCA should be positive for a country to have comparative advantage in production of a specific commodity. In case of all the three fruits, Pakistan has maintained positive RSCA throughout the period. Results of both indices (RCA and RSCA) reveal that Pakistan has comparative advantage in case of mango, citrus and dates. Despite having comparative advantage, results of RXA and  $RCA_1$  reveal that Pakistan do not have export competitiveness and competitive advantage in case mango, citrus and dates. Value of RXA is less than one which illustrates that Pakistan is having competitive disadvantage of Pakistan in case of production of mango, citrus and dates throughout the study period. In a similar token results of  $RCA_1$  in all years under consideration, reveals competitive disadvantage of Pakistan as value of  $RCA_1$  remained negative in case of all the three fruits. If value of  $RCA_m$  is compared in case of these three fruits, dates have higher value of the index, hence comparatively higher comparative advantage than other two fruits.

Pakistan should focus on improvement of quality of its top three important fruits in order to increase international competitiveness and retain the comparative advantage in production of mango, citrus and dates. International market is very dynamic and demands variability in terms of quality of a commodity

and its value addition. Being one of top ten exporters of these three fruits, competition with other competing countries becomes more challenging. Pakistan needs to invest in Research and Development (R and D) for improving the quality of these three exportable fruits in order to meet the demands of international consumer.

## Novelty Statement

This study provides analysis of Pakistan's comparative and competitive advantage in production of top three fruits, namely mango, citrus and dates by using Revealed Comparative Advantage, Revealed Symmetric Comparative Advantage, Relative Export Advantage Index and Log of Relative Export Advantage Index. It is critical for improving Pakistan's competitiveness in the world market through quality improvement and value addition.

## Author's Contribution

Rakhshanda Kousar drafted the outline of this paper and write down first two sections. Tahira Sadaf contributed in analysis and technical writing. M. Sohail Amjad Makhdum collected the data. M. Amjed Iqbal did proof reading of the manuscript and Raza Ullah helped in editing and write up.

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