



Price Distortions and Competitiveness of Cotton Production in Pakistan

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Abstract: The research is conducted to determine the cotton price distortions, as well as competitiveness at national and international levels. National competitiveness has been measured by using the nominal protection coefficient (NPC) and benefit-cost ratios for the period 2008-09 to 2018-19. To gauge international competitiveness, trade base indices under the revealed comparative advantage approach are used. A comparison of the international competitiveness of Pakistan with major cotton-exporting countries has also been made. The results of this research revealed that at the national level cotton producers in Pakistan faced implicit taxation for most of the years during the study period, as NPC_i averaged at 0.87 as an import substitution crop. Export parity prices were slightly less or equal to the domestic prices by varying degrees as NPC_c averaged at 1.06. The production cost grew at the rate of 12.3% per annum, while cotton output prices grew at the rate of 8.4 percent per annum. Consequently, a decrease was registered in the benefit-cost ratio during the study period. Pakistan has experienced comparative and competitive advantage for cotton as indicated by results of revealed comparative advantage (RCA) indices. A comparison of Pakistan's indices with main exporters/competitors demonstrated that Pakistan has a relatively higher comparative and competitive advantage for cotton. However, Pakistan's international competitiveness exhibited a declining pattern since 2011-12. This result is consistent with the national level scenarios as the benefit-cost ratio has declined over this period. It can be concluded that productivity growth and a reduction in input costs are needed to improve overall competitiveness in cotton production and trade.

Keywords: Cotton, Competitiveness, Revealed Comparative Advantage, Price Distortions, Protection, Implicit Taxation.

1. INTRODUCTION

Pakistan is fifth largest producer, third largest consumer of cotton and second largest cotton yarn exporter [1]. Cotton production supports Pakistan's largest industrial sector by providing domestic consumption of final textile products. Cotton and cotton products have 10 percent contribution in agricultural GDP and 55 percent of the total exports' earnings [2]. Agriculture is sensitive not only to climate change, but also to globalization of agriculture. To mitigate the sensitivity of agriculture, governments intervene in agriculture to

achieve desired policy goals of food security and agriculture competitiveness [3].

This study on price distortions demonstrates the extent to which domestic prices of cotton deviate from its corresponding free trade reference prices, i.e., export parity in case of exportable and import parity prices in case of importable. The distortions induced from the market failure, and/or trade and price related policies prevailed in the country. These distortions may be biased towards farmers and discourage the agricultural production. To maintain the competitiveness there are

interventions in the agricultural sector in different economies. These interventions may increase the government revenue through implicit taxation; however, these are counter balanced by the loss of earning in term of foreign exchange. The cost of market failure or policy distortions to incentive in term of resource misallocation tends to be greater in production substitution [4]. Cost efficiency in production and marketing is prerequisite for maintaining competitiveness. So, there is a need to reduce per unit production and marketing cost by focusing productivity growth. There is serious threat to farmers due to climate change, which frequently cause failure of crop with outcome of huge financial losses [5].

Pakistan being one of the fifth larger producer and 3rd largest consumer of cotton in world, hence market outcomes in Pakistan is expected to have an impact on global cotton trade [1]. Having this in background, this research seeks the answer of prices distortion, i.e., how far domestic prices of cotton deviate from its corresponding free trade reference prices (import and export parities) to gauge the level of distortions. By addressing the question, it has been determined that whether the country's trade and prices pattern (or policies) have built-in bias towards producers or consumers. As in less developed countries (LDCs) price distortion arises from government policy interventions or market failure effects. The current market system in Pakistan has no capacity to serve the farmers and consumers to save them from boom and bust cycles of the commodity prices [4]. This research study has been planned to exam cotton prices distortions and its implication for farmer's incentives and country's competitiveness of the strategic commodity, in international market. Findings of the present research investigation are important to determine the level of protection and incentive structure prevailing in the country. Existing literature reveals that in developing countries agricultural sector is often taxed, while consumption is subsidized which discourage the production [4]. This approach has been criticized, with the argument that increases in tax revenue to government is counterbalanced by a loss of agriculture foreign exchange earnings. Farm input and output markets in Pakistan have long history of state interventions. The public inter interventions in commodity market such as export monopolies in export of rice and cotton and wheat

procurement system are few examples [6], however state trading monopolies have been abolished in agricultural products since 2003 in trade liberation move [7].

Historically, in Pakistan implementation of support prices for major crops was aimed to provide a floor for market prices in the harvesting season [8]. State monopoly of exports and imports, restrictions on commodity movement and issuing of wheat to flour mills at subsidized prices have prime objective of provision of cheap food to consumers. Similarly, public sector monopoly in cotton and rice exports has also been maintained to develop export markets. Input subsidies are provided to encourage adoption of agricultural technology. The impact of these policy interventions was a source of distorted agricultural prices and incentives to producers. The policy interventions not only distort agricultural prices but also a source of lowered real prices of tradable agriculture produce [6]. In Pakistan, Rani *et al.* [9] suggested that government should ensure stability in prices that will also helpful in reducing area instability for cotton in the country.

Ender [10] used producer and consumer subsidy equivalent to gauge government intervention in agriculture. He concluded that in case of reduction in domestic support to export in other countries of the world prices go up and Pakistan can reap the benefit of liberalization. By using the same methodology Longmire and Debord [11] measured impact of policies on selected crops including cotton. The result revealed that Pakistan has strong comparative advantage in cotton production, whereas the authors suggested that inputs and output prices of cotton should be near to social cost [11].

Similarly, Akhtar *et al.* [12] studied incentive structure of rice and concluded that, to ensure the farm level competitiveness there is strong need to remove policy distortions and market failure effects. Moreover, Akhtar *et al.* [13] identified that distortions in inputs and output markets result in deviation in economic and private profitability. Javed *et al.* [14] reported that the cotton is losing its competitive position when it's cost of production increases and domestic prices go up. The prime objective of this research is to estimate degree of protection and economic incentives in cotton

production in Pakistan and to identify measures to enhance incentive structure for the cotton farmers in Pakistan to achieve the global competitiveness.

2. MATERIALS AND METHODS

In this study secondary data have been used for the analysis. The analysis covered the period through 2008-09 to 2018-19. Nominal protection coefficients (NPCs) and Benefit Cost Ratio (BCR) are used to quantify extent of protection and dis-protection and incentive structure for farmers prevailing in Pakistan. In the growth analysis compound growth rate is used to gauge the growth in different variables to determine pattern in the cotton competitiveness with respect to market and prices distortions in Pakistan. A well-recognized methodology as used by Anderson *et al.* [15], has been employed to study the market and prices distortions in the cotton. Tsakok [16] described the methods of measuring distortions based on world reference prices for a country that provides a measure of opportunity cost. He further stated that this measure also provides an indication of efficiency in production. Appleyard [17] argued that for tradable commodity efficiency can be measured by using a well-known indicator namely Nominal Protection Coefficient (NPC).

2.1. Nominal Protection Coefficient (NPC)

NPC is the empirical measure of price distortions reflected due to the taxation or protection in the commodity, this indicator also gauges the incentive structure for domestic producer of the traded commodity [18]. The nominal protection coefficient (NPC_{ijt}) as import substitution crop at time year t is given:

$$NPC_{ijt} = \frac{(Pd_{ijt})}{(Pb_{ijt})} \quad (1)$$

Where, Pd_{ijt} is Domestic price of cotton, Pb_{ijt} is Import parity prices of cotton, and Pb_{ejt} is Export parity price of cotton.

The nominal protection coefficient (NPC_{ejt}) as export promotion crop at time year t is given:

$$NPC_{ejt} = \frac{(Pb_{ijt})}{(Pb_{ejt})} \quad (2)$$

When $NPC = 1$, it demonstrates that there is no distortion and situation is neutral, showing

neither an incentive nor disincentives in domestic production. Whereas, if $NPC > 1$, it shows a protection or subsidy for domestic production and finally, when $NPC < 1$, there is negative protection (i.e., a tax) for domestic production.

2.2. Benefit Cost Ratio

The benefit cost ratio with R_t as referred the total revenue and C_t reported as the total cost. Total revenue of cotton crop determines the benefits generated through the production of cotton crop. Total cost encompasses all the expenditures on inputs regarding cotton cultivation.

$$BC_{ratio} = \sum_{t=0}^n \frac{R_t/(1+i)^t}{C_t/(1+i)^t} \quad (3)$$

Where, R_t stands for revenue at time year t, C_t stands for cost at time year t, n stands for number of periods years, and i stands to discount rates.

When greater than 1, benefit cost ratio indicates that crop is suitable, because the benefits measured by the present value of the total revenues (inflows), are greater than the costs, measured by the present value of the total outflows.

2.3. Compound Growth Rate

To capture the analysis for whole out-going decade and to calculate the compound growth rate, year 2008-09 was set as starting/base year while following formula was applied as used by Rani *et al.* [9].

$$Y_t = Y_0/(1+r)^t \quad (4)$$

Where, Y_t stands for Area/ production/ Yield/ import/exports in year t, Y_0 stands for base year Area/ production/ Yield/ import/exports, r is the compound rate of growth of Y_t .

2.4. Revealed Comparative Advantage Index

Rumankova *et al.* [18] has shown that numerous aspects determine export competitiveness of crops. Actual export performance of any country is demonstrated by country's comparative advantage analysis by using a recognized measure called revealed comparative advantage (RCA) index. RCA based indices are used to measure country's international competitiveness in large number of empirical studies in the literature. RCA indicator as

used in previous studies, i.e., Sossa [19] and Ballasa [20], premeditated as follows has been applied:

$$RCA_{ijt} = (X_{ijt}/\sum X_{ait})/(X_{iwt}/\sum X_{awt}) \quad (5)$$

Where, RCA_{ijt} is Revealed Comparative Advantage index value for product i in country j in year t , X_{ijt} is Export of product i in country j in year t , X_{iwt} is Total world exports of product i in year t , $\sum X_{ajt}$ is Total exports in country j in year t , $\sum X_{awt}$ is Total world exports in year t , and Product “ i ” mean cotton.

2.5. Revealed Symmetric Comparative Advantage (RSCA) Index

To make the RCA index symmetric, Laursen [21] and Dalum *et al.* [22] adjusted the RCA index values, which is called adjusted value. The adjusted index values are between -1 and $+1$. This index is called Revealed Symmetric Comparative Advantage index (RSCA) which enables symmetric index value of RCA. The RSCA is calculated as follows:

$$RSCA_{ijt} = (RCA_{ijt} - 1)/(RCA_{ijt} + 1) \quad (6)$$

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

2.6. Relative Export Advantage Index (RXA)

The RXA has been used previously, where it is considered that this indicator is more sophisticated and comprehensive measure of international competitiveness [23, 24]. 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 of countries and commodities in both the numerator and the denominator. 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 [25]. RXA is defined as:

$$RXA_{ij} = \frac{(X_{ij}/\sum_{l \neq j} X_{il})}{(\sum_{k \neq i} X_{kj}/\sum_{k \neq i} \sum_{l \neq j} X_{kl})} \quad (7)$$

If greater than 1, RXA value shows competitive advantage; while less than 1, it shows competitive disadvantage.

3. RESULTS AND DISCUSSION

In the present study the growth in cotton area and production has been recorded (Table 1), which revealed that the area under cotton in Pakistan has decreased by 1.72 percent per year, whereas production came down to the tune of 0.92 percent per year during the period under analysis, i.e., 2008-09 to 2018-19. The production and area of the cotton is dependent on output prices of competing crops along with prices of inputs [26]. As sugarcane is a competing crop of cotton and due to the guaranteed price of sugarcane there is a better profitability prospects for the farmers as compared to cotton production. Hence, the area under sugarcane has grown at the rate of 0.84 percent per year in the period under analysis. While the productivity and production has grown by 2.29% and 3.15%, respectively, for the period under analysis (Table 1). Thus, due to decrease in the area and production of cotton in Pakistan the dependence of country's textile sector on imported cotton has increased. A study by Shabbir and Yaqoob [27] revealed that root cause of decrease in cotton area in Pakistan is inefficient allocation of resources that resulted in stagnant growth. While, textile manufacturers/industry opposes to fix minimum guaranteed prices for the local farmers, rather link these with international market for cheap availability of raw cotton in the country.

Growth rate analysis in production cost, output price and benefit cost ratio have been used to determine the farmer's level competitiveness during 2008-09 to 2018-19 (Table 2). The present research was undertaken to investigate growth in different parameters of cost, yield and prices to gauge the pattern of competitiveness in cotton production during the outgoing decade. The analysis identified that highest growth rate in cost of production (12.3% per annum) was registered, whereas less growth in productivity remained -0.55% per annum and output prices grew at the rate of 8.4% per annum. High and rising cost of production of cotton in Pakistan is a major challenge to national competitiveness. Despite increase in, variable input cost (11.29%) there was also sharp increase in the fixed cost, i.e., land rent 14.9% per annum.

Table 1. Area and production of Cotton and Sugarcane in Pakistan.

Year	Cotton			Sugarcane		
	Area (million hectare)	Production (Cotton Lint Prod. 'million' bales* of 375 lbs each)	Cotton yield (Mound/acre)	Area (million hectare)	Production (million tonnes)	Sugarcane Yield (Maund/acre)
2008-09	2.82	11.82	20.35	1.03	50.05	526.9
2009-10	3.11	12.91	20.19	0.94	49.37	569.5
2010-11	2.69	11.5	20.88	0.99	55.31	605.7
2011-12	2.83	13.6	23.26	1.06	58.4	597.3
2012-13	2.88	13.03	21.98	1.13	63.75	611.7
2013-14	2.81	12.77	22.10	1.17	67.46	625.1
2014-15	2.96	13.96	22.89	1.14	62.83	597.6
2015-16	2.90	9.92	16.60	1.13	65.48	628.3
2016-17	2.49	10.67	20.82	1.22	75.48	670.8
2017-18	2.70	11.9	19.00	1.34	82.13	664.5
2018-19	2.37	10.78	19.25	1.12	68.25	660.7
Growth	-1.72	-0.92	-0.55	0.84	3.15	2.29

Source: GoP, *Economic Survey of Pakistan 2018-19*

In conclusion high and rising production costs remained a threat to maintain farmers' profitability as revealed by BCR analysis. BCR have registered a negative growth to the tune of 2.12% per annum. These results are also consistent with the findings of Maqbool *et al.* [29], which suggests that there should be more emphasis on infrastructure, reduction in the cost of production, use of modern technology, investment in agricultural sector and enhancing trade in international market to boost the exports volume of cotton. Balassa [23] argued that in addition to production cost, water shortage and high temperature are noticeable factors affecting cotton production.

The result revealed that high growth in cost

and low growth in yield and output prices make the cotton less competitive. BCR was high (2.09) during 2010-11, after that cotton production is found to be economically inefficient and reached as low as level 0.78 BCR ratio in the year 2014-15 (Table 2).

International trade pattern of cotton has been analyzed to determine growth in different trade variables over the period 2008-09 to 2018-19. The result indicates that during the period under analysis there is negative growth in raw cotton export in quantity and value term to the tune of -16.64% and -8.83% per annum, respectively; however, export unit value is positive to the tune of 9.38% for the study period. The results indicate that

Table 2. Production cost, Yield, prices of output Benefit Cost Ratio of cotton in Pakistan.

Year	Variable cost	Fixed cost	Total cost	Yield per acre (kgs)	Gross Income	BCR	Domestic Prices (Rs./Mound)
2008-09	17346.1	6500.0	23846.1	696.0	27092	1.14	1557
2009-10	18051.2	10000.0	28051.2	696.0	33338	1.19	1916
2010-11	21390.0	12000.0	33390.0	696.0	69652	2.09	4003
2011-12	26701.6	20000.0	46701.6	748.0	47835	1.02	2558
2012-13	31973.0	20000.0	51973.0	748.0	47722	0.92	2552
2013-14	32807.2	21000.0	53807.2	748.0	56923	1.06	3044
2014-15	37366.1	25000.0	62366.1	760.0	48431	0.78	2549
2015-16	37945.2	25000.0	62945.2	760.0	49894	0.79	2626
2016-17	38198.4	25000.0	63198.4	752.0	58092	0.92	3090
2017-18	43153.1	25000.0	68153.1	760.0	59945	0.88	3155
2018-19	50121.1	26000.0	76121.1	770.0	69801	0.92	3626
Growth (%)	11.29	14.9	12.3	1.01	9.93	-2.12	8.4

Source: Authors analysis by using GOP data, i.e., various issues of Cotton Policy Reports

Table 3. Raw Cotton trade in Pakistan (qty thousand tonnes), Value Million Rs., Unit Value (Rs. /Mound).

Year	Export quantity (Thousand tonnes)	Export value (Million Rs.)	Export Unit Value (Rs./ Mound)	Import quantity (Thousand tonnes)	Import value (Million Rs.)	Import Unit Value (Rs./ Mound)	Pakistan Net cotton trade quantity (Thousand tonnes)	Pakistan Net cotton trade Value (Million Rs.)
2008-09	78.2	6826.5	3492	397.2	50320.3	5068	-319	-43494
2009-10	160.1	16365.5	4089	342.8	50997.5	5951	-183	-34632
2010-11	144.3	31168.4	8640	344.69	83724	9716	-200	-52556
2011-12	265.54	41393	6235	172.52	43943	10188	93	-2550
2012-13	92.5	14882	6435	429.755	85666	7973	-337	-70784
2013-14	114.79	21353	7441	266.245	59231	8899	-151	-37878
2014-15	95.017	14937	6288	154.521	34880	9029	-60	-19943
2015-16	49.55	7948	6416	436.173	78494	7198	-387	-70546
2016-17	24.976	4484	7181	460.308	84315	7327	-435	-79831
2017-18	35.347	6183	6997	610.149	122010	7999	-575	-115827
2018-19	12.665	2709	8556	414.7	107874	10406	-402	-105165
Growth (%)	-16.64	-8.83	9.38	0.43	7.92	7.46	-	-

Source: Various Policy Analysis Reports of Agriculture Policy Institute, Islamabad

during the period under analysis, growth rates of import quantity, value and unit value are positive by 0.43%, 7.92% and 7.46% per annum, respectively (Table 3). Growth rates of cotton export and import unit values in the study period are 9.38% and 7.46%, respectively. Pakistan remained a consistent net-importer of cotton in quantity term during 2008-09 to 2018-19 except in 2011-12 (Table 3). This result is consistent with previous findings [28]. In that study it has been stated that Pakistan has become net importer of cotton in recent years. The results are in line with Maqbool *et al.* [29] that during 2013 to 2017 cotton exports of Pakistan has decreased

[2]. They reported that as Pakistan has comparative and competitive advantage in cotton exports, with comparative advantage in cotton imports, thus Pakistan had net competitive advantage in cotton sector from 2013-17.

Present research has been conducted to determine cotton prices distortion and its effects on competitiveness in national and international market during 2008-09 to 2018-19. These results revealed that during last decade the cotton producers faced implicit taxation for most of the years, as NPCi averaged at 0.87 as import substitution crop. The

Table 4. Domestic Market and International Prices of Cotton in Pakistan: 2008-09-to 2018-19.

Year	Domestic prices	Export parity	NPCe	Import Parity	NPC _i
2008-09	1557	1406.7	1.11	2001.7	0.78
2009-10	1916	1647.2	1.16	2350.5	0.82
2010-11	4003	3480.7	1.15	3837.8	1.04
2011-12	2558	2512.0	1.02	4024.5	0.64
2012-13	2552	2592.6	0.98	3149.5	0.81
2013-14	3044	2997.6	1.02	3515.0	0.87
2014-15	2549	2533.3	1.01	3566.5	0.71
2015-16	2626	2584.8	1.02	2843.4	0.92
2016-17	3090	2893.1	1.07	2894.1	1.07
2017-18	3155	2818.8	1.12	3159.5	1.00
2018-19	3626	3446.8	1.05	4110.4	0.88
Average	2788.73	2406.05	1.06	2949.01	0.87

Source: Authors' calculations by using GOP data

import parity prices of cotton have been generally higher than corresponding domestic prices, while export parity prices were by and large slightly less or equal to the domestic prices by varying degree as NPCe averaged at (1.06) (Table 4). This conclusion for cotton is backed by Valdes [7]. NPCe and NPCi are nominal protection coefficient estimated in relation to export and import parity prices, respectively. The results showed that prices of seed cotton in domestic and international markets are characterized by fluctuations during the period under analysis.

Based on competitiveness indicators provided in Table 5, the results revealed that Pakistan has relatively higher comparative and competitive advantage for cotton relative to its main competitors. RCA values of Pakistan have consistent decrease from 35.34 in 2011-12 to 23.9 in 2018-19 (Table 5). RXA index has more fluctuating pattern during the period under analysis. China and Turkey also registered decrease in comparative advantage slight over the investigated period, and China have fell in comparative disadvantage in 2018-19. United State of America (USA) did not have comparative advantage over the period under investigation except in 2010-11. India, Vietnam and Turkey

have secured comparative advantage in cotton with fluctuating trends (Table 5). The research findings by Khalid *et al.* [30] revealed that in cotton exports Pakistan has comparative and competitive advantages. Based on these finding the authors suggested that Pakistan should explore new markets to strengthen comparative advantage in cotton exports. Ahmad and Afzal [31] reported that cotton prices and output are positively, while cost of inputs is inversely related to profitability of cotton.

4. CONCLUSIONS

Evaluation of national and international competitiveness of Pakistani cotton production revealed that low productivity, high and fast-growing production costs and low output prices are important factors of decreasing competitiveness of cotton production at national level in Pakistan. Dependence on imported cotton for local industry is increasing, as exhibited by the positive growth in raw cotton imports in term of quantity and value with a positive growth in import unit value for the period under analysis.

Area and production of the cotton in Pakistan have registered a negative growth; while, a sharp

Table 5. International Competitiveness Indicators of major cotton exporters.

Indicator	Country/ year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	Average
RCA		30.37	31.19	33.46	35.34	35.33	31.84	30.43	28.34	26.64	24.79	23.90	30.15
RSCA	Pakistan (6)	0.75	0.77	0.84	0.83	0.87	0.93	0.93	0.92	0.91	0.93	0.89	0.87
RXA		48.6	58.1	64.0	67.8	68.0	69.3	70.0	64.0	69.3	79.3	76.3	66.79
RCA		1.33	1.38	1.36	1.21	1.32	1.16	1.16	1.19	1.11	1.03	0.94	1.20
RSCA	China (1)	0.14	0.16	0.15	0.09	0.14	0.07	0.07	0.09	0.05	0.01	-0.03	0.09
RXA		2.68	2.23	2.37	2.40	2.29	2.57	2.73	2.50	2.41	2.26	2.46	2.45
RCA		0.78	0.98	1.24	0.89	0.81	0.67	0.65	0.65	0.82	0.84	0.80	0.83
RSCA	USA (2)	-0.13	-0.01	0.11	-0.06	-0.11	-0.20	-0.21	-0.21	-0.10	-0.09	-0.11	-0.10
RXA		1.26	1.52	1.50	1.53	1.53	1.62	1.41	1.62	2.10	1.53	1.31	1.54
RCA		3.01	5.20	4.30	4.92	5.58	4.66	4.71	3.99	3.89	4.17	3.23	4.33
RSCA	India (3)	0.50	0.68	0.62	0.66	0.70	0.65	0.65	0.60	0.59	0.61	0.53	0.62
RXA		6.74	6.50	6.13	7.41	8.96	8.32	5.70	9.33	7.50	9.34	10.62	7.87
RCA		1.07	1.56	1.34	1.21	1.46	1.72	1.75	1.98	2.04	1.94	1.61	1.61
RSCA	Vietnam (4)	0.03	0.22	0.15	0.09	0.19	0.26	0.27	0.33	0.34	0.32	0.23	0.22
RXA		0.48	0.36	0.34	0.46	0.54	1.24	1.89	2.46	2.10	2.00	2.34	1.29
RCA		2.08	2.12	2.37	1.95	2.11	1.98	1.97	2.01	1.82	1.81	1.61	1.98
RSCA	Turkey (5)	0.35	0.36	0.41	0.32	0.36	0.33	0.33	0.34	0.29	0.29	0.23	0.33
RXA		2.07	1.97	1.96	1.83	1.64	1.46	1.32	1.24	1.02	1.02	1.19	2.83

Source: Authors Calculations, Figures in parenthesis are ranking of the countries in exports of cotton in world market. RCA=Revealed Comparative Advantage, RSCA=Revealed Symmetric Comparative Advantage, RXA=Relative Export Advantage Index

and consistent increase in cost of production has been recorded. However, a slow growth in cotton output prices was registered that resulted in decrease in the benefit-cost ratio at substantial rate during 2008-09 to 2018-19.

Pakistan has relatively higher comparative and competitive advantage for cotton relative to its main competitors. However, the country has registered a consistent decrease in revealed comparative advantage position during last five years. The present analysis revealed that Pakistan is losing its competitive position and its share in international market.

Due to the low competitiveness, there is negative growth in raw cotton export in quantity and value terms, however a positive growth in export unit value is registered. It can be concluded that productivity growth is vital for improving competitive position of Pakistan at international level. Policy support is needed to maintain and improve the national and international competitiveness of cotton production in Pakistan.

5. CONFLICT OF INTEREST

The authors declare no conflict of interest.

6. REFERENCES

1. GoP. Country Report of Pakistan for International Cotton Advisory Committee. *Government of Pakistan, Ministry of National Food Security and Research Islamabad* (2020).
2. GoP. Economic Survey of Pakistan 2018-19. *Government of Pakistan, Ministry of Finance, Islamabad* (2019).
3. G. Ali, and N.P. Khan. Government intervention in Pakistan's sugar cane sector Policy Analysis Matrix (PAM) Approach. *Sarhad Journal of Agriculture* 28(1): 103-107 (2012).
4. E. Lutz, and P.L. Scandizzo. Price distortions in developing countries: A bias against agriculture. *European Review of Agricultural Economics* 7(1): 5-27 (1980).
5. N. Zahra, N. Akmal, N. Habib, S. Rani, M. Nazir, and I. Raza. Impact of climate change hostilities on livelihood strategies: A case study of rainfed Pothwar area of Pakistan. *Journal of Applied Environmental and Biological Sciences* 7(11): 138-143 (2017).
6. N. Hamid, I. Nabi, and A. Nasim. Trade, exchange rate, and agricultural pricing policies in Pakistan. *World Bank Report* Number 9789 (1990). <http://documents.worldbank.org/curated/en/382161468774971758/Trade-exchange-rate-and-agricultural-pricing-policies-in-Pakistan>
7. A. Valdes. Agriculture trade and price policy in Pakistan. *World Bank Policy Paper Series on Pakistan PK (17/12)* (2013).
8. A. Salam. Intervention in Agricultural Commodity Markets: A View Point. *Pakistan Journal of Agricultural Economics* 4(2): 31-44 (2001).
9. S. Rani, N. Habib, I. Raza, and N. Zahra. Estimating compound growth rate, instability index and annual fluctuation of cotton in Pakistan. *Asian Journal of Agriculture and Rural Development* 7(4): 86-91(2017).
10. G. Ender. The use of producer and consumer subsidy equivalents to measure government intervention in Agriculture: The case of Pakistan. *Pakistan Journal of Agricultural Economics* 1(1): 24-59 (1992).
11. J. Longmire, and P. Debord. Agricultural pricing and comparative advantage in Pakistan: An update to 1991-92. *Report prepared for the South Asian Division of the World Bank Washington, D.C.* (1993).
12. W. Akhtar, M. Sharif, and N. Akmal. Analysis of economic efficiency and competitiveness of the rice production systems of Pakistan's Punjab. *Lahore Journal of Economics* 12(1): 141-153 (2007).
13. W. Akhtar, M. Sharif, A.H. Qureshi, K.M. Aujla, and M.A. Khan. Competitiveness of tomato production in Punjab Pakistan. *Pakistan Journal of Agriculture Research* 29(2):179-187 (2016).
14. I. Javed, A. Ghafoor, A. Ali, M.A. Imran, and M. Ashfaq. Margins and determinants of rice export from Pakistan to UAE market. *Pakistan Journal of Agricultural Sciences* 52(2): 569-575 (2015).
15. K. Anderson, M. Kurzweil, W. Martin, D. Sandri, and E. Valenzuela. Methodology for measuring distortions to agricultural incentives. *World Bank* 441-471 (2008).
16. I. Tsakok. Agricultural price policy: A practitioner's guide to Partial Equilibrium Analysis. *Cornell University Press, Ithaca, NY* (1990).
17. D. Appleyard. Comparative Advantage of Agricultural Production System and its Policy Implication in Pakistan. *Food and Agricultural Organization of the United Nations Paper* 68 (1987).
18. L. Rumankova, E. Kuzmenko, I. Benesova, and L. Smutka. Selected EU Countries Crop Trade

- Competitiveness from the Perspective of the Czech Republic. *Agriculture* 12(2): 127-165 (2022).
19. C.O. Sossa. Comparative analysis of the competitiveness of Beninese and Brazilian cotton exports in international trade from 2006 to 2018. *Revista de Economia e Sociologia Rural* 60(4): 1-17 (2021).
 20. B. Balassa. Trade Liberalization and Revealed Comparative Advantage. *The Manchester School of Economics and Social Studies* 33(2): 92-123 (1965).
 21. K. Laursen. Revealed comparative advantage and the alternatives as measures of international specialization. *Eurasian Business Review* 5(1): 99-115 (1998).
 22. B. Dalum, K. Laursen, and G. Villumsen. Structural Change in OECD Export Specialization Patterns: De-Specialization and Stickiness. *International Review of Applied Economics* 12(3): 423-43 (1998).
 23. B. Balassa (Ed.). Comparative Advantage, Trade Policy and Economic Development. *Harvester Wheatsheaf, London* (1989).
 24. T.L. Vollrath. A Theoretical Evaluation of Alternative Trade Intensity Measures of Revealed Comparative Advantage. *Weltwirtschaftliches Archiv* 127(2): 265-280 (1991).
 25. K. Froberg, and M. Hartmann. Comparing measures of competitiveness, Discussion Paper, No. 2. *Institute of Agricultural Development in Central and Eastern Europe (IAMO), Halle (Saale)* (1997). <https://nbn-resolving.de/urn:nbn:de:gbv:3:2-22616>
 26. S. Ashraf, A.H. Sangi, Z.Y. Hassan, and M. Luqman. Future of cotton sector in Pakistan: A 2025 Outlook. *Pakistan Journal of Agricultural Research* 31(2): 145-150 (2018).
 27. M.S. Shabbir, and N. Yaqoob. The impact of technological advancement on total factor productivity of cotton: a comparative analysis between Pakistan and India. *Journal of Economic Structures* 8(1): 1-16 (2019).
 28. K. Riaz, and H.G. Jansen. Spatial patterns of revealed comparative advantage of Pakistan's agricultural exports. *Pakistan Economic and Social Review* 50(2): 97-120 (2012).
 29. M. Maqbool, S.U. Rehman, H.F. Bashir, and R. Ahmad. Investigating Pakistan's revealed comparative advantage and competitiveness in Cotton Sector. *Review of Economics and Development Studies* 5(1): 125-134 (2019).
 30. Z. Khalid, M.A.R. Naseer, R. Ullah, and S. Khan. Measuring the Global Trade Competitiveness of Pakistan's Cotton Crop. *Sarhad Journal of Agriculture* 37(1): 158-166 (2021).
 31. D. Ahmad, and M. Afzal. Estimating the economic perspective of cotton crop in southern Punjab of Pakistan. *International Journal of Advanced and Applied Sciences* 5(6): 50-55(2018).

