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A study of comparative advantage of indian agricultural exports

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ABSTRACT: *Recent developments in the international trade scenario and corresponding alterations in India's foreign trade policies have depicted far reaching implications for India's agricultural sector in general and agricultural exports in particular. The present study has ascertained the changes in comparative advantage status of India's major agricultural exports during the postreforms period (1994-95 to 2008-09). India had enjoyed a comparative advantage in tea exports but had depicted a declining trend over the years. A similar pattern had been observed in coffee exports also, where India had been found losing its comparative advantage to other world coffee exporters. An unstable pattern of comparative advantage had been observed in the case of rice exports with intermittent ups and downs in the status. A gradual decline in India's comparative advantage had been depicted for exports of sugar and cashew also.*
As opposed to other commodities, India had strengthened its position in the global markets in exports of Ground nut. But as far as the exports of fresh fruits and fresh vegetables are concerned, India cannot boast to have a comparative advantage. India has been found losing out its comparative advantage in export of some of the agricultural commodities to world during the period after economic reforms.

Keywords: *FAO – Food and Agricultural Organization; RSCA - Revealed Symmetric Comparative Advantage; US$ - United States Dollar; WTO -World Trade Organization*

1. Introduction

Indian agricultural commodities have come to occupy a supreme position in the global market over the years. Today, India is a major supplier of several agricultural commodities like tea, coffee, rice, spices, cashew, oil meals, fresh fruits , fresh vegetables, meat and its preparations and marine products to the international market. However, the country faces fierce competition from other major players in the field, both the existing and new entrants in the fray. Ironically, the major challenge is from within Asia itself where countries like China, Malaysia, Philippines, Thailand, Singapore and Indonesia among others pose a big threat to Indian agricultural products. The demand and supply situations in the Asian continent have undergone a rapid transformation due to the growth of the world economy and lowering of trade barriers (Aksoy and Beghin, 2005). An economic upheaval which took place in most of the South-East Asian countries has resulted in the creation of a huge supply potential in these economies along with an increase in their per capita income and a simultaneous increase in their trade potential. Moreover, some recent developments in the international trade scenario, followed by the establishment of World Trade Organisation (WTO) and subsequent liberalization of trade have resulted in the emergence of new powers like Vietnam and Turkey with substantial potential in agricultural trade. The formation of regional trading blocks like ASEAN Free Trade Area (AFTA), Bangkok Agreement, South Asia Free Trade Agreement (SAFTA), etc. has given rise to powerful associations with strong bargaining power and these can significantly influence the demand and supply factors in the global markets. Above all, the Indian econom y in itself has undergone a rapid transformation after the inception of economic reforms in 1991. India's ratification of the Agreement on Agriculture (AoA) with WTO also had a major impact leading to redefining of its agricultural trade. During this time span, various agricultural commodities exported from India have responded differently and their levels of comparative advantage in the global markets have altered significantly. Hence, it is imperative to have a systematic and well-structured analysis to find alterations in the comparative advantage of India visa-vis World. The present study was undertaken with the specific objective of determining India's comparative advantage in exports of major agricultural commodities with respect to Asia and to compare it with world exports.

2. Data and Methodology

In the present study was taken up of selected agricultural commodities export value to total export value with the production in India and the country's and world's revealed symmetric comparative advantage has calculated by using the standard formulae. Ten

major agricultural commodities/commodity groups were selected for the analysis, based on their major shares in India‘s total agricultural exports. The commodities considered were rice, pulses, tea, coffee, cashew, groundnut, cotton, tobacco, fruits and vegetables, and sugar. During the period under study (1994-95 to 2008-09), these commodities together accounted for more than 65 per cent of India‘s total agricultural export earnings. The data on exports of selected agricultural commodities for India and other major exporting countries were collected from various issues of FAO Trade Yearbook. The official website of FAO [www.faostat.fao.org] was also used for the purpose. The selected commodities corresponded to the various codes of Standard International Trade Classification (SITC) and their export values were provided in US Dollars.

_Revealed Comparative Advantage‘ (RCA) is a measure of international trade specialization (Balassa, 1965). It identifies the comparative advantage or disadvantage a country has for a commodity with respect to another country or group of countries. It provides a ranking of commodities by degree of comparative advantage and identifies a binary type demarcation of commodities based on the comparative advantage (Balance *et al.,* 1987). Under the assumption that the commodity pattern of trade reflects the inter-country differences in relative costs as well as non-price factors, the index is assumed to ―reveal‖ the comparative advantage of the trading countries. The factors that contribute to movements in RCA are economic, structural, world demand and trade specialization. The advantage of using the comparative advantage index is that it considers the intrinsic advantage of a particular export commodity and is consistent with the changes in an economy‘s relative factor endowment and productivity. The disadvantage, however, is that it cannot distinguish improvements in factor endowments and pursuit of appropriate trade policies by a country (Batra and Khan, 2005). The original index of RCA was first formulated by Balassa (1965) and can be written as per equation(1)

$$RCAij = (Xij/Xik)/(Xnj/Xnk) \quad \ldots (1)$$

where,

Xij = Exports of country _i‘ of commodity _j‘

Xik = Exports of country _i‘ of a total agricultural commodities _k‘

Xnj = Exports of a world _n‘ of commodity _j‘, and

Xnk = Exports of a world _n‘ of a total agricultural commodities _k‘

In the present study, country _i‘ refers to India, commodity _j‘ refers to any of the selected agricultural commodities, set of commodities _k‘ refers to the total agricultural commodities and _n‘ refers to World. When RCA assumed the value greater than unity for a given country in a given commodity, the country is said to have a revealed comparative advantage in that commodity. However, RCA suffers from the problem of asymmetry as _pure‘ RCA is basically not comparable on both sides of unity. It the index ranged from zero to one, a country is said not to be specialized in a given sector and if the value of the index ranged from one to infinity, the country is said to be specialized. The index is made symmetric, following the methodology suggested by Dalum *et al* (1998) and the resultant index is called as _Revealed Symmetric Comparative Advantage‘ (RSCA). Mathematically, it can be expressed by the following equation (2)

$$RSCA = (RCA-1) / (RCA+1) \quad \ldots (2)$$

This measure ranges between -1 and +1 and is free from the problem of skewness. A commodity is said to have comparative advantage in its exports if the corresponding RSCA value is positive and vice versa. In the present study, the RSCA was used to look into the comparative advantage of the selected commodities.

3. Results and Discussion

Indian agricultural commodities have come to occupy a supreme position in the global market over the years. Today, India is a major supplier of several agricultural commodities like rice, pulses, tea, coffee, groundnut, cashew, cotton, tobacco, fruits and vegetables and sugar to the international market. However, the country faces fierce competition from other major players in the field, both by the existing and new entrants in the fray. Ironically, the major challenge is from within Asia itself from countries like China, Malaysia, Philippines, Thailand, Singapore and Indonesia, among others; pose a big threat to Indian agricultural products. During this time span, various agricultural commodities exported from India have responded differently and their levels of comparative advantage in the global markets have altered significantly. The result of Revealed Symmetric Comparative Advantage of the principal agricultural commodities in India presented in Table 1. and the figure 1-10 shown the comparative advantage, world‘s export value and India‘s export value of selected agricultural commodities (see in Appendix-I).

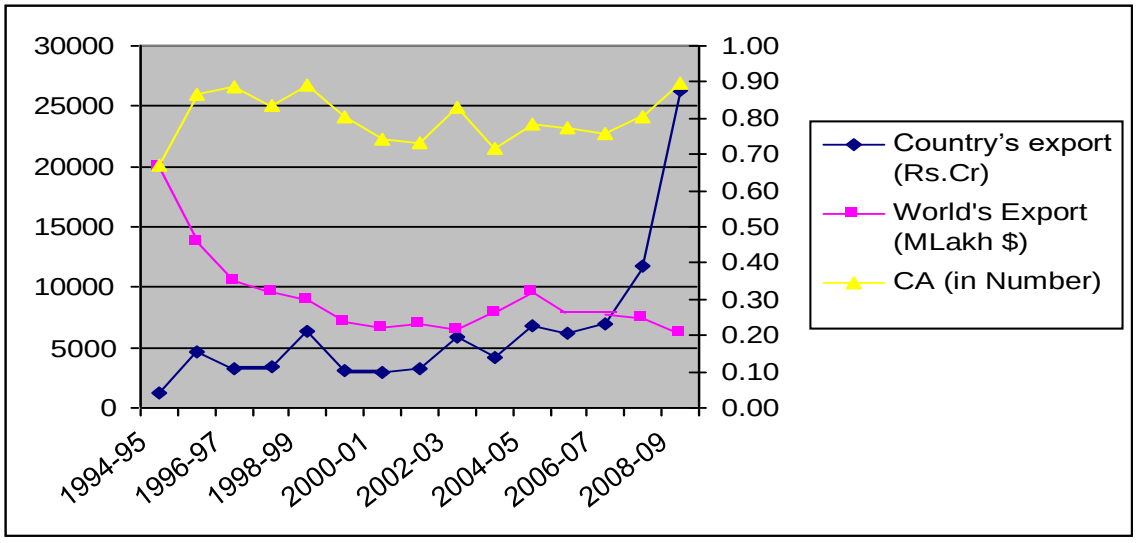
Table 1. Revealed Symmetric Comparative Advantage of Agricultural Commodities

Year	Rice	Pulses	Tea	Coffee	Cashew	Ground nut	Cotton	Tobacco	Fruits and Veg	Sugar
1994-95	0.67	0.07	0.87	0.60	0.99	0.70	0.10	-0.36	-0.61	-0.32
1995-96	0.86	0.02	0.85	0.56	0.99	0.76	-0.33	-0.30	-0.74	0.03
1996-97	0.89	0.25	0.88	0.68	0.99	0.90	0.78	0.15	0.44	0.23
1997-98	0.84	0.53	0.89	0.63	0.98	0.90	0.00	0.06	-0.71	0.30
1998-99	0.89	0.29	0.89	0.65	0.98	0.58	-0.66	-0.25	-0.77	-0.30
1999-00	0.80	0.51	0.85	0.60	0.99	0.79	-0.77	-0.12	-0.74	-0.49
2000-01	0.74	0.49	0.81	0.48	0.98	0.72	-0.77	-0.33	-0.70	-0.56
2001-02	0.73	0.28	0.79	0.39	0.98	0.64	-0.83	-0.43	-0.67	-0.27
2002-03	0.83	0.23	0.74	0.09	0.98	0.42	-0.78	-0.43	-0.67	-0.62
2003-04	0.72	0.18	0.73	0.08	0.97	0.45	0.35	-0.40	-0.62	-0.66
2004-05	0.78	0.44	0.74	0.02	0.98	0.77	-0.03	-0.38	-0.64	-0.79
2005-06	0.77	0.59	0.71	0.00	0.98	0.68	0.63	-0.45	-0.62	-0.79
2006-07	0.76	0.38	0.74	0.15	0.98	0.58	0.63	-0.45	-0.59	-0.49
2007-08	0.80	0.04	0.66	-0.07	0.98	0.71	0.67	-0.45	-0.66	-0.83
2008-09	0.90	-0.05	0.67	-0.11	0.98	0.64	0.19	-0.52	-0.71	-0.64

3.1. Rice

A brief perusal of the RSCA estimates presented in Table 1 and Figure 1 revealed the comparative advantage of India and World. Indian rice exports showed varying levels of comparative advantage in different years of the study period. In 1994-95, the estimated value of RSCA was 0.67 which improved to 0.90 in 2008-09. Therefore, it can be concluded that India enjoyed a comparative advantage in rice exports, though at varying levels.

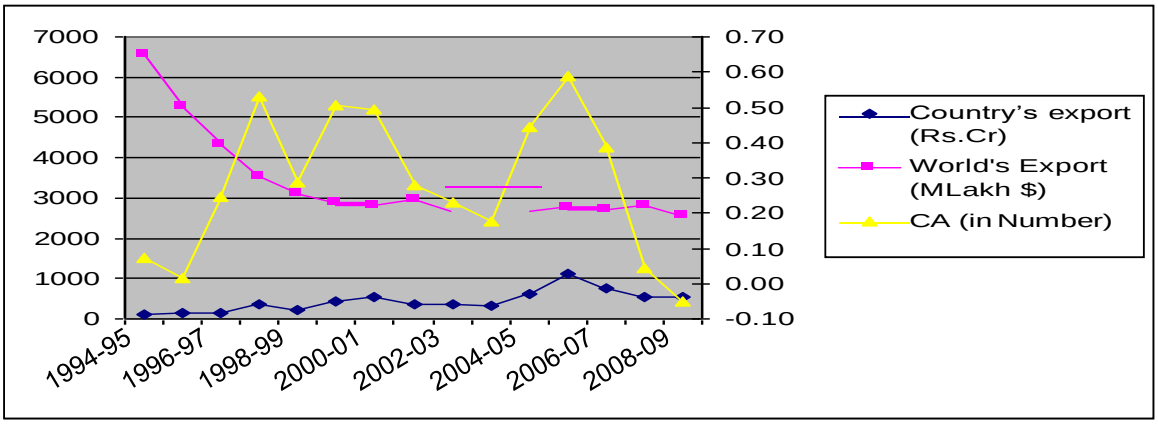
Figure 1. Revealed Symmetric Comparative Advantage Estimates of Rice exports from India



3.2. Pulses

Several developments that have taken place after economic liberalization, i.e. post-1991 seemed to have a detrimental effect on the pulses exports from India. There was a noted decline in the RSCA estimates corresponding to India's pulses exports from 0.07 in 1994-95 to -0.05 in 2008-09 (Table 2 and Figure 2). Thus it could be seen that a mixed trend was observed in India's position of comparative advantage in pulses with occasional ups and downs. India's position, as a pulse exporter, was not one to be emulated, since the negative RSCA estimates suggested comparative disadvantage in its exports.

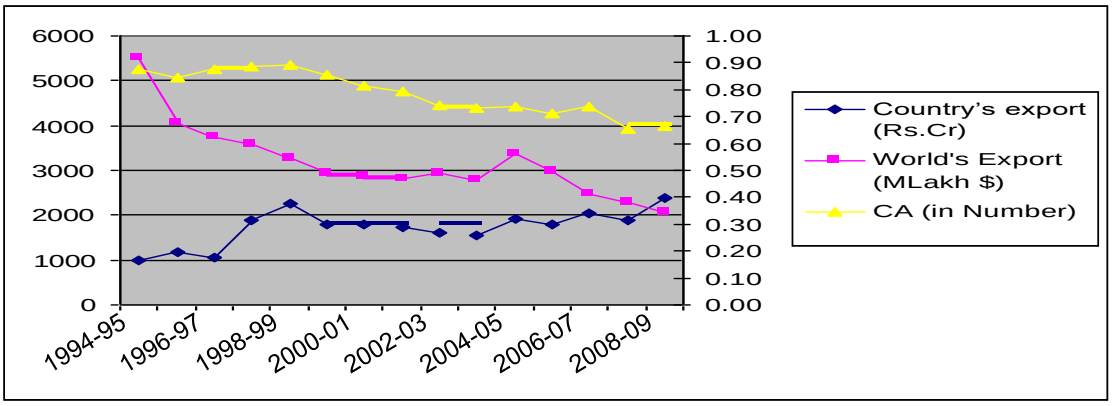
Figure 2. Revealed Symmetric Comparative Advantage Estimates of Pulses exports from India



3.3. Tea

The estimated RSCA indices for tea for India were presented in Table 1 and Figure 3 for the period from 1994-95 to 2008-09, India was found to have a comparative advantage in tea exports in all the years under consideration, as could be seen from the positive values of RSCA. But over the years, India's comparative advantage seemed to be deteriorating gradually. In 1994-95, the value of RSCA was 0.87 which decreased to 0.67 by the year 2008-09, depicting a clear downward trend. The results showed that India had significant and far reaching implications in the global market and direct impact on the Indian tea industry.

Figure 3. Revealed Symmetric Comparative Advantage Estimates of Tea exports from India

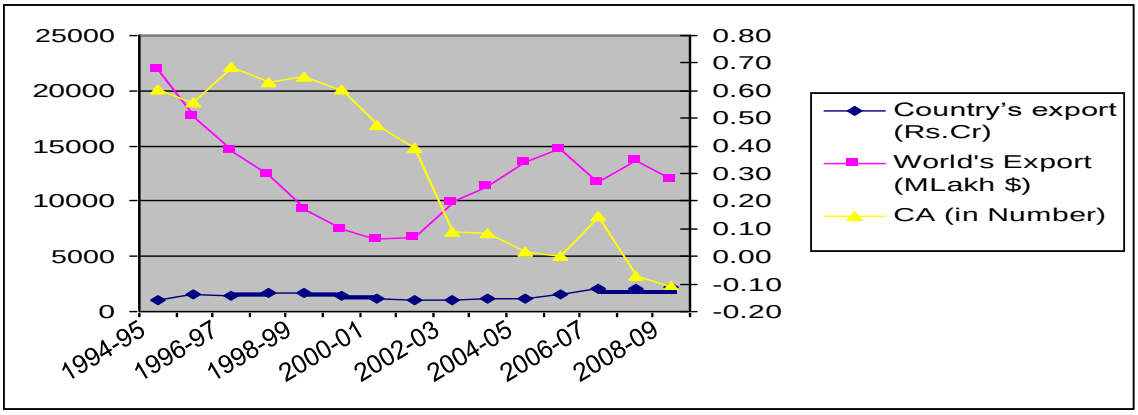


3.4. Coffee

In coffee exports, Indonesia, Thailand and Vietnam are the major competitors to India. The computed RSCA values for India were positive for all the years with the exception of 2007-08 and 2008-09 indicated its comparative advantage in coffee exports. Moreover, the comparative edge which India exhibited during the initial years of liberalization, deteriorated over the years, with the index gradually eroding from 0.60 in 1994-95 to -0.11 in 2008-09 (Table 1 and Figure 4). A mixed trend was

observed in India's position of comparative advantage with occasional ups and downs. However, the Indian coffee did not enjoy a comparative advantage throughout the study period and its position rather worsened gradually over the years.

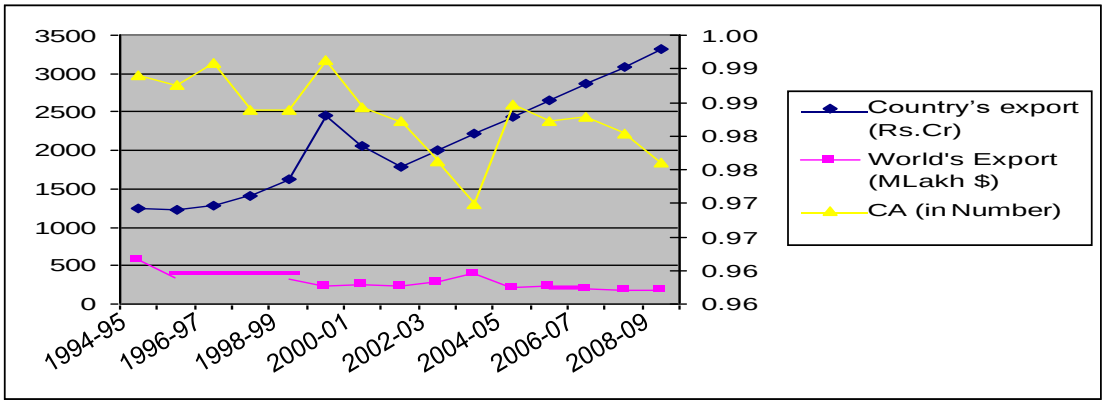
Figure 4. Revealed Symmetric Comparative Advantage Estimates of Coffee exports from India



3.5. Cashew

India maintained its prime status as the largest exporter of cashew in the world throughout the study period, particularly through its comparative advantage in the international markets. The RSCA estimated of Indian cashew exports was as high as 0.99 in the year 1994-95 (Table 1 and Figure 5) and till 2008-09, India did not face any notable external challenges. In this backdrop, it is imperative for the Indian cashew farmers and exporters to stay vigilant and undertake all possible steps to counter the stiff competition. At the same time, the government should also take appropriate initiatives to make Indian cashew exports more attractive in the global markets.

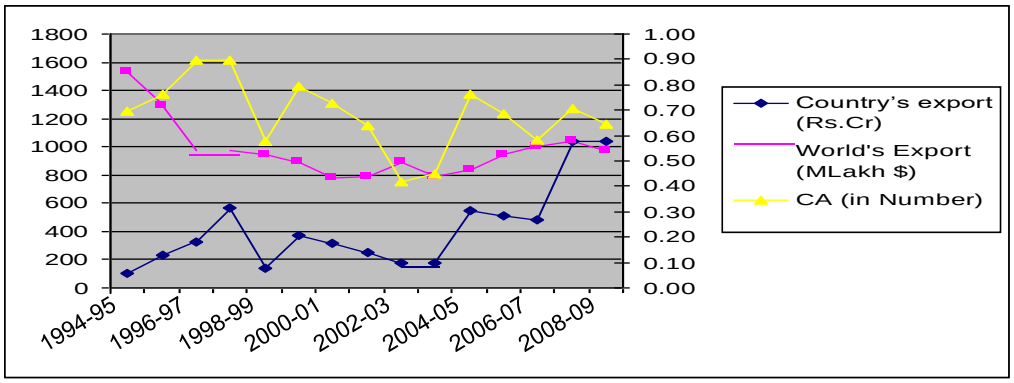
Figure 5. Revealed Symmetric Comparative Advantage Estimates of Cashew exports from India



3.6. Ground Nut

A brief perusal of the RSCA estimates presented in Table 1 and Figure 6 revealed the comparative advantage of India. Indian groundnut exports showed varying levels of comparative advantage in different years of the study period. In 1994-95, the estimated value of RSCA was 0.70 which improved to 0.90 in 1996-97 and 1997-98 but dropped to the lowest value of 0.42 in 2002-03. By the year 2004-05, it recovered to reach 0.77. However, India had a distinct advantage during the entire period under study.

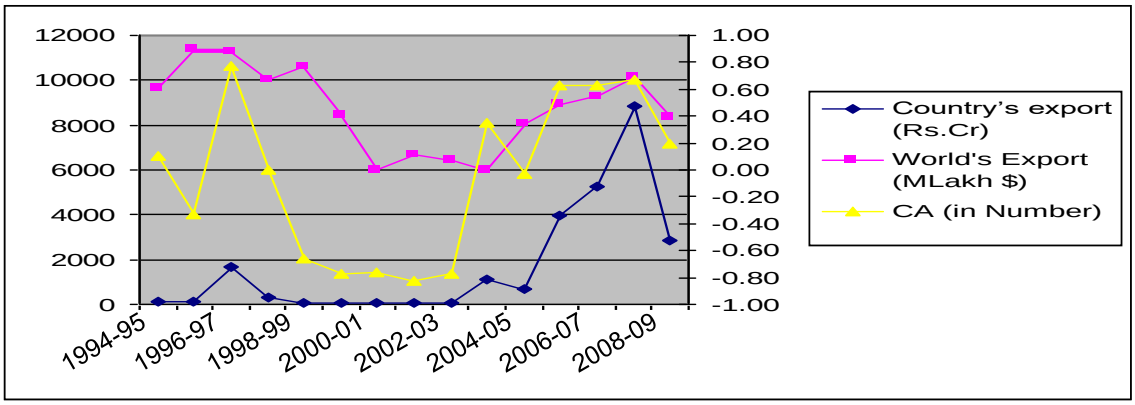
Figure 6. Revealed Symmetric Comparative Advantage Estimates of Groundnut exports from India



3.7. Cotton

The results presented in Table 1 and Figure 7 clearly depicted that India experienced a comparative disadvantage in export of cotton in all the years under consideration and had negative RSCA values in some years. The RSCA estimate for the year 2001-02 was -0.83 which points a quite unfavorable status of Indian cotton exports in the global market. The situation had hardly improved over the years, and RSCA value was below zero (-0.03) even during 2004-05. Given the current status, considerable efforts are needed to make India a competitive exporter of Cotton in future.

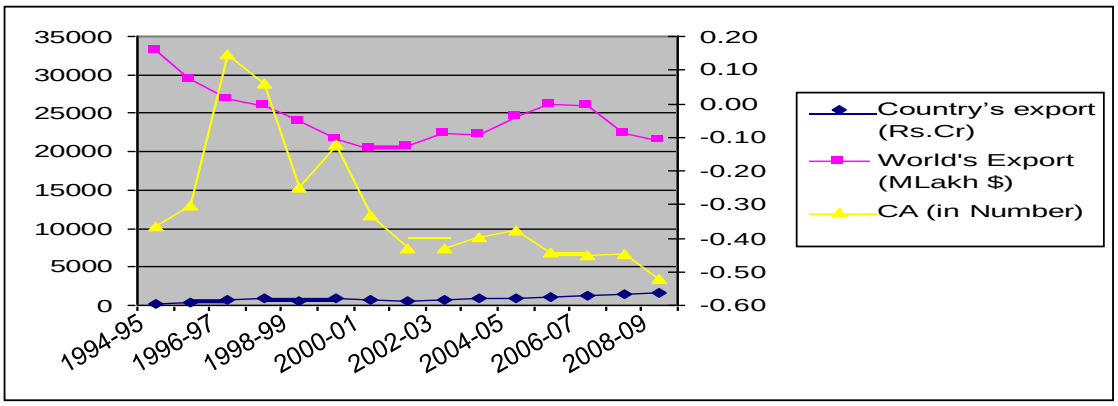
Figure 7. Revealed Symmetric Comparative Advantage Estimates of Cotton exports from India



3.8. Tobacco

In tobacco exports, US, Zimbabwe and Brazil are the major competitors to India. The computed RSCA values for India varied from positive to negative over the years and indicated its comparative position in Tobacco exports. Moreover, the comparative edge which India exhibited during the initial years of liberalization, deteriorated over the years, with the index gradually eroding from 0.15 in 1996-97 to -0.52 in 2008-09 (Table 1 and Figure 8). A mixed trend was observed in India's position of comparative advantage with occasional ups and downs. However, the Indian tobacco did not enjoy a comparative advantage throughout the study period and its position rather worsened gradually over the years.

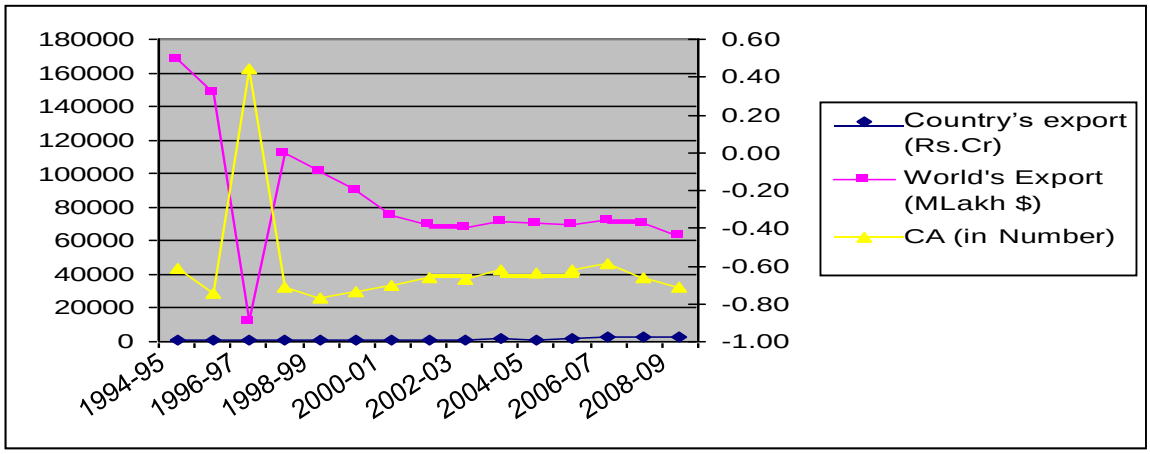
Figure 8. Revealed Symmetric Comparative Advantage Estimates of Tobacco exports from India



3.9. Fruits and Vegetables

India‘s comparative advantage in export of Fruits and Vegetables seemed to dwindle during various years after economic liberalization. In 1996-97, when the reforms were at the budding stage, India was found to have a marginal comparative advantage with an RSCA value of 0.44 (Table 1 and Figure 9). But the period which followed witnessed India losing its advantage with an RSCA value -0.71 in 2008-09. A gradual decline in India‘s comparative advantage had been depicted for exports of Fruits and Vegetables.

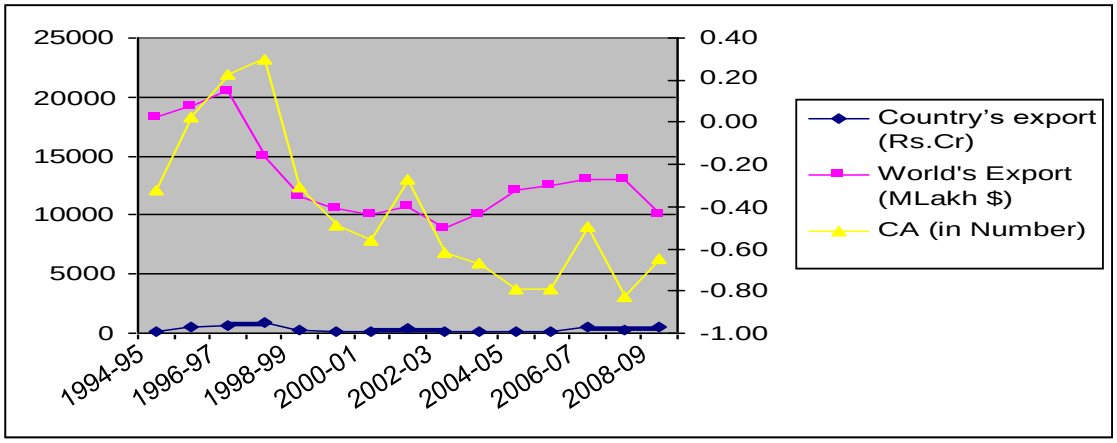
Figure 9. Revealed Symmetric Comparative Advantage Estimates of Fruits and Vegetables exports from India



3.10. Sugar

There was a noted decline in the RSCA estimates corresponding to India‘s sugar exports from -0.32 in 1994-95 to -0.64 in 2008-09 (Table 1 and Figure 10). A mixed trend was observed in India‘s position of comparative advantage with occasional ups and downs. India‘s position as a sugar exporter was not one to be emulated, the consistent negative RSCA estimates suggested comparative disadvantage in its sugar exports throughout the study period and it did not show any signs of recovery. The RSCA estimate for the year 2007-08 was -0.83 which points towards a quite unfavorable status of Indian sugar exports in the global market. Given the current status, considerable efforts are needed to make India a competitive exporter of sugar in the future.

Figure 10. Revealed Symmetric Comparative Advantage Estimates of Sugar exports from India



4. Conclusions

The study had shown that exports of various agricultural commodities from India had responded differently in terms of comparative advantage during the post-reforms period. India had enjoyed a comparative advantage in tea exports but had depicted a declining trend over the years. A similar pattern had been observed in coffee exports also, where India had been found losing its comparative advantage to other world coffee exporters. An unstable pattern of comparative advantage had been observed in the case of rice exports with intermittent ups and downs in the status. A gradual decline in India‘s comparative advantage had been depicted for exports of sugar and cashew also.

As opposed to other commodities, India had strengthened its position in the global markets in exports of Ground nut. But as far as the exports of fresh fruits and fresh vegetables are concerned, India cannot boast to have a comparative advantage.

The exports of various agricultural commodities from India have responded differently in terms of comparative advantage during the post-reforms period. A gradual decline in India‘s comparative advantage has been depicted for exports of spices and cashew also. Vietnam has bypassed India in the later years in terms of comparative advantage in cashew exports. As opposed to other commodities, India has strengthened its position in the global markets in exports of oil meals. While Philippines and Turkey have dominated in fresh fruits exports, Israel has been dominant in the exports of fresh vegetables. India‘s status in exports of meat and its preparations and marine products has not been very comfortable. Although marine products dominate India‘s agricultural exports, it cannot be attributed to India‘s comparative advantage in the global markets. It is assumed to be more due to a growing demand for these products among the international consumers. India‘s comparative advantage in most of the important agricultural exports has been found to be eroding and losing out to other Asian competitors in certain commodities during the period after economic reforms (Shinoj and Mathur, 2008).

India‘s status in exports of cotton had not been very comfortable. Although cotton products dominate India‘s agricultural exports, it could not be attributed to India‘s comparative advantage in the global market. It was assumed to be more due to a growing demand for these products among the international consumers.

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Appendix I

Total Export of India and World for 1994-95 to 2008-09 (in Rs)

Year	Country"s Total Agricultural Export	World Total Export
1994-95	12587	1059857464
1995-96	21138	873286036
1996-97	13223	721950701
1997-98	20398	654088142
1998-99	24161	607443140
1999-00	25016	525080964
2000-01	28582	442610290
2001-02	29312	414342232
2002-03	33691	410996478
2003-04	36253	417162886
2004-05	38079	437727189
2005-06	46703	457532322
2006-07	58959	465522012
2007-08	76006	442865470
2008-09	89859	388446646

Source: faostat.com

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