

Comparative Export Performance (CEP) and Revealed Comparative Advantage (RCA) of Paddy: with reference to India

^{1.} Eluri Pitcheswara Rao

^{2.} Dr. Balakrishna Ankalam

^{1.} Research Scholar, Dept. of Economics, Acharya Nagarjuna University, Gunutr, A.P

^{2.} Guest Faculty, Dept. of Economics, Acharya Nagarjuna University, Gunutr, A.P

ABSTRACT: After the introduction of Green Revolution technologies since 1970s, Indian agriculture was characterized by intensive agriculture practices in certain pockets through an integrated use of HYvs, irrigation, fertilizer, pesticide use and technologies meet the food needs. After, 1980s, the adverse effects of the green revolution technologies were realized and the emphasis was shifted to sustainable land use systems and increasing the efficiency of resources and inputs. It is projected that India needs to produce 115 mt of rice, 225 mt of food- grains and agriculture GDP growth 4 per cent by the Year 2020 to maintain the resent level of self-sufficiency. The future increase in rice production requires improvement in productivity and efficiency. To maintain national food security there is a need not only to increase rice production but also the efficiency to sustain self sufficiency. The prime objective of the paper is to examine the export competitiveness of paddy production with reference to India and other competing countries. Export competitiveness indices that are used in the context of the study are “Revealed Comparative Advantage Index RCA” and “Comparative Export Performance index CEP”. The export data concern the intra trade between China and both the rival countries and India were obtained from UNCTADSTAT trade data. The data on exports of rice for India and other major exporting countries were collected from UNCTADSTAT. The period under consideration will be divided into two sub periods 1995-2002 and 2003- 2014. India stands first place with 29.95 percent to the total rice exports to the world market during 2014-15. Thailand occupied second place with 20.61, Viet nam occupied third place with 10.59 percent and Pakistan occupied 4th place with 8.33 percent in the net exports value of rice to the world market. Developing countries compete with developed countries such as the United States and Australia for export markets. Developing countries themselves are not a homogeneous group, with economically powerful China, India, Brazil and Turkey playing a greater role in the market. India has high comparative advantage in the Iran rice market over Pakistan and Thailand. And India has high comparative advantage in the Nigeria rice market over Pakistan and shows a n week advantage against Thailand. Further, India has a very strong comparative advantage over Thailand in Saudi Arabia’s rice market and shows a week comparative advantage over Vietnam is the only country to achieve a high comparative export performance during 1995 to 2006. However, since 2007 onwards it declined continuously and reached to a moderate competitive possession with 0.86 SCEP index value in 2014-15. Altogether, Pakistan gained a commendable comparative competitive advantage in rice trade among 4 major rice exporting countries in the world. Log CEP indicate that Pakistan India and Thailand are in comparative disadvantage position.

Key words: CEP, RCA, Paddy, Exports and Imports, India

I. INTRODUCTION:

India’s food grain economy is one of the world’s largest one, the path India ultimately takes on food grain policy is likely to contain important implications for global markets for rice. Because, weak growth in food grain (rice and wheat) production, consumption, and pronounced recent promote cycles, have created pressure for reform of India’s longstanding food grain policies. This study examines recent developments in India’s production, trade and consumption policies for rice of prices, and analyzes the impacts of several policy changes already underway or under consideration to rebalance producer and consumer interests. India’s cereal imports trended downward between the 1970s and the late 1990s when, aided in some years by export subsidies meant at reducing surpluses, India became a major exporter of rice which is a significant aspect. India’s low average wheat and rice yields compared with other major world producers suggest that there is significant scope to further make better yields and output. Recently between 2000 and 2010 when trends in rice trade where determined not only by changes in yield growth and consumer demand, but, perhaps more importantly, by changes made in policies affecting producers and consumers. Another issue is concern about decentralized procurement, including elimination of the rice levy, indicates that decentralization will have negligible impacts on rice supply, demand, and prices. i) What is happening to area, production and yield? ii) Is the trend in area under rice same across the states? Impacts on the rice market would be somewhat larger than for wheat, mostly because of the increase in rice prices. With this back ground and the lacunas the study proposed to examine the trend and pattern in Indian rice in terms of production, procurement, trade and prices.

There has been a structural change in production and consumption parameters of rice at global and national level in relation to other cereals like wheat. A shift in consumption to animal food has further added to these changes the subsequent impact, on trade and price dimensions and a shift in favour of non-rice production has brought in demand-supply disequilibrium of rice. This problem has assumed greater significance in view of the fast growing population in the country. Rice economy in India is facing the constraints of slackening yield growth of rice and rapid depletion in the area under rice cultivation.

II. Objective

The prime objective of the paper is to examine the export competitiveness of paddy production with reference to India and other competing countries.

III. METHODS AND TOOLS:

Export competitiveness indices that are used in the context of the study are “Revealed Comparative Advantage Index RCA” and “Comparative Export Performance index CEP” (Balassa B), (Vollrath TL). These indices provide more precise information about competitive advantage concept - the ability of country to survive and gain large market shares relative to other countries. The analysis has been done to a consideration of the competitiveness of India's exports of rice in China market and also to major competitors of India in the China market. As we mentioned before, the main competitors of India in the China market of rice are, US, Australia and Brazil. The export data concern the intra trade between China and both the rival countries and India were obtained from UNCTADSTAT trade data. The data on exports of rice for India and other major exporting countries were collected from UNCTADSTAT. The period under consideration will be divided into two sub periods 1995-2002 and 2003- 2014.

Table: 1
Country wise share of Rice exports in the world rice exports

	India	Pakistan	Thailand	Viet Nam	World Rice	India	Pakistan	Thailand	Viet Nam
1995	1361515	478798	1951537	516657	7412006	18.37	6.46	26.33	6.97
1996	893589	500657	2001945	687987	7583245	11.78	6.60	26.40	9.07
1997	907269	485639	2099620	870892	7750973	11.71	6.27	27.09	11.24
1998	1492398	573335	2102435	1019738	9565093	15.60	5.99	21.98	10.66
1999	720900	584282	1946720	1025095	7916171	9.11	7.38	24.59	12.95
2000	629927	534063	1629859	667785	6457845	9.75	8.27	25.24	10.34
2001	610579	520953	1577473	623501	6906112	8.84	7.54	22.84	9.03
2002	1168645	463139	1630628	726263	6701527	17.44	6.91	24.33	10.84
2003	919151	626624	1830212	719916	7287151	12.61	8.60	25.12	9.88
2004	1178738	682860	2691394	950315	8842131	13.33	7.72	30.44	10.75
2005	1636489	1099267	2321682	1408379	10171658	16.09	10.81	22.83	13.85
2006	1456255	1151880	2579060	1275895	10750114	13.55	10.72	23.99	11.87
2007	2352946	1145677	3470015	1490180	13450967	17.49	8.52	25.80	11.08
2008	2843305	2439562	6107572	2895938	21790723	13.05	11.20	28.03	13.29
2009	2398163	1774460	5046464	2666062	19573013	12.25	9.07	25.78	13.62
2010	2295813	2277124	5341082	3249502	20585154	11.15	11.06	25.95	15.79
2011	4073331	2062063	6507473	3659212	24174458	16.85	8.53	26.92	15.14
2012	6127952	1882126	4632270	3677939	24695049	24.81	7.62	18.76	14.89
2013	8169519	2110992	4420370	2926255	26281389	31.08	8.03	16.82	11.13
2014	7905650	2199636	5438804	2795604	26394380	29.95	8.33	20.61	10.59

Country wise share of Rice exports:

The net value of rice exports from major producing countries to the world paddy market has been presented in table-1. From the table-1 it is observed that India, Pakistan, Thailand and Viet Nam are the major rice exporter to the world market. These four countries alone occupies nearly 70 percent in the net value of rice exports. Among them, India stands first place with 29.95 percent to the total rice exports to the world market during 2014-15. Thailand occupied second place with 20.61, Viet nam occupied third place with 10.59 percent and Pakistan occupied 4th place with 8.33 percent in the net exports value of rice to the world market. During 1995-96, the share of Thailand rice export in the net value of rice exports to the world market is high with 26.33 percent, where as in the case of India it is 18.37 percent. The same trend continues until 2011-12, whilst the government has removed the restrictions on rice exports. During 1995-96 to 2011-12, India uphold on an average of 13.46 percent only. Since 2011-12 onwards, India maintained on an average of 25.65 percent of paddy exports in the world rice market. On the other side Thailand has maintained on an average of 25.51 percent. During the same period, Pakistan and Vietnam has maintained a consistent share in the net value of rice exports to the world market.

Table: 2
Country wise share of Total products exports to the world

	India	Pakistan	Thailand	VietNam	Total products	India	Pakistan	Thailand	Vietnam
1995	31698567	8157869	56439341	5448994	5120727061	0.62	0.16	1.10	0.11
1996	33468591	9322194	55678128	7255955	5356255371	0.62	0.17	1.04	0.14
1997	34793751	8716964	58282513	9184986	5569478184	0.62	0.16	1.05	0.16
1998	33207325	8498194	53583495	9360261	5463081726	0.61	0.16	0.98	0.17
1999	36671914	8383173	58423032	11541358	5651864666	0.65	0.15	1.03	0.20
2000	42358096	9201164	68818990	14482743	6379944766	0.66	0.14	1.08	0.23
2001	43878489	9246489	64919226	15029192	6137410931	0.71	0.15	1.06	0.24
2002	50097958	9899658	68107865	16706053	6437556075	0.78	0.15	1.06	0.26
2003	59360659	11930076	80323274	20149324	7497683233	0.79	0.16	1.07	0.27
2004	75904200	13379015	96247901	26485035	9172701583	0.83	0.15	1.05	0.29
2005	100352637	16050201	110110034	32447129	10459467727	0.96	0.15	1.05	0.31
2006	121200606	16932873	130580046	39826223	12117416747	1.00	0.14	1.08	0.33
2007	145898053	17838407	153571126	48561343	14004691970	1.04	0.13	1.10	0.35
2008	181860898	20279046	175907915	62685130	16137785349	1.13	0.13	1.09	0.39
2009	176765036	17554698	152497203	57096274	12515846988	1.41	0.14	1.22	0.46
2010	220408496	21413103	195311520	72236665	15242854311	1.45	0.14	1.28	0.47
2011	301483250	25343769	228823973	96905674	18322873867	1.65	0.14	1.25	0.53

2012	289564769	24613676	229544513	114529171	18377413840	1.58	0.13	1.25	0.62
2013	336611389	25120883	228527440	132032854	18854183694	1.79	0.13	1.21	0.70
2014	317544642	24722182	227572764	150475423	18957775346	1.68	0.13	1.20	0.79

Country wise share of total exports in world's total products exports has been presented in table-2. Data shows that there is a continuous raise in the share of India's total products exports to the world, which was increased from 0.62 percent in 1997-98 to 1.79 in 2013-14 and reached to 1.68 percent. Interm of percentage of total products exports to the world market, India attained only two fold increase. But interms of value of total products exports in the world exports India attained a 10 fold increase during this period. Another Asian country Viet nam also shows a significant increase in the share of total products exports to the world market, which attained 3 fold increase interms of percentage and 10 fold increase interms of value. In the case of Pakistan it is consistent and ranged between 0.13 to 0.17 percent. The value of total exports to the world market form Pakistan is increasing continuously, but interms of percentage it is in declining trend.

Trends in world rice and total trade:

After years of negotiations and even a framework resolution to a pivotal trade dispute, rice still remains a critical concern for countries at the World Trade Organization. With rice prices above historical averages in recent years, trade and production has evolved substantially. Developing countries compete with developed countries such as the United States and Australia for export markets. Developing countries themselves are not a homogeneous group, with economically powerful China, India, Brazil and Turkey playing a greater role in the market. Exports from Brazil and Australia are both down by about 40 percent, as production has continued to fall from recent records. India's exports are expected to decline only slightly as a larger total supply partially offsets growing use and a significant decline in the value of the rupee enhanced its competitiveness against other origins.

The largest exporter of rice over the last five years has been the United States, accounting for around a third of global rice trade. U.S occupies first place and major share in rice exports to world market till now. But exports of rice form U.S has been declined from 41 percent in 2004 to 25.66 percent in 2013.

The US is the world's third largest producer of rice and its largest exporter. Only China and India grow more of the fiber. Over the preceding decade the US has accounted, on average, for a third of world exports, with its share fluctuating between 26 percent in 2011/12 and 44 percent in 2008/09. The United States is also the developed country providing the largest amount of support to its rice farmers. 9,10 In contrast, most developing countries do not have the resources to provide such help to their rice growers. Numerous reports have attempted to estimate the impact of U.S. rice support on international prices. U.S. government support to its rice farmers was found to depress world rice prices by a number of studies.

IV. Revealed Comparative Advantage (RCA)

Revealed Comparative Advantage (RCA) index explores whether the country has a comparative advantage over the rival countries. (RCA) index is measured by this formula;

$$RCA = \ln \left(\frac{XiB}{XB} \right) / \left(\frac{XiA}{XA} \right),$$

where

XiB: country's exports of good *i* to specific country

XB: country's total exports to specific country.

XiA: the rival country's exports of good *i* to the specific country/ region/block.

XA the rival country's total exports to specific country/region/block.

A positive value of RCA is interpreted as an indication of country's comparative advantage against a rival country in *i* to specific country/region/block. Besides these basic foundations of the respective measures, more appropriate thresholds/bounds as shown in Table-3 are introduced to aid efficient assessment of export performance, effectiveness of policy instruments, reflect fragileness of agricultural export trade and as well capture possible inefficiencies in exports due to distortionary measures.

Table-3
Seven-year mean thresholds for assessing export performance

	RCA	CEP	SCEP	In (CEP)
Highly Competitive	≥ 2.55	≥ 5.01	0.62 – 1.00	≥ 3.51
Competitive	2.55 – 1.54	2.01 – 5.00	0.27 – 0.61	3.0 to 3.51
Weakly Competitive	0.00 -1.54	1.00 – 2.0	0.00 – 0.26	2.50 to 3.01
Uncompetitive	< 0.00	≥ 1.00 and 0.00	< 0.00	2.0 to 2.51

Source: Developed by Author

These thresholds were not just randomly selected, but were set at the respective upper and lower bounds after several rotations for robustness. This is to ensure that no minor changes in the cardinal measures (figures within respective thresholds) would lead to movement of a country from a lower export performance level to a higher level, but rather to move from a lower to a higher level would require effective and efficient policy instruments, reduction of existing inefficiencies in export market of the respective commodities, improvements in trade (including appropriate liberalization of internal and external marketing) and minimization of distortionary measures which according to reduces competitiveness.

RCA INDEX OF INDIA AND ITS RIVAL COUNTRIES

Revealed Comparative Advantage (RCA) Index of Soudi Arabia against India:

Data regarding Revealed Comparative Advantage (RCA) Index of Soudi Arabia has been presented in table-4. India has a week revealed comparative advantage over Pakistan in exporting rice to Saudi Arabia, which is on an average 0.50 RCA index value during 2007-08 to 2014-15. Whereas India shows a moderate comparative advantage over Pakistan in exporting rice to Saudi Arabia, which is 2.56 on an

average during 1995-96 to 2006-07. It is observed from the data, for the period 1995-96 to 2005-06 India has a comparative advantage over Thailand in exporting rice to Saudi Arabia. Since then, India's turned in to a weak competitor against Thailand to export rice to Saudi Arabia, which declined from 12.43 RCA index value in 2005-06 to 2.37 in 2009-10. However, RCA index value of India's against Thailand in exporting rice to Saudi Arabia shows a consistent increasing trend, which reached to 5.49 in 2014-15. India has a great comparative advantage over Thailand and has a weak comparative advantage against Pakistan in exporting Rice to Saudi Arabia.

Table-4
Revealed Comparative Advantage (RCA) Index Saudi Arabia against India

Year	India rice to Saudi Arabia /India total product to Saudi Arabia	India rice to Saudi Arabia /India total product to Saudi Arabia
	Pakistan rice to Saudi Arabia/ Pakistan total product to Saudi Arabia	Thailand rice to Saudi Arabia/Thailand total product to Saudi Arabia
1995	2.42	7.65
1996	2.25	5.72
1997	2.98	5.78
1998	3.11	6.28
1999	1.94	6.11
2000	2.26	6.91
2001	3.24	5.51
2002	3.69	5.77
2003	2.92	7.15
2004	2.75	6.82
2005	2.03	12.43
2006	1.18	8.03
2007	0.78	4.77
2008	0.47	2.80
2009	0.58	2.37
2010	0.45	3.48
2011	0.63	3.92
2012	0.38	3.83
2013	0.36	4.47
2014	0.40	5.49

Source: Computed from the data provided by UNCTADSTAT.

Revealed Comparative Advantage (RCA) Index Iran against India:

Data regarding Revealed Comparative Advantage (RCA) Index of Iran has been presented in table-5. From the data it is observed that until 2009-10 India has a very weak comparative advantage over Pakistan in exporting rice to Iran. Since 2010-11 onwards, RCA value of India over Pakistan shows an increasing trend, which is 0.31 in 2009-10 and reached to 2.10 in 2014. Eventually, India became a moderate competitor against Pakistan in Iran's rice market. India faced a similar kind of situation with Thailand in exporting rice to Iran. India maintained a moderate and low comparative advantage over Thailand in exporting rice to Iran. However, during 2009-10 and 2012-13 India recorded a high comparative advantage over Thailand in exporting rice to Iran.

Table-5
Revealed Comparative Advantage (RCA) Index Iran against India

Year	India rice to Iran/India total product to Iran	India rice to Iran/India total product to Iran
	Pakistan rice to Iran/ Pakistan total product to Iran	Thailand rice to Iran/Thailand total product to Iran
1995	0.23	1.28
1996	0.13	1.40
1997	0.08	1.01
1998	0.17	0.73
1999	0.00	0.83
2000	0.00	0.82
2001	0.00	1.10
2002	0.02	1.52
2003	0.01	1.68
2004	0.00	1.36
2005	0.00	2.65
2006	0.01	1.74
2007	0.00	2.01
2008	0.05	6.31
2009	0.31	44.12
2010	0.21	9.51
2011	0.48	3.22

2012	0.71	117.98
2013	1.66	1.75
2014	2.10	1.96

Source: Computed from the data provided by UNCTADSTAT.

Revealed Comparative Advantage (RCA) Index Nigeria against India:

Calculated Data regarding Revealed Comparative Advantage (RCA) Index against Pakistan and Thailand in Nigeria market has been presented in table-6. Data clearly shows that India has low and weak comparative advantage over Thailand in exporting rice to Nigeria, which is 0.058 on an average during 1995 to 2014. However, India became a strong competitor over Pakistan in exporting rice to Nigeria during 2011-12 to 2014-15. Overall, RCA index value of India over Pakistan in exporting rice to Nigeria is in high fluctuating trend. From time to time India blocked the rice exports to Nigeria to avail the rice produced for the domestic needs.

Table-6
Revealed Comparative Advantage (RCA) Index Nigeria against India

	India rice to Nigeria/India total product to Nigeria	India rice to Nigeria/India total product to Nigeria
Year	Pakistan rice to Nigeria/ Pakistan total product to Nigeria	Thailand rice to Nigeria/Thailand total product to Nigeria
1995	0.05	0.00
1996	16.38	0.00
1997	5.73	0.03
1998	0.00	0.00
1999	0.00	0.00
2000	0.11	0.11
2001	17.24	0.01
2002	8.15	0.01
2003	148.31	0.00
2004	107.24	0.00
2005	2.12	0.15
2006	60.10	0.01
2007	0.00	0.00
2008	4.56	0.00
2009	0.00	0.47
2010	0.00	0.28
2011	8.94	0.01
2012	3.75	0.07
2013	8.56	0.01
2014	20.75	0.00

Source: Computed from the data provided by UNCTADSTAT.

Overall India has high comparative advantage in the Iran rice market over Pakistan and Thailand. And India has high comparative advantage in the Nigeria rice market over Pakistan and shows a weak advantage against Thailand. Further, India has a very strong comparative advantage over Thailand in Saudi Arabia's rice market and shows a weak comparative advantage over Pakistan.

V. CEP OF INDIA'S RICE EXPORTS IN THE GLOBAL MARKET

Competition is an important term in the economy because all countries in the world want to sell their production to the other countries. For that reason, countries have given an importance to competitiveness of their goods and products. During this period, countries have given the subsidies, investment to the research and developments technologies. The competitiveness of a country refers to an increase in its production capability and capacity. If a firm's or country's economic performance is measured, we can compare to the International competitiveness. With regard to this measuring, we can decide the situation of firm's or country's economic performance. As we know that competition law is globalized nowadays.

The concept of comparative advantage is widely used in economic literature to evaluate the patterns of trade and specialization of countries in commodities which they have a competitive edge. The classic concept of international competitiveness is based on the comparative costs principles formulated by Ricardo in 1817. He pointed out that the basis of international trade is the differences among countries in comparative costs among commodities. At the same field another group of Economists adds other determinations (Heckscher-Ohlin, Mill), they stated that the difference in the comparative advantage of the factors of production between two countries is a prerequisite for the difference in comparative costs. Comparative advantage of a country cannot be directly measured since relative prices. This approach is based on the notion that even though the theoretical in autarky are not observable; a country's observable pattern of trade "reveals" its comparative advantage. Revealed Comparative Advantage (RCA) index explores whether the country has a comparative advantage over the rival countries only. This approach is based on the notion that even though the theoretical in autarky are not observable; a country's observable pattern of trade "reveals" its comparative advantage. Several measures are used in assessing the country competitiveness. Most of them are based on the concept of revealed comparative advantage. With this approach, related to goods or industry, the Balassa tried to determine whether the country has a comparative advantage.

New framework has been formulated in the latest decades referring that international competitiveness explained by other forces than factor prices and endowment. Porter's Competitive Advantage of nations: (Diamond Model) helps to understand the competitive position of a nation or geographic regions in global competition. However, for agricultural sector, the competitiveness will depend largely on the extent

to which the country is able to increase its share in global markets. Among the factors most likely to impact the long-run competitiveness of international trade in agriculture are; the growing number of bilateral trade agreements between the country and its trade partners; food safety and sanitary/phytosanitary issues; several other potentially important policies that could reduce production and marketing costs through more efficient customs services. The policy environment plays also a critical role in allowing the exporters to be able to aim at new market opportunities and to be able to compete with foreign competitors that benefit from more efficient supporting industries (transport services, quality control, certification services, packaging). In assessing performance of the country in exports of the commodities aforementioned, the comparative export performance index (CEP), the symmetric comparative export performance index (SCEP) and the logarithmic form of CEP are used. These respective indices are defined as follows:

Comparative Export Performance Index (CEP)

Different indices have been reported to measure the strength of the competition. Among them, the Balassa Comparative Export Performance Index (CEP) is the most commonly used index. The analysis of comparative advantage of exports has been undertaken using the *Balassa (1965)*¹ using Comparative Export Performance (CEP) index. Balassa's index of relative export performance by country and commodity, defined as a country's share of world export of a commodity divided by its share of total world exports. In this study, the comparative advantage and competitiveness of India's rice exports in the global market has been calculated and analysed. The index for country *i* commodity *j* is calculated as follows:

$$CEP = \frac{(X_{ij}/X_i)}{(X_{aj}/X_a)}$$

Where,

- X_{ij} = Export of product *j* from country *i*
 X_i = Total exports from country *i*
 X_{aj} = Total export of product *j* from the world
 X_a = Total exports from the world

Comparative Export Performance (CEP) is a measure of export performance that shows comparison of commodity of a country's market share compared with the average percentage of exports of the country in total world exports. In this study CEP index of major rice producing countries Pakistan, Thailand and Vietnam were analyzed and compared with India's CEP index.

Symmetric Comparative Export Performance Index SCEP

The symmetric comparative export performance index is consequently defined as follows:

$$SCEP = \frac{(CEP-1)}{(CEP+1)}$$

and

$$\ln(CEP) = \log(CEP)$$

The index of $\ln(CEP)$ has a very simple interpretation. If it takes a value greater than 1, the country has a revealed comparative advantage in that product (rice). That is, the country's total export share in goods of an interest is greater than the share in global trade. The Comparative Export performance index has a relatively simple interpretation. As the index number getting better for a commodity of a country indicates a comparative advantage. On the other hand, if $\ln(CEP) < 1$ then that the goods of an interest as a comparative disadvantage. Among these three measures of competitiveness, the SCEP (Symmetric Comparative Export Performance as a symmetric measure of CEP is perceived to provide the best picture on performance of a country by setting boundaries between -1 and +1. SCEP is the symmetric form of the CEP index. The closer a given country is to +1, the higher its export performance and vice versa. Values of CEP of at least +1 and $\ln(CEP)$ of at least 0 reveal competitive advantage in exports. The values of CEP of at least +1 and $\ln(CEP)$ of at least 0 reveal competitive advantage in exports. However, for the better interpretation and analysis, $\ln(CEP)$ values were ranged in table-7.

Table-7
India Export performance of rice

Year	CEP Index			
	India	Pakistan	Thailand	Vietnam
1995	29.67	40.55	23.89	65.51
1996	18.86	37.93	25.40	66.97
1997	18.74	40.03	25.89	68.13
1998	25.67	38.53	22.41	62.22
1999	14.04	49.76	23.79	63.41
2000	14.69	57.34	23.40	45.55
2001	12.37	50.07	21.59	36.87
2002	22.41	44.94	23.00	41.76
2003	15.93	54.04	23.44	36.76
2004	16.11	52.95	29.01	37.22
2005	16.77	70.43	21.68	44.63
2006	13.54	76.68	22.26	36.11
2007	16.79	66.87	23.53	31.95
2008	11.58	89.09	25.71	34.21
2009	8.68	64.64	21.16	29.86
2010	7.71	78.74	20.25	33.31

¹ Balassa B. Trade liberalization and revealed comparative advantage. The Manchester School Econ. Soc. Stud.1965;33(1):99-123.

2011	10.24	61.67	21.55	28.62
2012	15.75	56.90	15.02	23.90
2013	17.41	60.29	13.88	15.90
2014	17.88	63.91	17.17	13.34

Comparative Exports performance Index (CEP) of Major Paddy exporting countries:

In this study, the Comparative Export performance Index (CEP) is calculated to determine the comparative advantage and competitiveness of India's rice exports in the global market. CEP index values for rice exports of India and selected countries are shown in Table-7. According to the calculations, the CEP index varied in the range of 7 to 89. Further, ranges of CEP has been classified in to different competitive classes and presented in table-5.2. The results shows that there are larger variations in the CEP index among major rice producing countries. During 2014-15, CEP index is at 63.1 for Pakistan, followed by India with 17.88 index value, Thailand with 17.17 index value and Vietnam with 13.34 index value. Results of CEP clearly indicate that Pakistan shows a high comparative export performance over all other major rice exporting countries to the world market.

India's CEP had increased continuously during 2010-11 to 2014-15. But since 2010-11 onwards, CEP index of India had declined and in a fluctuating trend. The CEP index value of India declined from 29.69 in 1995-96 to 7.71 in 2011 and reached to 17.88 in 2014-15. Whereas in the case of Pakistan CEP index value is constituted around 40 to 70 during 1995 to 2014, which is on an average of 57.76 CEP index value. This clearly reveals that Pakistan holds and maintained the high comparative export performance over all other major rice producing countries in the world's rice market. Till 1999 Vietnam maintained the CEP index value with an average of 65.25, but afterwards it is declined to 32.66 CEP index value an average during 2000 to 2014.

In the case of Vietnam, the calculated CEP index value is continuously declined from 65.51 points in 1995-96 to 45.55 in 2000-01, further to 23.90 in 2013-14 and reached to 13.34 in 2014-15. Until 1999-00, Vietnam shows a high competitive export performance over all other major rice producing countries in the global rice market during 1999 to 2010, yet it became the lease competitor among all other major paddy exporting countries to the world market. Since, 2001-02 onwards CEP index of Vietnam shows a continuous declining trend. The situation is quite contrary in the case of Pakistan during the same period. Pakistan achieved a high CEP index value in the year 2008-09, for India it is 29.67 in year 1995-96, for Thailand it is 29.01 in the year 2004-05 and for Vietnam it is 68.13 CEP index value in the year 1997-98.

It was only after introduction of SRI technology in rice cultivation the entire position has turned in the favor rice exports from India to world. The share of India's rice exports to world market got sharp increase from 1.76 in 2004 to 22.64 in 2013. And at the same time the total exports from India also increased from 1.02 in 2004 to 2.16 in 2013, which indicates a 10 fold increase in rice exports and 2 fold increase in total commodity exports from India. Eventhough, Thailand maintained the CEP index value with an average of 22.20 during 1995-96 to 2014-15. Since 2012 onwards, CEP index value of Thailand has been declining.

Symmetric Comparative Export Performance Index (SCEP):

SCEP is the symmetric form of the CEP index. The closer a given country is to +1, the higher its export performance and vice versa. For the better interpretation and analysis, In(CEP) values were again ranged different competition levels in table-

Calculated symmetric comparative exports performance index values are presented in table-8. The data clearly reveals that India's rice export was uncompetitive position in the world trade. SCEP index value reveals that Pakistan has the high comparative export performance over all other major paddy exporting countries. Data clearly shows that SCEP index value is more than 0.95 points during 1995 to 2014 for Pakistan. Data clearly shows that India, Thailand and Vietnam have the moderate comparative export performance possession in the world paddy market. When compared with other countries Vietnam achieved a low comparative export performance. India is the only country in the range of weak comparative export performance possession during 2008-09 to 2011-12. India and Thailand are not able to high comparative export performance during 1995 to 2014. Vietnam is the only country to achieve a high comparative export performance during 1995 to 2006. However, since 2007 onwards it declined continuously and reached to a moderate competitive possession with 0.86 SCEP index value in 2014-15.

Altogether, Pakistan gained a commendable comparative competitive advantage in rice trade among 4 major rice exporting countries in the world.

Table-8
Symmetric Comparative Export Performance Index (SCEP)

Year	India	Pakistan	Thailand	Vietnam
1995	0.93	0.95	0.92	0.97
1996	0.90	0.95	0.92	0.97
1997	0.90	0.95	0.93	0.97
1998	0.93	0.95	0.91	0.97
1999	0.87	0.96	0.92	0.97
2000	0.87	0.97	0.92	0.96
2001	0.85	0.96	0.91	0.95
2002	0.91	0.96	0.92	0.95
2003	0.88	0.96	0.92	0.95
2004	0.88	0.96	0.93	0.95
2005	0.89	0.97	0.91	0.96
2006	0.86	0.97	0.91	0.95
2007	0.89	0.97	0.92	0.94
2008	0.84	0.98	0.93	0.94
2009	0.79	0.97	0.91	0.94
2010	0.77	0.97	0.91	0.94
2011	0.82	0.97	0.91	0.93

2012	0.88	0.97	0.88	0.92
2013	0.89	0.97	0.87	0.88
2014	0.89	0.97	0.89	0.86

Ln CEP or Log CEP:

As it is indicated earlier the values of ln(CEP) at least +1 and at least 0 reveal competitive advantage in exports. Above and beyond less than 0 indicated comparative competitive disadvantage in rice exports. Calculated Log values of comparative exports performance index are presented in table-9. The results of Log CEP indicate that Pakistan India and Thailand are in comparative disadvantage position.

Table-9
Ln (Log) CEP

	India	Pakistan	Thailand	Vietnam
1995	3.39	3.70	3.17	4.18
1996	2.94	3.64	3.23	4.20
1997	2.93	3.69	3.25	4.22
1998	3.25	3.65	3.11	4.13
1999	2.64	3.91	3.17	4.15
2000	2.69	4.05	3.15	3.82
2001	2.51	3.91	3.07	3.61
2002	3.11	3.81	3.14	3.73
2003	2.77	3.99	3.15	3.60
2004	2.78	3.97	3.37	3.62
2005	2.82	4.25	3.08	3.80
2006	2.61	4.34	3.10	3.59
2007	2.82	4.20	3.16	3.46
2008	2.45	4.49	3.25	3.53
2009	2.16	4.17	3.05	3.40
2010	2.04	4.37	3.01	3.51
2011	2.33	4.12	3.07	3.35
2012	2.76	4.04	2.71	3.17
2013	2.86	4.10	2.63	2.77
2014	2.88	4.16	2.84	2.59

VI. CONCLUSION:

India, Pakistan, Thailand and Viet Nam are the major rice exporter to the world market. These four countries alone occupies nearly 70 percent in the net value of rice exports. Developing countries compete with developed countries such as the United States and Australia for export markets. Developing countries themselves are not a homogeneous group, with economically powerful China, India, Brazil and Turkey playing a greater role in the market. The largest exporter of rice over the last five years has been the United States, accounting for around a third of global rice trade. U.S occupies first place and major share in rice exports to world market till now. But exports of rice from U.S has been declined from 41 percent in 2004 to 25.66 percent in 2013. India has a great comparative advantage over Thailand and has a weak comparative advantage against Pakistan in exporting Rice to Saudi Arabia. India faced a similar kind of situation with Thailand in exporting rice to Iran. India maintained a moderate and low comparative advantage over Thailand in exporting rice to Iran. However, India became a strong competitor over Pakistan in exporting rice to Nigeria during 2011-12 to 2014-15. However from time to time India blocked the rice exports to Nigeria to avail the rice produced for the domestic needs. Overall India has high comparative advantage in the Iran rice market over Pakistan and Thailand. And India has high comparative advantage in the Nigeria rice market over Pakistan and shows a weak comparative advantage against Thailand. Further, India has a very strong comparative advantage over Thailand in Saudi Arabia's rice market and shows a weak comparative advantage over Pakistan. Until 1999-00, Vietnam shows a high competitive export performance over all other major rice producing countries in the global rice market during 1999 to 2010, yet now it became the least competitor among all other major paddy exporting countries to the world market. At present Pakistan shows a high comparative export performance over all other major rice exporting countries to the world market. India is the only country in the range of weak comparative export performance possession during 2008-09 to 2011-12. India and Thailand are not able to high comparative export performance during 1995 to 2014. Vietnam is the only country to achieve a high comparative export performance during 1995 to 2006. However, since 2007 onwards it declined continuously and reached to a moderate competitive possession with 0.86 SCEPT index value in 2014-15. Altogether, Pakistan gained a commendable comparative competitive advantage in rice trade among 4 major rice exporting countries in the world. Log CEP indicate that Pakistan India and Thailand are in comparative disadvantage position.

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