

**Competitiveness of Indian Rice in the Global Market:
A Comprehensive Revealed Comparative Advantage
(RCA) and Nominal Protection Coefficient (NPC)
Evaluation**

Abstract

The present study was conducted to analyse the competitiveness of Rice export from India and major Rice exporting countries in the global market for a period from 2000 to 2020. The data on export quantity and value was collected from the official website of UNCOMTRADE. Compound Annual Growth Rate (CAGR) was used to estimate the growth rate of export quantity, value and per unit value of rice. Revealed Comparative Advantage (RCA) and Nominal Protection Coefficient (NPC) were used in the study for analysing the competitiveness of Rice export between India, Pakistan, China, USA, Thailand and Vietnam. The findings revealed that as per the NPC analysis Thailand and Vietnam were most competitive while India was the least competitive in global market. As per the findings of RCA Pakistan and India had the highest comparative advantage while USA had comparative disadvantage during the study period. Policies aimed at enhancing and sustaining the competitiveness of Rice export from India should be formulated.

Keywords: Revealed Comparative Advantage, Nominal Protection Coefficient, CAGR, Rice export, Competitiveness

1. INTRODUCTION

Agriculture had been the backbone of Indian economy since the very beginning and although the Indian economy is now moving away from being an agrarian economy, but agriculture still remains a major part of India 's economic development. With 20 agro-climatic regions and 157.35 million hectares of land under cultivation, India has the second-largest agricultural land area in the world. (Rathna et al.,2019). Rice is a staple food for a large population worldwide, particularly in Asia and Africa. Asia alone accounts for nearly 90% of area under Rice and 91% of the global production of rice(Madhu et.al.,2023).China, India, Indonesia, Bangladesh, Japan and Vietnam are the major Asian countries which accounts for nearly 80% of production and consumption of rice(Abdullah et.al., 2008). Among these China and India alone accounts for more than 50% of global rice production.

Rice is one of the major agricultural commodities in India, and the country is among the largest producers and exporters of rice globally. It has a diverse range of rice varieties and is known for its high-quality rice. The total production of rice in India during year 2021-22 was 130.29 million tonnes with total area of 46.28 million hectares. West Bengal (12.87 %) Uttar Pradesh (11.72), Punjab (9.89 %), Telangana (9.44), Odisha (7.01) and Tamil Nadu (6.19) were the major rice producing states in India during the year 2021-20. Rice export from India plays a significant role in the country's agricultural economy. The quantity and value of rice exports from India vary from year to year. The value of rice exports is influenced by factors like global demand, international market prices, and currency exchange rates. During the year 2021-22 India exported 21.28 million tonnes of rice which was nearly 41% of the global rice export. India ranks first in export of rice and it ranks second after China in production of rice in the world.

India holds a strong competitive advantage in the global market for rice due to several factors. Firstly, Indian Basmati rice is renowned for its quality and distinct fragrance, which sets it apart from other varieties. This unique characteristic appeals to consumers worldwide, leading to a high demand for Indian Basmati rice. Further the ample production capacity of India due to a robust agricultural sector with favourable climatic conditions and fertile soil, enabling large-scale cultivation of rice also contributes to its strong competitiveness. The high production volume allows India to meet the substantial demand for rice in the international market consistently. Furthermore, India's ability to supply a diverse range of rice varieties adds to its competitiveness. Apart from basmati rice, India produces non-basmati rice varieties suitable for various culinary preferences and applications. Despite the imposition of a 20% export duty by the Indian government in 2022-23 to stabilize domestic prices, the demand for Indian rice remains strong in the international market. This indicates the resilience and attractiveness of Indian rice to global buyers, highlighting its continued competitiveness. These factors collectively position India as a key player and preferred supplier in the global rice trade. Despite this India faces stiff competition in the global market from the major rice exporting countries such as China, Thailand, Vietnam, Pakistan and USA. Hence there is need to analyse the competitiveness of India in the global market to strengthen its position and further enhance and sustain the competitiveness.

2. LITERATURE REVIEW

Kumari et al. (2021) analysed the export competitiveness and price trends of Basmati Rice in both domestic and international markets from 1999-2000 to 2018-2019. The study used trend analysis and Nominal Protection Coefficient (NPC) methods. The findings showed notable shifts in Basmati Rice prices over the years, with the NPC results indicating that Basmati

Rice remained competitive in global markets. Diksha (2015) analysed the comparative advantage of India's rice exports using the Revealed Comparative Advantage (RCA) index over 12 years (2001-02 to 2013-14). The study found that India consistently had an RCA value greater than 1, indicating a comparative advantage in global rice exports. However, fluctuations in the RCA value were noted throughout the period. Javed et al. (2018) analysed the competitiveness of Pakistan's agricultural exports to the UAE using the Nominal Protection Coefficient (NPC) over a 10-year period. The study focused on cotton yarn, basmati rice, and meat (mutton and beef). Results showed a decline in Pakistan's competitiveness in basmati rice, suggesting the need for alternative markets. Pakistan had a comparative advantage in beef exports, a moderate advantage in cotton, and a strong advantage in milk and cream, though domestic demand necessitates importing milk from the UAE. The country faced a disadvantage in exporting mutton and sugar.

3. METHODOLOGY

The study was based on secondary data obtained from UNCOMTRADE. Data on export quantity and value of Rice export from India and other major competing countries was obtained for a period from 2000 to 2020. For analysing the export of rice from India, 10 destination countries were selected out of about 150 countries on the basis of maximum quantity exported (60%) out of the total export of rice from India during 2020. The selected countries included Saudi Arabia, Iran, Iraq, UAE, Nepal, Bangladesh, Côte d'Ivoire, Benin, Senegal, and Guinea. Five major rice exporting countries were selected on the basis of export figures of 2020, which included Vietnam, Thailand, Pakistan, China and USA.

Analytical techniques

a. Compound annual growth rate (CAGR)

The compound annual growth rate was estimated to quantify the growth of export quantum and earnings from export of rice. To estimate compound annual growth rates, the exponential equation of the following form was fitted:

$$Y_t = ab^t$$

Annual compound growth rate was given by

$$r = (\text{antilog } b - 1) * 100$$

where,

- Y_t = Annual export quantity/export value/per unit value of rice
- T = time in years
- a = constant
- b = regression coefficient.

b. Export competitiveness

For analysing the competitiveness of Rice export Nominal Protection Coefficient (NPC) and Revealed Comparative Advantage (RCA) were used in the study.

The **Nominal Protection Coefficient (NPC)** helps in measuring the divergence of domestic price from the international price and determines the degree of export competitiveness for a commodity (Goverdan et.al, 2021). Under the exportable hypothesis, domestic commodities compete with foreign goods at a foreign port or in a foreign market. It was estimated by using the following formula:

$$\text{NPC} = \frac{P_d}{P_i}$$

where,

P_d = Domestic price of Rice in Rs./Tonnes

P_i = International price of Rice in Rs./Tonnes

Revealed Comparative Analysis(RCA) shows the comparative advantage of agricultural products and exhibit the level of agricultural competitive advantage through the trade performance of agricultural products. The RCA value ranges between 0 to infinity. Higher the value of RCA, higher the comparative advantage in export competitiveness. The formula of RCA is given as:

$$\text{RCA}_{ij} = \frac{(X_{ij}/X_{ia})}{(X_{wj}/X_{wa})}$$

where, i stands for respective country,

j stands for Rice and w stands for world.

RCA_{ij} represents the revealed comparative advantage of i^{th} country 's Rice export

X_{ij} represents the export of Rice from the i^{th} country

X_{ia} represents the export of total agricultural commodities from the i^{th} country

X_{wj} represents the export of Rice in the world & X_{wa} represents the export of total agricultural commodities in the world.

4. RESULTS AND DISCUSSION

The export of Rice from India increased in the last five years between 2018 to 2022 from 11.67 to 22.24 million tonnes with slight decline during 2019. Export of Rice from Pakistan, China and USA remained nearly constant during the last five years with an average of 4.22, 2.36 and 3.20 million tonnes respectively. Thailand observed slight dip in rice export during the year 2019 from 11.09 to 6.12 million tonnes however during the year 2022 its export increased and it accounted for 7.70 million tonnes of rice export in the world. Vietnam

observed increasing trend in its rice export between 2018 to 2022 from 2.89 million tonnes to 6.56 million tonnes.

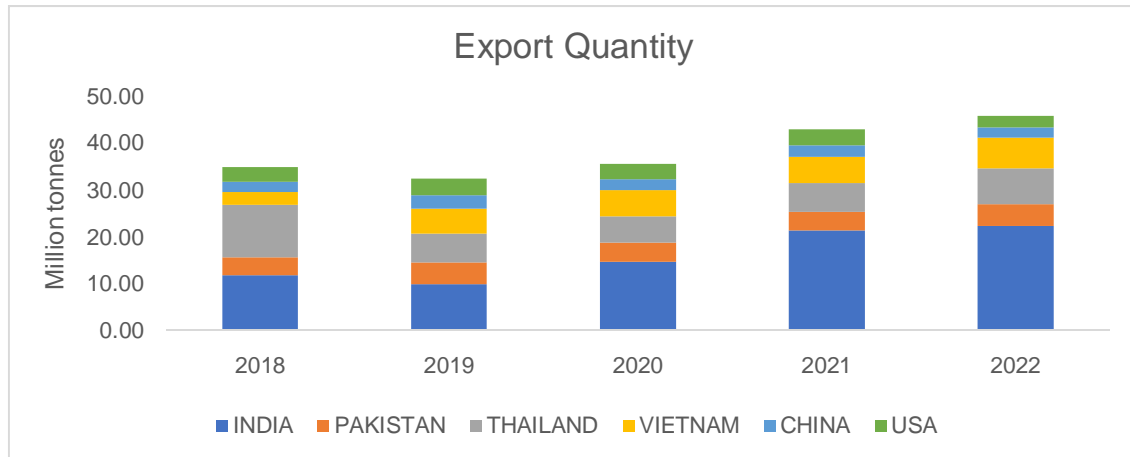


Figure I: Export quantity of Rice from India and major exporting nations

The data present in table 1 indicates the growth rate of export quantity, value and per unit value of rice exported from India to major destinations during the period 2000 to 2020. From the data it can be observed that in terms of quantity and value highest growth rate was observed for Senegal with 71.61 and 84.94 per cent respectively followed by Guinea with 66.04 and 73.26 per cent respectively. While for Bangladesh there was negative and non-significant growth rate of -8.51 per cent in export quantity and for value also it showed the least growth rate among all countries with 01.45 per cent CAGR. Per unit value of Rice export showed higher growth rate for the Middle East countries i.e., Saudi Arabia, Iran, Iraq, and UAE, while the West African countries showed the least growth rate for per unit value. Highest growth rate of per unit value of rice export was observed for Iraq with 11 per cent followed by Bangladesh with 10.89 per cent whereas least and non-significant growth rate was observed in Senegal and Guinea with 1.51 and 4.35 per cent respectively.

Table 1. Growth rate of export quantity, value and per unit value of rice exported from India to major destination countries during 2000 to 2020

Country	CAGR (%)		
	Export quantity	Export Value	Per unit value
Bangladesh	-08.51	01.45	10.89**
Benin	35.65**	56.95**	08.99**
Côte d'Ivoire	23.83*	32.99**	07.40**
Guinea	66.04**	73.26**	04.35
Iran	45.03**	59.27**	09.82**
Iraq	40.14**	55.56**	11.00**
Nepal	23.49**	31.39**	06.40*
Saudi Arabia	03.52**	12.25**	08.43**
Senegal	71.61**	84.94**	01.51
UAE	13.45**	22.31**	07.81**
Other countries	09.67**	17.68**	07.30**
Total	09.81**	18.50**	07.91**

**Significant at 1 per cent level of significance

*Significant at 5 per cent level of significance

The data present in table 2 presents the NPC of Rice export from India and major competing countries between the TE 2002 to TE 2020. The findings showed that Thailand and Vietnam were the most competitive in rice export in the global market during the period. In Thailand the NPC value remained less than one during most of the years indicating higher competitiveness except TE 2020. Following Thailand and Vietnam, China showed most competitiveness. Among all countries India remained moderately competitive between TE 2002 to TE 2008 with NPC value of 0.88 during TE 2005. However, after TE 2008 the competitiveness declined indicating non-competitiveness with average NPC of 1.13 during the study period. Srikala et.al(2017), Goverdan et.al (2014) conducted NPC to analyse the competitiveness of rice export and observed moderate competitiveness of Indian rice export.

Table 2: NPC of Rice export from India and major competing countries between the TE 2002 to TE 2020

	India	Pakistan	Thailand	Vietnam	China	USA	Others
TE 2002	1.18	1.54	0.82	1.08	0.66	1.22	0.79
TE 2005	0.88	0.97	0.82	1.29	0.77	1.27	1.29
TE 2008	1.03	1.06	0.95	0.84	0.87	0.93	1.28
TE 2011	1.55	0.92	0.98	0.78	1.18	0.94	1.09
TE 2014	1.06	0.88	0.96	0.72	1.44	0.90	3.04
TE 2017	1.11	0.91	0.89	0.87	1.36	0.94	1.12
TE 2020	1.10	0.91	1.10	1.09	0.71	0.96	0.98
AVERAGE	1.13	1.03	0.93	0.95	1.00	1.02	1.37

NPC <0.50 Highly Competitive

NPC between 0.50 to 1.00 Moderately Competitive

NPC >1.00 Non-Competitive

The data present in table 3 presents the RCA value of Rice export from India and major competing countries between the TE 2002 to TE 2020. From the data it can be observed that Pakistan showed highest comparative advantage in the export of Rice in global market. The comparative advantage of Indian Rice export increased continuously from the TE 2011. Following Pakistan, India showed highest comparative advantage in Rice export during the period. Among all countries USA showed the least comparative advantage with average RCA value of 0.31 during the study period. The comparative advantage for India in Rice export increased from 11.25 during TE 2014 and increased continuously till the TE 2020 with average RCA value of 13.70. The highest RCA value for India was observed during TE 2020. Similar results were found by Suman et.al (2022). For Thailand, Vietnam, China and USA the RCA value declined during the study period with minimum RCA value during the TE 2020.

Table 3: RCA of Rice export from India and major competing countries between the TE 2002 to TE 2020

	India	Pakistan	Thailand	Vietnam	China	USA	Others
TE 2002	11.52	37.37	12.17	14.50	04.17	0.56	0.27
TE 2005	12.55	39.87	12.26	14.38	04.17	0.37	0.26
TE 2008	10.45	42.87	11.62	12.06	03.31	0.32	0.26
TE 2011	07.95	32.83	10.25	12.18	02.86	0.21	0.28
TE 2014	11.25	26.50	07.86	08.92	01.99	0.13	0.28
TE 2017	12.40	29.53	08.52	06.67	01.72	0.18	0.30
TE 2020	13.70	30.89	07.45	06.22	01.61	0.41	0.29
AVERAGE	11.40	34.27	10.02	10.71	2.83	0.31	0.28

RCA 0 to 1 No-Comparative advantages

RCA 1 to 2 Weak-Comparative advantages

RCA 2 to 4 Medium-Comparative advantages

RCA >4 Strong-Comparative advantage

5. CONCLUSION

In conclusion, the findings of this research suggest that India is among the leading exporters of rice in the world along with major competing countries such as Pakistan, Thailand, Vietnam, China and USA. The export of rice from India during the period 2000 to 2020 increased mainly towards countries like Guinea, Senegal in terms of quantity and value while in terms per unit value higher growth rate was observed for countries including Iran, Iraq, Bangladesh and Saudi Arab. As per NPC findings Thailand and Vietnam emerged as the most competitive countries in rice export while India remained non-competitive in rice export in global market. The findings of RCA showed that Pakistan followed by India were the countries with highest comparative advantage in Rice export in global market. During the study period, the comparative advantage of India increased continuously and was highest

during the TE 2020. Except for India and Pakistan, the comparative advantage for rest of the countries declined during the study period. As per the findings of RCA, USA showed the highest comparative dis-advantage with average.

6. POLICY IMPLICATIONS

- Higher potential for rice export was observed towards the West African countries hence efforts should be made to strengthen and expand Indian rice market in such countries. Exploring new markets can help lessen reliance on specific regions and generate more prospects for export growth.
- The government can assist exporters in expanding their market by providing market access, conducting market research, and organizing trade promotion activities in certain regions.
- India indicated potential advantage in Rice export hence efforts should be aimed towards further strengthening this advantage through targeted support, research and adoption of advanced agricultural practices.
- Major Rice exporting countries such as Thailand and Vietnam showed declining advantage in global market, India should take advantage of this to further strengthen its share in global rice market.

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Details of the AI usage are given below:

1. ChatGPT 4.0

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