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Export competitiveness and direction of trade of banana from India: A agribusiness performance appraisal

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Abstract

India with a strong agricultural economy that gives a platform for economic growth and the significance of achieving increased growth in the business of agricultural sector, particularly in relation to banana, has garnered substantial attention from both policy makers and research experts. Given this context, the current research endeavours to assess the export competitiveness and direction of trade in export of the aspects of price and quantity in export of banana from India. The present study is mainly based on the secondary data which is collected from various secondary sources for the period 2006-07 to 2021-22 by using analytical tools like Compound Annual Growth Analysis (CAGR), Cuddy-Della Valle Index (CDVI), Nominal Protection Co-efficient (NPC) and Markov Chain Analysis. The results revealed that the growth rate and instability for export of banana is positive and significant. The NPC for the period 2021-22 under exportable hypothesis, the NPCs value were 0.54 for Qatar, 0.60 for Germany, 0.69 for USA, 0.86 for UAE, 0.87 for Saudi Arabia, 0.93 for Australia, 0.94 for Nepal and 0.98 for Oman, respectively and their NPC value is less than one, which also revealed that the domestic prices received by the farmers were lower than the international prices, which also implied that the domestic producers were dis-protected or rather taxed compared to a situation prevailing under free trade condition. Nepal and USA was one of the most stable country among the major importers of Indian banana as indicated by the high retention probability of 79.81 and 18.06 percent, respectively. A dependency on few export market would increase the trade risk in the near future. Hence, appropriate export promotion strategies in agricultural business are to be evolved to diversify the geographical concentration.

Keywords: Export competitiveness, direction of trade, nominal protection co-efficient, Markov chain analysis, banana, India

Introduction

The horticulture sector occupies an important position in providing more employment and high income, mitigating to some extent the excess demand for cereals and contributing to food and nutritional security (Jha *et al.*, 2019) ^[5]. India is a country with a strong agricultural economy that gives a platform for economic growth and provides employment opportunities to around 70 percent of its rural people. Indian economy is mainly based on agricultural trade as agriculture is the backbone of India and contributes to the global food basket. India produces a large amount of milk, legumes, fruits, vegetables, wheat, rice and other agricultural products. Fruits and vegetables farming is the best alternative for Indian agriculture because it increases land productivity, creates job opportunities and improves farmer's financial position because they can sell their produce with a better price and makes a higher profit (India at a glance, FAO). Most importantly, though it gives the

population access with healthy and nutritious food. Also, India's climate makes it possible to grow a wide variety of fruits and vegetables.

Horticulture is an important segment of agriculture sector which contributes about one-fifth share in the economy of agriculture and allied sectors. Horticulture is the fastest growing sector within agriculture sector to the economic prosperity that has provoked marked changes in the life styles and the consumption habits. There has a perceptible change in the consumption pattern characterized by declining share of food grains and the increasing share of non-food grain items in the consumption baskets particularly fruits and vegetables. Rapidly growing demand for horticultural commodities especially burgeoning market for banana market is evidence of the phenomenon that is expected to accelerate banana growth in the country. Consequently, banana is to set to assume a greater role and importance within the horticulture sector and eventually in

the national economy.

Fruits are important items in everyday meals and have medicinal and aesthetic value (Kondal, 2014; Chand *et al.*, 2008)^[7, 3]. The fruits are considered suitable for keeping the heart healthy and lowering the chances of heart disease when used regularly. They are recommended for patients suffering from high blood pressure, arthritis, ulcers, gastroenteritis, and kidney disorders (Kashish and Dhawan, 2017)^[6]. Banana is the second major producer of fruit after mango in India. The major banana producing states in India, include Tamil Nadu, Gujarat, Karnataka, Andhra Pradesh, Maharashtra, Madhya Pradesh, Uttar Pradesh, and Bihar (Bisht *et al.*, 2015; Ministry of Agriculture and Farmers' Welfare, 2020)^[2, 8].

India is the second largest producer of fruits in the world after China. The total area under fruit crops in the country with 9.6 million hectares in 2021-22 and the production with 102.48 million metric tonnes. Among the fruit's mango, grapes, banana, oranges, lemon, pomegranate, watermelon and other fresh fruits, mango and grapes are the major fruits which stand first in terms of production accounting for 11 million metric tonnes and 27.40 million metric tonnes, respectively.

Banana

Despite being the largest producer of banana in the world, India is ranked 20th in exports and is a meagre 0.6 percent share in the global banana trade. If India adopts an export-oriented strategy to upgrade the value chain, the country can increase its exports by four-fold and grab a spot among the top ten exporters. India's exports of banana in FY22 were \$160.52 million against global exports of \$14.50 billion share of 0.60 percent. Even, the world's fifth largest producer Ecuador has a 24 percent share. According to Federation of Indian Export Organisations (FIEO) India can reach at least \$500 million exports within five years to grab a 3 percent share in global trade and be one of the top 10 exporters if it improves production, post-harvest handling and phytosanitary standards. Our research institutions and other stakeholders should come forward to provide solutions to increase shelf life, reduce skin damages and improve technology and infrastructure for pre and post-harvest processes. The government should encourage major retailers and department stores in India to invest in post-harvest channels to procure banana and sell through stores with specified standards, branding and packaging. Need of branding for banana and the state governments should come forward to create state-specific brands and promote them in major markets. State governments should also provide support for creating procurement, sorting, packing and processing centres. Globally, banana is exported entirely by sea-freight. However, in India more than 60 percent is exported through air. This costlier mode restricts marketability of Indian banana. There is a need for closer association with major shipping lines.

However, it is required to study the production and export trade in horticultural commodities, export competitiveness, Direction of trade in exports for banana. So, the present study has undertaken keeping in view to study those, considering banana were selected. It is to make an in-depth study of export competitiveness and direction of trade in export of banana from India. An identification of banana

having greater advantage in agribusiness sector so it is very much needed to plan export strategies in near future business development in India. Hence, the present study is attempted with the following specific objectives:

- To study the price competitiveness in export of banana from India.
- To study the market instability in direction of trade for banana from India.

Material and Methods

The study was conducted by utilising the time series data on price and quantity of banana in India were collected from publication of National Horticultural Board (NHB), APEDA (Agricultural Processed Food Products and Export Development Authority), Agricoop (Agriculture Co-operation and Farmers Welfare, agricoop.nic.in) Books, Reports, Journal, Periodicals and News Paper etc.

Analytical techniques employed

Compound Annual Growth Analysis (CAGR)

Growth rate was calculated for export of banana in India in the present study for the period of 2017-18 to 2021-22.

$$Y = a b t e$$

Where; Y = Dependent variable for which growth rate is estimated, a = Intercept, b = Regression co-efficient, t = Time variable, e = Error term.

The logarithmic form of the above equation estimated the compound growth rate

$$\log Y = \log a + t \log b$$

The compound growth rate (g) was estimated by using $g = [\text{Anti log of } (b) - 1] * 100$

Cuddy-Della Valle Index (CDVI)

$$\text{Instability index} = CV \times \sqrt{1-r^2}$$

Nominal Protection Co-efficient (NPC)

In the present study Nominal Protection Co-efficient (NPC) is estimated under the exportable hypothesis.

$$\text{NPC} = P_d/P_b$$

Where; P_d = Domestic price of the commodity, P_b = Respective country's reference market price of the commodity.

Markov Chain Analysis

Markov Chain Analysis is employed to analyse the structural change in any system whose progress through time can be measured in terms of single outcome variable. In this study, market instability in trade directions and its pattern for banana are analysed using LINGO software to get transition probability matrix.

This was algebraically expressed as

$$E_{jt} = \sum_{i=1}^r E_{it-1} P_{ij} + e_{jt}$$

Where;

E_{jt} = Exports from India to the j^{th} country in the year “t”, E_{it-1} = Exports or imports to i^{th} country during the year t-1, P_{ij} = The probability that exports will shift from i^{th} country to j^{th} country, e_{jt} = The error term which is statistically independent of E_{it-1} , n = The number of importing countries

$$B_t = B_0 \times T$$

$$B_{t+i} = B_{t+i-1} \times T$$

Where; B_0 = Quantity exported in Base years, B_t = Quantity exported in next year (prediction), T = Transitional probability matrix.

Results and Discussion

Growth and instability index for export of banana from India

The growth and instability index for export of banana from India is presented in Table 1. The Compound Annual Growth Rate (CAGR) in terms of quantity with 1.12 percent in the same way, in terms of value with 10.84** percent i. e. positive Compound Annual Growth Rate (CAGR) with significant at 1 percent level for value. The result reveals that the CDVI of the quantity and value is 52.10 and 44.10 respectively, which shows that as instability in terms of both quantity and value. The results corresponded with the studies conducted by Pawar *et al.* (2006) [10]; Mittal (2007) [9]; Roy and Thorat (2008) [11]; Goyal and Gupta (2009) [4].

Export competitiveness of banana from India

The Nominal Protection Co-efficient (NPC) technique used to elucidate the relative advantage that a commodity holds within the framework of free trade. When examining the export competitiveness of banana in a broad sense, it becomes evident that all the countries considered in this study have a competitive edge when importing banana from India, as demonstrated by NPC values that are less than one. The calculation of the NPC for banana exports was conducted using the exportable hypothesis.

In Table 2, find the computed Nominal Protection Co-efficient for banana under the exportable hypothesis in the fiscal year 2021-22. This calculated value for the nominal co-efficient was consistently less than one in all the countries. Different countries have different freight charges according to the respective country’s stipulations. Marketing margin has uniform with 5 percent of wholesale price for each quintal. Insurance is calculated at 2 percent of FOB

price and dollar exchange rate was ₹78.60. Specifically, for the period of 2021-22, the NPCs were 0.54 for Qatar, 0.60 for Germany, 0.69 for USA, 0.86 for UAE, 0.87 for Saudi Arabia, 0.93 for Australia, 0.94 for Nepal and 0.98 for Oman. This data suggests that it was not only favourable but also financially rewarding for exporters in India to conduct trade with these countries in banana. The proven competitiveness in the export of banana solidifies its acceptance (Abdul *et al.*, 2023) [1]. The analysis confirms that the export of banana from India to these mentioned countries are both effective and economically beneficial, as indicated by the efficient NPC values and the established competitiveness.

Direction of trade in export of banana from India

Transitional probability matrix of banana exports from India to different destinations during 2006-07 to 2021-22 (16 years) was studied which can be observed from the Table 3. The dynamics of export trend are an important aspect in evolving export-oriented programmes in order to enhance or sustain current export trends. Hence, the knowledge of changing exports trade across the destinations of prime importance. The dynamics of changes in the export trade of banana were studied by estimating Markov transitional probability matrix. The probability of retaining the previous period market share was interpreted by study the diagonal elements of transitional probability matrix. It was observed from the table, that the Nepal, USA and UAE are the three stable countries which has retained the shares with the value of 79.81, 18.06 and 13.28 percent respectively, while countries like Saudi Arabia, Oman and Australia has totally lost their shares which failed to retain even a single percent of the share. Qatar lost 99.22 percent of its share to Nepal, Germany lost 97.31 percent of its share to USA, others nations and USA lost 56.17 and 43.97 percent of its share to UAE and others nations lost 43.22 percent of its share to Nepal, export share over the study period.

Projection of export of banana to different selected countries for next five years was analysed with the help of transitional probability matrix. It observed from that the Table 4. The results showed that Nepal country import major quantity of banana from India. The quantity imported by Nepal increase from 301.48 to 316.76 metric tonnes from 2022-23 to 2026-27. The Nepal followed by UAE, Saudi Arabia, USA, Germany, Australia, Qatar and Oman, as revealed from the future projections calculated by the use of transitional probability matrix.

Table 1: Growth and instability index of export of banana from India

Sl. No.	Years	Quantity (MT)	Value (₹ in Crores)
1.	2017-18	1,942.62	4.18
2.	2018-19	798.02	1.39
3.	2019-20	724.86	2.96
4.	2020-21	564.01	2.34
5.	2021-22	519.08	6.28
Average		770.62	2.07
CV (%)		50.81	72.58
CAGR (%)		1.12	10.84**
CDVI		52.10	44.10

Note: CAGR: Compound Annual Growth Rate, CDVI: Cuddy Della Valle Index, ** Significant at 1 percentage

Table 2: Export competitiveness of banana from India during 2021-22

Sl. No.	Particulars	Unit	Nepal	UAE	Saudi Arabia	USA	Oman	Germany	Qatar	Australia
1.	Wholesale price (Mumbai)	₹/Q	2,660.00	2,660.00	2,660.00	2,660.00	2,660.00	2,660.00	2,660.00	2,660.00
2.	Marketing margin (5%)	₹/Q	133.00	133.00	133.00	133.00	133.00	133.00	133.00	133.00
3.	Port clearing and handling charges	₹/Q	575.00	575.00	575.00	575.00	575.00	575.00	575.00	575.00
4.	FOB Price (1+2+3)	₹/Q	3,368.00	3,368.00	3,368.00	3,368.00	3,368.00	3,368.00	3,368.00	3,368.00
5.	Freight charge	₹/Q	480.00	550.00	590.00	750.00	550.00	690.00	540.00	725.00
6.	Insurance at 2% of FOB price	₹/Q	67.36	67.36	67.36	67.36	67.36	67.36	67.36	67.36
7.	Landed cost (4+5+6)	₹/Q	3,915.36	3,985.36	4,025.36	4,185.36	3,985.36	4,125.36	3,975.36	4,160.36
8.	Exchange rate	1\$=₹	78.60	78.60	78.60	78.60	78.60	78.60	78.60	78.60
9.	CIF price (row 7 / row 8)	US \$ /Q	49.81	50.70	51.21	53.25	50.70	52.49	50.58	52.93
10.	Reference price	US \$ /Q	52.77	58.83	58.84	76.82	51.73	87.38	93.83	56.83
11.	NPC of (row 9 / row 10)		0.94	0.86	0.87	0.69	0.98	0.60	0.54	0.93

Note: FOB: Freight on Board, CIF: Cost, Insurance and Freight, Q: Quintal

Table 3: Direction of trade for export of banana from India to different destinations (2006-07 to 2021-22)

	LOSS									
	Countries	Netherland	Saudi Arabia	USA	UAE	UK	Russia	China	Nepal	Others
GAIN	Netherland	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000
	Saudi Arabia	0.00000	0.12724	0.09663	0.19784	0.00000	0.00000	0.00000	0.00000	0.57829
	USA	0.05439	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.94561
	UAE	0.00000	1.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	UK	0.35983	0.00000	0.30747	0.00000	0.00000	0.00000	0.00000	0.33270	0.00000
	Russia	0.00000	0.00000	0.00000	0.00000	0.00000	0.73452	0.26071	0.00000	0.00477
	China	0.13306	0.00000	0.00000	0.00000	0.00000	0.12827	0.51425	0.22442	0.00000
	Nepal	0.58891	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.41109
	Others	0.21749	0.15975	0.06497	0.06390	0.10978	0.01425	0.00874	0.00000	0.36112

Table 4: Projections for export of banana from India to different destinations (Quantity-MT)

Years/countries	Netherland	Saudi Arabia	USA	UAE	UK	Russia	China	Nepal	Others
2022-23	45,830.23	49,398.56	20,298.54	19,637.39	16,864.71	12,915.78	9,825.54	8,212.05	1,50,756.47
	(13.73)	(14.80)	(6.08)	(5.88)	(5.05)	(3.87)	(2.94)	(2.46)	(45.17)
2023-24	46,104.54	50,006.02	19,754.03	19,406.44	16,550.11	12,895.52	9,737.33	7,815.87	1,51,469.45
	(13.81)	(14.98)	(5.92)	(5.81)	(4.96)	(3.86)	(2.92)	(2.34)	(45.39)
2024-25	45,871.73	49,966.26	19,762.32	19,572.18	16,628.38	12,879.48	9,692.91	7,691.40	1,51,674.65
	(13.74)	(14.97)	(5.92)	(5.86)	(4.98)	(3.86)	(2.90)	(2.30)	(45.45)
2025-26	45,865.76	50,159.72	19,795.87	19,577.43	16,650.90	12,864.92	9,667.67	7,707.48	1,51,449.54
	(13.74)	(15.03)	(5.93)	(5.87)	(4.99)	(3.85)	(2.90)	(2.31)	(45.38)
2026-27	45,832.84	50,153.62	19,806.87	19,601.32	16,626.19	12,847.79	9,648.94	7,709.31	1,51,512.43
	(13.73)	(15.03)	(5.93)	(5.87)	(4.98)	(3.85)	(2.89)	(2.31)	(45.40)

Note: The figures within the articles indicate percentages to total exports

4. Conclusion

India is the largest mango producing nation globally, and their export can contribute significantly to the country's economic growth. Despite a vast production base, the export share of India is not very impressive, which is the cause of great concern. The estimations of net terms of trade and revealed comparative advantage revealed that India had a comparative advantage of exporting mango. The model Markov Chain Analysis was applied to the export data, and the transitional probability matrix provided a great deal of information on where to sell Indian mango to get the highest benefits. For mango, Qatar was the loyal buyer with 81.93 percent of the retention capacity of its previous year. Therefore, efforts are also needed to improve the efficiency of production and quality of mango to stabilize the markets and make the product acceptable and price competitive in other importing countries. Although India has a vast production base yet, the yield estimates were not that promising compared to the world, therefore, horticulturists also need to focus on this issue.

India is the largest fruits producing nation globally and their

export can contribute significantly to the country's economic growth. Despite a vast production base, the export share of India is not very impressive, which is the cause of great concern. The estimations of net terms of price competitiveness and direction of trade revealed that India had a competitive advantage of exporting banana. The model Nominal Protection Co-efficient (NPC) and Markov Chain Analysis was applied to the export data and the transitional probability matrix provided a great deal of information on where to sell Indian banana to get the highest benefits. For banana, Qatar and Germany were the loyal buyers with 0.54 and 0.60 percent of the retention capacity of its previous year. Therefore, efforts are also needed to improve the efficiency of quality of banana to stabilize the market instability and make the product acceptable and price competitive in other importing countries. Although India has a vast production base yet, the yield estimates were not that promising compared to the world, therefore, horticulturists also need to focus on this issue. This will improve banana business in agricultural and horticultural exports in the future in India. This expansion

also holds the promise of advantageous outcomes for farmers and all involved in the agricultural value chain, while concurrently mitigating potential business in export risks in the times ahead.

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