

DIRECTION OF TRADE AND CHANGING PATTERN OF EXPORTS OF CEREALS FROM INDIA

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ABSTRACT

India is not only the largest producer of cereals as well as largest exporter of cereal products in the world. India is the world's second largest producer of Rice, Wheat and other cereals. The huge demand for cereals in the global market is creating an excellent environment for the export of Indian cereal products. Rice (including Basmati and Non-Basmati) occupy the major share of 95.70 % in India's total cereals export. Whereas, other cereals including wheat represent only 4.3 % share in total cereals exported from India. The direction of trade of Cereals for the period from 2009 to 2018 was determined using Markov chain analysis. Projections are made from 2019 to 2023. Nepal retained 70.92 per cent of its original share followed by Others (69.02%), Indonesia (61.53%) and Saudi Arabia (47.35%). For export of cereals from India the most reliable markets are Nepal, Indonesia and Saudi Arabia and least reliable markets are Bangladesh, Iran, Senegal, UAE and Benin. The results suggest that the category others import major quantity of Cereals from India followed by Nepal. The quantity imported by others increased from 56.54 to 59 lakh tonnes from the year 2019 to 2023. Whereas quantity imported by Nepal decreased from 12.91 to 12.62 lakh tonnes over the forecasted period. There is need for policies to maintain export share of Cereals to most stable markets. Efforts should be taken to promote cereals export from India to explore and exploit potential of Other markets. There is need to promote export of cereals to new emerging markets to avoid overdependency on few countries.

Keywords: Cereals, Exports, Direction of trade, Markov chain analysis

1. INTRODUCTION

India is not only the largest producer of cereals as well as largest exporter of cereal products in the world. India is the world's second largest producer of Rice, Wheat and other cereals. The huge demand for cereals in the global market is creating an excellent environment for the export of Indian cereal products. Rice (including Basmati and Non-Basmati) occupy the major share of 95.70 % in India's total cereals export. Whereas, other cereals including wheat represent only 4.3 % share in total cereals exported from India. In 2008, India had imposed ban on export of rice and wheat etc to meet domestic needs. Now, seeing the huge demand in the global market and country's surplus production, Country has lifted the ban, but only limited amount of export of the commodity are allowed. The allowed marginal quantity of exports cereals could not make any significant impact either on domestic prices or the storage conditions.

2. LITERATURE REVIEW

Mohit et al. (2016) studied changes in direction of trade of mango exports from India. Markov chain model was used to analyze data from 2000 to 2015. The results revealed that Bangladesh, UAE and Nepal were the reliable importers whereas USA, UK and Saudi Arabia were not the reliable importers for mango exports from India.

Manjunath et al. (2017) analysed the export performance of Indian marine products. Markov Chain approach was used to analyse structural change and direction of trade in marine products from 2005-06 to 2014-15. European Union, South East Asia and China were the most stable markets for Indian marine products with high retention probability of 79, 78 and 74 per cent respectively. The study suggested need to promote exports to these countries for further expansion of markets.

Balakrishnan and Chandran (2018) conducted a study on stability analysis of Indian coffee export using Markov chain approach. It was observed that the countries which were unstable destinations for Indian coffee export were Italy, Germany, Russian Federation, Belgium and USA as they have shown retention probability of zero per cent.

Mohandas et al. (2018) conducted an economic analysis on exports of vegetables from India. The period considered for analysis was from 1988 to 2016. Nepal, Belgium, Pakistan, Mauritius, Oman, UAE, Sri Lanka and Bangladesh were the highly preferred markets for most of the vegetables exported from India.

Naik and Nethrayini (2018) studied market stability of India's coffee export in the post-liberalization era with an application of Markov chain analysis. The study revealed that for Indian coffee category "other countries" was the most reliable market with retention probability of 83.00 per cent whereas Spain was the least reliable market with retention probability of 6.78 per cent.

3. METHODOLOGY

The research study completely based upon the secondary sources of data. The required data was procured from UNCOMTRADE data accessed through the World Bank's World Integrated Trade Solution (WITS) software. Data related to composition of trade were based on Harmonized System coding (HS 1992) and HS two-digit level of classification has been considered for a period of 10 years i.e., from 2009 to 2018. As data on weight is not available for two-digit level classification, sum of all the four-digit level categories under that two-digit level are considered for the study.

3.1 Markov chain analysis

Markov chain analysis was employed to analyze the structural change in any system whose progress through time can be measured in terms of single outcome variable. In the present study, the dynamic nature of trade patterns of cereals from India studied using the Markov chain model.

Markov chain analysis involving developing a transitional probability matrix 'P', whose elements, P_{ij} indicate the probability of exports switching from country 'i' to country 'j' over time. The diagonal element P_{ij} where $i=j$, measure the probability of a country retaining its market share or in other words, the loyalty of an importing country to a particular country's exports.

In the context of current application, structural change was treated as a random process with eight importing countries for cereals. The assumption was that the average export of cereals from a country amongst importing countries in any period depends only on the export in the previous period and this dependence is same for all the periods. 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 of i^{th} country during the year $t-1$

P_{ij} = 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

The transitional probabilities P_{ij} , which can be arranged in a $(c \times r)$ matrix, have the following properties.

$$0 < P_{ij} < 1$$

$$\sum_j P_{ij} = 1 \text{ for all } i$$

Thus, the expected share of each importing country during period 't' is obtained by multiplying the exports of cereals to these countries in the previous period (t-1) with the transitional probability matrix. The probability matrices were estimated for the period from 2009 to 2018. Projections are made from 2019 to 2023.

Thus, transitional probability matrix (T) was estimated using linear programming (LP) frame work by a method referred to as minimizing of Mean Absolute Deviation (MAD).

$$\text{Min, } O P^* + I e$$

$$\text{Subject to } X P^* + V = Y$$

$$G P^* = 1$$

$$P^* > 0$$

Where,

P^* is a vector of the probabilities P_{ij}

O is the vector of zeros

i is an appropriately dimensional vectors of areas

e is the vector of absolute errors

Y is the proportion of exports to each country

X is a block diagonal matrix of lagged values of Y

V is the vector of errors

G is a grouping matrix to add the row elements of P arranged in P^* to unity.

Prediction of quantity of cereals exports were made by using the Transitional Probability Matrix.

$$B_t = B_0 \times T$$

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

Where,

B_0 = Quantity exported in Base years

B_t = Quantity exported in next year (prediction)

T = Transitional probability matrix

The values in the transition probability matrix will have different interpretations. The value of diagonal elements indicates the probability of retention of the previous year's share, while values in the columns reveal probability of gain by a particular country from other countries, values in rows reveal probability that a country might lose to other countries in respect of a specific commodity exports.

4. RESULTS AND DISCUSSION

4.1 Transition probability matrix for export of Cereals (HS Code:10) from India

The dynamics in the direction of Cereals (HS Code:10) export from India were computed using transitional probability matrix and presented in Table 1. The major importing countries are Nepal, Iran, Bangladesh, Saudi Arabia, Senegal, UAE, Benin, Indonesia and the remaining importing countries are categorised as others. Nepal retained 70.92 per cent of its original share followed by Others (69.02%), Indonesia (61.53%) and Saudi Arabia (47.35%). Iran lost 55.26 per cent of its share to Bangladesh. Saudi Arabia lost 40.66 per cent of its share to UAE. Senegal lost 66.13 per cent of its share to Benin. UAE lost 98.50 per cent of its share to others category. Benin lost 40.84 per cent of its share to Senegal and 57.56 per cent of its share to other countries.

The results reveal that for export of cereals from India the most reliable markets are Nepal, Indonesia and Saudi Arabia and least reliable markets are Bangladesh, Iran, Senegal, UAE and Benin.

Table-1: Transition probability matrix for export of Cereals (HS Code:10) from India for the period from 2009 to 2018

GAIN ↓	LOSS →									
	Country	Nepal	Iran	Bangladesh	Saudi Arabia	Senegal	UAE	Benin	Indonesia	Others
	Nepal	0.7092	0.0000	0.0000	0.1121	0.1787	0.0000	0.0000	0.0000	0.0000
	Iran	0.0409	0.0515	0.5526	0.1440	0.0000	0.0000	0.0000	0.2110	0.0000
	Bangladesh	0.0608	0.0372	0.1209	0.2450	0.0000	0.2499	0.0000	0.0949	0.1913
	Saudi Arabia	0.0000	0.0000	0.0000	0.4735	0.0000	0.4066	0.0000	0.0000	0.1200
	Senegal	0.3387	0.0000	0.0000	0.0000	0.0000	0.0000	0.6613	0.0000	0.0000
	UAE	0.0000	0.0150	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9850
	Benin	0.0160	0.0000	0.0000	0.0000	0.4084	0.0000	0.0000	0.0000	0.5756
	Indonesia	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6153	0.3847
Others	0.0000	0.1221	0.0715	0.0082	0.0423	0.0298	0.0359	0.0000	0.6902	

4.2 Projected exports of Cereals (HS Code:10) from India

Projections for export of Cereals (HS Code:10) to major importing countries from India for the period from 2019 to 2023 are presented in Table 2. The results suggest that the category others import major quantity of Cereals from India followed by Nepal. The quantity imported by others increased from 56.54 to 59 lakh tonnes from the year 2019 to 2023. Whereas quantity imported by Nepal decreased from 12.91 to 12.62 lakh tonnes over the period from 2019 to 2023.

Table-2: Projected exports of Cereals (HS Code:10) to major importing countries from India: 2019 to 2023 (in lakh tonnes)

Year/ Country	Nepal	Iran	Bangladesh	Saudi Arabia	Senegal	UAE	Benin	Indonesia	Others
2019	12.91 (9.92)	8.52 (6.55)	11.95 (9.18)	11.10 (8.53)	7.28 (5.59)	8.73 (6.71)	7.55 (5.80)	5.59 (4.29)	56.54 (43.44)
2020	12.82 (9.85)	7.92 (6.08)	10.19 (7.83)	11.32 (8.70)	7.78 (5.98)	9.18 (7.05)	6.84 (5.25)	6.37 (4.89)	57.74 (44.36)
2021	12.78 (9.82)	7.98 (6.13)	9.74 (7.48)	10.91 (8.38)	7.53 (5.78)	8.87 (6.81)	7.22 (5.55)	6.56 (5.04)	58.60 (45.02)
2022	12.65 (9.72)	8.06 (6.19)	9.77 (7.51)	10.61 (8.15)	7.71 (5.92)	8.61 (6.61)	7.08 (5.44)	6.64 (5.10)	59.03 (45.35)
2023	12.62 (9.70)	8.12 (6.24)	9.86 (7.57)	10.48 (8.05)	7.65 (5.88)	8.52 (6.55)	7.22 (5.55)	6.71 (5.15)	59.00 (45.33)

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

5. CONCLUSIONS

Nepal is most stable market for export of Cereals from India but amount of cereals imported decreased over the forecasting period. There is need for policies to maintain export share of Cereals to most stable markets. Efforts should be taken to promote cereals export from India to explore and exploit potential of Other markets. There is need to promote export of cereals to new emerging markets to avoid overdependency on few countries.

6. REFERENCES

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