

## Cereal Commerce: An Indian Trade Scenario at HS 4-digit level

### Abstract

India's cereal trade landscape is a complex interplay of production, export, and import dynamics, reflecting both domestic priorities and global market demands. Despite historical export restrictions on staples like wheat and rice, recent policy shifts have positioned India as a pivotal player in global cereal commerce. Notably, India's cereal production has exhibited steady growth, with a Compound Annual Growth Rate (CAGR) of 0.044 per cent over the years. This growth trajectory, coupled with fluctuations in India's share of world cereal production (hovering around 10-11%), underscores the country's consistent contribution to the global market. In terms of export composition, rice stands out as the dominant commodity, comprising a significant 76.42 per cent share of the total exported value, followed by wheat and maize. On the import front, India shows a strategic reliance on specific cereals like barley, oats, and maize, which collectively constitute over 90 per cent of the imported cereal value. This import pattern reflects targeted procurement strategies based on market needs and domestic consumption patterns. Examining trade partnerships, the United States emerges as a key exporter, while China features prominently as a significant importer of cereals. Other notable exporters include Argentina, Brazil, and Australia, contributing to a diverse distribution of cereal trade globally. This diversity in trade partnerships highlights India's adaptability and its ability to navigate complex international markets. Overall, India's cereal trade dynamics demonstrate a blend of strategic production growth, export prioritization, and targeted import strategies, showcasing its pivotal role and significance in the global cereals market.

**Keywords:** Global markets, compound annual growth rate, trade partnerships, trade dynamics

### INTRODUCTION

India is one of the world's leading producers of grains, including wheat and rice, among other staples. Indian exports have bright prospects because of the demand for these crops in other markets. To prioritise domestic needs, India decided to impose export restrictions on wheat and rice in 2008. Recognising the excess output and worldwide demand, India recently relaxed the embargo, but with restrictions on the amount that may be exported. However,

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neither domestic prices nor storage circumstances have been greatly affected by the permissible amount. The major cereals under consideration are barley, maize, sorghum, wheat, rice, and millet (Bajra). The forecasts for 2020–21 from the Ministry of Agriculture show that main crops such as rice, maize, and Bajra comprised 102.36 million tonnes, 19.88 million tonnes, and 9.23 million tonnes, respectively. The most recent data on wheat output (2019–20) indicates an expected 107.49 million tonnes (APEDA, 2023). The final estimates from Ministry of Agriculture and Farmer Welfare, 2022-23 indicated that Food grains comprise of 3296.87 lakh tonnes with 1357.55 lakh tonnes of Rice, 1105.54 lakh tonnes of Wheat, respectively.

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India is the world's biggest manufacturer and exporter of cereal products. India's cereal exports valued Rs. 111,062.37 crore (13,857.95 USD million), in the fiscal year 2022–2023. Eighty percent of India's cereal exports are made up of rice, including Basmati and Non-Basmati types. In contrast, over the same period, just 20 per cent of India's total grain exports were made up of other cereals, such as wheat (APEDA, 2023). The quality of Indian basmati rice is widely acknowledged in the global market, and its demand continues to rise as new emerging markets emerge. India will need to take decisive action to raise productivity and local production in the region (Udhayakumar, M., & Karunakaran, K.R. (2020). Gopalsamy et. al., in their work discussed that India has further scope in wheat exports due to consistent growth in production.

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## METHODOLOGY

### Analytical Tools and Techniques employed

The mission of the study is understanding the Indian trade dynamics of cereal at HS 4-digit level in the world. The descriptive statistics such as mean and percentage shares are calculated to obtain India's average product trade level and its shares at HS 4-digit. Along with this, Co-efficient of Variation (CV) and Compound Annual Growth Rate (CAGR) are calculated to obtain deeper insights of trade significance.

$$CV = \frac{Mean}{Standard\ Deviation} \times 100$$

### Compound annual growth rate (CAGR) analysis

The growth rates can be specified as the percentage change of a particular variable within a given period. compound annual growth rates (CAGR) of area and production of onion crop in the study area were estimated using the following growth model:

Growth model here is,

$$Y_t = \alpha\beta^t \dots\dots\dots (1)$$

Where,

$Y_t$ = Area/ production of onion for the year t

t= Time variable (1, 2..... n) for each period.

$\alpha$  = Constant

$\beta$  = Growth coefficient

Log transformation of (1)

$$\ln Y_t = \ln \alpha + t (\ln \beta) \dots\dots\dots (2)$$

Where,

$$\ln \beta = \ln (1+ t), \text{ and} \dots\dots\dots (3)$$

$$t = [\text{antilog} (\ln \beta) - 1] \dots\dots\dots (4)$$

$$\text{CAGR} = [\text{antilog} (\ln \beta) - 1] * 100 \dots\dots\dots (5)$$

## RESULTS AND DISCUSSION

### World and Indian Scenario in Cereal Production

According to early projections, the world's cereal production is expected to rise by 1.0 percent in 2023 to reach 2 813 million tonnes (including milled rice equivalent). The majority of the gain in main cereal production is expected to come from an increase in maize production, with rises also predicted for rice and sorghum. It is anticipated that wheat and barley yields will decline from their levels in 2022, partially offsetting these increases (FAO, 2023).

Cereal production in India has shown a consistent increase over the years with a slight fluctuation in its share (10.93) of world cereal production (Table 1). Despite a rise in absolute production from 193.92 million tonnes in 1990 to 355.09 million tonnes in 2022, India's share

in world cereal production has varied between 10.07 per cent and 11.60 per cent. The Compound Annual Growth Rate (CAGR) for India's cereal production stands at 0.044 per cent, indicating a steady growth trajectory. It is evident from the study that India's cereal production has been growing steadily and its relative contribution to global cereal production has remained relatively stable over the years.

**Table 1: Cereal production in World and India**

Y e a r	World Cereal Production in million tonnes	India Cereal Production in million tonnes	India's share in world (%)
1 9 9 0	1 7 1 4 . 5 2	1 9 3 . 9 2	1 1 . 3 1
2 0 0 0	2 0 5 4 . 4 6	2 3 4 . 9 3	1 1 . 4 3
2 0 1 3	2 7 6 3 . 4 0	2 9 5 . 6 7	1 0 . 6 9
2 0 1 4	2 8 1 7 . 9 5	2 9 7 . 1 1	1 0 . 5 4
2 0 1 5	2 8 3 7 . 7 1	2 8 6 . 0 0	1 0 . 0 7
2 0 1 6	2 9 1 5 . 0 8	2 9 5 . 3 6	1 0 . 1 3
2 0 1 7	2 9 6 7 . 1 4	3 1 1 . 4 2	1 0 . 4 9
2 0 1 8	2 9 1 4 . 5 3	3 2 1 . 5 6	1 1 . 0 3
2 0 1 9	2 9 6 3 . 5 0	3 2 4 . 9 6	1 0 . 9 6
2 0 2 0	3 0 0 3 . 6 4	3 4 2 . 1 1	1 1 . 3 9
2 0 2 1	3 0 7 1 . 2 6	3 5 5 . 1 1	1 1 . 5 6
2 0 2 2	3 0 5 9 . 6 4	3 5 5 . 0 9	1 1 . 6 0
<b>A v e r a g e</b>	<b>2 7 5 6 . 9 0</b>	<b>3 0 1 . 1 0</b>	<b>1 0 . 9 3</b>
<b>C V</b>	<b>1 5 . 3 8 3</b>	<b>1 5 . 7 6 3</b>	-
<b>CAGR (%)</b>	<b>0 . 0 3 9</b>	<b>0 . 0 4 4</b>	-

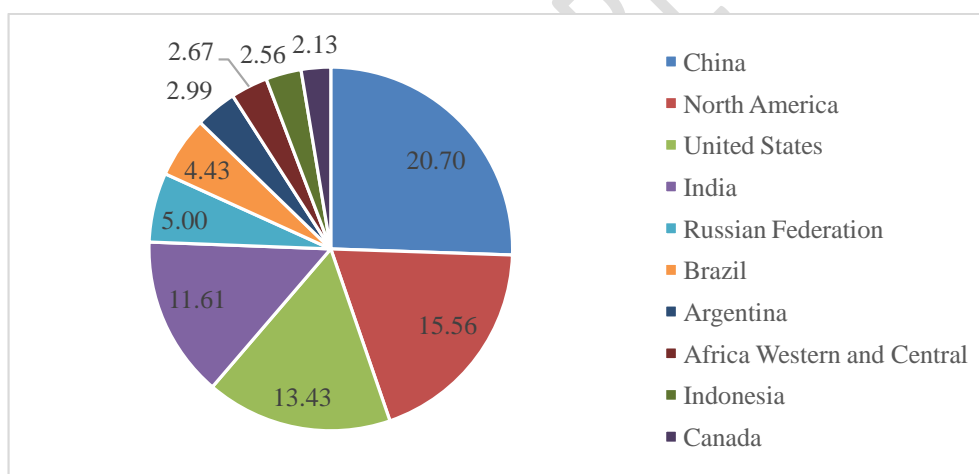
Source: World Bank data, 2023

Top ten cereal-producing countries in the world have been named in Table 2 and per cent share contribution to the world cereal production has been represented graphically in Fig.1 Results revealed that China took first rank with 633.29 million tonnes in 2022 followed by North America and United States with 475.98 and 410.94 million tonnes respectively. While India stands at fourth with 355.09 million tonnes other countries viz a viz, Russia, Brazil, Argentina, Africa, Indonesia and Canada have contributed a significant portion to the global cereal production. Together all these countries produced 3059.64 million tonnes of cereals during 2022 accounting for a substantial share of global cereal production.

**Table 2: Top ten cereal-producing countries in the world**

C o u n t r y N a m e	Production in million tonnes (2022)				
C h i n a	6	3	3	.	2 9
N o r t h A m e r i c a	4	7	5	.	9 8
U n i t e d S t a t e s	4	1	0	.	9 4
I n d i a	3	5	5	.	0 9
R u s s i a n F e d e r a t i o n	1	5	3	.	1 0
B r a z i l	1	3	5	.	4 9
A r g e n t i n a	9	1	.		5 8
Africa Western and Central	8	1	.		5 9
I n d o n e s i a	7	8	.		3 1
C a n a d a	6	5	.		0 4
<b>W o r l d</b>	<b>3</b>	<b>0</b>	<b>5</b>	<b>9</b>	<b>.</b> <b>6 4</b>

Source: WorldBank data, 2023



**Fig 1: Percentage share of major ten cereal producing countries in the world (2022)**

#### World trade scenario of cereal (Chapter – 10)

The trade partners for cereals across the world during the period 2022 have been presented in Table 3. United States of America emerged as the top exporter with an exported value of 2,475.13 million rupees, holding a 17.55 per cent share and China was the largest importer with an imported value of 1524.47 million rupees, representing 9.81 per cent of the total imports. Argentina, India, Brazil, and Australia also contributed prominently among the top exporters exhibiting a diverse distribution of cereal trade across the globe.

**Table 3: Major exporters and importer of cereals in the world**

<b>Exporters</b>	Exported value in 2022 (million rupees)	Percentage share (%)	<b>Importers</b>	Imported value in 2022 (million rupees)	Percentage share (%)
United States of America	2 4 7 5 . 1 3	1 7 . 5 5	C h i n a	1 5 2 4 . 4 7	9 . 8 1
Argentina	1 1 3 1 . 8 2	8 . 0 2	J a p a n	7 5 7 . 7 6	4 . 8 8
I n d i a	1 1 0 4 . 1 8	7 . 8 3	M e x i c o	6 9 6 . 4 8	4 . 4 8
B r a z i l	1 0 8 9 . 2 2	7 . 7 2	I r a n	6 6 5 . 1 9	4 . 2 8
Australia	1 0 8 1 . 2 3	7 . 6 7	K o r e a	5 1 5 . 5 1	3 . 3 2
F r a n c e	9 2 9 . 8 1	6 . 5 9	S p a i n	5 1 3 . 6 6	3 . 3 1
Russian Federation	8 1 7 . 6 2	5 . 8 0	E g y p t	5 0 2 . 2 5	3 . 2 3
C a n a d a	7 9 7 . 0 0	5 . 6 5	I t a l y	4 8 7 . 0 4	3 . 1 3
U k r a i n e	7 1 8 . 8 0	5 . 1 0	Saudi Arabia	4 8 3 . 0 7	3 . 1 1
R o m a n i a	3 5 9 . 6 2	2 . 5 5	T u r k e y	4 2 0 . 7 8	2 . 7 1
O t h e r s	3 6 0 1 . 2 7	2 5 . 5 3	O t h e r s	8 9 7 4 . 2 6	5 7 . 7 5
<b>W o r l d</b>	<b>1 4 1 0 5 . 6 9</b>	<b>1 0 0 . 0 0</b>	<b>W o r l d</b>	<b>1 5 5 4 0 . 4 9</b>	<b>1 0 0 . 0 0</b>

Source: ITC Trademap statistics

India's cereal export composition at the HS 4-digit level reveals that rice is the dominant commodity accounting for 76.42 per cent of the total exported value followed by wheat and meslin with a 15.12 per cent share, while maize or corn holds a 7.94 per cent share. Buckwheat, millet, canary seed, and other cereals contribute 0.38 per cent to the total exported value. Grain sorghum and barley have a minimal share of 0.12 per cent and 0.01 per cent, respectively. Rye contributed an insignificant share to the total export value (Table 4).

**Table 4: India's cereal export composition categories at HS 4-digit level**

HS Code	P r o d u c t l a b e l	Exported value in million rupees	Percentage share (%)
1006	R i c e	8 4 3 . 8 7 6 0 7	7 6 . 4 2 5 3 4
1001	W h e a t a n d m e s l i n	1 6 7 . 0 0 4 9 8	1 5 . 1 2 4 7 5
1005	M a i z e o r c o r n	8 7 . 6 5 2 0 6	7 . 9 3 8 1 8
1008	Buckwheat, millet, canary seed and other cereals	4 . 2 1 8 9 8	0 . 3 8 2 0 9
1007	G r a i n s o r g h u m	1 . 3 2 6 4 8	0 . 1 2 0 1 3
1003	B a r l e y	0 . 0 8 9 9 8	0 . 0 0 8 1 5
1004	O a t s	0 . 0 1 4 8 1	0 . 0 0 1 3 4
1002	R y e	0 . 0 0 0 1 6	0 . 0 0 0 0 1

<b>T o t a l</b>	<b>1 1 0 4 1 8 3 5 2 4 . 1 5</b>	<b>1 1 0 4 . 1 8</b>
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Source: ITC Trademap statistics 2022

India's cereal import composition at the HS 4-digit level revealed that significant reliance on barley, oats and maize, which collectively constitute over 90 per cent of the imported cereal value. Barley dominates the import market with a remarkable share contribution of 65.85 per cent followed by oats and maize with 18.17 per cent and 9.58 per cent respectively. Despite rice being a staple in Indian cuisine its imported value is comparatively lower, standing at 6.14 per cent. Other cereals like buckwheat, millet, canary seed, and wheat contribute minimally to the import portfolio (Table 5).

**Table 5: India's cereal import composition categories at HS 4-digit level**

Code	Product Label	Imported value in million rupees	Percentage share (%)
1003	Barley	6 . 2 3 3 9	6 5 . 8 5 3
1004	Oats	1 . 7 1 9 8	1 8 . 1 6 7
1005	Maize or corn	0 . 9 0 6 7	9 . 5 7 8
1006	Rice	0 . 5 8 1 5	6 . 1 4 3
1008	Buckwheat, millet, canary seed and other cereals	0 . 0 2 2 3	0 . 2 3 5
1001	Wheat and meslin	0 . 0 0 2 0	0 . 0 2 2
1007	Grain sorghum	0 . 0 0 0 2	0 . 0 0 2
1002	Rye	0 . 0 0 0 0	0 . 0 0 0
	<b>T o t a l</b>	<b>9 . 4 7</b>	

Source: ITC Trademap statistics 2022

The major countries that export barley and oats to India have been presented in Table 6. It is evident from the study that Argentina is the leading exporter of barley with an imported value of Rs. 3.71 million thousand followed by France and Uruguay. Meanwhile, Australia emerges as the dominant oats exporter with an imported value of Rs. 1.70 million thousand followed by Ukraine. The total imported value for barley from all countries is Rs. 6.23 million thousand, while for oats it stands at Rs. 1.72 million thousand emphasizing the significant contribution of these countries to India's cereal import market.

**Table 6: Major barley and Oats exporters to India**

<b>B a r l e y ( 1 0 0 3 )</b>	<b>O a t s ( 1 0 0 4 )</b>
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Exporters	Imported Value (000, Rs.)	Exporters	Imported Value (000, Rs.)
Argentina	3 7 0 8 6 5 4 . 4 1	Australia	1 7 0 2 0 7 6 . 1 9
France	2 1 2 5 6 3 5 . 7 7	Ukraine	1 7 7 9 2 . 0 1
Uruguay	2 8 8 1 9 9 . 2 2	World	1 7 1 9 7 8 9 . 8 2
Australia	1 1 1 5 3 3 . 1 7	-	-
World	6 2 3 3 9 4 4 . 1 9	-	-

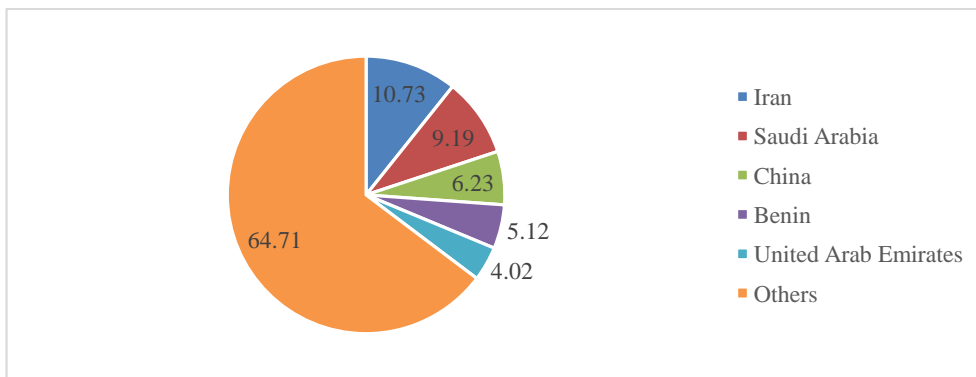
Source: ITC Trademap statistics 2022

Major Rice, Wheat and Meslin importers of India have been displayed in Table 7 and per cent share of different importing countries also have been graphically represented in Fig 2 and Fig 3. India is a significant importer of rice and wheat/meslin, with major import partners including Iran, Saudi Arabia, China, and Benin for rice, and Bangladesh, Indonesia, Korea, and the United Arab Emirates for wheat and meslin. India imported rice worth 843.88 million rupees, with Iran being the largest exporter at 90.54 million rupees, followed by Saudi Arabia, China, and Benin. India imported wheat and meslin worth 167.00 million rupees, with Bangladesh as the largest exporter at 57.57 million rupees, followed by Indonesia, Korea, and the United Arab Emirates. Despite significant imports from various countries, India also trades substantially with other partners in both categories.

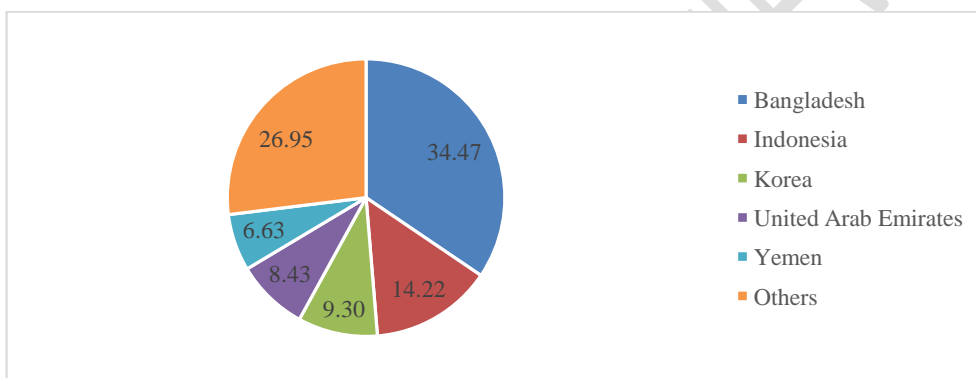
**Table 7: Major Rice and Wheat and Meslin importers of India**

<b>R i c e ( 1 0 0 6 )</b>		<b>W h e a t a n d M e s l i n ( 1 0 0 1 )</b>	
Importers	Exported value (million rupees.)	Importers	Imported value (million rupees.)
Iran	9 0 . 5 4	Bangladesh	5 7 . 5 7
Saudi Arabia	7 7 . 5 8	Indonesia	2 3 . 7 4
China	5 2 . 5 4	Korea	1 5 . 5 3
Benin	4 3 . 1 8	United Arab Emirates	1 4 . 0 7
United Arab Emirates	3 3 . 9 4	Yemen	1 1 . 0 8
Others	5 4 6 . 1 1	Others	4 5 . 0 1
World	8 4 3 . 8 8	World	1 6 7 . 0 0

Source: ITC Trademap statistics



**Fig 2: Percent share of major cereal (Rice – 1006) import destinations in 2022**



**Fig 3: Percent share of major cereal (Wheat and meslin – 1001) import destinations in 2022**

## CONCLUSION

In conclusion, India's cereal trade scenario at the HS 4-digit level reflects a dynamic and evolving landscape driven by both domestic production capabilities and international market dynamics. The relaxation of export restrictions on staples like wheat and rice has enabled India to capitalize on its position as a major producer and exporter of cereals. Despite fluctuations in global market shares, India has maintained a steady growth trajectory in cereal production, contributing significantly to the global cereal market. The dominance of rice in India's export composition underscores the strategic focus on high-value commodities. On the import side, India's reliance on specific cereals like barley, oats, and maize reflects targeted procurement strategies. The diverse trade partnerships, with countries like the United States and China playing pivotal roles, highlight India's adaptability and strategic positioning in the

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global cereals trade. Overall, India's cereal commerce presents a balanced approach, leveraging domestic strengths while actively participating in and contributing to the global cereals market.

## REFERENCES

Anonymous. (2023). Agricultural and Processed Food Products Export Development Authority (APEDA), Ministry of Commerce&Industry, Government of India. [https://apeda.gov.in/apedawebsite/six\\_head\\_product/cereal.htm](https://apeda.gov.in/apedawebsite/six_head_product/cereal.htm)

Anonymous. (2023). Final estimates of production of major crops. Ministry of Agriculture & Farmers Welfare, Government of India. <https://pib.gov.in/PressReleasePage.aspx?PRID=1968931>

Anonymous. (2023). FAO Agricultural Outlook: Cereals. Food and Agriculture Organization. [www.fao.org](http://www.fao.org)

Gopalsamy, S.,&Arul Kumar, M. (2020). Export of Wheat inIndia-with Reference to Middle East Countries. *CLIO An Annual Interdiscip J. History*, 6(2), 509-518.

Parte, J., Koshta, A. K., Pandey, S., Patel, M., & Tripathi, P. (2022). Export Status of Cereals and its Preparations fromIndia: *An Overview. Econ. Aff.*, 67(03), 197-200.

Udhayakumar, M.,&Karunakaran, K.R. (2020). Growthand Stability of Basmati and Non-basmati Rice Export inIndia. *Growth*, 39(40).

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