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A B S T R A C T

This article investigates India's export performance of Agriculture sector with Saudi Arabia. The study has used several trade indicators such as Revealed Comparative Advantage index, Export intensity index and Import intensity index to empirically analyze trade competition and intensity of 24 agricultural products. The analysis is performed for the period 2001 to 2020. The findings of this study show that only five of the agriculture products have sustainable comparative advantage during the study period. It also confirms that there are few products in which the RCA is declining while in the others it is increasing. There exists great potential for further development of agricultural trade between India and the Saudi Arabia, and that positive and effective trade policies will result in maximization of potential agriculture trade development and will bring forth mutual benefits to both countries.

***Key words*:** Revealed comparative advantage, Trade intensity index, Agricultural products, Trade, Export competitiveness

International trade flourishes on the comparative advantage that economies offer in the world market [1]. The unprecedented growth of trade among the economies of the world can be best attributed to the process of trade liberalization [2]. India has integrated itself with the world economy by bringing certain institutional changes in domestic policies, and continuously trying to improve its position in the world market as a supplier. India has initiated a series of economic and trade reforms in the year 1991. It has integrated itself with the global economy and its international trade volumes have been growing faster than GDP. The rising significance of exports for the Indian economy is evident in the growing proportion of exports as a share of GDP [3]. The growing importance of exports as a growth strategy has enabled countries to establish an environment that increases demand and production of different commodities [4]. Agriculture and its allied sectors remain an important sector because of its continued role in employment, income, and most importantly in national food security. It happens to be the largest source of livelihood in India. This sector has strong forward and backward linkages and has also played an important role in the overall development of the country.

India is a net exporter of Agricultural products and it exports a large number of agricultural commodities to many countries [5]. Over the past few years government has undertaken a series of trade policy measures such as the "Agriculture Export Policy" aimed at doubling the agricultural exports and integrating farmers and agricultural products with the global value chains. Its major export destinations are the United States, Saudi Arabia, Iran, Nepal, and Bangladesh.

Comparative advantages were measured by [6] between India and Gulf region to analyze the trade relations. The study found that there are huge potentials for diversifying India's export structure based on the growth of new sectors in which India has a global comparative advantage. [7] argued that India's export items to Saudi Arabia are concentrated only to few traditional items. However, based on the findings of RCA they proposed that there are several potential sectors of export interest to both countries. [8] explored the prospects of India's trade with Sri Lanka, employed Revealed Comparative Advantage (RCA) and Trade Intensity Index (TII). Results of the study revealed that India has (RCA>1) in many products and that intensity of total trade and exports is strong and greater than one. [9] examined the strength of trade relations between New Zealand and India from 1990 to 2014 using various trade indices such as TII, RCA, IIT Intra-industry trade index, and Aquino index. They found that the trade intensity has strengthened and that there is a growth of IIT for several industries and products. [10] empirically investigated the trade relations between India and GCC. They found that the trade relations between them in increasing continuously and there is a lot of untapped potentials to increase the welfare gains for both India and GCC. They found that India's trade is more intense with GCC countries and has a comparative advantage in various goods. [11] analyzed the export performance of India in the Handloom industry using revealed comparative advantage and concluded that some commodities have a significant comparative advantage and have good export performance. [12] investigated the trade relationship between India and UAE over

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the period 2001-2018. They found that India had revealed a comparative advantage in 228 products.

Trade structure of India and Saudi Arabia

Saudi Arabia is one of the most important trading partners of India. India made cumulative progress in trade with Saudi Arabia after 2001. The trade relation between them since then has grown enormously. In 2019-2020, Saudi Arabia was the seventh-largest exporting and third-largest importing partner of India. The total exports and imports in the year 2019-2020 were 6236.86 US$ million and 26857.37 US$ million respectively. The total trade between them in the year 2019-202 was 33094.24 US$ million. India's trade balance with Saudi Arabia was -20620.51 US$ million. The top five major export items to Saudi Arabia in the year 2020 are Cereals, Vehicles other than railway or tramway rolling stock, and parts and accessories thereof, Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral, Organic chemicals, and Ceramic products. Whereas, the top five major import items from Saudi Arabia in the year 2020 are Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral, Fertilisers, Organic chemicals, Plastics and articles thereof, and Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals.

The bilateral trade between India and Saudi Arabia has grown tremendously in the last two decades. It has risen from US $ 1300705 in 2001 to US $ 23878083 in the year 2020. Up to the year 2005, India exports more to Saudi Arabia than it imports. India's trade balance is in deficit with Saudi Arabia from 2006-2020. One of the important reasons behind this imbalance in trade is the rising oil prices in the international market as oil and oil products constitute a bulk of India's import items from the Gulf countries. There is still a lot of possibilities to strengthen the trade relationship.

Table 1 India's Bilateral trade with Saudi Arabia (value and percentage growth): 2001-2020

Year	Exports (US $ thousands)	Growth	Imports (US $ thousands)	Growth	Total Trade (US$ thousands)	Growth
	X	%	M	%	X + M	%
2001	796384		504321		1300705	
2002	908818	14.12	469161	-6.97	1377979	5.94
2003	1027369	13.04	687397	46.52	1714766	24.44
2004	1374642	33.80	1155462	68.09	2530104	47.55
2005	1713420	24.64	1526573	32.12	3239993	28.06
2006	2329927	35.98	10783079	606.36	13113006	304.72
2007	3246113	39.32	16570154	53.67	19816267	51.12
2008	5375372	65.59	22982841	38.70	28358213	43.11
2009	3867830	-28.05	14494390	-36.93	18362220	-35.25
2010	4483704	15.92	20374084	40.57	24857788	35.37
2011	5133491	14.49	28423659	39.51	33557150	35.00
2012	8546654	66.49	32826639	15.49	41373293	23.29
2013	12357201	44.59	36596585	11.48	48953786	18.32
2014	13063511	5.72	32703510	-10.64	45767021	-6.51
2015	6969586	-46.65	21365549	-34.67	28335135	-38.09
2016	5044523	-27.62	18459918	-13.60	23504441	-17.05
2017	5218976	3.46	21077369	14.18	26296345	11.88
2018	5501775	5.42	28523033	35.33	34024808	29.39
2019	5974037	8.58	27000125	-5.34	32974162	-3.09
2020	6154273	3.02	17723810	-34.36	23878083	-27.59

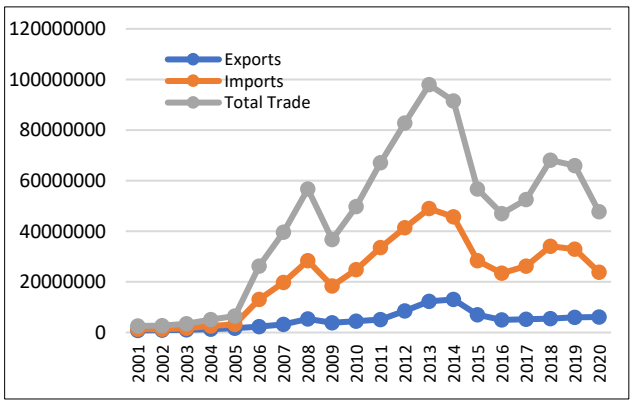

Fig 1 India bilateral trade with Saudi Arabia, 2001-2020

(Fig 1) shows India's export and import performance with Saudi Arabia from 2001-2002. It can be seen from the figure that both of them have intensified during the last two decades. From the year 2006 onwards, India started importing more from Saudi Arabia than exporting to it. India has trade and economic interests with the Gulf countries. Despite the distance between them and their differences in size, their economies are complementary. India's "Look West Policy" and "Delhi Declaration with Saudi Arabia" were designed to enhance trade and economic cooperation. The trade intensity between them has increased over the years. Hence, there is considerable potential for increasing bilateral trade and economic relations. The present study is designed to explore the current performance and competitiveness of India's agriculture sector with Saudi Arabia.

MATERIALS AND METHODS

This study focuses on trade relations between India and Saudi Arabia in the agriculture sector. The exports of the agriculture and food sector are recorded under the Harmonized System's (HS) Classifications 01 to 24 [13-14]. To fulfil the above objectives, Revealed Comparative Advantage (RCA), Export Intensity Index (EII), and Import Intensity Index (III) have been calculated. All the trade data at HS-2 digit related to the export of agricultural products from India to Saudi Arabia, total exports of India to Saudi Arabia, export of agricultural products from World to Saudi Arabia, total exports of World to Saudi Arabia, India's total exports, total imports of Saudi Arabia, total exports of the Saudi Arabia, total imports of India, total world imports, total world exports, imports of India from Saudi Arabia. All trade data is taken from ITC Trade Map database for the period 2001 to 2020. RCA is calculated for the years 2001, 2005, 2010, 2015, and 2020. Whereas, EII and III have been calculated for all the years to identify the long-term strength of trade relations. The various trade indices that are used in the study are explained as:

Revealed comparative advantage (RCA)

Ricardo laid down the basic tenets of comparative advantage, [15] developed the concept of the Revealed Comparative Advantage index. It tells about the relative trade performance of countries in particular commodities. The index assumes that a country's export volume to the world is a deciding factor in calculating a country's comparative advantage. RCA index highlights how competitive is a product in countries export compared to the products share in world trade. Thus, a product with high revealed comparative advantage can be exported to countries with low revealed comparative advantage. The advantage of using the comparative advantage index is that it is consistent with changes in an economy's relative factor endowment and productivity.

The RCA for exports is calculated as follows:

$$RCA_{ij}^{k} = \left(\frac{X_{ij}^{k} / X_{ij}}{X_{wj}^{k} / Xw_{j}} \right)$$

Where, RCA_{ij}^{k} is the revealed comparative advantage of the
X_{ij}^{k} is the export of product k from country i to country j
X_{ij} is the total exports of country i to country j
X_{wj}^{k} is the export of product k from world to country j
Xw_{j} is the total exports of world to country j
If the RCA value is less than one, it means the country has a revealed comparative disadvantage in that product. Similarly, if the value is more than one, it implies the country has RCA in that product.

Trade intensity index

The trade intensity method measures the share of one country's trade with another country as a proportion of the latter's share of world trade. This trade intensity index was developed by [16].

Export Intensity Index (EII) of India with Saudi Arabia

$$EII = \frac{(X_{IS} / X_{I})}{\frac{M_{s}}{(Mw - M_{I})}}$$

Where EII is the export intensity index
X_{IS} = India's export to Saudi Arabia
X_{I} = India's total export
M_{s} = Total import of Saudi Arabia
Mw = Total world imports
M_{I} = Total imports of India
Import Intensity Index (III) of India with Saudi Arabia

$$III = \frac{(X_{IS} / M_{I})}{\frac{X_{s}}{(Xw - X_{I})}}$$

Where III is the import intensity index
X_{IS} = Import of India from Saudi Arabia
M_{I} = Total import of India
X_{s} = Total export of Saudi Arabia
Xw = Total world export
X_{I} = Total export of India

The value of the trade intensity index varies between zero and infinity. If the value is zero, it means there is no bilateral trade. If the value is greater than zero and below one, it means the home country 'trade with partner country is less intense with the respect to the world'. Similarly, if the value is more than one, then it means home county 'trade with partner country is more intense with the respect to the world'.

RESULTS AND DISCUSSION

In (Table 2), the result of the RCA of India has been presented for all agriculture products exported to Saudi Arabia for the years taken into consideration (2001, 2005, 2010, 2015 and 2020). There are only 5 products whose RCA value is greater than one in all the periods. These are the products in which India had enjoyed the comparative advantage over the rest of the exporting goods in the global market. These products are Edible vegetables and certain roots and tubers (7), Edible fruit and nuts; peel of citrus fruit or melons (8), Coffee, tea, maté and spices (9), Cereals (10), and Vegetable plaiting materials; vegetable products not elsewhere specified or included (14). These products have a sustainable comparative advantage (RCA>1) since 2001 and are thus more competitive as compared with the rest of the products.

On the other hand, India has no trade specialization (RCA<1) in the export of products like Live animals (01), Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere (04), Products of animal origin, not elsewhere specified or included (05), Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal (15), Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates (16), Cocoa and cocoa preparations (18), Preparations of cereals, flour, starch or milk; pastrycooks' products (19), Preparations of vegetables, fruit, nuts or other parts of plants (20), Miscellaneous edible preparations (21), Beverages, spirits and vinegar (22), and Residues and waste from the food industries; prepared animal fodder (23).

Except for 2001, India has a trade specialization in the export of Meat and edible meat offal (02) to Saudi Arabia. India has no trade specialization (RCA<1) in the exports of product Sugars and sugar confectionery (17) except for 2015 and 2020. Likewise, the product Tobacco and manufactured tobacco substitutes (24) to Saudi Arabia has RCA less than one except for 2001 and 2015

Whereas, there are some products, whose RCA values are decreasing over the years like Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage (06), Oil seeds and oleaginous fruits; miscellaneous grains,

seeds and fruit; industrial or medicinal (12), and Lac; gums, resins and other vegetable saps and extracts (13). Thus, the analysis of revealed comparative advantage (RCA) showed that India's competitiveness is higher in selected agriculture sectors.

Table 2 India's Revealed Comparative Advantage (RCA) Index in Exports to Saudi Arabia

Product code	Product name	2001	2005	2010	2015	2020
1	Live animals	0.00	0.00	0.00	0.00	0.00
2	Meat and edible meat offal	0.10	2.18	1.87	2.32	1.31
3	Fish and crustaceans, molluscs and other aquatic invertebrates	0.12	0.05	0.90	2.33	0.26
4	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere ...	0.20	0.24	0.19	0.26	0.18
5	Products of animal origin, not elsewhere specified or included	0.26	0.02	0.02	0.00	0.22
6	Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage	1.00	1.15	0.34	0.37	0.12
7	Edible vegetables and certain roots and tubers	1.64	2.76	1.44	1.12	1.18
8	Edible fruit and nuts; peel of citrus fruit or melons	3.17	3.00	2.45	2.40	1.39
9	Coffee, tea, maté and spices	2.66	2.60	2.72	3.36	1.50
10	Cereals	9.55	7.83	3.92	6.76	8.15
11	Products of the milling industry; malt; starches; inulin; wheat gluten	0.22	0.32	0.54	1.13	0.68
12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal ...	2.35	2.64	0.59	0.45	0.27
13	Lac; gums, resins and other vegetable saps and extracts	4.07	2.57	1.19	1.00	0.63
14	Vegetable plaiting materials; vegetable products not elsewhere specified or included	4.30	3.19	1.16	6.79	1.88
15	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal ...	0.18	0.31	0.15	0.24	0.21
16	Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates	0.00	0.06	0.62	0.05	0.00
17	Sugars and sugar confectionery	0.13	0.05	0.05	1.70	1.14
18	Cocoa and cocoa preparations	0.00	0.05	0.00	0.31	0.38
19	Preparations of cereals, flour, starch or milk; pastrycooks' products	0.17	0.25	0.16	0.19	0.19
20	Preparations of vegetables, fruit, nuts or other parts of plants	0.47	0.38	0.38	0.63	0.68
21	Miscellaneous edible preparations	0.12	0.11	0.07	0.19	0.25
22	Beverages, spirits and vinegar	0.02	0.12	0.28	0.21	0.28
23	Residues and waste from the food industries; prepared animal fodder	0.08	0.09	0.68	0.54	0.05
24	Tobacco and manufactured tobacco substitutes	1.01	0.79	0.58	1.35	0.53

Table 3 Export Intensity Index (EII) and Import Intensity Index (III) of India with Saudi Arabia

Year	Intensity of trade index for exports by India to Saudi Arabia	Intensity of trade index for imports by India to Saudi Arabia
2001	3.89	0.89
2002	3.90	0.72
2003	3.34	0.76
2004	3.75	0.84
2005	3.13	0.62
2006	3.43	3.40
2007	3.52	4.44
2008	4.22	3.67
2009	2.93	3.45
2010	2.94	3.46
2011	2.38	3.01
2012	3.52	3.14
2013	4.14	3.87
2014	4.52	3.86
2015	2.51	4.14
2016	2.34	4.53
2017	2.41	3.73
2018	2.41	3.61
2019	2.38	4.12
2020	2.92	4.64

The trade intensity index (TII) is used to calculate India's intensity of trade with Saudi Arabia (Table 3). The TII with a value greater than one indicates higher bilateral trade than can be expected based on their share in world trade and vice versa. When the value of intensity is high between the two countries, it shows that both have more prospects of trade with each other. In the year-wise analysis of the intensity of the trade index of India with Saudi Arabia, it is found from (Table 3) that there are fluctuations in the export intensity index (EII) and import intensity index (III). India's exports are more intense than its imports from 2001 to 2006 and from 2015 onwards up to 2020 India's imports are more intense than exports. The intensity of India's exports is greater than one since 2001 (Table 3). The value of EII is recorded maximum in 2014 with a value of 4.52 and least in 2011 and 2019 with values 2.38 each respectively. India's intensity of trade with Saudi Arabia for imports by India from it is greater than one since 2006. It is noted as maximum in 2020 with a value of 4.64 and minimum in 2005 with a value of 0.62.

The index of India's import intensity with Saudi Arabia has maintained a value of less than unity (Fig 2). This implies that imports from Saudi Arabia to India are lower than would be expected given India's share of world trade. India's import intensity values exceeded only after 2005. The analysis shows that from 2015 onwards India's export intensity index is more than import intensity. Overall, the trade between them has increased, and trade intensities have varied over the years. In recent years export intensity has declined while import intensity has increased. The low intensities may reflect the fact that the bilateral trade between the two countries is less than the average level between India and the rest of the world.

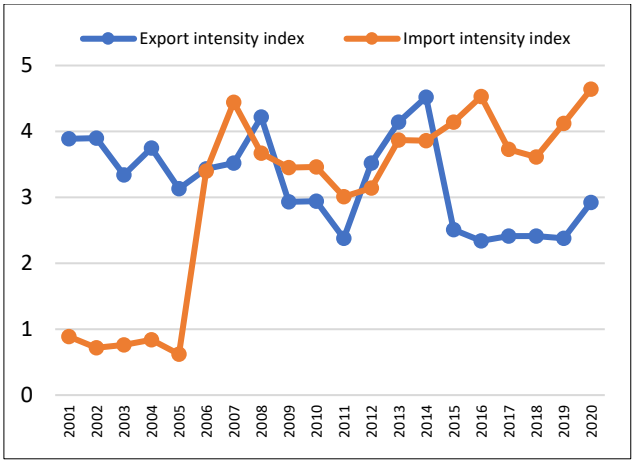

Fig 2 India's trade intensity with Saudi Arabia

CONCLUSION

The purpose of this article is to present empirical findings of the relative importance of India's agricultural products traded with Saudi Arabia using different trade indexes such as Revealed Comparative Advantage (RCA) index, Export Intensity Index (EII), and Import Intensity Index (III) from 2002 to 2020. RCA results indicate that India has a sustainable comparative advantage in 5 out of 24 product categories. There are also some products in which RCA is increasing over the years. The RCA analysis suggests that India possesses a sustainable comparative advantage in Edible vegetables and certain roots and tubers, Edible fruit and nuts; peel of citrus fruit or melons, Coffee, tea, maté and spices, Cereals, and Vegetable plaiting materials; vegetable products not elsewhere specified or included. Results of trade intensity also show that India's trade is more intense with Saudi Arabia compared to its trading partners with the rest of the world. The results show that trade between India and Saudi Arabia has increased and that trade relations have strengthened moderately in recent years. However, despite the recent trade growth, bilateral trade between them remains below its potential. There is still a lot of possibilities to strengthen the trade relationship. The results of trade indices (RCA, EII, and III) favour this argument. So, India should focus on exporting more goods, and consequently, the trade balance will improve.

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