

Case Study

# Agricultural Trade Performance: A Case Study of Indian Oilseeds

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## ABSTRACT

A country's comparative advantage in world trade may be affected by differential rates of change in production, factor accumulation or by other countries' increased trade integration. The study of trade balance of agriculture sector would reveal that export always outstripped import, but what is distressing for agriculture import was that one commodity accounted for large proportion in import that commodity was edible oils. The export of any commodity in large quantities do not necessarily indicate that nation is competitive in the world market. The present study is an attempt to study the growth trend, variability, and the comparative advantage of major oilseeds export from India using revealed comparative advantage, trade specification coefficient, revealed symmetric comparative advantages and revealed competitive advantage indices. Growth trend analysis for export and import values indicates that, with the exception of export quantity of oilseed nes and import quantity and value of linseed, all showed a positive trend with high inter-annual variability over the period of the study. Following the TSC analysis, the value of export exceeded the value of import for all oilseed crops except linseed, and certain years of fluctuation were observed in the case of oilseed nes over the period of the study. The analysis of competitiveness of oilseeds export showed a favourable competitive scenario except in the case of linseed where in early 2000's India was inefficient in export and for oilseed nes competitive advantage indices showed negative values for some years revealing lack of export competitiveness.

## HIGHLIGHTS

- ① The current study aims to examine India's comparative advantages in the Oilseed sector on a global scale.
- ② This will aid policymakers in identifying competitive oilseed crops and promoting their cultivation to increase domestic production to address domestic consumer needs as well as to offer a much-needed export boost to the sector, which has been under strain for a considerable period.

**Keywords:** Oilseeds, comparative advantage, competitiveness, trade balance, export

A country's comparative advantage in world trade may be influenced by differential rates of change in production factor accumulation or by other countries' enhanced trade integration. Comparative advantage means that countries tend to export goods they can produce more efficiently than others and it should focus more of its limited resources on producing that specific good when engaging in trade (Bhattacharyaa, 2012). The importance of exports for a country's economic growth is widely recognized. The WTO agreement

grants every participating country the opportunity to leverage their comparative advantages in the international economy. Additionally, it promotes healthy competition, encouraging efficient resource utilization and allocation on a global scale (Singh *et al.* 2020) and trade policies of country could

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influence its comparative advantage (Mirzaei *et al.* 2021). Murugesan (2019) found in his empirical study that India's real GDP is directly influenced by the variations in both agricultural and non-agricultural exports.

India's agricultural goods have become more significant in the world market throughout time. India holds a significant position in the world oilseeds market, Until the 1960s, India was a net exporter of oilseeds, meals, extractions, and edible oils. However, due to stagnant production and rising demand for edible oils, India became a net importer of edible oils by the late 1970s. Despite having the world's second largest area under oilseeds, edible oils were the largest import item by the mid-1980s, accounting for almost 30 percent of total imports, following only petroleum products. Currently with 20.8 percent of total global cultivation area and 10 percent of global production, India became the world's fourth largest producer of oilseeds. Oilseeds grown in the country include groundnut, soybean, sunflower, sesame, Niger seed, mustard, and safflower. The production of oilseeds has not been able to keep pace with the rising demand for edible oils, which necessitated import of edible oils and today India imports more than half of its edible oil requirement.

Commodity trade competitiveness plays a distinctive role in policymaking. According to classical trade models, a country can create a commodity at a lower cost in which the country has a comparative advantage and export that commodity, but another country imports that commodity since the importing country has a comparative disadvantage in manufacturing that commodity (Ahmed *et al.* 2017).

Various agricultural commodities exported from India have responded differently and their levels of comparative advantage in the global markets have altered significantly. Hence, it is imperative to have a systematic and well-structured analysis to find alterations in the comparative advantage of India vis-a-vis World. The objective of present study was: (1) to estimate the trade specification coefficient index, trend analysis, and variability of agricultural commodities; and (2) to investigate the comparative advantage of Indian oilseed exports using revealed comparative advantage, trade specification coefficient, revealed symmetric

comparative advantages, and revealed comparative advantage indices.

## MATERIALS AND METHODS

### Data use and Source of Data

The study was based on secondary data and it was collected from the various data sources like Agricultural Statistics at a Glance, FAOSTAT and CMIE economic outlook, Ministry of Commerce Export-Import data bank.

### Analytical Procedure

The exponential function ( $Y = a*b^t$ ) was used to study the temporal growth in agricultural import and export. Where,  $Y$  is the dependent variable (it may be export or import data),  $t$  is the independent variable (it is rank given to the year concerned). Ranking of the year was done in ascending order,  $a$  is the functional coefficient used in exponential function and  $b$  is the compounding coefficient (Singh and Singh, 1997).

The coefficient of variation [ $CV = (\sigma/\mu) \times 100$ ] was used to measure the variability in agricultural import and export. Here,  $\sigma$  is the standard deviation and  $\mu$  is the mean (Singh and Singh, 1997).

Balassa's (1965) measure of relative export performance by country and industry/commodity, defined as a country's share of world exports of a commodity divided by its share of total world exports was employed. The index for country  $i$  commodity  $j$  is calculated as follows:

$$RSCA_{ij} = (X_{ij}/\Sigma X_{ij}) / (\Sigma_j X_{ij} / \Sigma_j \Sigma_i X_{ij})$$

Where,  $X_{ij}$  denotes the exports of commodity  $i$  in country  $j$ ;  $\Sigma_i X_{ij}$  is the total agri-exports of country  $j$ ;  $\Sigma_j X_{ij}$  is the world's exports of commodity  $i$ ; and  $\Sigma_j \Sigma_i X_{ij}$  is the total agri exports of world.

RCA is measured using post-trade data. The index of revealed comparative advantage ( $RCA_{ij}$ ) has a relatively simple interpretation. If it takes a value greater than unity, the country has a revealed comparative advantage in that product. The advantage of using the comparative advantage index is that it considers the intrinsic advantage of a particular export commodity and is consistent with changes in an economy's relative factor endowment

and productivity. The disadvantage, however, is that it cannot distinguish improvements in factor endowments and pursuit of appropriate trade policies by a country.

There are several limitations with RCA index. First, RCA can be biased by ignoring imports, especially when country size matters. Second, Government export subsidies and protectionist measures may also distort the RCA index. (Ashish and Kannan, 2015).

Vollrath (1991) and Dalum *et al.* (1998) suggested another alternative method to measure the competitiveness of a particular country to avoid the problem of double counting is Revealed Symmetric Comparative Advantages (RSCA). The RSCA can express as:

$$RSCA_{ij} = [\{(X_{ij} / \sum X_{ij}) / (\sum_j X_{ij} / \sum_j \sum_i X_{ij})\} - 1] / [\{(X_{ij} / \sum X_{ij}) / (\sum_j X_{ij} / \sum_j \sum_i X_{ij})\} + 1]$$

Where,  $X_{ij}$  is the exports of commodity  $i$  in country  $j$ ;  $\sum_i X_{ij}$  is total agri-export of country  $j$ ;  $\sum_j X_{ij}$  denotes the world's export of commodity  $i$  and  $\sum_j \sum_i X_{ij}$  signifies world's total agri export.

The value of RSCA index ranges between -1 to +1 to avoid the problem of zero. Positive values of the index indicate the stability as well as the competitiveness of a particular country.

Revealed Competitive Advantage (RC) index measures the balances in supply and trade by using the values of export and it was developed by Vollrath (1991). It also used to know the distinctions between specific commodity and all other commodity as well as among specific country with rest of the world/ a set of countries. The RC index can be expressed as:

$$RC_{ij} = \{(X_{ij} / \sum X_{ij}) / (\sum_j X_{ij} / \sum_j \sum_i X_{ij})\} - \{(M_{ij} / \sum M_{ij}) / (\sum_j M_{ij} / \sum_j \sum_i M_{ij})\}$$

Where,  $X_{ij}$  represents the exports of commodity  $i$  in country  $j$ ;  $\sum_i X_{ij}$  is total agri-exports of country  $j$ ;  $\sum_j X_{ij}$  implies world's exports of commodity  $i$  and  $\sum_j \sum_i X_{ij}$  is total agri-exports of world;  $M_{ij}$  represent the imports of commodity  $i$  in country  $j$ ;  $\sum_i M_{ij}$  is the total agri-import of country  $j$ ;  $\sum_j M_{ij}$  implies world's imports of commodity  $i$  and  $\sum_j \sum_i M_{ij}$  is the total agri imports of world.

The values of index must be either positive or negative. If the values depict positive, the commodity of the country is competitive and if the index value is negative means it will not be competitive internationally in that commodity trade.

Trade specification coefficient index (TSC Index) also known as Lafay's (1992) Index has been employed to understand the export competitiveness of Indian exports during the study periods. The mathematical model of the TSC index is represented as follows:

$$ISC = \frac{(X_{ij} - M_{ij})}{(X_{ij} + M_{ij})}$$

This index represents the ratio of the trade balance (changes between exports and imports) of a particular commodity in a country to the total value of the trade (cumulative value of exports and imports) for that commodity. In the above equation,  $X_{ij}$  represents the total exports of the commodity while  $M_{ij}$  represents the total imports of the commodity. The value of the index ranges between -1 and +1. The value of this index equals 'zero' when a commodity's exports are equal to its imports. A positive index indicates that the country's exports of a particular commodity are higher than the imports of the commodity. Hence, this measure indicates the degree of equilibrium between exports and imports of a particular commodity and is a suitable method for comparing the trends over a longer period.

## RESULTS AND DISCUSSION

### Agricultural Trade

India's agricultural import during 1990-91 was ₹ 12.06 billion and it was expanded to the level of ₹ 1545.11 billion by the year 2020-21. The growth trend analysis suggests that it was growing with compound growth rate of 15.56 percent per annum during same period of time. The agricultural export from India to different parts of the world was ₹ 60.13 billion during 1990-91 and it was increased to the level of ₹ 3088.30 billion by the year 2020-21 showing annual growth rate of 13.29 percent (Fig. 1). The agricultural trade balance was ₹ 48.07 billion in 1990-91 and it was increased to ₹ 1543.19 billion by the year 2020-21. The inter-annual variability in the value of agricultural import and export was 108.05 and 98.19 percent, respectively.

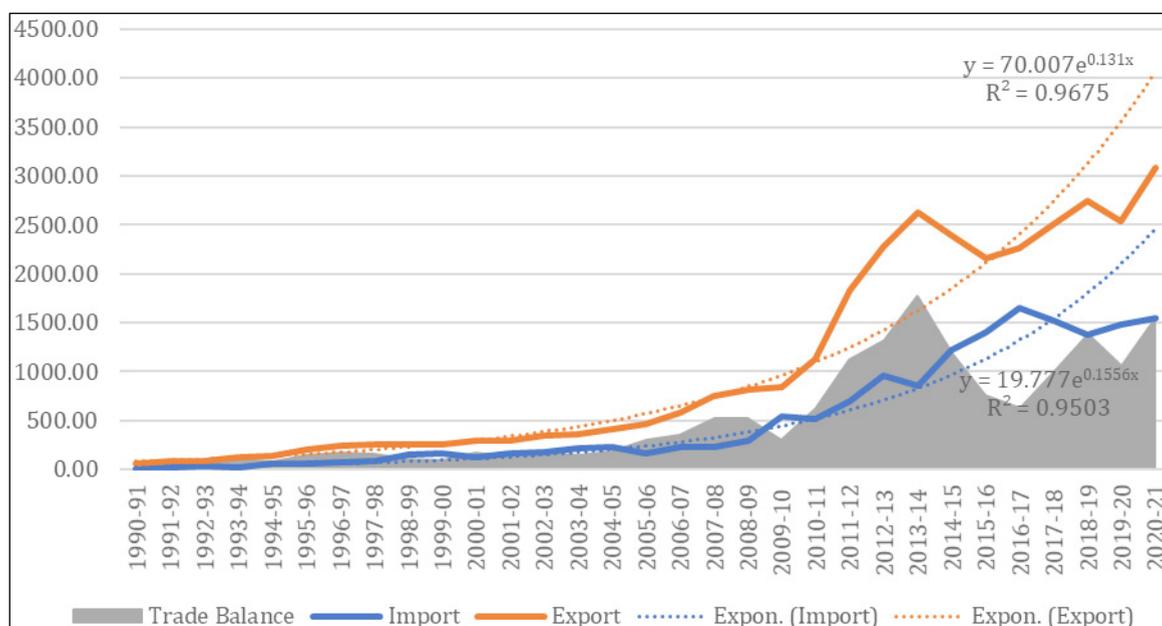


Fig. 1: Value of Agricultural Import and Export (Billion ₹)

Table 1: Growth performance of oilseeds (export and import) in terms of quantity and value

Commodity	Parameters	Export		Import	
		Quantity	Value	Quantity	Value
Sesame seed	Compound Growth Rate	3.62	8.97	36.65	41.88
	R <sup>2</sup>	0.5088	0.7099	0.6732	0.702
Soybean	Compound Growth Rate	17.53	23.36	68.08	67.14
	R <sup>2</sup>	0.416	0.5589	0.6301	0.6606
Sunflower	Compound Growth Rate	3.41	3.5	80.51	75.84
	R <sup>2</sup>	0.1273	0.087	0.4477	0.4168
Linseed	Compound Growth Rate	35.56	37.39	-9.00	-4.6
	R <sup>2</sup>	0.7413	0.7606	0.0258	0.0075
Groundnut	Compound Growth Rate	12.00	16.16	—	—
	R <sup>2</sup>	0.7813	0.7755	—	—
Oilseed nes	Compound Growth Rate	-3	2.06	20.79	22.27
	R <sup>2</sup>	0.273	0.1342	0.4352	0.5212

### Import and export of sesame seed

Total quantity of sesame seed import from international market in India was 47 tonnes in 2000 and it was further increased to the level of 149097 tonnes by the year 2020. The quantity of sesame seed import was augmenting with compound growth rate of 36.65 per cent per annum during 2000-2020. (Table 1). The coefficient of variation for import quantity of sesame seed was found to be 145.17 per cent during study period. Total quantity of sesame seed export from India was 183306 tonnes in 2000 and it was further increased to the level of 276265

tonnes by the year 2020. The quantity of sesame seed export from India was inflating with annual growth rate of 3.62 per cent during 2000-2020 (Table 1). The variation in export quantity of sesame seed was estimated to be 28.72 per cent during study period. Total value of sesame seed import in India was 28 thousand US\$ in 2000 and it was augmented to the level of 183904 thousand US\$ by the year 2020. The value of sesame seed import in the country was augmenting with annual growth rate of 41.88 per cent during study period (Table 1). The coefficient of variation for import value of beans was found to

be 150.58 per cent during same period of time. In 2000, total value of sesame seed export from India was 115256 thousand US\$ and it was augmented to the level of 447843 thousand US\$ by the year 2020. The value of sesame seed export from India was expanding with compound growth rate of 8.97 per cent per annum during 2000-2020 (Table 1). The variation in export value of sesame seed was estimated to be 53.01 per cent during study period.

In 2000, total value of export and import of sesame seed was 115256 and 28 thousand US\$ respectively and trade balance for sesame seed was found to be 115228 thousand US\$. In 2020, total value of sesame seed export and import was 447843 and 183904 thousand US\$ respectively and trade balance was found to be 263939 thousand US\$.

High revealed comparative advantage values during all the years under consideration was found for sesame seed, which indicates better comparative advantage in export of sesame seed from India (Table 2). The revealed symmetric comparative advantages values also were found positive throughout the years, further emphasizing the comparative advantage scenario in export. Double digit values were found for revealed comparative

advantage until 2011, which were high in the early 2000's and then decreased. During the last nine years, the values were half or more than half of the values in the earlier years- showing a steep downfall in the comparative advantage status. While looking into competitiveness, as indicated by specialization in export, both the indicators considered- trade specification coefficient and revealed competitive advantage, were found positive throughout the years, showing high competitiveness. Revealed comparative advantage values clearly shows the same pattern as observed in revealed comparative advantage.

### Import and export of soybean seed

In 2000, total quantity of soybean seed import of India was 132 tonnes in 2000 and it was increased to the level of 505223 tonnes by the year 2020. The quantity of soybean seed import was augmenting with compound growth rate of 63.01 per cent per annum during study period (Table 1). The coefficient of variation for import quantity of soybean seed was found to be 239.68 per cent during study period. Total quantity of soybean seed export from India was 75020 tonnes in 2000 and it was further

**Table 2:** Revealed comparative advantages and competitiveness indices of sesame seed

Year	Revealed Comparative Advantage (RCA)	Trade Specification Coefficient (TSC)	Revealed Symmetric Comparative Advantages (RSCA)	Revealed Competitive Advantage (RC)
2000	17.455099	0.999514	0.891629	17.447792
2001	21.323291	0.999984	0.910407	21.323083
2002	15.391814	0.986714	0.877988	15.265196
2003	22.135650	0.988716	0.913553	21.978763
2004	18.765127	0.982644	0.898812	18.581432
2005	14.561338	0.968797	0.871476	14.165988
2006	15.069944	0.991906	0.875544	14.978558
2007	19.834080	0.971229	0.904003	19.196259
2008	15.119247	0.946634	0.875925	14.464631
2009	12.368150	0.931159	0.850391	11.856471
2010	14.975950	0.964559	0.874812	14.514283
2011	13.412845	0.999405	0.861235	13.406334
2012	9.526935	0.951398	0.810011	9.090089
2013	7.824902	0.676438	0.773369	4.468907
2014	8.873761	0.769142	0.797443	6.828096
2015	6.512460	0.882936	0.733776	5.922701
2016	8.955499	0.797727	0.799106	7.952243
2017	8.799430	0.818209	0.795907	7.817021
2018	8.887754	0.776497	0.797730	7.287417
2019	8.408364	0.458566	0.787423	4.626417
2020	6.508101	0.417792	0.733621	2.795754

increased to the level of 72021 tonnes by the year 2020. The quantity of soybean seed export from country was inflating with compound growth rate of 17.53 per cent per annum during 2000-2020 (Table 1). The variation in export quantity of soybean seed was estimated to be 104.05 per cent during study period.

Total value of soybean seed import of India was 68 thousand US\$ in 2000 and it was augmented to the level of 292094 thousand US\$ by the year 2020. The value of soybean seed import was augmenting with compound growth rate of 66.06 per cent per annum during study period (Table 1). The coefficient of variation for import value of soybean seed was found to be 250.51 per cent during same period of time. In 2000, total value of soybean seed export from India was 15946 thousand US\$ and it was expanded to 44126 thousand US\$ by the year 2020. The value of soybean seed export from India was expanding with compound growth rate of 23.36 per cent per annum during 2000-2020 (Table 1). The variation in export value of soybean seed was estimated to be 111.08 per cent during study period.

In 2000, total value of export and import of soybean seed was 15946 and 68 thousand US\$ respectively

and trade balance for soybean seed was found to be 15878 thousand US\$. In 2020, total value of soybean seed export and import was 44126 and 292094 thousand US\$ respectively and trade balance was found to be -247968 thousand US\$.

There was no comparative advantage in export of soybean seed from India during any of the years under consideration (Table 3). The values of revealed comparative advantage were far less than one throughout the years, and also revealed symmetric comparative advantages values were negative for all the years. But, while looking into export competitiveness- represented by export specialization, positive values were found until 2018 for the indices – trade specification coefficient and revealed competitive advantage (RC). This shows better competitive scenario in export of soybean seed from India. While it turned negative for last two years, in the case of TSC it indicates country was importing more than what it exports and negative values of RC indicates that India has lost its soybean seed export competitiveness since last two years.

**Table 3:** Revealed comparative advantages and competitiveness indices of soybean seed

Year	Revealed Comparative Advantage (RCA)	Trade Specification Coefficient (TSC)	Revealed Symmetric Comparative Advantages (RSCA)	Revealed Competitive Advantage (RC)
2000	0.143999	0.991507	-0.748253	0.143024
2001	0.009071	0.966942	-0.982021	0.008881
2002	0.002910	0.994898	-0.994196	0.002901
2003	0.322424	0.999968	-0.512375	0.322417
2004	0.004202	1.000000	-0.991631	0.004202
2005	0.008742	0.998951	-0.982668	0.008735
2006	0.005871	0.894872	-0.988327	0.005380
2007	0.006634	0.980946	-0.986820	0.006514
2008	0.032905	0.995336	-0.936286	0.032769
2009	0.021855	0.993976	-0.957224	0.021778
2010	0.009764	0.997907	-0.980660	0.009745
2011	0.016675	0.988782	-0.967196	0.016515
2012	0.021881	0.961594	-0.957174	0.021120
2013	0.061272	0.990107	-0.884532	0.060633
2014	0.100356	0.968396	-0.817594	0.097816
2015	0.125872	0.888684	-0.776401	0.116900
2016	0.090006	0.494338	-0.834853	0.057257
2017	0.132620	0.626035	-0.765817	0.100401
2018	0.097568	0.218935	-0.822211	0.013924
2019	0.054303	-0.299130	-0.896989	-0.073489
2020	0.032027	-0.737517	-0.937934	-0.282846

## Import and export of sunflower seed

Total quantity of sunflower seed import to India was 598 tonnes in 2006 and it was increased to 3494 tonnes by the year 2020. The quantity of sunflower seed import was very irregular (Table 1). The quantity of sunflower seed import from India was augmenting with compound growth rate of 80.51 per cent per annum during 2000-2020. The coefficient of variation for import quantity of sunflower seed was found to be 117.40 per cent during study period. In 2000, total quantity of sunflower seed export from India was 1133 tonnes and it was further increased to 2308 tonnes by the year 2020. The quantity of sunflower seed export from India was augmenting with compound growth rate of 3.41 per cent per annum during 2000-2020 (Table 1). The variation in export quantity of sunflower seed was estimated to be 52.01 per cent during study period.

In 2000, total value of sunflower seed import to India was zero thousand US\$ and it was augmented to the level of 2016 thousand US\$ by the year 2020. The value of sunflower seed import was very irregular (Table 1). The value of sunflower seed import from India was expanding with compound growth rate

of 75.84 per cent per annum during 2000-2020. The coefficient of variation for import value of sunflower seed was found to be 98.30 per cent during same period of time. In 2000, total value of sunflower seed export from India was 1059 thousand US\$ and it was expanded to 1110 thousand US\$ by the year 2018. The value of sunflower seed export from India was expanding with compound growth rate of 3.51 per cent per annum during 2000-2020 (Table 1). The variation in export value of sunflower seed was estimated to be 69.78 per cent during study period.

Total value of export and import of sunflower was 1059 and zero thousand US\$ respectively and trade balance for sunflower seed was found to be 1059 thousand US\$ in 2000. The total value of sunflower export and import was 1110 and 2016 thousand US\$ respectively and trade balance was found to be -906 thousand US\$ by the year 2020.

Similar to soybean seed, for sunflower seed also there was no comparative advantage in export from India- as shown by less than unity values of revealed comparative advantage and negative values of revealed symmetric comparative advantages indices throughout the period (Table 4). Whereas

**Table 4:** Revealed comparative advantages and competitiveness indices of sunflower seed

Year	Revealed Comparative Advantage (RCA)	Trade Specification Coefficient (TSC)	Revealed Symmetric Comparative Advantages (RSCA)	Revealed Competitive Advantage (RC)
2000	0.094646	1.000000	-0.827075	0.094646
2001	0.085160	1.000000	-0.843046	0.085160
2002	0.128056	1.000000	-0.772962	0.128056
2003	0.061850	0.991011	-0.883506	0.061468
2004	0.151285	0.997046	-0.737190	0.151001
2005	0.096334	1.000000	-0.824261	0.096334
2006	0.127419	0.845055	-0.773963	0.109226
2007	0.079309	0.200283	-0.853037	-0.030702
2008	0.166922	0.679918	-0.713910	0.104229
2009	0.090186	0.526604	-0.834549	0.057972
2010	0.086019	1.000000	-0.841589	0.086019
2011	0.075902	1.000000	-0.858906	0.075902
2012	0.069383	0.817677	-0.870237	0.056393
2013	0.053422	0.811762	-0.898574	0.040541
2014	0.072880	0.805051	-0.864141	0.060331
2015	0.058223	0.618014	-0.889961	0.041338
2016	0.026341	0.361192	-0.948670	0.012819
2017	0.041953	0.581308	-0.919473	0.029844
2018	0.019492	0.186676	-0.961761	0.000559
2019	0.012101	-0.158260	-0.976087	-0.010504
2020	0.010967	-0.289827	-0.978304	-0.017701

trade competitiveness – found from specialization in export was high as shown by positive trade specification coefficient values and revealed competitive advantage values throughout the years except in the last two years of the study period and only in the year of 2007, revealed competitive advantage value came negative, showing lack of export competitiveness in that particular year.

### Import and export of linseed

In 2000, total quantity of linseed import by India was 1654 tonnes in 2000 and it was decreased to 341 tonnes by the year 2020. The import quantity of linseed was shrinking with compound growth rate of -9.00 per cent per annum during study period (Table 1). The inter-annual variation in import quantity of linseed was found to be 79.44 per cent during study period. In 2002, total quantity of linseed export from India was 146 tonnes in 2000 and it was augmented to the level of 12493 tonnes by the year 2020. The quantity of linseed export from India was inflating with compound growth rate of 66.83 per cent per annum during 2000-2018 (Table 1). The variation in export quantity of linseed was estimated to be 126.19 per cent during study period.

In 2000, total value of linseed import was 450 thousand US\$ in 2000 and it was further increased to 260 thousand US \$ by the year 2018. The value of linseed import was declining with compound growth rate of -4.60 per cent per annum during study period (Table 1). The instability for import value of linseed was found to be 74.51 per cent during same period of time. In 2002, total value of linseed export from India was 89 thousand US\$ and it was expanded to 12109 thousand US\$ by the year 2020. The value of linseed export from India was expanding with compound growth rate of 68.02 per cent per annum during 2000-2020 (Table 1). The variation in export value of linseed was estimated to be 132.70 per cent during study period. In 2000, total value of export and import of linseed was zero and 450 thousand US\$ respectively and trade balance for linseed was found to be -450 thousand US\$. The total value of linseed export and import was 12109 and 260 thousand US\$ respectively and trade balance was found to be 11849 thousand US\$ in 2020.

The revealed comparative advantage values were less than unity and revealed symmetric comparative advantages values were found negative throughout the years, which indicates lack of comparative advantage in linseed export from India (Table 5). But

**Table 5:** Revealed comparative advantages and competitiveness indices of linseed

Year	Revealed Comparative Advantage RCA)	Trade Specification Coefficient TSC)	Revealed Symmetric Comparative Advantages (RSCA)	Revealed Competitive Advantage (RC)
2000	0.000000	-1.000000	-1.000000	-0.333191
2001	0.000000	-1.000000	-1.000000	-0.069640
2002	0.029852	-0.666667	-0.942027	-0.175605
2003	0.006446	-0.870801	-0.987192	-0.117119
2004	0.016363	-0.592727	-0.967801	-0.057605
2005	0.045482	-0.227586	-0.912993	-0.064214
2006	0.044171	-0.159236	-0.915395	-0.046129
2007	0.001080	-0.963702	-0.997842	-0.118660
2008	0.053598	0.580808	-0.898257	0.025409
2009	0.332678	0.902489	-0.500738	0.314106
2010	0.067463	0.576642	-0.873601	0.036851
2011	0.098882	0.933202	-0.820032	0.093615
2012	0.071657	1.000000	-0.866269	0.071657
2013	0.950696	0.998781	-0.025275	0.949337
2014	0.535242	0.950102	-0.302727	0.512891
2015	0.571603	0.972603	-0.272586	0.561492
2016	0.475764	0.801680	-0.355230	0.421057
2017	0.473332	0.948320	-0.357467	0.459841
2018	0.609504	0.886140	-0.242619	0.559004
2019	0.652694	0.957902	-0.210145	0.633388
2020	0.562691	0.957959	-0.279844	0.542974

a different scenario was observed when looked for export competitiveness, as indicated by the indices addressing the extent of specialization in export of the particular commodity. In the beginning years, up to 2007, both trade specification coefficient and revealed competitive advantage values were found negative, indicating lack of competitiveness. Whereas during the recent years – from 2008 to 2020 the values were positive, indicating competitiveness.

### **Import and export of groundnut**

In the year 2000, total quantity of groundnut imported in India was 19 tonnes and it has increased to the level of 1113 tonnes by the year 2020. The quantity of groundnut import in the country was minimal during the study period (Table 1). The coefficient of variation for import quantity of groundnut was found to be 144.60 per cent during study period. Total quantity of groundnut export from India was 116732 tonnes in 2000 and it has increased to the level of 666396 tonnes by the year 2020. The quantity of groundnut export from India was increasing with compound growth rate of 12.00 per cent per annum during 2000-2018 (Table 1). The variation in export quantity of groundnut was found to be 60.85 per cent during study period.

Total value of groundnut import in India was 12 thousand US\$ in 2000 and it has increased to the level of 1162 thousand US\$ by the year 2020. The coefficient of variation for import value of groundnut was found to be 167.47 per cent during study period. In 2000, total value of groundnut export from India was 60757 thousand US\$ and it was increased to the level of 739523 thousand US\$ by the year 2020. The value of groundnut export from the country was declining with annual compound growth rate of 161.60 percent during 2000-2020 (Table 1). The variation in export value of groundnut was estimated to be 74.17 per cent during study period. In 2000, total value of export and import of groundnut was 60757 and 12 thousand US\$ respectively and trade balance for groundnut was found to be 60745 thousand US\$. By the year 2020, total value of groundnut export and import was 739523 and 1162 thousand US\$ respectively and trade balance was found to be 738361 thousand US\$.

Throughout the years in the study, it was found that comparative advantage values were very high,

which shows country has remarkable comparative advantage in export of groundnut, which indicates that the share of groundnut export to total agriculture export in India is more than that of world's combined data (Table 6). This observation was further supported by positive values of revealed symmetric comparative advantages found for all the years throughout the study period. Whereas, when looked into the competitiveness in export as shown by export-import ratios represented through trade specification coefficient and revealed competitive advantage, positive values were found for all the years during study period shows high competitiveness of India's groundnut export. TSC value was +1.00 for all the years during study period which reveals that India is importing very insignificant quantity of groundnut.

### **Import and export of oilseed nes**

Total quantity of oilseed nes import was 1997 tonnes in 2000 and it was increased to the level of 57187 tonnes by the year 2018. The quantity of oilseed nes import in India was augmenting with compound growth rate of 20.79 per cent per annum during study period (Table 1). The coefficient of variation for import quantity of oilseed nes was found to be 58.57 per cent during study period. Total quantity of oilseed nes export from the country was 30792 tonnes in 2000 and it was decreased to 23121 tonnes by the year 2020. The quantity of oilseed nes export from India was deflating with compound growth rate of -3.00 per cent per annum during 2000-2020 (Table 1). The variability in export quantity of oilseed nes was found to be 36.61 per cent during study period.

Total value of oilseed nes import of India was 1077 thousand US\$ in 2000 and it was augmented to 33036 thousand US\$ by the year 2020. The value of oilseed nes import was augmenting with annual compound growth rate of 22.27 per cent during study period (Table 1). The coefficient of variation for import value of oilseed nes was found to be 65.52 per cent during same period of time. In 2000, total value of oilseed nes export from India was 19682 thousand US\$ and it was decreased to the level of 25294 thousand US\$ by the year 2020. The value of oilseed nes export from India was expanding with compound growth rate of 2.06 per cent per annum during 2000-2020 (Table 1). The variation in export

**Table 6:** Revealed comparative advantages and competitiveness indices of groundnut

Year	Revealed Comparative Advantage (RCA)	Trade Specification Coefficient (TSC)	Revealed Symmetric Comparative Advantages (RSCA)	Revealed Competitive Advantage (RC)
2000	6.407625	0.999605	0.730008	6.405503
2001	4.089287	0.999535	0.607018	4.088161
2002	3.029322	0.999033	0.503639	3.027560
2003	10.024209	0.999743	0.818581	10.022573
2004	7.750346	1.000000	0.771438	7.750346
2005	7.253259	1.000000	0.757671	7.253259
2006	10.651745	0.999624	0.828352	10.649076
2007	10.660060	0.999807	0.828474	10.658137
2008	12.802033	0.999920	0.855094	12.801280
2009	14.303775	0.997559	0.869313	14.286138
2010	15.508679	0.998843	0.878852	15.494833
2011	17.653109	0.999018	0.892779	17.637131
2012	12.709468	0.999878	0.854115	12.708113
2013	9.332192	0.999801	0.806430	9.330323
2014	12.904241	0.999933	0.856159	12.903579
2015	13.583778	0.999733	0.862861	13.581645
2016	14.974400	0.999797	0.874800	14.972784
2017	13.088107	0.994489	0.858036	13.055109
2018	9.590551	0.994107	0.811152	9.557101
2019	10.621180	0.994511	0.827900	10.583702
2020	9.666284	0.996862	0.812493	9.643151

**Table 7:** Revealed comparative advantages and competitiveness indices of oilseed nes

Year	Revealed Comparative Advantage (RCA)	Trade Specification Coefficient (TSC)	Revealed Symmetric Comparative Advantages (RSCA)	Revealed Competitive Advantage (RC)
2000	14.525599	0.896238	0.871180	13.255794
2001	6.173237	0.976523	0.721186	6.059788
2002	10.170356	0.996782	0.820955	10.154200
2003	5.798431	0.773129	0.705814	4.987724
2004	6.506943	0.641268	0.733580	4.861006
2005	6.871790	0.365814	0.745928	3.460733
2006	5.715459	-0.132167	0.702180	-2.812130
2007	5.195136	-0.083307	0.677166	-2.708083
2008	5.968495	0.301386	0.712994	1.488793
2009	2.974663	-0.265937	0.496813	-0.732191
2010	2.000997	0.264533	0.333555	0.549469
2011	3.854820	0.369930	0.588038	1.632593
2012	1.803457	0.111904	0.286595	-0.564938
2013	1.404237	0.050482	0.168135	-1.089520
2014	1.224456	0.013614	0.100904	-0.540666
2015	1.918446	0.082414	0.314704	0.361308
2016	1.237964	-0.188708	0.106330	-0.473684
2017	1.176708	0.054960	0.081181	0.152933
2018	1.098078	-0.135010	0.046747	-0.499513
2019	1.056663	-0.262456	0.027551	-1.271811
2020	1.602062	-0.132728	0.231379	-0.933459

value of oilseed nes was estimated to be 36.51 per cent during study period. Total value of export and import of oilseed was 19682 and 1077 thousand US\$ respectively and trade balance for oilseed nes was found to be 18605 thousand US\$. In 2020, total value of oilseed nes export and import was 25294 and 33036 thousand US\$ respectively and trade balance was estimated to be -7742 thousand US\$.

India's oilseed nes export was found to have better comparative advantage throughout the years, as indicated by the high values of revealed comparative advantage and positive values of revealed symmetric advantage (Table 7). Wide variations were seen in the revealed comparative advantage values. It was high in the initial years and then decreased steeply during the most recent year. During 2000 and 2002, revealed competitive advantage values were very high- around 14 per cent and 10 per cent respectively- showing high comparative advantage. Competitiveness – revealed from the results of specialization in export, was showing slightly different pattern. Both trade specification coefficient and revealed competitive advantage indices showed negative values for some years like 2006, 2007, 2009, 2016, 2018, 2019 and 2020 revealing lack of export competitiveness during these years and also revealed competitive advantage was negative during 2012, 2013 and 2014.

## CONCLUSION

India was net exporter of oilseed in 1960s and in present time import of edible oils account for a major shar of agriculture import. The current paper revealed India's high competitiveness in the trade of sesame seed, groundnut, and soybean seed, and the government should increase its efforts to provide some incentives to farmers to increase the area under these crops, as domestic prices of oilseeds have remained low for a longer period due to higher reliance on imports. Another finding was that while India was not competitive in the trade of linseed and sunflower, the country was nevertheless exporting significant amounts of these commodities. The many variables causing this inefficiency must be identified and addressed at the policy level. In highly intertwined international market Indian agriculture, especially oilseed sector is in dire need to become more competitive.

Over the years Indian government had taken cognisance of the fact that India has been highly dependent on foreign countries to meet its domestic consumption needs and it tried to address that concern with the help of several policies targeted towards oilseed commodities. In the recent years the Government of India undertook several initiatives like Targeted Rice Fallow Area (TRFA) oilseeds, National Food Security Mission (NFSM) oilseeds, cluster demonstrations of improved technology, Mustard programme during Rabi, and Special programme on rapeseed; to increase the oilseed production. Despite all the efforts India's oilseed sector faces stiff challenges in increasing the efficiency in several of its sub-sectors: improving the technology in oilseed cultivation and processing, extending such improvements to farmers and processors apart from introducing policy reforms in the marketing of oilseeds and products domestically and internationally. All the players need to come together with the Government in a creative partnership to enhance efficiency and equity in this important sector. A strong policy framework for the growth of the oilseed industry must focus on two fundamental goals: (a) improving economic efficiency and lowering unit costs; and (b) promoting social equity by making products available to the weaker sections at fair rates. Import tariff policy should find a good balance between encouraging efficient domestic manufacturing and taking advantage of cheap imports.

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