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Pattern of foreign trade and export competitiveness of Indian cashew

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Abstract
The Indian Cashew industry provides employment to more than 5 lakh people both directly and indirectly, particularly in the rural areas. The total earnings from export of cashew kernel and cashew nut shell liquid have increased from 2,053.49 crores in 2000-01 to` 5,488.66 crores in 2014-15. India is facing tough competition from Vietnam and Brazil in the exports of Cashew Kernels. The NPC for the period 2015-16 under exportable hypothesis USA, UAE and Netherlands were 0.85, 0.93 and 0.87 respectively and they were less than one, which also revealed that the domestic prices received by the farmers were lower than the international prices, which also implied that the domestic producers were dis-protected or rather taxed compared to a situation prevailing under free trade condition. USA was one of the most stable country among the major importers both of Indian cashew kernel and cashew nut shell liquid as indicated by the high retention probability of 0.765 and 90.10% respectively. The major competitors for India in the world market are Vietnam and Brazil. A dependency on one or two export market would increase the trade risk in the near future. Hence, appropriate export promotion strategies are to be evolved to diversify the geographical concentration.

Keywords: Cashew kernels, cashew nut shell liquid, direction of trade, nominal protection coefficient, India

1. Introduction

Cashew (*Anacardium occidentale* L.) is a native of Eastern Brazil introduced to India just as other commercial crops like rubber, coffee, tea *etc.* by the Portuguese in 1960. The first introduction of cashew in India was made in Goa from where it spread to other parts of the country. In the beginning, it was mainly considered as a crop for afforestation and soil binding to check the erosions. The nuts, apple and other by-products of the plants are of commercial importance. Though, its commercial exploitation began from1920, marginal lands and denuded forests were the areas set apart for this plantation development. Due to the absence of high yielding varieties and multiplication technique, indiscript seed and seedlings were used for planting purpose.

Cashew ranks third in world production of edible nuts that are traded globally. Cashew is produced in around 32 countries of the world. India led in production of cashews in 2015-16 with a production of 1,72,719 metric tonnes (kernel basis), which represented 23% of global production, followed by Côte d'Ivoire 1,71,111 metric tonnes, Vietnam 1,13,095 metric tonnes, East Africa (40,000), Brazil (33,000), Cambodia (19,048), Indonesia (12,000) and others (1,28,712). Worldwide, trade in cashew exceeds US$3 billion and, 1, 10,000 tonnes are traded on international markets. East and West-Africa are exporting almost all their production in shell (raw cashew nuts) to India, Vietnam, India and Brazil account for more than 90% of all cashew kernel exports. India with share of (30%) and Vietnam with share of (54%) were the major exporters during 2015-16. As a major importer of cashew, the USA has a strong influence over the world price.

India has long been the world's largest producer of cashew, with its prices and quality, setting the standard for the industry. In USA, UAE and Europe, India has been the preferred supplier, with long standing trading relationship based on confidence in product quality and on fast and regular deliveries. India has more than 150 cashew kernel shippers.

The Cashew Export Promotion Council of India (CEPC) was established by the Government of India in the year 1955, with the active cooperation of the cashew industry with the object of promoting exports of cashew kernels and cashew nut shell liquid from India.

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By its very set up, the council is providing the necessary institutional frame-work for performing the different functions that serve to intensify and promote export of cashew kernels and cashew nut shell liquid. The council provides the necessary liaison for bringing together foreign importers with member exporters of cashew kernels. The enquiries received from the foreign importers are circulated amongst council members. The council also extends its good offices in settling complaints amicably in the matter of exports/imports either of quality and/or variation in fulfillment of contractual obligation.

Even though strong competition from other countries has reduced India's share in the global cashew exports, India's advantage in terms of less percentage of broken kernels has brought European and US buyers to its proximity. To strengthen cashew exports, there is definite need for increasing production by developing cashew as plantation crop on commercial basis, exploring new markets, and strengthening non-traditional markets and adding value to the product by introducing innovations in processing and branding them.

After independence, India launched various programmes to expand the area under cashew cultivation. In 1966, Directorate of Cashew nut Development was established under the Ministry of Agriculture with a mandate to increase the production of cashew nuts. Other initiatives introduced under different five year plans include the All India Coordinated Cashew Improvement Project under the Indian Council of Agricultural Research, Programmes on cashew production-area expansion and replanting, along with facilitating cashew processing and trade. Currently, the National Horticulture Mission (NHM), a centrally sponsored scheme, has been launched in 2005-06 to promote holistic growth of cashew production, processing and marketing.

The area under cashew cultivation in India increased from 6.34 lakh hectares in 1995-96 to 10.35 lakh hectares in 2015-16. Among states, Maharashtra tops with respect to area, production and productivity of cashew nut. Over the years, the area under cashew cultivation has registered an increase in all the major cashew growing states, except in Kerala. This is attributed to diversification of land under cashew cultivation to other remunerative crops

2. Material and Methods

The study on direction of trade and export competitiveness of cashew was purposively taken up in all India level. The secondary data on direction of trade and export competitiveness of cashew were used to analyze the direction of Indian cashew exports and Nominal Protection Co-efficient (NPC). The time series data on direction of trade cashew kernel was available from 2000-01 to 2014-15 and for cashew nut shell liquid was available from 2004-05 to 2014-15 onwards. Data used for the study was collected from indiastats.com, Cashew Export Promotion council of India. Time series data pertaining to exports of cashew was collected for the same period from Agricultural and Processed Food Products Export Development Authority report. For the analyses of direction of trade and export competitiveness Markov Chain first order process and NPC were used.

2.1. Direction of foreign trade

Markov Chain first order process was used to analyses the direction of Indian cashew exports. The major import markets for Indian cashew considered in the study.

The structural change in exports was examined using the Markov Chain Approach.

Markov Chain Analysis is the estimation of the Transitional Probability Matrix. The element P_{ij} of this matrix indicates the probability that exports will switch from country i to country j with the passage of time. The diagonal P_{ij} measures the probability that the export share of a country will be retained. Hence, an examination of the diagonal elements indicates the loyalty of an importing country to a particular country's exports.

$$E_{jt} = \sum_{r=1}^{r} E_{ij} - P_{ij} + e_{jt} \ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.4.3.1$$

Where,

E_{jt} = Export from India during the year t to j^{th} country.
E_{it-1} = Export to i^{th} country during the year t-1.
P_{ij} = the probability that exports will shift from i^{th} country to j^{th} country.
e_{it} = The error term which is statistically independent of E_{it-1}
r = the number of importing countries

The Transitional Probability P_{ij}, which can be arranged in a (c x r) matrix, have the following properties.

$$0 \le P_{ij} \le 1$$

$$\sum_{i=1}^{r} P_{ij} = 1 \text{ for all} \ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.4.3.2$$

Thus, the export proportions of each country during period t were obtained by multiplying the export to these countries in the previous period (t-1) with the Transition Probability Matrix.

The Transitional Probability Matrix is estimated in the Linear Programming (LP) frame work by a method referred to as Minimization of Mean Absolute Deviation (MAD).

The LP formulation is stated as
Min OP * + Ie …………………………………… (3.4.3.3)

Subject to –
XP * + V = Y ……………………………………. (3.4.3.4)
GP * = 1 ……………………………………………. (3.4.3.5)
P * ≥ 0

Where,
P* is a vector in which probability Pij are arranged,
0 is a vector of zeros,
I is an appropriately dimensioned vector of area,
e is the vector of absolute errors (IUI)
Y is a block diagonal matrix of lagged values of Y and
V is the vector of errors
G is a grouping matrix to add the row-elements of p arranged in P* to unity.

2.2. Export competitiveness

Nominal Protection Co-efficient (NPC) of Indian cashew was estimated for the year 2015-16 in order to examine its export competitiveness in the world markets.

Nominal Protection Co-efficient is a direct measure of

competitiveness of a country towards in the context of free trade. The Nominal Protection Co-efficient (NPC) is defined the domestic price to world reference price of the commodity under consideration.

Symbolically

$$NPC = \frac{Pd}{Pr}$$

(3.4.4.1)

Where,
NPC = Nominal Protection Co-efficient
Pd = Domestic price of the commodity in question
Pr = World reference price of the commodity in question *i.e.*

What the farmer would have received in case of free trade. NPC can be estimated under two main hypotheses *i.e.* under importable hypothesis and exportable hypothesis. A decision criterion is, if NPC is less than one, then the commodity is competitive (under importable hypothesis it is considered as a good import substitute and under a good exportable hypothesis, it is worth exporting) if NPC is greater than one, the commodity is not competitive (not a good import substitute or not worth exporting),the domestic price is normally the wholesale market price of the commodity in the selected market, the reference price is international price adjusted for transfer cost, market and trading margin including the processing charge necessary to make the commodity equivalent in the international traded commodity.

The interpretation of the co-efficient is as follows
Under importable hypothesis,

NPC<1 an efficient import substitute
Under exportable hypothesis.

NPC<1 an efficient import substitute
In the present study, Nominal Protection Co-efficient (NPC) was estimated under exportable hypothesis for the year 2015-16, Nominal Protection Co-efficient and international reference in the case of exportable hypothesis are calculated.

3. Results and Discussion
3.1. Direction of trade of Indian cashew kernel exports
The direction of trade of cashew kernel export to different destinations was examined by estimating the Transitional Probability Matrix (TPM) using Markov Chain Analysis and results are presented in the Table 1. Five major countries importing the Indian cashew kernel in large quantities and rest of countries were pooled under others category. The diagonal elements in the TPM provide the information on the probability of retention of the trade, while row elements indicate the probability of loss in trade on account of competing countries. The column elements indicated the probability of gain in trade from the competing countries.
A close look at table indicated that the U.S.A was one of the most stable market among the major importers of Indian cashew kernel as exhibited by the highest probability of retention at 0.765. U.S.A had retained its original share of 76.50% during the period 2000-01 to 2014-15. Similarly, UAE was the stable market. U.A.E had probability of retention 0.641, which retained its original export share of 64.10%. This implied that U.A.E was also the stable importer of Indian cashew kernel. Japan, Netherlands, Saudi Arabia and others had probability of retention 0.359, 0.319, 0.249 and 0.905 respectively.

Table 1: Transitional probability matrix of cashew kernel export from India during 2000-01 to 2014-15

Country	U.S.A	Netherlands	U.A.E	Japan	Saudi Arabia	Others	
U.S.A	0.765	0.170	0.000	0.040	0.000	0.019	
Netherlands	0.487	0.319	0.000	0.000	0.000	0.195	
U.A.E	0.012	0.061	0.641	0.089	0.199	0.000	Gain
Japan	0.546	0.000	0.000	0.359	0.069	0.027	
Saudi Arabia	0.000	0.000	0.528	0.210	0.249	0.015	
Others	0.000	0.000	0.084	0.000	0.011	0.905	
Loss							

The major gainer among importer of Indian cashew kernel over the study period was U.S.A, which had a transitional probability of 54.60% from Japan, 48.70% from Netherlands and 1.20% from U.A.E. UAE in addition to having high probability of retention was also likely to gain 52.80% market share from Saudi Arabia and 8.40% from others. On the contrary, UAE also likely to lost 19.90% market share to Saudi Arabia, 8.90% to Japan, 6.10% to Netherlands, 1.20% to U.S.A.

3.2. Direction of trade of cashew nut shell liquid exports
The trade direction of Indian cashew nut shell liquid to

major importing countries was studied by estimating the Transitional Probability Matrix using the Markov Chain Model. The transitional probability is depicted in the Table 4.14 indicated the trader idea of change of the trade direction of Indian cashew nut shell liquid over a period of 2004-05 to 2014-15. There were six major countries, which imported heavily Indian cashew nut shell liquid *viz.*, Korea Republic, China, USA, Japan, Slovenia and Singapore. The exports to remaining countries were grouped as the other countries. Major portion of Indian cashew nut shell liquid were being imported by Korea Republic, USA and China.

Table 2: Transitional probability matrix of cashew nut shell liquid export from India during 2004-05 to 2014-15

Countries	Korea Rep.	China	U.S.A	Japan	Slovenia	Singapore	Others	
Korea Rep.	0.355	0.440	0.000	0.000	0.000	0.000	0.205	
China	0.091	0.538	0.000	0.146	0.080	0.045	0.100	Gain
U.S.A	0.073	0.000	0.901	0.026	0.000	0.000	0.000	
Japan	0.000	0.000	0.096	0.138	0.000	0.000	0.766	

Slovenia	0.953	0.000	0.000	0.000	0.000	0.000	0.047
Singapore	0.926	0.000	0.000	0.000	0.000	0.074	0.000
Others	0.719	0.000	0.158	0.000	0.000	0.024	0.099
Loss							

A perusal of Table 2 indicated that U.S.A was one of the most stable market among the major importers of cashew nut shell liquid as exhibited by the highest probability of retention at 90.10% share during the study period, it gained 9.60% from Japan and 15.80% from others. China could retain 53.80% of previous year's share, and lost 9.10%, 14.60%, 8.00%, 4.50% and 10.00% to Korea Rep, U.S.A, Japan, Slovenia, Singapore and others respectively. Korea Rep. could retain 35.50% of previous year's share, and lost 44.00% to China and 20.50% to others. In contrast, it gained 9.10%, 7.30%, 95.30%, 92.60% and 71.90% from China, U.S.A, Slovenia, Singapore and others respectively. Japan lost 9.60% to USA and 76.60% to others, Slovenia lost their complete share 95.30 to Korea Republic and 4.70% to others. Similarly, Singapore lost most of their share, 92.6% to Korea Republic.

3.3. Nominal protection coefficient of cashew kernel
In the era of globalization, foreign trade policies had given high importance in boosting over agricultural exports. This had resulted in cut-throat competition among nations in the trade scenario of various commodities, and in this connection a country's exports were decided by efficiency promotion and its price competitiveness. Hence, examining the export competitiveness of the commodities of interest for a country was utmost importance. India had higher access to global market especially for horticultural commodities.

Table 3: Nominal protection coefficient of cashew kernel during 2015-16

SI. No	Particulars	Unit	U.S.A (Texas)	U.A.E (Dubai)	Netherlands (Amsterdam)
1	Whole sale price (Cochin)	₹/q	51,803.00	51,803.00	51,803.00
2	Marketing margin (5% of Wholesale price)	₹/q	2,590.15	2,590.15	2,590.15
3	Transportation cost to Port (Cochin)	₹/q	80.00	80.00	80.00
4	Port cleaning and handling charges	₹/q	450.00	450.00	450.00
5	F.O.B price (1+2+3+4)	₹/q	54,923.15	54,923.15	54,923.15
6	Freight charges	₹/q	750.00	450.00	660.00
7	Insurance (at 2% of FOB price)	₹/q	274.22	274.22	274.22
8	Landed cost (5+6+7)	₹/q	55,947.37	55,647.37	55,857.37
9	Exchange rate	1$=₹	66.60	66.60	66.60
10	CIF price (row7/row8)	US $/q	840.05	835.54	838.70
11	Reference price	US $/q	980.00	900.00	960.00
12	NPC of (row 10/row11)		0.85	0.93	0.87

Though, India was the largest producer, processor and exporter of cashew, but its total market share in the world trade of cashew kernel was found a decreasing trend, because of stiff competition from Vietnam and other tree nuts like almond, pistachio *etc*. However, the nominal protection coefficient of cashew kernel is estimated for the year 2015-16 under exportable hypothesis and results of the analysis are presented in the Table 3.

In cashew kernel, the nominal protection coefficient of USA, UAE and Netherlands were 0.85, 0.93 and 0.87 respectively and they were less than one for the year 2015-16, indicating that USA and Netherlands were high export competitiveness than UAE. In other words, higher price of cashew kernel in the international market than the domestic price showed distinct comparative price advantage in favour of India.

4. Conclusion
USA and UAE were found to be highly loyal markets for Indian cashew kernel as indicated by the retention of their previous shares of cashew kernel exports from India by 76.50 and 64.10% respectively. In case of cashew nut shell liquid, USA and China were found to be most loyal markets by having 90.10% and 53.80% respectively. The nominal protection coefficient for USA, UAE and Netherlands (0.85, 0.93 and 0.87 respectively), indicating that cashew kernels markets were competitive for its export to other countries from India.

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