

**THE TRANSITION OF WORLD CASHEW INDUSTRY AND
THE CHALLENGES TO INDIA**

*Thesis submitted to
Cochin University of Science and Technology
for the award of the Degree of
Doctor of Philosophy
under
the Faculty of Social Sciences*

by

Bhooles R.K.

Under the guidance of

Dr. Francis C.A.



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COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY
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The Transition of World Cashew Industry and the Challenges to India

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This is to certify that the thesis entitled “**The Transition of World Cashew Industry and the Challenges to India**” submitted by **Mr. Bhooles R.K.**, to Cochin University of Science and Technology for the award of the Degree of Doctor of Philosophy under the Faculty of Social Science is a record of bonafide research work carried out under my guidance and supervision and that it has not previously formed the basis for the award of any Degree, Diploma, Associateship, Fellowship or any other similar titles of any University or Institution.

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This is to certify that-all relevant corrections and modifications suggested by the audience during the pre-synopsis seminar and recommended by the Doctoral Committee of the candidate have been incorporated in the thesis entitled **“The Transition of World Cashew Industry and the Challenges to India”**.

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Declaration

I, Bhoo des R.K., hereby declare that the thesis entitled “**The Transition of World Cashew Industry and the Challenges to India**” submitted to Cochin University of Science and Technology for the award of the Degree of Doctor of Philosophy is a record of bonafide research done by me under the guidance and supervision of **Prof. (Dr). Francis C.A.**, Former Director, School of Management Studies, Cochin University of Science and Technology and that it has not previously formed the basis for the award of any Degree, Diploma, Associateship, Fellowship, or any other similar title of recognition.

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Abstract

Cashew is an important commodity traded across the continents and the world cashew industry is the livelihood of more than three million people worldwide, the majority of whom are womenfolk from the socially and economically backward community of the developing nations. Cashew tree was originally planted to prevent soil erosion and it was during the beginning of the 19th century that cashew kernels attained the status of a food item. Further, the cashew kernels attained the status of an international commodity with India exporting its first consignment of cashew kernels to U.S.A. in 1920. India was the first country to hit the world market with cashew as a commodity and it was she who pioneered cashew processing as an industry. For decades together India was enjoying a monopoly in the world cashew industry in the fields of raw nut production (cultivation), processing and the market share in the international trade. The liberalisation of international trade has brought in a big transition in the world of cashew. India started to benefit from the trade policy, that improved her supply positions of raw nuts from other producing countries, accelerated her growth in processing of raw nuts and exports of cashew kernels. On the other side, her domestic consumption started growing up that by the beginning of the new century, she emerged out as the world's largest consumer of cashew kernels as well.

But with more raw nut producing countries acquiring the know how of processing coupled with vast mechanization in cashew processing, India started loosing her premier positions in the world cashew scenario. Her traditional suppliers of raw cashew nuts turned out to be her competitors in the world market. India lost her supremacy in international market to Vietnam. Her market share registered a decline in the international market. In short there was an overall transition in the world cashew sector over the years in general and after the trade liberalisations that started a quarter century back. This transition of world cashew industry and the challenges that await India in the years to come in view of these continued transition were the subject matter of this research work.

Though there has been a lot of research conducted in the field of cashew, most of them were in the field of cashew production and trade of raw nuts in individual countries. Consumption pattern was also put to research in individual consumer countries. A detailed review of all such research revealed the gap of a research in the international level coupling production, processing and consumption of cashew nuts,

The main objectives of the study were to analyse (i) the present scenario of the world cashew industry and its transition, (ii) the transition of Indian cashew industry, (iii) the pattern and preference of Indian cashew exporters, (iv) the pattern and preference of overseas buyers of Indian cashew and (v) the challenges to India in the cashew sector in the years to come. Secondary data in the field of raw nut production, processing of raw nuts and kernel consumption worldwide was relied on to analyse the transition of the industry. Primary data was collected separately from Indian exporters and overseas buyers to analyse their pattern and preference of trade. The primary data collected based on a common questionnaire from both Indian exporters and overseas buyers was relied on to analyse the challenges to India in the cashew sector in the years to come.

Different data analysis techniques like Dickey-Fuller, Augmented Dickey-Fuller, Johansen co-integration test, Granger causality test, Chi-square test, Regression analysis, Kenderwall's test, Friedman's test, longlinear multinominal test, Kruskal Walli's test and exploratory factor analysis were made use of. Computer softwares like SPSS, Greatl and E-views were employed in the conduct of analysis.

The research findings drew a clear picture of the international cashew scenario and its transition over the period from 1988 to 2012. The different challenges that await India in the years to come and their relative importance were also analysed. Based on the above, certain suggestions were also put forward. The outcome of the study is of much relevance to the cashew industry in general and to the Indian cashew industry in particular.

Key Words: Transition, Challenge, International Market Share, Global market Share

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Abbreviations

| | |
|--------------|---|
| ACA | African Cashew Alliance |
| ACI | African Cashew Initiative |
| ADB | Asian Development Bank |
| ADF | Augmented Ducker Fuller |
| AFI | Association of Food Industries, USA. |
| ANOPACI | l'Association Nationale des Organisations professionnelles Agricoles de <i>Côte d'Ivoire</i> , (<i>Association of National Organisation of Agricultural Professionals, Ivory coast</i>) |
| ARECA | Autorité de Régulation du Coton et de l'Anacarde, (<i>the government body controlling the cotton and Cashew in Ivory coast</i>) |
| AVC | Agricultural Value Chain |
| BPLR | Benchmark Prime Lending Rate |
| BRC | British Retail Consortium |
| CAGR | Compound Annual Growth Rate |
| CENTA | Combined Edible Nut Association, London |
| CEPCI | Cashew Export Promotion Council of India |
| CNS Liquid | Cashew Nut Shell Liquid |
| CNSL | Cashew Nut Shell Liquid |
| CPCRI | Central Plantation Crops Research Institute |
| DEPB | Duty Entitled Pass Book (An Export incentive) |
| DF | Ducker Fuller |
| EEFC Account | Exchang Earners Foreign Currency Account |
| FAO | Food and Agricultural Organisation |
| FCL | Full Container Load |
| FGD | Focussed Group Discussions |
| FGG | Farmers with Gardens of Graft origin |

| | |
|---------|--|
| FOB | Free on Board |
| FSG | Farmers with Gardens of Seedy origin |
| GDP | Gross Domestic Product |
| HACCP | Hazard Analysis at Critical Control Points |
| He. | Hector |
| HRW | Humar Rights Watch |
| IMF | International Monetary Fund |
| INC | International Nut Council |
| IRR | Internal Rate of Return |
| ISO | International Standard Organisation |
| K | Degree Kelvin |
| Kg | Kilogram |
| Lbs | Pounds |
| LDO | Light Diesel Oil |
| LIBOR | London Interbank Offered Rate |
| MDS | Multi Dimensional Scaling |
| MNC | Multi National Company |
| MT | Metric Tonne |
| NABARD | National Bank for Agricultural & Rural Development |
| NEPC | Nigerian Export Promotion Council |
| NGO | Non Governmental Organisation |
| NRC | National Research Center |
| NUTPACK | Nut Processors Association of Kenya |
| OPEC | Oil Producing and Exporting Countries |
| OT | Out tern |
| PCFC | Packing Credit in Foreign Currency |
| PPP | Purchase Price Parity |
| R&D | research and Development |

| | |
|--------|---|
| RCA | Revealed Comparative Advantage |
| RCN | Raw cashew Nut |
| SWOT | Strength, Weakness,, Opportunity and Threat |
| TAFCON | Tamilnadu Forest Plantation Corporation Ltd |
| TFE | Twenty Feet Equivalent (Container) |
| TMP | Tea Mosquito Pest |
| UNDP | United Nations Development Programme |
| VAT | Value Added Tax |
| VKUGY | Vishesh Krishi Udyog Gramina Yojana (An Export incentive) |
| WATCH | West African Trade and Cultural Hub |
| WTO | World Trade Organisation |
| WW | White Wholes |

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Publications

Papers presented/Published

- Generic Promotion of Cashew with specific reference to nutrient value:
- 'Kaju India' -international Seminar-2006
- Impact of Change in Exchange rate in the export sector of India:
- Albertian Institute of Management, Cochin-2008
- The transition of Global Cashew Industry and Challenges to india:
- Albertian Institute of Management, Cochin 2010
- Risk management in International Trade :
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- India-Challenges ahead in Cashew Sector :
- International Conference on Cashew-Ministry of Agriculture-2012
- Exchange rate Management by Agri based SME Sectors in India
- Kochi Business School-2014
- Dealing with Broken kernels-Practices in India
- Cashew Handbook - Global perspective -2014

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Chapter 1

INTRODUCTION

| | |
|--|--|
| <i>C o n t e n t s</i> | 1.1 <i>About Cashew</i> |
| | 1.2 <i>Cashew and Health Care</i> |
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| | 1.4 <i>Cashew Kernel Specifications</i> |
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| | 1.10 <i>The Objectives of the Study:</i> |
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Cashew is an important commodity in the international trade spread across the continents and is a major foreign exchange earner to many a countries in the world including India. Further it provides gainful employments to more than three million people around the world of which around one million are in India alone. Cashew tree which was planted mainly to prevent soil erosion has today attained the status of a commercial plantation. The world of cashew chain starts with the production of raw cashew nuts, its trade and shipments, the processing of raw nuts to cashew kernels and the

marketing and consumption of cashew kernels-all both within the countries and across different countries.

1.1 About Cashew

Cashew, botanically known as ‘anarcadium occidentale’ is a short stocky, low spreading evergreen tropical tree belonging to the ‘Anacardiaceae’ family and has its origin in Brazil. It grows in tropical climatic area normally 30 degree north and south of equator and spreads up to 200 Km from the coastal belt. The cashew tree blooms once a year with a yellow pink flower and the season lasts for three to four months. It was introduced to the rest of the world mainly by the early Portuguese travelers, mostly as a soil binding tree. In India, cashew was introduced in the early 16th century.

This succulent fruit of cashew known as ‘cashew apple’ was perhaps the major product in use those days. It was consumed in raw and preserved form as a fruit and also as an alcoholic drink after fermentation. The branch of the tree was a source of fire wood for the villagers and tribes. The sap and leaves of the tree were used as medicine for certain skin diseases. In short, the nut of the tree was the only waste product just meant for reproduction.

The cashew nut in its raw form contains a hard shell of honey comb structure. Inside the shell is the white/grayish pulpy kernel covered by a protective layer of testa membrane. The acidic oil contained in the shell – known as CNS oil – made it unacceptable for human consumption. Yet, it was consumed by the villagers and tribes in its primitive form, by cutting open the shell before it hardens.



Source: www.plantpicture.de

Fig.1.1 The Cashew Leaf, Apple and Nut

It was during the 19th century that India developed some or other raw techniques to extract the cashew kernels without the presence of the shell oil and gradually the cashew kernels found a way in the Mediterranean diet and attained the status of a food item. Cashew kernels were extracted and sold in the nearby and far off markets in the early 19th century. This led to the development of trade of cashew in the local and far-off markets. It was in

1920's that cashew emerged out as a commodity in the international trade with India exporting its first consignment of cashew kernels to USA.

Today, cashew is a major agricultural commodity traded in the international market and the world cashew industry is spread over the continents of Asia, Africa, Europe, America and Australia. It is a major forex earner to many a developing countries in the world. It fetches livelihood to more than three million people the world around, the majority of whom are women from the weaker sections of the society in the third world countries.

Cashew industry is the back bone of the economy of many a villages in rural and semi urban India. The industry is so important that it fetches gainful employment to around one million workforce and a forex earning to the tune of USD 850 million annually.

In raw form, the cashew kernel is a soft, white and pulpy nut. When roasted, the kernels turns from a creamy white into a golden hue and the mellow pulp becomes crispy. It is a form of high energy and tastes good consumed in any form-plain, roasted or steamed. The cashew kernels, commonly and commercially known as 'cashew nut' is the most traded and consumed and hence the most commercially important product of the cashew tree.

1.2 Cashew and Health Care

“Nuts are notable not only for the superior quality of protein, but for their richness in calcium, iron and other mineral elements. Nuts are the quintessence of nutriment, in fact the ‘chef-d’ oeuvre’ of Nature in food products. They supply for a given weight nearly twice the amount of any other food products”

– Dr. John Harvey Kellogg 1932.

Cashew kernels, which is a unique combination of fat, carbohydrates and protein, and a source of high energy. are mostly mis-conceived as not good for health due to the high level of fat contents. Like all plant products, they are cholesterol free. Cashew Nuts are sodium free and contain 7 per cent of recommended daily value for dietary serving per serving. They contain small amounts of thiamin, riboflavin, niacin and folic acid. They are good source of iron, phosphorous and magnesium. (cashew, the millennium Nut, 2000).

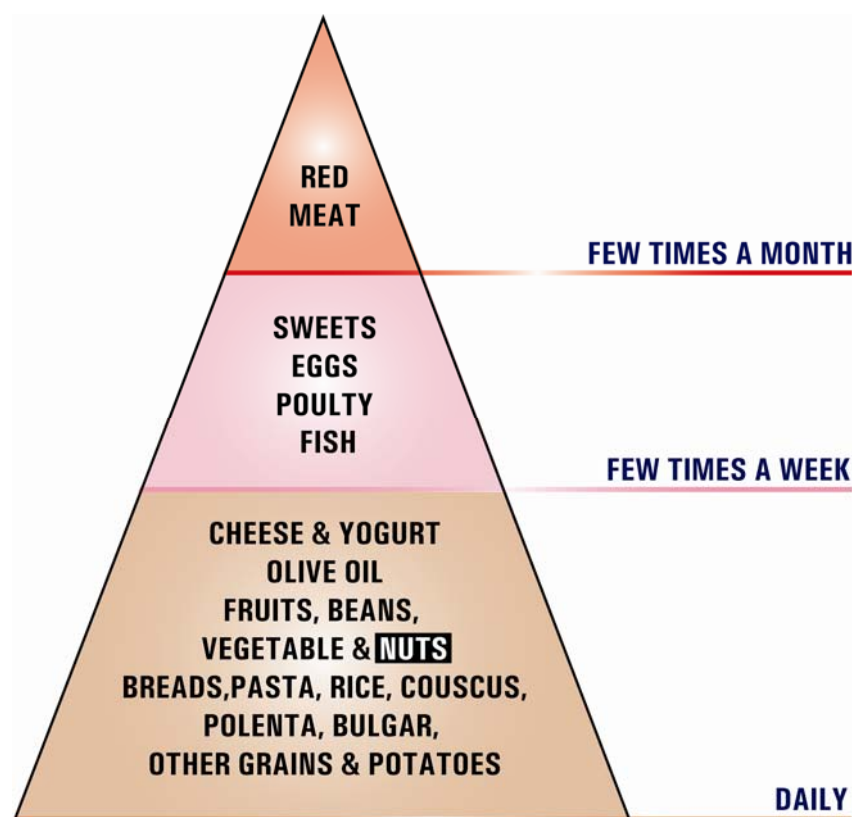
Cashew is well balanced in their dietary composition. For the composition of fat to be well balances, there should be a high level of monosaturated fat and relatively low level of saturated and poly unsaturated fat, that too in almost equal propositions. In cashew, the relative levels of saturated and poly unsaturated fats is almost of 1:1 ratio and the ratio of monosaturated to saturated fat is almost in the ratio 4:1., which as per research on dietary fat from the 'Framingham heart study' in USA forms a well balanced diet. Further the predominant poly unsaturated acid in cashew kernel is Omega-6, which is an essential fatty acid. Monosaturated fat acts like a level controller of cholesterol in the body that it allows the body to produce cholesterol when the level falls below the required level or not to produce cholesterol when not required. Relatively small levels of saturated and poly unsaturated fats with higher levels of mono saturated fats keeps to maintain a balanced level of cholesterol. As per research conducted in University of Maryland (USA), low levels of saturated fat might protect against heart diseases, while higher levels of monosaturated fats could prevent stroke.

Further, though cashew contains 22 per cent of carbohydrates, it contains only 1 per cent of soluble sugar, that one is privileged to have a sweet taste without worrying for excess calories. Cashew nuts prevents certain types of cancer, as evidenced by most epidemiological study that identify a low saturated fat high fiber diet as associated with low incidence of cancer.

Cashew, is rich in 'selenium', a nutrient. In the 1st May 1995 edition of 'Newyork Times', a study published in the journal 'Nature Medicines' indicates the first direct scientific evidence linking mutation of virus due to nutritional deficiency in the host. Selenium is an anti oxidant that protects the gene from the damaging effects in the body. The cashew nuts contains the highest level (23.40 mcg per 100 grams) of selenium than any other edible nuts. (Indian cashew Journal Vol XXII).

The World Health Organisation, FAO collaborating centre in Nutritional Epidemiology at Harward school of Public health and oldways Preservation & Exchange trust have co – developed a Mediterranean diet pyramid that may be considered as a role model for good health and longevity.

There is documented evidence to show that cashew consumption is good for health and is a recommended item for daily consumption in small quantities. Such clinically backed finding can be made an important tool in market promotion of cashew kernels worldwide. CEPCI has recently taken up a research on the effect of cashew on certain types of diabetics with the participation of Dr. Mohan's clinic, Chennai.



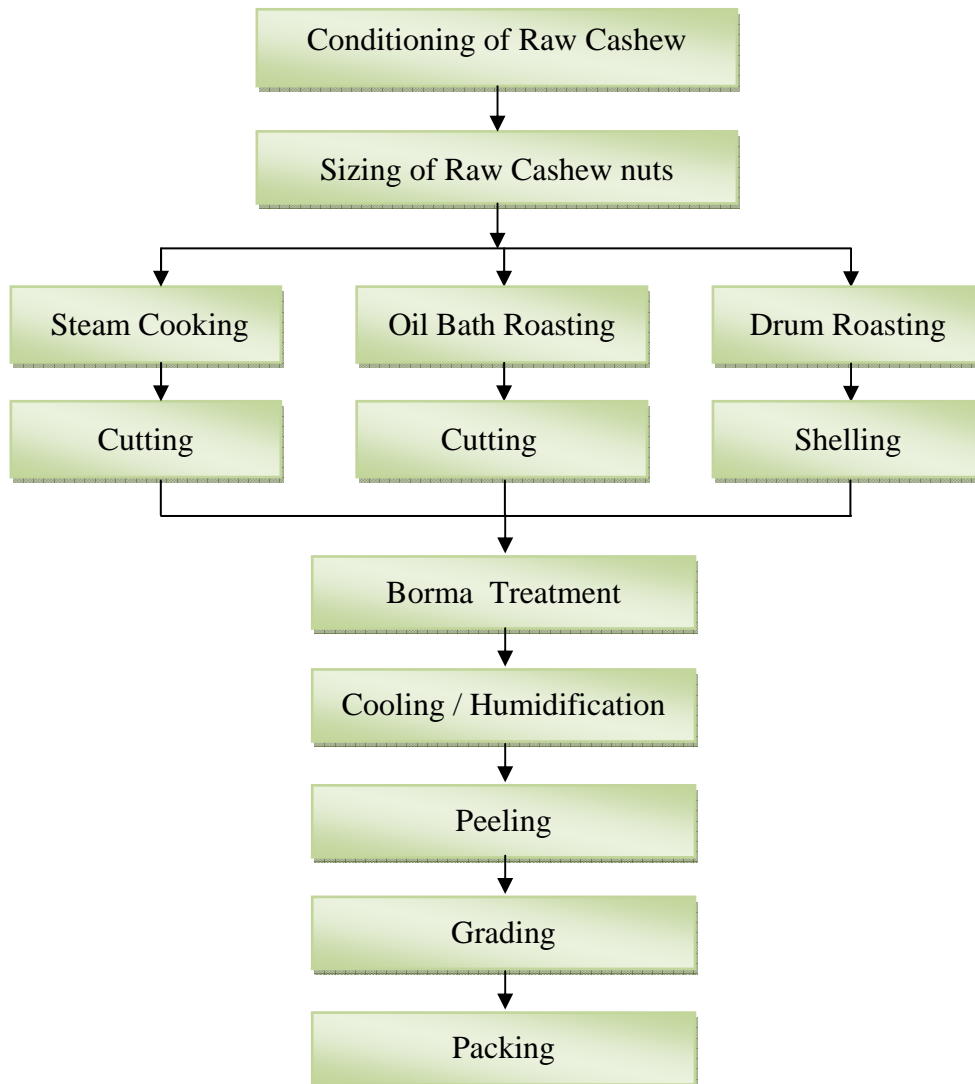
Source: *Cashew the Millennium Nut-2000* (CEPCI)

Fig.1.2 The Mediterranean Diet Pyramid

1.3 Processing of Cashew

Cashew nut by all means is a versatile crop. The manufacturing of cashew nut kernels involves various stages which is entirely different from one another. The processing of Cashew nuts starts from sizing of raw Cashew nuts and continues up to packaging. The processing involves de-shelling of raw cashew kernels to extract the pulpy kernel inside, heat treatment, removal of skin and standardization of the final product. The de-shelling of cashew is done mainly in three different ways viz. (1) steaming and cutting (2) oil Bath Roasting and Cutting and (3) Drum Roasting and shelling. Each method has

its own merit and de-merits and is being adopted in different regions depending on the peculiar socio-economic characteristics of the region.



Source: Compiled during the study

Fig.1.3 Processing stages of cashew nut

In the First process, the raw cashew nuts are dried to expel excess moisture. Mostly it is done by sun drying. The moisture level of raw nuts should be maintained at about 8 per cent for safe storage and effective

processing. Later on, the raw nuts are segregated to different sizes. Different sizes are given different treatments in the subsequent processing. The raw nuts are then either steam cooked or roasted in drums or oil bath, making the hard shell easy to open. The raw nuts are either cut open using cutting machines or de-shelled by striking with wooden sticks (malleting). Malleting is normally associated with drum roasting. In all these process, the kernel with skin is extracted. The de-shelled nuts are then heated in an oven to remove excess moisture and subsequently cooled and humidified. This process loosens the adhering testa, that makes its removal easy. In peeling the membrane skin covering the cashew kernel is removed and the white kernel inside is extracted. The kernel thus extracted is then segregated to different grades and finally packed. The grading and final packing are all as per international norms. Strict quality standards are adhered to in all stages of processing.

1.4 Cashew Kernel Specifications

Cashew kernels are specified in terms of Colour, Size and Shape (ie, whole cashews, broken Cashews etc.). The colour is commonly classified into While, Scorched and Scorched Seconds. The Size (applicable for wholes only) is classified on the basis of number of whole kernels in one pound and is termed as count. Thus a grade WW 320 (or W 320) stands for while wholes cashew kernels that counts a maximum of 320 numbers per pound (454 grams). The shape of cashew is classified into Wholes, Brokens and Pieces.

Cashew Kernels currently have three internationally accepted grading systems:

1. CEPCI : The Cashew Export Promotion Council of India
2. AFI : Association of Food Industries
3. UNECE : United Nations Economic Commission for Europe

The specification laid by the Cashew Export Promotion Council of India is widely accepted in the international trade of Cashew kernels. The AFI have also laid down the specification of Cashew kernels, but that is at par with the CEPCI specifications, but only with some change in the nomenclature of grades. The UNECE specification is a hybrid of CEPCI and AFI specification.

1.5 The World Cashew Industry

Cashew both in raw form and in kernels is today an important commodity in the international trade. Cashew is generally a tropical product that grows 30⁰ North and south of equator along the coastal regions and up to 200 km interiors. The major raw cashew producing regions in the world include Brazil, West Africa, East Africa, India, Vietnam, Indonesia, Sri Lanka etc.

Cashew processing is a labour intensive job that requires high skill involving dexterity. Traditionally India was the sole processor of cashew nuts in the world in the beginning days of international trade. The western worlds efforts to find an alternate supplier encouraged Brazil to start processing in the 1950's. Other small producers like Sri lanka, Indonesia, East African Countries etc. were also processing cashew in a small way. Later in the early 1990's, the world witnessed the emergence of Vietnam as a strong competitor of India in the international market. In the 2010's, Vietnam took the batten from India as the world's largest exporter of cashew kernels. Mechanisation in process added comfort levels to cashew producing countries to go for processing. Heavy mechanization in processing was the success key of Vietnam in the international cashew scenario.

Cashew is considered as 'the poor man's crop and the rich mans's food'. Rich nations like USA, UK, Europe, Japan and Australia are the major consumers of cashew kernels in the world. Though the exports from processing countries are in the form of plain cashew kernels, the consumption in the above regions are in roasted, salted and other value added forms. A strong market was developed in India during all these days for the broken grades of cashew kernels, which otherwise was not in demand in the international market. But later on, the World witnessed a strong market of cashew kernels in the Middle East and an emerging domestic market in India. Today India is the largest consumer of Cashew kernels in the World.

Apart from cashew kernel, the cashew apple, cashew feni (an alcoholic drink), cashew nut shell liquid (CNS Liquid) - used in the manufacture of paints & abrasives, cashew shell cake (used as fuel) and cashew testa (making varnishes & tanning agents for leather) are the other products of the cashew tree. More than 90 per cent of the value realization is on cashew kernels alone and as such the kernel is the most important product of the tree.

1.6 India and the Cashew Industry

The cashew industry in India can be traced back to the early 1900s, when the villagers introduced some or other raw methods to extract the kernel from the raw cashew nuts without much presence of the CNS liquid. Slowly, cashew attained the status of a food item and that started the trade of cashew kernels in nearby and far off markets. Cashew attained the status of an international commodity with India shipping the first consignment of cashew kernels to the US in 1920. (Rajmohan and Santha *The World Cashew Industry* 2008).

India was the First country to hit the world market with cashew kernels and it was she who pioneered the cashew processing as an industry. Majority of the cashew producing countries are still counting on India as the main market for their Raw Cashew Nut produced. India has the advantage of highly skilled labour and a strong domestic market for broken cashew kernels -which otherwise cannot be sold in the international market, making cashew processing in India more feasible than any other part of the world.

More than a million workers, majority of whom are women folk from the socially and economically backward communities of rural India and their extended families fetch their livelihood in this industry. In farms also almost four million farmers earn their living by cultivating cashews. As per the statistics published by the Department of Cocoa and cashew, the total area of cultivation of cashew in India was 956,200 hectares in 2012. The cashew Industry fetches a forex of rupee equivalent of ` 5,000 crores to the nation in the year 2013 as per reports published by the Cashew Export Promotion Council of India.

1.7 The Problem Defined

India was enjoying her unparalleled and premier position as the largest Producer, processor and exporter in the world. India had an hedge in cashew trade world over in both processing as well as marketing .Uninterrupted processing was ensured on account of round the year imports of raw nuts from other producing countries, mainly in the African and Far East Asian regions.

But with more and more producing countries acquiring the knowhow and starting production and thus entering the international cashew market, the

premier position enjoyed by India in this market looks shaky today as India is facing stiff competition in the international market than ever before,

Further, the heavy dependence of India on imports of raw cashew nuts has put the producing countries in a commanding position that today India is at the mercy of these producing countries to source raw cashew nuts for processing.

India was the processing hub of cashew nuts in the world that apart from her own production of raw cashew nuts, a lion share of production of raw nuts in the rest of the world was imported into India and after processing here, the processed kernels were exported to different parts of the world.

Again, mechanization in processing has brought in a feel of comfort for the raw nut producing countries to process the raw nuts in their own countries - which otherwise was not possible due to lack of skilled labour - so that they can directly export their processed kernels in the international market. This had a double effect that on one side it affected the raw material sourcing for India while on the other side these countries turned out to be the competitors to India in the international market by offering these processed cashew kernels, which otherwise would have been the produce of India. Also, these countries are able to sell their broken grades – which otherwise cannot be sold in the international or their domestic market - in the domestic market of India by adopting some or other means that made the trade more lucrative for others, but more tough for India.

On the other side, the domestic consumption in India had grown up considerably. The consumption of cashew kernels had increased worldwide

including India. While Indian consumption had grown up, Indian exports also had grown up. Had India been able to gear up with the international and domestic demand?

It is a fact that Indian production, processing and exports had grown up and also her domestic consumption. But had her production and processing gone up in tune with the real transition in the cashew scenario worldwide? What effects the mechanization of cashew processing had brought in the Indian cashew scenario? What was her comparative advantage and the trend in cashew compared to her competitors? What are the challenges that India is about to face in the coming years?.

1.8 The Statement of the Research Problem

India is facing heavy competition in the international cashew sector in view of the recent transition in production, processing and consumption of cashew. The mechanization in processing, the change in the production and consumption worldwide coupled with the policy changes in the industry and various governments have brought in a total shift to the industry world over. Several new countries started processing and posed threat to India in the international market. India's share of cashew kernels in the international market is declining day by day.

The effects of globalization and the resulting transition of cashew industry in production, processing and consumption are un-explored. The opportunities and challenges to India in view of the transition in global cashew industry in the years to come is yet to be analysed. All these have derived to the formulation of the research problem as under:

- What are the transitions in the field of production, processing and consumption of cashew nuts worldwide and in India in particular?
- What are the challenges to India in the light of the transitions in the years to come?

1.9 The Research Gap

A lot of study was conducted in the field of cashew both from the research and trade point of view. Most of the studies were in this field of agri-research area that dealt with the growing of the cashew trees, development of high yielding breads, the effects of climatic changes in cashew production, the harvesting and grafting methods and disease control of cashew trees, organic production of cashew and the like. Further, the economy in cashew production and its effects in the third world countries was another area studied in detail.

In the processing side, most of the research was pertaining to the economy in processing and the pollution aspects of cashew processing. Further, there had been medical research in the area of the effect and dermatoses among cashew workers, effects of cashew fumes in the aspiratory system etc.

Regarding marketing, most of the studies were isolated to the western world, who used to be the traditional consumers of cashew kernels. These studies were mainly based on the market environment, the competition from other edible nuts and the market promotion (both generic and specific) of cashew. All these researches were mainly isolated in the North American and European countries.

A health aspect of cashew was another field widely put to research. The health advantage of cashew consuming, its ability to lowering / stabilizing cholesterol levels in the blood, stabilizing the nervous system, controlling diabetics etc were researched in detail.

After an extensive literature survey, it was identified that no study had been conducted combining the production, processing and consumption of cashew worldwide. The emerging markets of India and her challenges in the cashew field had never been a subject of research in spite of the fact that India is the world largest consumer of cashew in the world. Hence this study was relevant and aimed to bridge the aforementioned gap in the research.

1.10 The Objectives of the Study

The research study was aimed at analysing the transition of the world cashew industry -with specific reference to the declining market share of India in the international market - and the challenges that India is likely to face in the years to come.

- 1) To analyse the present scenario of world cashew industry with reference to production and processing of raw cashew nuts and consumption of cashew kernels in the international market.
 - a) To analyse the transition in production of raw cashew nuts worldwide.
 - b) To analyse the transition in processing of raw cashew nuts worldwide.
 - c) To analyse the transition in the trade and consumption of cashew kernels worldwide.

- 2) To analyse the transition of the Indian cashew Industry.
 - a) To analyse the cause and effect of different factors and their co-integration with domestic consumption in India.
 - b) To analyse the co-integration of internal factors with the share of India in the international market.
 - c) To analyse the co-integration of external factors with the share of India in the international market.
- 3) To analyse the pattern and preference of Indian Cashew Exporters
 - a) To Analyse the various strategies adopted by Indian Exporters in the trade.
 - b) To analyse the various stimuli in switching between exports and domestic sales.
 - c) To analyse the perception of Indian exporters regarding export of Value added cashew kernels.
- 4) To analyse the pattern and preference of overseas buyers of Indian Cashew.
 - a) To analyse the various strategies adopted by overseas buyers in the import of cashew kernels.
 - b) To analyse the perception of overseas buyers regarding quality of Indian cashew
 - c) To analyse the various stimuli of overseas buyers and their preference in the cashew trade.
 - d) To compare the performance of competing countries in the international cashew market.

- 5) To analyse the challenges to India in the years to come in view of the ongoing transition of cashew in production, processing and consumption worldwide.
 - a) To identify the challenges to India in the years to come.
 - b) To suggest remedial measures to overcome the challenges identified.

1.11 The Scope and Relevance of the Study

Cashew industry in India is the livelihood of more than a million employees, a vast majority (more than 90%) of whom are women folks from the socially and economically backward section of the rural and sub-urban villages. An equal number of people are indirectly employed in the cashew sectors that include the farmers, farm labours, traders, agents, retailers, wholesale sellers etc. Further it fetches a foreign exchange equivalent of 5000 crores to the nation. The domestic turnover of the industry is estimated at 9000 crores during 2012-13. As such any small problem in the cashew sector is more than enough to bring in far reaching effects in the socio-economic sector of thousands of villages in India whose economy depends more or less on the cashew sector. Further, as a forex earner to the country, the cashew sector is very important to the economy of India as well.

Today, cashew industry in the state is spread across the states of Kerala, Karnataka, Goa, Maharastra, Tamilnadu, Andhrapradesh, Orissa and West Bengal. The economy of thousands of village in the rural India in these states more or less depend on the cashew industry. The cashew industry plays a major role in the poverty alienation and ensuring better living standards to many a people employed directly and indirectly. More than a commercial activity, the Cashew industry in India is a social commitment.

Started as a cottage industry in the early 20th Century in an unorganized way, it had attained the status of a small scale industry towards the middle of the 20th century. Today with a professional approach it has attained a corporate and MNC standard in the Indian scenario as well.

Further, India was the first country to hit the world market with cashew as a commodity and it was she who pioneered cashew as an industry. India is today, the largest producer, importer and processor of raw cashew nuts and the biggest consumer of cashew kernels in the world. India was the largest exporter of cashew kernels in the world, the position that she left out to Vietnam in 2006. She is facing a lot of competition and problems both in the domestic as well as the overseas market.

It is highly necessary that the problems that India faces in the cashew sector are addressed properly, for which studies in the relevant area are essential. Most of the research studies in India in the cashew sector is related to cashew growing. Medical researches are also carried out here regarding the effect of cashew processing and the health problems of the workers and also on the pollution problems of cashew processing. Even in the international level, most of the researches concentrates to the above aspects only. No studies are seen conducted clubbing the production, processing and consumption of cashew so far.

This study was aimed at bring in more depth to the world cashew trade with specific reference to India and the challenges that India faces in view of the competition in the international market, as a result of the transition of the industry in the international level, which otherwise was not seen studied in detail. The suggestions that came out of the study can be of great relevance to

the cashew industry in India in providing better orientation to the industry in future.

1.12 The Hypotheses

While analyzing the declining trend of Indian exports of processed cashew kernels, the main argument that came across was whether the problem was due to just diversion of its production to the domestic market or that due to the fact that India could not gear-up to the changing demands and trends in the production, processing and trade of cashew. Also, whether it is the change in the income levels or the low prices that prompted for the high level of domestic consumption in India? Further, had the government incentives and policies made any changes to the exports of cashew kernels? Is it viable to eliminate the imports by increasing the domestic production of raw cashew nuts etc.

Arguments regarding the cause and effect of decline in export share of India in the international cashew kernel market lead to the formation of hypotheses as under:

- H1: The domestic consumption in India was co-integrated to the income levels.
- H2: Import of raw nuts had more effect on the domestic consumption in India than the domestic production of raw cashew nuts.
- H3: The market share of India in the international market and the domestic consumption were co-integrated.
- H4: The domestic consumption in India and the export prices of cashew were co-integrated

Regarding the performance of India in the international market, the following hypotheses were formulated:

- H5: The effect of Vietnam on the market share of India was more when compared with other competitors.
- H6: The international Market share of India was co-integrated to her global supply share of raw nuts
- H7: Indian cashew enjoyed a premium price in the international market compared to her competitors.

Regarding the internal (domestic) factors that influenced the exports of cashew nuts from India, the hypotheses formulated were:

- H 8: Government policies had significant effects on the exports of cashew kernels from India
- H 9: The exchange rate fluctuations had influenced the exports of cashew kernel from India.

And regarding the external (international market driven) factors that affected the exports from India, the hypothesis formulated was:

- H 10: Demand drives caused the change in international market price of cashew kernels than the supply positions of raw cashew nuts.

Further analysis of the pattern and practices including the stimuli for Indian Exporters for opting imports of raw nuts, exports of cashew kernels and engaging in international trade lead to the formulation of the following hypothesis:

- H11: The sales methods and volume exported were associated.
- H12: Export share of cashew kernels was associated with import share of raw cashew nuts.
- H13: Import of raw cashew nuts was inevitable for Indian cashew industry.
- H14: There existed no significant difference among small, medium and top exporters in their attitude towards the export of value added products from India.
- H15: There existed no significant difference among small, medium and top exporters in the trade related factors for exports
- H16: Direct monetary incentives were more motivating for Indian Exporters than indirect incentives
- H17: Foreign exchange management of Indian Exporters was associated with experience in export trade.

And analyzing the pattern and practices of overseas buyers engaged in the cashew kernel trade, the hypothesis formulated were:

- H18: Overseas buyers had no specific preference to any supplier even under identical purchase criteria conditions.
- H19: Quality of Indian Cashew was superior to that of other origins.
- H20: There existed no significant difference among the small, medium and top classes of overseas buyers regarding their perception to various purchase criteria of cashew kernels.
- H21: There existed no significant difference in the performance of competing countries in the international cashew market on the basis of buyers preference.

1.13 The Research Methodology

This study was conducted to analyse the transition of the world cashew industry in the field of production, processing and consumption of cashew in the world over the last 25 years (1988-2012) and the challenges to India in the cashew sector in the years to come. The views and opinions of Indian Exporters and Overseas buyers were also collected and analysed to arrive at conclusions. The study was conducted over the period of 2004-2014. The material and information available worldwide regarding the production, processing and consumption of cashew were utilized for the study.

1.13.1 Types of Data Analysed

Both primary and secondary data were used for the study. Secondary data was relied on for analyzing the transition of the world cashew industry. Data pertaining to production of raw nuts, processing of raw nuts, consumption of cashew kernels, economic indicators of different nations etc. were made use of for the study. Primary data was collected to analyse the views and opinion of Indian Exporters and Overseas buyers and also the challenges to India in the years to come. Separate questionnaires were used to survey the Indian Exporters and overseas buyers.

a) Secondary Data Sources

Secondary data analysed consisted of published data in the field of cashew trade and research. The published data available with research publications in India and abroad, domestic and international trade bodies, export promotion councils in India and abroad, customs authorities of various exporting and importing countries, embassy publications in India and abroad, trade statistics published by the UN,

FAO (Food and Agricultural Organisation), data published by international organisation, other government agencies in India and abroad were the main source of secondary data.

b) Primary Data

Primary data was collected from Indian Exporters and Overseas buyers of cashew kernels. For the first hand information of various factors, expert interviews were conducted with eminent exporters and overseas buyers. The conclusions drawn from such interviews were the basis of further analysis. Separate Questionnaires were prepared for Indian Exporters and Overseas buyers based on the conclusions drawn. Pilot study and protocol analysis adopting Newel and Simon (1973 method) on a focus groups of 12 Indian Exporters and 8 overseas buyers were concluded. The focus group was selected on convenience basis from among the participants of 'Kaju India 2011' – a buyer seller meet conducted in kollam, kerala. The questionnaire was modified based on the inference drawn on pilot study and protocol analysis. Reliability of the questionnaire was tested using Cronbatch's Alpha test and administered to the sample of both Indian Exporters and overseas buyers.

1.13.2 Sampling Method

The universe of the study consisted of Indian Exporters and Overseas buyers of cashew kernels. In India, cashew processing is spread across the states of Kerala, Karnataka, Goa, Maharashtra, Taminadu, Andhrapradesh, Orissa and West bengal. But the exporters are mostly from Kerala, Karnataka, Tamilnadu and Goa, where as the processing in the rest of the states are fully domestic market oriented.

The overseas buyers are spread world over. Most of the buying takes place in USA and UK and a part of the cashew so bought is being re-exported to other small markets across the world. Middle East has emerged out as a promising market. Europe, Japan and Australia are other traditional buyers for cashew kernels.

a) Sample Frame

Since the exact numbers of Indian Exporters and Overseas buyers were not readily available, a sample frame of such Indian Exporters and overseas buyers had to be resorted to. Most of the Indian Exporters were members of The Cashew Export Promotion Council of India (CEPCI) and the overseas buyers (other than Middle East) were the members of AFI (Association of Food Industrie, USA) or CENTA (Combined Edible Nut Traders Association, U.K.). A majority of Middle East buyers were from Dubai (UAE) and Saudi Arabia (KSA). The list of such buyers in UAE and KSA could be traced from the Chamber of Commerce of Dubai and Jeddah, who were involved in the import of cashew kernels. On the basis of the above, a sample frame was selected.

Table 1.1 Sample Frame of Respondents

| Respondents | Sample Frame |
|-------------------------|--|
| Indian Exporters | Members of CEPCI as on 2010 |
| Overseas Buyers | <ul style="list-style-type: none"> a. Members of AFI as on 2010 b. Members of CENTA as on 2010 c. Dubai Chamber of Commerce members -2010 d. Jeddah Chamber of Commerce Members-2010 |

b) Inclusions and Exclusions

The list of members of CEPCI consisted of 181 Members as of 2010. Only those members having exports of cashew kernels during 2009-10 were considered. But some of them were members of the same business groups. The views and opinion of such group members could be the same as they were under the same management. Such group members were identified with common address / contact number / contact person and considered as a single entity. Further, exporters with less than five years of experiences were not considered for the purpose of sampling. Also, exporters having exports of less than 10 FCL (about 150 M.T) during the year was excluded. With the above exclusions, the sample frame was reduced to 93 members.

As regards overseas buyers, the members of dry fruit section dealing in cashew nut were only considered for the survey. Certain overseas buyers were members of both AFI and CENTA. Such members were considered only once. Further Indian, Vietnamese and Brazilian exporters who were members of both AFI and CENTA were excluded from the list. Regarding the members of the Dubai and Jeddah chambers of commerce, only those members who had imported cashew kernels any time during the calendar year 2010 were only considered. However those with imports of less than 10 FCL (150M.T) during the year was not considered. With the above exclusions, the sample frame got reduced to 62 numbers.

Table 1.2 Inclusion and Exclusion Criteria of Samples

| Respondants | Inclusion criteria | Exclusion criteria |
|-------------------------|---|---|
| Indian Exporters | <ol style="list-style-type: none"> 1. All Manufacturing Exporters of Indian cashew Kernel who are members of CEPCI | <ol style="list-style-type: none"> 1. Exporters with less than 5 years experience in export. 2. Exporters with less than 10 FCL (150 M.T) in the year. 3. Additional members of the same group 4. Exporters of CNS liquid alone. 5. Traders/ brokers in cashew trade |
| Overseas Buyers | <ol style="list-style-type: none"> 1. Members of AFI 2. Members of CENTA 3. Members of Dubai Chamber of Commerce with cashew kernel imports in 2010 4. Members of Jeddah Chamber of Commerce with cashew kernel imports in 2010 | <ol style="list-style-type: none"> 1. Members already included in one organisation 2. Members with less than 5 years experience in cashew imports. 3. Importers with less than 10 FCL during the year. 4. Agents/brokers of cashew kernels |

c) Sampling Technique and Sample Size

The population under study after applying the inclusions and exclusions criteria was only 155 comprising of 93 Indian Exporters and 62 overseas buyers. Since the responses were to be collected separately from Indian Exporters and overseas buyers, two levels of sample size estimations were required. One for the Indian exporters and another for overseas buyers. Even though the sample frame seems to be small, the difficulty in reaching both the groups which is spread across India and

other parts of the world justified the move of the researcher to go for sampling rather than census.

Since the real population was infinite, the methodology of sample size estimation was based on the mean and standard deviation of key variables involved in the study extracted after the pilot study and could be estimated using the following formula. $4\sigma^2/(0.025 \bar{x})^2$. Hence the sample size was estimated for all the major variables and the final sample size was the average of all estimations.

Table 1.3 Sample Size Estimation for Indian Exporters

| Indian Exporters – Key Parameter – Descriptive Statistic | | | | | | |
|---|--------------|-------------|-------------|-------------|-------------|-------------|
| | Parameter 1 | Parameter 2 | Parameter 3 | Parameter 4 | Parameter 5 | Parameter 6 |
| Mean | 6.5500 | 5.1538 | 5.7500 | 4.7436 | 5.6500 | 2.1500 |
| Std. Deviation | 2.55152 | 2.00707 | 1.97094 | 1.58476 | 1.59406 | .73554 |
| Estimated Sample size | 37.86982 | 22.14533 | 49.24592 | 46.35582 | 51.02041 | 14.51247 |
| Average | 36.85 | | | | | |

In this case the sample size was estimated to be 36.85 for Indian exporters which was then rounded off to 45 samples. But in the case of overseas buyers, the sample size was estimated to be 27.45 and then rounded off to 35. To ensure the minimum sample size in view of anticipated non responses and erroneous responses, the minimum sample size was exceeded by 25 per cent in the rounding off sample sizes.

Table 1.4 Sample Size Estimates for Overseas Buyers

| Overseas Buyers – Key Parameter – Descriptive Statistic | | | | |
|--|--------------|-------------|-------------|-------------|
| | Parameter 1 | Parameter 2 | Parameter 3 | Parameter 4 |
| Mean | 3.12 | 2.48 | 4.28 | 3.32 |
| Std. Deviation | 0.268 | 0.293 | 0.321 | 0.102 |
| Estimated Sample size | 28.44444 | 41.62331 | 32.65306 | 7.111111 |
| Average | 27.45 | | | |

The sampling technique deployed was simple random sampling using lottery method. Since the details of the exporters and overseas buyers were available, SRS by using lottery method was used to draw 40 samples from Indian exporters and 30 samples from overseas buyers. The Indian exporters were contacted in person and the data was collected. But regarding the overseas buyers, they were contacted with the help of organisations like AFI and CENTA.

d) Data Collection Method

Separate questionnaire were used for collection of data from Indian Exporters and overseas buyers. The questionnaires were prepared on the basis on information collected during secondary data analysis and the interviews with experts (both Indian Exporters and overseas buyers) modified after protocol analysis and pilot study.

Collection of data was carried out using both questionnaire and schedule methods for Indian Exporters as well as Overseas Buyers. Online questionnaire were prepared and a link created in both the cases. The link was forwarded to the respondents with a request to participate

in the survey. In addition schedule method was used to collect the responses from those overseas buyers who had visited India during 2011 (for those who had not responded to online questionnaire).

Regarding Indian Exporters, a schedule method was adopted to collect responses from those Exporters from Kerala and Tamilnadu who had not responded to the online questionnaire.

The responses were collected during April to Dec 2011 from both Indian Exporters and Overseas buyers.

e) Response Ratio

The collection of responses from both Indian Exporters and Overseas buyers was time consuming as most of them had to be reminded quite often. Two of the Overseas buyers and three Indian Exporters were reluctant to participate. One Overseas Buyer expressed his reluctance as the policy of the firm did not allow him to take part in such surveys, while the other expressed his concern that knowingly or unknowingly his strategy was being shared by taking part in the survey. One of the Indian Exporter also shared the second view of the overseas buyer where as the rest two were 'too busy' that they did not want to take part in the survey.

Out of 45 samples of Indian Exporters identified, 42 responded. But the response of 3 of them were not full and contained some errors. After contacting them one of them responded and the responses got corrected. The rest two respondents either did not respond or were not contactable. Thus the total responses collected for further analysis was 40.

Again out of 35 samples selected for survey from the overseas buyers, the response received was 33. One response received was not full and contained multiple selections. Efforts to reach the respondent did not work out and finally that response had to be discarded. Thus the total responses received from overseas buyers were 32 in numbers.

Table 1.5 The Response Ratio

| Respondents | Sample Frame | Sample size | Response Received | Response ratio to Sample |
|-------------------------|--------------|-------------|-------------------|--------------------------|
| Indian Exporters | 93 | 45 | 40 | 88.89% |
| Overseas Buyers | 62 | 35 | 32 | 91.43% |
| TOTAL | 155 | 80 | 72 | 90.00% |

f) Data Analysis

After the data collection, the collected data was edited and tabulation done. The data was coded in SPSS, Gretl and E-Views for analysis using the respective software. The reliability of the questionnaire was measured using Cronbach's Alpha test after the pilot study done with 15 Indian Exporters and 12 overseas buyers. Those with scores less than 0.7 were discarded and the questionnaires were modified with the rest part of the questions identified.

For analyzing the growth rates CAGR (compounded Annual growth rate) was used after determining the graph of best fit. The secondary data with time series were analysed for unit root analysis to check stationarity in the data using Dickey-Fuller (DF) test and Augmented Dickey-Fuller (ADF) test. Co-integration test with Johansen test and Engle –granger test were used to analyse cointegration and longterm

association between the variables. Trace test/ maximum Eigen values were calculated to arrive at conclusions. Further, once the long term association was established between two variables, Granger Causality test was used to identify which variable caused change on the other variable. (Dependent and independent variables). Regression analysis was used to establish the relationship between variables by reducing the relationship into a regression equation and to find out the R^2 value.

For analysing the primary data mostly non-parametric tests were adopted. Kenderwall's W test and Friedman's test were used to analyse the preference of the respondents. While analyzing the association between different classes of respondents to a particular variable, longlinear multinomial test and Kraskal Wallis tests were made use of. Chi-square test was used to ascertain the reliability of such finding. For analyzing the challenges to India in the years to come, the responses received from both Indian Exporters and Overseas buyers were analysed using Exploratory Factor Analysis.

1.14 Limitations

For the purpose of the analysis, secondary data pertaining to the last 25 years were collected .Primary data from 32 overseas buyers and 40 Indian Exporters were also collected for the analysis. Though every effort was made to collect the data accurately and analyse the same with the appropriate statistical tools, the study suffers from the following limitations.

- 1) Since number of Indian Exporters and Overseas buyers engaged in the cashew trade is limited, the size of the population itself was low.

- 2) Further, the same group of organisation was engaged in the cashew trade under different trade names. Since the responses from the entire group was likely to be the same due to common management and control, such groups had to be considered as a single entity. This further reduced the size of the sample frame.
- 3) The views and practices of those exporters and overseas buyers who fall out of the sample frame was not considered.
- 4) Language problems and hesitations to participate in surveys by certain respondents made the response rates lower than expected.
- 5) No data was available for the domestic consumption of cashew kernels in India, and that had to be computed from other related data available.
- 6) No data was available for the domestic prices in India, and instead of domestic prices, the international price of cashew kernels were taken for correlating price and consumption in India under the assumption that domestic prices moved along with international prices.
- 7) The data collection was much time consuming and the change in cashew trade scenario during the data collection period might have influenced the opinion of different respondents.
- 8) The change in Political and economical conditions, the exchange rate fluctuations etc.. of different countries might have changed the norms and pattern of cashew trade, which was not considered in the analysis.

- 9) The climatic changes and other factors of production, processing and consumption of different countries which may have a bearing on the outcome was not considered in the study.
- 10) The study would have been more meaningful if the survey was conducted on exporters of the competing countries and the final consumers in the consumer market worldwide. But due to time and financial restrictions, the same had to be limited to Indian Exporters and Overseas buyers only.
- 11) Confirmatory factor Analysis could not be performed on the Exploratory factor Analysis done in analysis the challenges to India due to the small sample size, which otherwise could have verified the outcome of the Exploratory Factor Analysis.

1.15 Chapterisation

The report is divided into nine chapters. The first chapter covers the introduction that includes the history of cashew and its development as an industry, the health benefits of cashew, the processing of cashew, the specifications of cashew, the overall view of world cashew industry and the Indian cashew industry. It also includes the definition and statement of the research problem, the research gap identified, the objectives of the study, its scope and relevance, the statement of hypotheses, the research methodology and the limitations of the study.

The second chapter deals with the literature review. It reviews the literature on raw nut production and trade of raw cashew nuts, cashew processing, kernel consumption and marketing, the social aspects of cashew industry and the promotion of cashew using health aspects as a tool. The

literature pertaining to the research done abroad and in India are analysed separately.

The third chapter provides a glimpse of the world cashew industry. It describes in detail the global cashew value chain, the world cashew production, processing and consumption scenarios and portrays the cashew events worldwide in the form of a cashew calendar.

The fourth chapter analyses about the profile of the respondents and conducts the basic research on preliminary aspects regarding the respondents. It deals with the profiles of both Indian exporters and overseas buyers surveyed.

The fifth chapter analyses the transition of the world cashew Industry based on the secondary data collected. The transitions in the fields of production, processing and consumptions are analysed here. Certain hypotheses drawn regarding the cause and effect of domestic consumption in India, the performance of India in the international market and the domestic and the external factors affecting the exports from India are also analysed.

The sixth chapter analyses the responses collected from the Indian Exporters. The strategies adopted in the trade, the attitude towards export of value added products, the management of exchange rate risk are covered in this chapter.

The seventh chapter deals with the analysis conducted on the responses collected from overseas buyers. Their attitude towards Indian cashew, perception about Indian cashew, buying criteria and the evaluation of performance of competing countries viz, India, Vietnam and Brazil are described here.

The eighth chapter analyses the challenges to India in the years to come in the field of cashew based on the combined responses collected from both Indian exporters and overseas buyers.

The ninth chapter summarises the findings of the study. It proposes certain suggestions based on the outcome of the study and draws a clear conclusion to the study conducted.

1.16 Conclusion

India was enjoying an unbeatable and unparallel monopoly in the world cashew trade for decades together as the largest producer, processor and exporter of cashew nuts in the world. It was she who pioneered cashew as an industry and the raw nut producing countries in the world was counting on India as the sole market for their raw nuts produced. The skill of the workforce and the strong domestic market was the backbone of the cashew industry in India.

But of late, the cashew industry had undergone a series of transitions in the fields of raw nut production, processing and cashew kernel consumption. Over the period of study (1988-2012), the raw cashew production had experienced an exponential growth rate of 6.3 per cent, while the same on processing and consumption was at 8.1 per cent. The Indian cashew consumption had also gone up beyond imaginations. Today India is the world's largest consumer of cashew kernels. On the other hand, with the raw nut producing countries acquiring the know how in processing, the processing started to spread to other raw nut producing countries as well. The last two decades witnessed a steep fall in India's share in the international market. Had India geared up to meet the challenges in the world cashew

industry, India could have still enjoyed her premium position in the world. If the situation continues, what would be the position of India in future?

The study was aimed at analysing the transition of world cashew industry and the challenges to India in the years to come. There was a gap in the previous research conducted in the cashew sector, as none of the addressed the world transition and challenges. The study is socially relevant as cashew industry provides gainful employment to around one million employees, a vast majority (around 95%) of whom as women folk from the socially and economically weak section of the society. Cashew processing is the backbone of the economy of many a villages of rural and sub-urban India. Further the industry fetches forex to the tune of USD 850 Millions to the nation annually.

The challenges identified were relevant as seen from the test results. It is apprehended that the challenges identified if properly addressed would be beneficial to the Industry and would also help the country regain her lost image in the world of cashew in the international market.

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Chapter 2

REVIEW OF LITERATURE

| | |
|-----------------|---|
| <i>Contents</i> | 2.1 <i>Review of literature on Raw Nut Production and Trade</i> |
| | 2.2 <i>Research on Cashew Processing</i> |
| | 2.3 <i>Research on Kernel Consumption</i> |
| | 2.4 <i>Research on the Social Aspects of Cashew Industry</i> |
| | 2.5 <i>Cashew and Health promotion</i> |
| | 2.6 <i>Conclusion</i> |

A literature review is an account of what has been published on a topic by accredited scholars and researchers. This study was about the transition of the world cashew industry in general and the resulting challenges to Indian cashew industry in particular in the years to come. Transition can be defined as the gradual movement, passage or change from one position, state, stage, subject, concept etc. to another. The transition of the world cashew industry was analysed in the fields of production (cultivation), processing (manufacturing) and consumption of cashew worldwide.

There has been numerous studies in the field of cashew production, processing and consumption and this chapter analyses the documents containing information relevant to the topic of study. The section focuses separately on the review of various books, articles and scholarly journals in the fields of production, processing and consumption of cashew including the technical, nutrition and social research related to cashew in India and abroad.

The raw cashew nut production across the world has widely been analysed by scholars and international organisations across the world including India.

2.1 Review of Literature on Raw Nuts Production and Trade

(Jaeger, 1999) studied about the global market for raw cashew nuts and its present scenario on a global basis in his study titled 'The Market for Cashew Nuts and its Relevance to African Production'. As per the study, the main producers of cashew nuts were India, Vietnam, Brazil and Tanzania, with further significant harvests in Mozambique, Indonesia and West Africa. Global production was estimated by FAO at 750,000 M.T though this was likely underestimated. Over 150,000 M.T of kernels per year were imported to non-producing countries in temperate regions. This was equivalent to at least 650,000 M.T of raw nuts, or 85 per cent of the estimated annual global production. According to the author, decorticating the nut to release the kernel was a difficult and labour intensive process which could not be carried out economically in the consuming countries with developed economies. Nuts could be processed at village level in the producing areas, but the output had to be consolidated to build up export quantities and the fragile kernel required specialised packaging to prevent damage in transit to the consumer. The cashew nut therefore first entered international trade as a whole raw nut bought directly or indirectly for processing. From the early part of this century, an industry based on the manual shelling of cashew nuts was developed in the major cashew nut producing state of Kerala in south India. The labour force acquired skills in manual processing that have not hitherto been replicated elsewhere. Up to the mid 1960s most of the world's cashew crop was processed in India, using both local production and nuts imported from other growing regions. Subsequently, mechanised processing factories

were installed in East Africa which led to a temporary decline in the dominance of India in the kernel market. With the widespread failure of mechanical processing plants, India was again the dominant processor, shelling around 500,000 M.T per year that accounted to two third of the world crop. The study reported that the cashew tree was strictly tropical and its cultivation was largely restricted to latitudes 15 degrees north and south. The best climatic conditions for cashew are found in the tropical coastal lowlands where there is a well-defined dry season of at least four months. Cashew is widely grown across the tropics, but in most countries it still remains as a small holder crop. Only Brazil had a significant production of cashew from plantations. Production statistics were difficult to accumulate and only FAO made an attempt at estimating and collating country data. The viability of processing cashew nuts in competition with India is doubtful. Much has been argued for and against developing processing industries in Africa and elsewhere. The seduction was always the apparent increase in value between raw nuts and kernels, but the potential was far from clear. Cashew nuts are grown widely but there are only three origins where processing is carried out on a large scale namely India, Brazil and Vietnam. The particular attributes, besides the skills attributed to their processing are:-

(i) There is a substantial local or nearby market for all grades - India has a strong domestic demand, Vietnam shares a border with China and regional requirement for cashews for cooking is high, while Brazil holds stocks for North America where there is a strong market for pieces; (ii) Raw nut supply for the industries is protected through restrictions on the exports of raw nuts. Compare for example, the vigour of the Vietnamese industry with the difficulties in Indonesia.

2.1.1 The West African Scenario

The ACI (African Cashew Initiative) funded by ‘Bill & Melinda Gates Foundation’ in association with ACA (African Cashew Alliance), Technoserve, Cooperation Ivory coast (in Federal Republic of Germany) and private partners had conducted a series of studies in the cashew sector covering the West African Countries.

The African Cashew Initiative (ACI) in its study by (Dörr, 2008), titled ‘Competitiveness of the African Cashew Sector’ analysed the competitiveness of African Cashew sector both in raw form and kernels in finished form concentrating on ten African countries viz. Benin, Burkinofaso, Ghana, Guinea Bissau, Ivory Coast, Kenya, Mozambique, Senegal, Tanzania and Ganbia. The study concluded that (a) Current cashew market conditions and projected developments provided a positive environment for the development of the cashew sector in Africa; (b) There were no major barriers – such as quality, seasonality, tariffs and product acceptability – to the development of the markets for African cashew kernels; (c) The international in-shell supply chain and the international cashew kernels chain were linked; however, they were not integrated and could thus function independently; (d) The West African and East African regions were at different stages of cashew market development and had different priorities; (e) African in-shell cashew exports were competitive in the market and important for growers. They will remain a significant part of the African market for some years to come; (f) The in-shell export chain had a narrow base and was controlled by traders with access to finance. These traders expected high margins in return for taking high risks; (g) The balance of supply and demand for cashews were fragile. Demand was rising rapidly while growth in supply was slowing down; (h) Price volatility was a dominant feature of the global cashew market. Price

levels were rising over time, but this was interspersed by sharp falls and rallies; (i) Better practices in terms of husbandry, post harvest practices, education and market information could significantly improve competitiveness and grower's income. Moreover, they could improve the general environment, making it more conducive to the development of processing; (j) The major obstacles to the development of the African cashew market were not cashew sector specific. Rather, they laid in the structure of the producing countries economies and business environments and (k) Given the context of African countries, entry to the cashew processing sector was difficult. Large investors were deterred by country-specific risks and smaller entrepreneurs shy away from the technical challenges and the difficulty of doing business in Africa.

ACI's study on Analysis of Benin Cashew Sector Value Chain by (Mahoutin, Feb 2010) analysed the cashew value chain at national level, focusing on production, processing and trade of cashew nuts and their derivatives. The study reported that the cashew sector represented a huge agricultural export opportunity for Benin, together with cotton. The sector accounted for 13.5 per cent by volume of Benin's exports in 2008. Cotton, which had always been Benin's top agricultural export product, was replaced in 2008 by cashews, which outpaced all agricultural products exported by Benin during that year. Cashews represented 8 per cent of the total value of exports in 2008, 7 per cent of agricultural GDP and 3 per cent of national GDP. The production of raw cashew nuts occupied about 200,000 planters (Matthess et al., 2008) working a total of 190,000 ha in an agro forestry land-use system. The report also spoke about the cashew processing sector as very stunted, accounting for less than an estimated 5 per cent of national production. At that time it comprised of only one industrial processing unit with a capacity of more than 1,000 M.T per year, whose output was exported

to the European market (Afonkantan Benin Cashew factory south of Parakou), and small units with a lower capacity of 150 M.T per year, whose output was sold on local and regional markets. Many processing units that existed in the past shut down for reasons of marketing, the poor quality of the processed goods, lack of suitable technology, inefficient resource management and the absence of suitable financial support.

ACI study on the Analysis of cashew Sector Value Chain in Cote d' Ivoire by (Kone, Apr 2010) analysed the production, processing and marketing of raw cashew nuts in Cote d' Ivoire (Ivory Coast). That outlaid a SWOT analysis of the cashew sector in the country. As per the study, the total production of cashew nuts in Côte d'Ivoire rose from 6,300M.T in 1990 to 335,000M.T in 2008, with over 20 per cent of the increase occurring between 2004 and 2010. According to *Autorité de Régulation du Coton et de l'Anacarde*, the government body overseeing the cashew sector (ARECA), the rise resulted from increased land cultivation rather than a rise in productivity, and cashew plantations covered around 420,000 ha in 2005. Côte d'Ivoire that exported more cashew nuts than any other country worldwide was the world's third highest producer of cashew in 2010; the lion share of the production was exported in the form of raw cashew nuts to India (71%) and Viet Nam (28%). The study also analysed the impact of the civil war that broke out in 2002 on the national cashew sector where 54 per cent of cashew growing area came under the area occupied by the rebels. Cashew nuts are normally grown mainly by small-scale farmers. Owing to property laws, female farmers accounted for only about 17 per cent of all cashew farmers. Women were traditionally in charge of harvesting, transporting, sorting and drying the fruit. Yield per tree was very low, between 2 to 3 Kg of raw cashew nuts per tree per year. Farmers sold their nuts to local traders, mostly community members

whom they knew and who came to their farms. The local traders sold their products to independent buyers or to buyers working with bigger trading companies. Local traders thus operated as intermediaries between buyers and farmers. Certain buyers worked with big trading companies or export companies, some of which had global connections and pre-finance for the procurement. This system for marketing cashew functioned relatively well and ensured some degree of competition, at least at the level of buyers and trading companies. Marketing of the nuts was dominated by exports. As per the reports of *ANOPACI, (2008)* Productivity at the cashew plantations remained low. While average yield worldwide was around 1 tons per hectare, that among farmers in Côte d' Ivoire it was between 200 to 500 Kg per hectare. The study also critically analysed that the increase in growth in cashew nut production in Côte d'Ivoire was essentially due to the increase in the area under cultivation and not to improvements in yield.

The study also spoke about the cashew processing in the country. Cashew processing was carried out by three types of facility, namely; (1) large industrial facilities, which had an average capacity of over 1,000 M.T. per year; (2) semi-industrial facilities, which had an average processing capacity of between 500 to 1000 M.T. per year and (3) small facilities, which had an average capacity of less than 500 M.T per year. Côte d'Ivoire was a special case when it came to the marketing of cashew products. Indeed, raw nuts accounted for almost 98 per cent of the market. The marketing of cashew kernels, the main product of processing, was not developed. The channels of distribution for cashew apples and the other by-products of processing (kernel) were virtually non-existent. As per the study, large amount of land under cashew cultivation, good quality of nuts, existence of grower organisations, existence of a permanent framework for dialogue between

stakeholders (INTERCAJOU), population's keen interest in the crop, growing international demand were the strength of the cashew sector in Ivory coast. Failure to make use of by-products, lack of research programmes on plant material and the technical aspects of production, grower ignorance of technical aspects (for example the majority lack expertise in harvest and post-harvest activities), lack of financing, low processing rate and under-equipment of existing facilities, lack of reliable statistics on certain aspects of the sector etc. accounted for the weakness. Growing international demand, existence of national and international guidance structures with genuine expertise, possibility to develop a local market, indirect financial support from the State for the export of kernels, possibility to develop production, existence of quality infrastructure etc.. were the opportunities and absence of tax incentives (tax exemption for production factors and inputs) to encourage the installation of processing facilities, existence of non-tariff barriers (compliance with quality standards), impeding access to the international market, length and complexity of distribution channels, failure to control quality and poor management of post- harvest practices etc. were the threats faced by the cashew sector in Ivory Coast.

(Hameed, Anikwe & Adedeji, 2008) in their journal titled 'Cashew nuts and Production Development in Nigeria' published in the American – Eurasian journal of Scientific Research (2008) dealt with the constraints militating against the crop cultivation and formulation of strategies for sustained development in Nigeria. Six factors were identified to constitute constraints while eleven developmental strategies were formulated. Insect and disease attacks were more devastating threats. As per the study, the constraints to the production of cashew nuts in Nigeria were perpetuation of cashew landraces on Nigerian cashew plantations, low funding for cashew

research activities, lack of awareness on the economic potential of cashew, entomological/ pathological problems and Vast differences in cashew ecology while the strategies for cashew production development in Nigeria included immediate and periodic broadening of Nigerian cashew gene-pools through the exploration of the Brazilian heavier nut-size germplasms, establishment of cashew seed garden centers at strategic places accessible to the farmers, immediate and periodic national cashew survey, ecological protection, constant awareness creation on economic potentials and the health benefits of cashew product consumption, youth encouragement in Cashew-based agriculture, value addition, maintenance of the organic nature of Nigerian cashew, constitution of cashew development commission, establishment of 'Consolidated Cashew trust fund' and periodic acquisition of modern research equipment/ materials and manpower.

(Kyle, 2009) Cornell university, USA, in his paper 'Cashew Production in Guinea Bissau' commended that Cashew was by far the most important cash crop grown in Guinea Bissau and its export dependence on this crop exceeded even the export dependence of most members of OPEC on oil exports. Guinea Bissau had 98 per cent of export earnings and 17 per cent of fiscal revenue derived from this crop. As for the author, this fact had led many observers to promote diversification away from cashew. Guinea Bissau possessed near optimal conditions for cashew production and a vast majority - that according to the then survey more than 85 per cent of the population - was involved in cashew production in some or other way. It was estimated that cashews covered more than 6.7 per cent of the national territory, or about 210,000 hectares and that each Bissau Guinean produced an average of more than 53 Kg of raw cashew each year. The study estimated that the cashew area was increasing at the rate of 4 per cent per year though output was

increasing at a rate of 10 per cent due to the fact that many recently planted trees were only then reaching their period of highest productivity. The author was of the opinion that in spite of the reasonable efficiency of marketing agents, the cost of domestic marketing and exporting raw nuts (and kernels) was extremely high in Guinea Bissau. It was estimated that it cost up to US\$300 per ton to move nuts from farm-gate to processors in India as against US\$90 per ton from East African and USD 40 per ton from West African countries, mainly owing to the low traffic touching the Guinea Bissau port and extraordinary port charges in Guinea Bissau. The report also pointed to the fact that expensive and bureaucratic export procedures including high cost of transport and handling costs; lengthy and expensive administrative procedures; export tax (and related charges) of 8.6 per cent of FOB and certification (by SGS) fee of about 4 per cent of the FOB price accounted to this excessive costing. The report also commended that the domestic marketing costs were also high (about US\$180 per ton), in spite of adequate competition among traders, mainly due to the poor state of the transport network which made transport expensive particularly during the rainy season and also due to the illegal levies collected at road blocks by government officials and armed forces. The paper called for effective changes in the system and the need for a corruption free environment to make cashew production more rewarding for the farmers to promote its cultivation further.

2.1.2 The East African Scenario

The East Africa was a traditional producer of raw cashew nuts from the early stage itself and they were doing well in cashew processing as well. But the production in the region declined over years due to multiple reasons and there is a lot of research conducted about the East African cashew sector.

(Bolnick, 2004) in his study ‘The Great Cashew Controversy in Mozambique’ presented in USAID workshop on ‘Promoting Economic Growth in new Era’ cited the collapse of cashew industry in Mozambique as a classic example of a “notorious case” of how economic reforms can ‘go wrong’. Mozambique dominated global cashew market in early 1970s and after 1974 it witnessed the collapse of the cashew sector mainly owing to the nationalisation, breakdown of trading system, the export ban on raw cashew nuts, and the civil war (until 1992) that lead to a massive dislocation of rural population, destructing the infrastructure. The study described the policy as the fuel for anti-globalisation movement. The world Banks conditions applied for adjustments of loan insisted to end administrative allocation of raw nuts to processors; end export restrictions and reduce export tax to 20 per cent to be phased out in three years. The outcome of this liberalisation policy was the collapse of the processing industry, as it could not compete with overseas buyers in raw nut purchase. Further the lack of financing for restructuring of processing facilities and the constraints also adversely affected the processing industry. The condition of the farmers was reported to be still worse, as they were alleged victims of monopony traders. The backlash and retreat of this was the firestorm of opposition, industry, labor, civil society and the media. BBC reported a retrenchment of 40,000 jobs. As for the author, perhaps the only beneficiaries were the traders and processors in India. This had resulted in the reinstating of the export ban and price controls of raw cashew nuts in 1999 followed by retreat by the World Bank and IMF.

(Joseph, 2002) in the review of African political economy also looked at the implication of world bank policies and the civil war in Mozambique and analysed the fundamental problem relating to the growing and processing of cashew in Mozambique. As for the review, the cashew nut production in

Mozambique failed to recover after the civil war of 1982-92. In the 1960s, more than half of the world production of raw cashew nut was the contribution of Mozambique and cashew processing was the single largest industry there. The cashew production was so important to the national economy that a question of the 1997 census that included the question “*do you have any cashew trees*”. Cashew remained to be the largest exchequer for the country till 1982, but in 2002 the cashew production in Mozambique accounted to around 5 per cent only of the world production. This article starts with the history of the cashew processing and then to the world bank’s intervention and to the subsequent developments. The report said that there had been a steady decline of cashew production from 1972 onwards. Most of the cashew factories in Mozambique were opened in the colonial era. But after independence in 1975, the then head of the state Frelimo nationalised some factories while the most of the remaining factories were abandoned by the owners (mostly the Portuguese) under the fear of threat to their lives. The Anglo-American corporation of South Africa abandoned its factories in 1981 as a result of ‘de facto sanctions’ imposed on Mozambique by South Africa.

Raw cashew exports were prohibited by law from the colonial period onwards until the domestic processing units have acquired their required level of inventories. But in 1960s there were some exports to India. The World Bank conducted a study in 1994 by Hilmar Hilmarsson on the Mozambique cashew industry that was released in 1995. This study was caustic and pointed out that the Mozambique cashew processing was inefficient that the value of the processed kernel was less than the value of the raw nuts, had they been directly exported and that thus the cashew industry in Mozambique was a foreign exchange losing exercise for the country. There

was an outcry from the government and the industry who demanded a reconsideration. But out of the fear of losing the World Bank and IMF support to the country, the Mozambique had to follow the directions of the World Bank, that lead to the collapse of the cashew processing industry in Mozambique.

On the other side, (Mitchell, 2004) in his study titled 'Tanzania's Cashew Sector: Constraints and challenges in a global environment' in June 2004 attributed full credit to the World Bank for the recovery of the cashew sector that was otherwise on the verge of a total collapse in the 1980s.. The author was of the opinion that the economic reforms at the instance of the World Bank that began in 1986 and the trade liberalisation policy adopted in the 1990s were instrumental in the boost of the cashew industry in Tanzania. The decision to export raw cashew nuts accelerated the growth due to the fact that the farmers got high prices and were paid more quickly. The reviewer expressed his concern that the industry was not likely to expand further or even maintain its current levels. According to the report, the constraints and challenges faced by the cashew sector in Tanzania included more constructive role for the Cashew Board, reversing the decline in export crop quality, assisting farmers with financing input costs who otherwise incurred more than 40 per cent of their revenue in production costs alone and reducing high taxes on exports. Beyond correcting these immediate problems, there was an opportunity for the industry to expand in several directions. Replanting with improved varieties would reduce costs and make Tanzania a more competitive exporter. Better post-harvest handling and storage would bring in better revenue to the farmers who otherwise were forced to sell their crops at the ever low prices during the harvest season. Developing a competitive private sector processing industry would create jobs and reduce dependence

on India as the market for raw nuts. The report also demanded for an optimal export tax on cashew exports that should be determined on the basis of the price elasticity of demand for the commodity, the elasticity of supply in the exporting country and its competitors, and temporal issues such as the social discount rate.

An official press release Ministry of Agriculture Kenya (Aug 2009), announced a ban on export of raw cashew nut from Kenya. The press release claimed that the ban would support the domestic industry and help farmers to obtain better prices. With the introduction of the ban, only the government and the National Cereals and Produce Board were permitted to buy raw nuts from the farmers. Some traders had reacted to the imposition of the ban claiming it would lead to a fall in farm gate prices. Others had said the ban would ensure enough raw materials for processing cashew nuts for both the local and international market.

2.1.3 The Brazilian Scenario

Brazil, the home country of Cashew nut has a saturated growth in the production as well as the processing of cashew. It is wholly dependent of the US market for marketing its produce.

(Dörr, 2008) in his study titled ‘Understanding the Marketing Chain:A Case Study of Certified and Non-Certified Cashew Nut Farmers’ discussed about the marketing chain and transaction cost associated with it in the cashew nut industry. Cashew nut marketing chains in the Northeast region in Brazil offered particularly challenging setting for the analysis of the importance of transaction costs for production and supply chain efficiencies. Primary data was collected through the application of 85 questionnaires to cashew nut producers. This paper aimed to verify the functioning of the

marketing chain and to evaluate the contractual arrangements between buyers and farmers. It also proposed an analysis of the type of governance used in this value chain regarding the characteristics of transactions. The theoretical background was based on the concepts of the Global Value Chain and the Transaction Cost Economics approaches. The results showed that in the marketing chain, certified and non-certified farmers traded with individual buyers and the cooperatives. Regarding the trading processes with verbal agreements (trust based), it was found that they were longer with individual buyers and very few when trading with the cooperatives. Around 13 per cent of non-certified and 8 per cent of certified producers reported selling kernels to one single individual. This was statistically tested significant at 1 per cent level. Nevertheless, the remaining analyses did not present statistical differences between both groups. 83 per cent of non-certified and 32 per cent of certified farmers indicated selling raw cashew nuts to single individuals as well. On the other hand, nearly 16 per cent of certified producers and 5 per cent of non-certified producers indicated selling their kernel production to the cooperative, compared to 16 per cent and 8 per cent who sold cashew nuts, respectively. Further, an analysis on the number of years that producers had been selling to a specific buyer showed that the non-certified producers of cashew nuts had been operating with their respective buyers for an average of 3.1 years, while the certified ones had an average of only 2.4 years. The results regarding the producers, who sold cashew nuts to a group and kernel individually or to the cooperative, indicated an average of zero years. Thus, the figure showed the way the trading process had developed in the region. First, both set of producers used to sell only cashew nuts individually, second, they started to trade with the cooperative, third, farmers started to process the raw nuts to sell either individually or to the cooperative in 2005.

It was expected that with organic certification, farmers would be able to upgrade to a more sophisticated market and marketing channel. Nevertheless, results showed that this sector needed to focus in new technologies, better farm organisation and management. Although the adoption of certification did not affect the volume traded with stricter buyers, it was important to consider that the trend for certification was on the increase in the sector and region. In addition, farmers had to register the production cost to be able to calculate the final price of the products. The extent to which farmers were willing to invest and upgrade was visible in cases in which farmers had already decided to certify. The expectation to receive a higher price for the certified product and to access more refined marketing channels played the major role as incentives. Organisations in the region should invest in training courses and managerial skills in order to increase the number of certified farmers. Further, they could facilitate contacts between buyers and farmers and provide support for future agreements. This could help farmers decrease transaction cost.

2.1.4 The Asian Scenario

A workshop conducted by FAO (Food And Agriculture Organisation) of The United Nations regional office for Asia and the Pacific in Bangkok, Thailand (1998) had papers presented by eminent scholars regarding the Integrated Production practices of cashew in the Asia and Pacific region that included China, India, Indonesia, Myanmar, Philippines, Sri Lanka, Thailand and Vietnam. The then status of cashew cultivation, propagation and production of planting material, establishment of cashew orchards, management and after care of cashew orchards, harvesting of nuts and cashew yields, marketing of raw cashew nuts, potential for development and

constraints of cashew production were analysed in detail for the above countries.

(Kangde, Shibang & Suisheng, 1998) in their paper 'Integrated Production Practices of Cashew in China' portrayed the current position of cashew in China. As per the report, cashew production was mainly confined to the southern and south-western coastal areas of Hainan Island. The majority of plantations had been established with unselected seedling germplasm which had resulted in low production and productivity. Cashew extents had progressively declined during the last 10 years, in spite of the fact that China had an enormous domestic demand for cashew kernels and the local production was not sufficient to meet its demand. Climatic conditions, crop management problems and over all the low temperature that was unfavourable for cashew production were the major constraints for cashew production in China. But, despite this climatic constraints elsewhere, the long sandy tracts of Hainan Island covering 40,000 hectares was suited for cashew cultivation in China. A vigorous campaign is required to attract and encourage farming community to the development of this eco-stable crop for a sound land usage system.

(Rao, 1998) in his paper 'Integrated Production Practices of Cashew in India' analysed that prior to 1985, most of the plantations were of seeding origin and the cashew cultivation was mostly for afforestation program of waste land development. As such the cultivation was under neglected conditions. This was prevalent in most of the cashew growing areas of Karnataka, Goa, Andhra Pradesh, Orissa and Tamil Nadu. Later on with the cashew gaining commercial importance, the situation gradually changed and substantial research in the field of cashew cultivation accelerated the growth

of cashew production. The stable price of cashew kernels in the international market helped India expand its production. The cashew kernels rich in proteins and carbohydrates have high levels of polyunsaturated fats that lowers the level of cholesterol in blood and is highly nutritional. The kernel was steadily gaining acceptance in the western markets where consumers were more health conscious. The author concluded that development and introduction of eco-friendly production packages such as organic farming and integrated pest management could provide a further boost to the development of the crop and the cashew industry in the future.

(Daras, 1998) in his paper 'Integrated production practices of Cashew in Indonesia' critically analysed the then position of cashew production in Indonesia that estimated the contribution of Indonesia in the world market of raw cashew production accounted to 14 per cent. The cashew program with funding from ADB (Asian Development Bank) and UNDP (United Nation Development Funds) had accelerated the growth of production as evidenced by the statistics. More than 15 million hectares of land spread out in 9 provinces as per the land use survey could effectively be used for cashew cultivation and there were no constraints in this aspect. Indonesian cashew is more favoured in the international market and the cashew prices were more encouraging for the development of the crop in Indonesia. But lack of high quality planting material, improper pest and disease control, fire hazards were the main constrains in the production while instability of quality of cashew processed in home and small level processing enterprises, strong competition from raw nut exporters were the issues related to processing of cashew nuts in Indonesia.

(Lay, 1998) in his paper titled 'Integrated production practices of cashew in Myanmar'(1998) reported that "Cashew is cultivated at present in ten regions, namely, in Kachin State, Kayin State, Sagaing Division, Taninthayi Division, Bago Division, Mon State, Rakhine State, Yangon Division, Shan State and Ayeyarwady Division". The paper called for better propagation and production of planting material as the key solution for cashew production in Myanmar. The author insisted that vegetable propagation be encouraged in the place of seeding methods used. Further, agronomic practices pertaining to land development and orchard establishment should be systematically carried out to ensure the best conditions for cashew orchards. Since, use of chemical manure was not practiced, there was good scope for promotion of organic cashew. Intercropping of cashew orchards would bring in additional revenue to farmers especially during the pre-gestation period. Though there was vast scope for development of cashew cultivation, the returns were not that encouraging as in the case of competitive crops like rubber, oil palm etc. Government intervention with financial and technical assistance would only help Myanmar to improve the cashew production.

According to (A.E, 1998) the agro-forestry program of the Philippines Government that provided priority to promote cashew as a promising crop had accelerated the cashew production in Philippines. In his paper titled 'Integrated production practices of cashew in the Philippines' the reporter insisted for technology transfer, promotion and dissemination of production technologies including cultural management of the crop be given priority in the development programs on cashew. The research and development in cashew production and post-harvest activities were to be strengthened. The various by-products of cashew cultivation which otherwise was treated

as a waste product need be utilised and processing encouraged with proper linkages to promote the production of cashew nuts in Philippines.

Sri Lanka is yet another producer of raw cashew nuts in the Asian Region. (G.B.B., 1998) in his study 'Integrated production practices of cashew in Sri Lanka' reported that cashew was introduced to Sri Lanka also in the 16th century by the Portuguese and that more than half of the production was confined to the dry zone of the country, that helped environmental stabilisation whilst helping the country to earn valuable foreign exchange. The Sri Lanka Cashew Corporation, the ADB funded Perennial crops Development Project, the Southern Development Authority and the Mahaveli Project played key role in the production of raw cashew nuts in the country. As per the study, the inferior germplasm and inadequate planting material of recommended varieties, lack of knowledge on improved cultural and management practices, variations in weather patterns, fire hazards and weed problems, under-utilisation of cashew orchards and losses due to poor post-harvest practices were the main constraints in cultivation where as the lack of price support system, poor linkage with other agricultural organisations, high cost of inputs and lack of credit facilities for processing industry were the institutional constraints to cashew in Sri Lanka. The reviewer also identified the large displacement of cashew growers during the civil war, high unemployment, low incomes of cashew farmers, poor market, physical infra-structure including storage, processing and transport facilities and Poor farm-gate prices during harvesting season as the socio-economic constraints in the cashew sector of the country.

(Chaikiattiyos, 1998) in his paper presented on 'Integrated Production practices of Cashew in Thailand' traced that cashew was introduced to

Southern Thailand in 1901 from adjacent areas of Malaysia from where it spreaded all over the country. The crop attained economic importance to the country by 1984 with the government implementing the policy to reduce cassava production by substituting with cashew. But the trend declined since 1991 especially in the North -West, whereas the Southern region picked up with installation of several processing centers. With all these, the country could not benefit much from the cashew sector.

Whereas, as for (Chau, 1998) the neighboring country Vietnam had a success story in the cashew sector that started growing cashew only in the 19th century. As per the study on the cashew sector in the paper titled 'Integrated production practices of cashew in Vietnam' reported that cashew was recognised as an industrial crop just about a decade back only, and with the setting up of *The Vietnam Cashew Tree Association in 1990*, there had been a rapid increase in the area and quantity of production. It identified the vast potential for improvement of the cashew sector in Vietnam and reported that the lack of improved varieties and lack of sufficient high quality planting material as the main constraints which should be well addressed. The boom in processing that resulted in better pay off for the farmers were another accelerating factor for the cashew sector in Vietnam. The cashew crop had demonstrated its adaptability to the growing conditions in Vietnam and had emerged out as an important foreign exchange earner to the country (USD 115 millions in 1996) with the vast development of the processing industry. In order to realise the projected targets of expanding the area under production to 400,000 ha with a yield of 1 ton per hectare producing about 300,000M.T, more research and development efforts were urgently needed.

(Loan, Phuong & Hung, 2006) in the Case study in Vietnam prepared for SEANAFE's (Southeast Asian Network for Agroforestry Education) 2nd Regional Workshop on 'Markets for Agroforestry Tree Products' in Chiang Mai, Thailand analysed the factors affecting cashew nuts farmgate price variation in Binh Phuoc and Dak Nong provinces in 2006. The model revealed that betterment in the quality of raw nuts and right information of the prices help improve the farm gate price. It further revealed that farmers under indebtedness received low price compared to those without any selling obligation and pointed to the fact that more educated farmers got comparatively better price than their counter parts. The analysis of value added in the supply chain of cashew kernels had proved that the monthly farmers' earnings were lowest among stakeholders. However, by performing post-harvest activities for their own processing business, farmers could gain a profit of 10 per cent in selling price of cashew nut kernel in addition to 5 per cent of labor cost arriving either to their own pocket or to hired labor. Thus, the study focused on the two main objectives viz. exploring the affecting factors of cashew nut farmgate price in households' transaction and analysing value added in the supply chain to assess marketing performance of different farmer groups in Binh Phuoc and Dak Nong provinces. It concluded that: (1) Infrastructure development and availability of purchasing services have affected farmgate price; (2) Restriction on information had made farmers unable to reach the market price; (3) Some constraints on crop finance cost, working capital and certain non-competitive relation induced farmers to lose out on competitive price for their indebtedness; (4) Lack of the linkage among the producers with the participation of community-based organisation in the supply chain had excluded small farmers and ethnic minority to access a shorter chain in their cashew nut supply and (5) Lack of post-harvest activities at household level prevented the farmers in going for further value addition.

A study by the International Finance Corporation (2010), a World Bank Group on the 'Prospects of Cambodia's Cashew Sub Sector' presented a comprehensive picture of cashew sub-sector trends around the world in general and that in Cambodia in particular in the fields of cashew growing and cashew production; cashew processing, cashew consumption in long-standing as well as new markets; structure of the cashew trades; the fair-trade market and the organic market with case studies on small scale processing in several developing countries and implications for Cambodia. The report evaluated that Cambodia has good prospects for becoming a recognised cashew kernel exporting country. Until then there had been almost no recognised Cambodian cashew kernels for sale on the world market because Cambodia's cashews were shipped to Vietnam or India for processing, where they are mixed with cashews from other countries. As this study showed, Cambodian cashew sector had a number of attributes which should appeal to international buyer which included; (a) good quality (kernel outturn of 24 per cent to 28 per cent is similar to Vietnam's outturn and places Cambodian cashews in the mid-quality range; (b) larger size of raw nuts; (c) comparative ease of shelling; (d) abundant workforce in rural areas who would welcome jobs in cashew factories if working conditions were decent and wages were fair and (f) a large enough crop of cashews to justify establishing a processing industry. Further there is good prospects in the premium-priced organic cashew market because Cambodia's cashews were largely grown chemical free and could be certified as organic if reliable testing and certification were established in Cambodia.

This report also recommended a marketing strategy for Cambodia which was then exporting good quality (and potentially organic certified) in-shell cashews to Vietnam and India thus losing a major opportunity for value

addition and job creation. The development of a shelling plant in Cambodia would add value and create employment, as well as create competition and enhance the value of in-shell exports. Establishing at least one quality processing unit is essential to build a positive brand image for Cambodian-grown cashews. Processing has the potential to add value of \$30-40 million per year, based on current levels of production. With regard to establishing a processing industry, Cambodian processors were advised to take advantage of new processing technology and expertise available in neighboring Vietnam. The marketing strategy recommended establishing at least one high-quality factory that will help to build a positive image for Cambodian cashews, while the long-term marketing objective should be to export high quality, roasted, organic cashews in consumer packs for sale in supermarkets around the world.

2.1.5 Indian Scenario

Raw cashew nut production in India has also been analysed in detail by various scholars and research institutions across the country.

(Venkattakumar, 2009) in his study titled 'Socio-Economic Factors for Cashew Production and Implicative Strategies: An Overview' discussed about a study which was initiated by NRCC during 2004-05. An ex-post facto research study was initiated by NRCC, Puttur during 2004-05 to assess the socio-economic impact of cashew cultivation in Kerala, Maharashtra, Andhra Pradesh and Tamil Nadu, with the aim of suggesting implicative strategies to improve the cashew cultivation scenario. The respondents of the study included two categories viz, farmers with gardens of seedling origin (FSG) and farmers with gardens of graft origin (FGG). In Kerala, Maharashtra and Tamil Nadu, each 30 FSG and FGG respondents were selected through

multi-stage random sampling procedure, whereas in Andhra Pradesh each 60 FSG and FGG respondents were selected through accidental followed by snowball sampling technique. The knowledge, adoption level and technology gap of majority FSG and FGG were medium in nature in all four states. The average adoption gap of all the respondents was 54 per cent, whereas it was 57, 60, 65 and 35 per cent in Maharashtra, Kerala, Andhra Pradesh and Tamil Nadu, respectively. Damage due to major cashew pests was the first ranked constraint followed by need for training in all four states. State-wise opportunities and threats for cashew development were assessed and an action model depicting implicative strategies for cashew production scenario was suggested. Cashew occupied major farm area in Kerala, Maharashtra, Andhra Pradesh and Tamil Nadu. Hence, any promotional and developmental activity for cashew would definitely have impact on socio-economic status of the farmers. The knowledge and adoption level, adoption and technology gap of the respondents were medium and there was significant difference between FSG and FGG on the above-mentioned variables that indicated the need for intensive transfer of technology and efforts to promote lateral spread of improved cashew production technology. The technologies *viz*, soil and water conservation, initial training and pruning, management of CSRB and irrigation needed better promotion. The drip irrigation subsidy might help promoting irrigation in cashew. Problems due to major pests of cashew (TMP and CSRB) and the supply of quality planting material required attention of researchers and development departments.

(Desai et al., 2010) in the technical bulletin titled ‘Techniques and Practices for Cashew Production’ discussed about the latest Techniques and Improved Practices for Cashew Production, which would be useful for all those dealing with this crop, right from students to the cashew farmers and

policy planners. At that time, more than forty high yielding cashew varieties were available in the country for commercial cultivation in different cashew growing states. Majority cashew plantations in Goa were of seedling progeny of non-descript types with varied degree of nut and apple yield performance. But, new plantations were coming up with improved high yielding varieties recommended for commercial cultivation in the state of Goa. Cashew was propagated by both seeds and also by vegetative methods. Seed propagation resulted in enormous variability in the seedling progeny. Therefore, high yielding cashew varieties were commercially propagated by different vegetative methods to produce true to type planting material. For establishing new orchards, the land has to be cleared off thorny bushes, shrubs and other weeds well before the pre-monsoon showers. Most of the cashew growing areas in the country including Goa state were poor in soil fertility and water holding capacity. But the studies had indicated that cashew responded well to application of manures and fertilisers. For establishing cashew plantation in one hectare area, it required around ₹ 27,100 for initial investment. But, cashew has a juvenile phase for the initial period 3-4 years. During this period, considering the need and suitability, high value annual crops can be cultivated as intercrops for deriving the income during the juvenile period. Economic yield could be harvested from fourth year after planting and the breakeven point starts from 6th-7th year. With all the improved production practices and stabilised yield at 9-10 years, a net return of more than ₹ 80,000 may be expected annually from one hectare area under cashew plantation.

(Bhat, Nagaraja, & Rupa, 2010) together conducted a research about cashew in their paper titled 'Cashew Research in India'. Cashew, after its introduction from Brazil during the 16th Century, has established very well in India. A total of 40 high-yielding varieties have been released so far by the

Directorate of Cashew Research, Puttur, and various Agricultural Universities, for cultivation. Of these, 13 are hybrids and 27 are selections. Research achievements in the area of crop improvement, management, protection and post-harvest technology over the last six decades were reviewed and documented here. As India has been importing raw nuts to the tune of 6.5 lakh M.T annually to cater the demand of established processing factories, research priorities have been identified to meet the challenges of enhancing production and productivity of cashew in the country. There is an ever-increasing demand for cashew kernel both in international and domestic markets. Countries such as Vietnam and Brazil compete with India in the international market. Since African countries have started processing raw cashew nuts themselves, availability of raw cashew nuts for import by India may gradually decline or altogether stop. A few African countries had already taken steps to ban export of raw cashew nuts. Hence, there was an urgent need to increase domestic raw cashew nut production and become self-sufficient. As cashew is a cross-pollinated crop, propagation by vegetative means was attempted. Among the various methods tested, softwood grafting was found to be the best for vegetative propagation. It was also shown that softwood grafting was feasible for commercial multiplication. Based on these results, India has been producing over 15 million grafts annually under both government and private sectors. Hybridisation techniques for breeding varieties in cashew was standardised by various workers and 13 hybrids were developed and released for commercial cultivation in the country. The study reported that in order to face challenges within the country from other crops like rubber and mango, and to face challenges from countries like Vietnam, Brazil etc., research strategies needed to be reoriented.

(Varmudy, 2011) in the article named 'Cashew: Time to Raise Production' discussed about the importance of increasing the production of cashew and thus earning foreign exchange. As per the study, cashew sector was providing sustainable employment to more than one million people and the country was earning well through its export and import. There was a need to increase the domestic production. This was possible through scientific and systematic methods to bring more area under the crop, apart from growing high-yielding varieties. In terms of area, India has the maximum area under cashew in the world. In terms of production, share of India has been declining over the years, whereas the share of Nigeria, Vietnam and Cote d'Ivoire has been increasing. As far as production of cashew nuts was concerned, it depended on climatic conditions, area, yield rate, area under fruit bearing trees, age of plantations and variety. The Indian cashew industry had made tremendous strides in its history of exports dating back to 1920. From mere 45 tons in 1923, export increased to 108,120 M.T in 2009-10. India exports cashew kernels and cashew nut shell liquid (CNSL) oil to several countries. The export of cashew kernels was in larger volume to American, European, West-Asian, Oceanic, South and Far- East zones and to the African zone in small quantities during the reporting period considering the importance of cashew as a major employment provider to rural poor and utilisation of vast stretches of waste lands in the country, the government had set up a Cashew Development Board aimed at achieving self-sufficiency in production, taking research findings to the farmers' field and improving quality of production, processing, marketing and exports. The study concluded that there was a need for systematic and timely implementation for self-sufficiency in cashew nuts production.

(Senthil & Mahesh, 2013) together analysed the cashew nut production in India in their study titled 'Analysis of Cashew nut Production in India'. In the beginning cashew was mainly considered as a crop for afforestation. As it can adapt to varied agro climatic conditions, it has become a crop of high economy and commercial value. The cultivation and marketing of cashew nut involved a considerable amount of manpower and hence played a vital role in the economic activities in India. However, in recent years the owners of the cashew nut growers are unable to obtain optimum yield and return. The coastal states of India were the main cashew producers. Though the processing flourished both in domestic and foreign trade, the problems associated with its cultivation, domestic and export marketing did not permit the growers to reap optimum return and traders did not get reasonable profit. In India, large numbers of middlemen were involved in domestic and export marketing of cashew nut. As there was no organised domestic and export market for cashew nuts, many a time the growers were at the mercy of unscrupulous village traders. Further in the recent past, the export price of cashew nut had fluctuated widely due to changes in foreign market. Therefore, a scientific study to explore the ways and means to identify the problems connected with the production and marketing of cashew nut in order to enlighten the people concerned about the inherent strength, weakness, opportunity and threat becomes relevant and socially significant. The main objective of the article was to highlighten the growth and performance of cashew nut production in the various states in India during 1990-91 to 2009 -10. The cashew nut production in Indian states had been gradually increasing from 1990-91 to 2009-10. But sometimes a negative trend and rapid declining was also been noticed over the study period mainly because of poor crop husbandry and rampant disease spread to endemic level

which caused complete collapse of the production process. Problems due to major pests of cashew and the supply of quality planting material required attentions of research and development departments. Massive area expansion programme and rejuvenation of old cashew orchards of seedling origin, coupled with supply of quality planting material may have the potential to alter the cashew production, processing and exim scenario of not only these states but also the whole country. The policy initiatives towards promotion of cashew grower's cooperatives (for procurement of raw nuts, supply of inputs, credit and infrastructure, small scale processing, value addition and marketing), and cashew apple processing would definitely widen the perspective of cashew growers.

Apart from the above studies at national levels, there has been a lot of research conducted on the production of raw cashew nuts on regional and state levels in India.

(Health Vision and Research, 2001) had conducted a study for Chattisgarh State Institute of Rural Development on the topic 'Cashew Sub Sector Study in Chattisgarh'. The subsector studies were being commissioned by the CGSIRD to assist PRIs for reduction of poverty through development of sustainable collective action around selected activities. The final list of subsectors identified for the studies included (i) Dairy; (ii) Goat rearing, (iii) Cashew; (iv) Vegetable cultivation; (v) Lac; (vi) Mahua flower & seed; (vii) Bamboo; and (viii) Pisciculture. In Chhattisgarh there were around 50 nurseries managed by Horticulture Dept. From here the rate of plants were cheaper than the private nurseries. The rate of grafted plants was ₹16-20 per plant and ₹5 per seeded plant. Number of private small or big nurseries in the state was around 50 and the price of the grafted plant was ₹30 per plant.

Three types of cashew plants grow were: v2, v3 & v4; out of which v3 was commonest or the deshi variety counting around 90 per cent. It appeared that the possibilities were higher in districts like Raigarh, Bastar and Kanker. Cashew plantation in Bastar & Raigarh was a success of the Forest Department. Market scope for cashew in Chhattisgarh was another weak point of the value chain. Raw cashew nut was sold from the farmers to the middleman directly without any segregation. Only one processing unit in Bastar contributed to 10 per cent of the total domestic market in Raipur. This unit marketed cashew as Kernel in 10 Kg packets to Raipur market which accounted to almost 60 per cent of its products and rest to Delhi, Maharashtra & Andhra Pradesh. Cashew nuts from the farmers were also procured by Omurkot and Jaipur in Orissa, Parashar and Waltare in AP for processing and manufacturing. Information from the wholesalers or retailers in Raipur city market reported that cashew as an edible commodity came from Orissa-Jaipur or Omurkot. PPP was a common practice that the state had to adopt particularly for the cashew subsector, when the number of processing units was very less and some units were closing. On one hand, PPP would help for more plantations and on the other hand, processing would be done in Chhattisgarh rather than in Orissa. Other than Deshi variety high yielding cashew should be planted. Disease control of the plants through proper training of the farmers was the immediate need. The horticulture department could not successfully manage processing units those were established earlier in Bastar & Kanker. Problems were in the supply of cashew nuts and operational management of the unit. The Horticulture Dept had a plan to open few small units and the forest dept had also a plan for one central Processing Unit with field level 4-5 small processing unit in Bastar as pilot. There should be coordinated plan between departments. Tapping resources from the

departments like NABARD for plantation; NREGA for plantation and processing would manage resource constraints. This would ensure consistent value chain.

(Gupta S.P., Sep 2003) in Indian Journal of Agricultural Economics in their study 'Production Performance and Processing of Cashew nut in Goa State: An Empirical Analysis' critically analysed the problems and performance of production and the cost of processing. The findings of this study pointed out that the coefficients of variation in the production of cashew nut were quite high in North Goa (15.63%) and South Goa (15.29%) on account of high variability (12%) in the productivity of crop. The small and large processing units on an average processed 2.4 M.T. and 3.8 M.T. of raw cashew nuts per day with around 60 per cent and 63.68 per cent capacity utilisation respectively. While 70-80 per cent of the raw material was sourced from the local market, more than 90 per cent of the production was sold to the processors of neighboring states of Karnataka and Maharashtra. According to the study, lack of finance to purchase the necessary inputs, lack of soil testing facilities, latest technical know-how and shortage of labour were some of the major problems faced by the cashew nut growers. A better crop management system was recommended. The report also suggested the utilisation of full processing capacity and adoption of improved technology for the processing of cashew.

(Kesarkar, Narayan, Patil, & Gaonkar, 2012) together conducted the study titled 'Cashew Nut Cultivation in Goa State with Special Reference to Organic Cultivation Practices' with the objectives, to study the personal socio economic and psychological characteristics of the organic cashew nut growers, to determine the extent of use of organic cashew nut cultivation

practices by the cashew nut growers and to identify training needs of growers about cashew nut cultivation in general and organic cashew nut cultivation in particular and to know the constraints and seek suggestions of cashew nut growers about organic cashew nut cultivation practices. The study was undertaken in Goa state. In all, 200 organic cashew nut growers from four tahsils of Goa state were contacted. The data were collected with the help of structured interview schedule. Personal interview technique was used for data collection. The extent of use of organic cultivation practices was the dependent variable, which was measured with the help of specially developed scale. It was observed that the average age of the organic cashew nut growers was 48 years. They had average 7th standard education. The average land holding was 2.74 hectare and with 23 years of farming experience. Majority of them had farming as a major occupation and average annual income was ₹79,767/-. They had put up average 2.30 hectare area under organic cultivation with average number of 444 trees. The average age of orchard was 19 years and their average cashew nut yield was 8.3 quintals. The average score regarding information seeking behaviour was 17.5, infrastructural facilities 27.5, risk orientation 12.7, economic motivation 14.72 and market orientation 12.53. Majority of them were in medium knowledge level about organic cashew nut cultivation practices. The study made it clear that the organic cashew nut growers had medium knowledge level only. This implied that the extension agencies should guide the organic cashew nut growers for improving their knowledge level. There was a need to convince the cashew growers about utility of organic practices through demonstration and training. It was observed that the extent of use of organic cashew nut cultivation practices recommended for soil and water conservation, application of bio fertilisers, application of farm yard manure and poultry manure, in situ vermi-

composting and use of botanical pesticides was deplorably low. The study established that some personal, socio-economic and psychological correlates do influence the adoption behaviour of organic cashew nut growers. The study also identified the specific topics on which the organic cashew nut growers needed training. Hence, it was essential to provide sufficient opportunities to the growers for in depth training on organic cashew nut cultivation. The findings in respect of suggestions of the cashew nut growers revealed that the supportive role of the government in marketing, subsidy, loan, input supply and incentives for organic cashew nut cultivation and intensive training programmes needed to be strengthened, which would enable the growers to take up organic cashew nut cultivation at full extent. Organic farming in cashew nut was a viable alternative in the then scenario, as cashew nut orchards were multi resource units in Goa.

(Vilasachandran, 2007) in his article named 'Supply Chain Analysis of Raw Cashew nuts in Goa' discussed about the marketing channels and supply chain of cashew nuts in different states of India. The article reported that cashew nut ranked among the most nutritious food items. Cashew kernel, graded according to the size and colour, was available in the form of wholes and pieces. Contrary to the popular belief, it contained no harmful cholesterol. It is rich in minerals and vitamins, essential for the well being of a human body. In addition to import, there was lateral movement of raw cashew nuts among major cashew pockets within the country. The price mechanism of the commodity was broadly influenced by the import as well as lateral in country trade movements. In this context, the supply chain analysis of raw cashew nuts produced within the country assumed much relevance. An analysis of supply chain of raw cashew nuts in Goa was attempted in the study. There was an organised marketing net work for raw cashew nuts in Goa.

Availability and trading season of the commodity in the state is from March to May. Due to the highly competitive nature of the cashew trade, growers had few marketing problems. Grades and standards for cashew were yet to be introduced in the state as is the case with the rest of India. Quality was generally determined by appearance and cutting tests that traders employed prior to purchase. The higher prices realised in 1999 and 2000 were in line with all India price pattern and was attributed to short supply situation. Due to its premium quality, Goan cashew nuts fetched a premium price - the highest as compared to those produced in Kerala, Karnataka, Andhra Pradesh and Tamil Nadu. This trend remained unchanged during the entire period from 1990 to 2003. The supply chain analysis of raw cashew nut in Goa revealed that the trade route involving the cooperative as intermediary between the farmer and processor was the most popular one. While processors looked at it as an assured and reliable source of supply, the farmers favoured it for the transparent and competitive pricing mechanism. The direct marketing of the produce by farmers to the processors offers the shortest supply chain. However, there was a school of thought that the pre harvest contract and advance credit, which were integral part of the channel, made it less advantageous to farmers from the price realisation point of view. The emergence of a supply chain model for raw cashew nut trade in Goa was quite evident from the foregoing discussion. From the angles of supply chain management and value chain analysis, this model anchored by the growers' co-operative appeared to be beneficial both to producers and processors.

(Namdeo, Koulagi, & Wader, 2007) together studied about the quality and price-quality relationship of cashew nuts in their study titled 'Grade Development and Study of Price-Quality Relationship of Cashew Nut in North District of Goa'. The grade standards were developed for ascertaining

the quality of cashew nuts and quality-price relationship studied in the North District of Goa, based on the data collected through personal interview for the year 1999-2000. Laboratory analysis, indexing, stepwise multiple regression analysis and tabular presentation were employed for data analysis. Laboratory analysis consisted of generating data on qualitative variables, namely (i) number of nuts per Kg; (ii) extraneous matter; (iii) void nuts; (iv) broken and damaged nuts; (v) oozing of liquid from cashew nut shell; (vi) cutting test; (vii) floating test; (viii) length; (ix) width; (x) thickness; (xi) moisture percentage and (xii) recovery of kernels. By assigning appropriate weightages to these qualitative variables, scores were worked out by adding the 12 quality parameters multiplied by the respective weightage. The total score so obtained had constituted the basis for grades. Five grade standards were developed for cashew nut, based on composite index. It was found that the number of nuts per Kg, moisture percentage and cutting test reduced the prices and these factors could explain 98 per cent variations in price. All variables were found to have the expected signs and only three variables, namely number of nuts per Kg, floating test, and length were observed significant in price determination. These results could be used as a guide by the farmers for fetching better price in the market, and by buyers for getting product of ascertained quality. The quality of cashew, brought to the market by the farmers, varied considerably from lot to lot. Therefore, it was highly essential to evolve a grading system for cashew nuts on a scientific basis to get remunerative prices. This grading should be based on 'objective evaluation of quality aspects' so that sellers should be able to describe the quality of their produce and buyers could understand what was being offered to them. Hence, the study was undertaken to develop grade standards for cashew nut and to study the price- quality relationship of cashew nut. This

study was divided into three parts. Part I presented the grade standards developed for raw cashew nuts in the study area. Part II presented the grade and qualitative variables and their inter-relationship. Part III depicted the results of stepwise regression analysis, indicating the most important variables contributing to the price. The grade standards of cashew nuts were developed to study their price-quality relationship. Laboratory analysis, indexing, stepwise multiple regression analysis and tabular presentation were used for data analysis. Five grade standards were developed for cashew nuts, based on their composite index. The results based on price-quality relation had revealed that the number of nuts per kilogram, moisture percentage and cutting test affected the prices and these factors could explain 98 per cent of total variations in prices.

(Tendulkar, 2012) presented a paper titled ‘Development of Cashew in Goa’ in the International Conference on Cashew. As for the study, one third of the area under cultivation in Goa was under cashew covering 55000 hectare and producing about 25000 M.T annually. The State had about 15000 hectare under high yielding grafts and remaining area was under seedling progeny. A large chunk of land under cashew of about 7000 hectare was with Goa Forest Development Corporation, which was also seedling progeny. The remaining all area was in private holdings. The average productivity of cashew in Goa was about 450 Kg per hectare with trees ranging from 60-250 per hectare. The production per tree from sparsely populated plantation was more while the same was very low in thick plantation. The sparsely populated plantations were also not cared properly, and in many of the places the wild bushes and shrubs were growing rampantly. The need was therefore felt for cleaning such areas to facilitate optimum plant population to enhance production. However, the forest regulations were hindrance to this activity.

The high density plantations out of seedling origin generally tend to be tall and very frequently the trees were seen broken down in rains. The stem borer problem was noticed to be increasing in such areas. Cashew in Goa was generally grown in neglected hill slopes without irrigation or manuring, thus by default it was organic in nature. Many of the processing units exploited this situation for exporting this product as organic. However, there should be collective efforts to improve the productivity of this crop to meet the ever growing demand of this organic cashew. Cashew in Goa was unique, mainly because it was not harvested but collected. The fruit ripened on tree and the fallen fruits were collected. This provides full term for the fruits to develop sugar and other components including the size of kernel which provided a unique taste. The full development of the kernel also increased the recovery for processing industry and improved the quality of raw nuts, which was a major reason for the high demand of Goa cashew by processing industry and the resulting premium rate in the market. The feni making industry was thus supportive to the production of quality cashew. Cashew cultivation was getting more and more popular and added thrust was given for increasing the production and productivity. However, some issues needed to be addressed on top priority to meet the ever growing demand of this crop by the processing industry.

(Yadav, Shalini; Kumbhare, S L, 2008) in Indian Journal of Agricultural Economics 63.3, Jul-Sep 2008 in their study titled 'Cashew Production and Processing: Livelihood opportunities' analysed the economics in cashew cultivation and cashew processing with specific reference to Cuddalore district of Tamilnadu. Cashew industry provided gainful employment and revenue for the country in production, processing and marketing within and outside the country. They highlighted the significance of cashew processing in

the economy of rural India. The paper also analysed the experience of TAFCON (Tamilnadu Forest Plantation Corporation Limited) in cultivation in public – private partnership and the potential of value addition and processing of cashew apple and CNSL (Cashew nut shell Liquid). The report identified that the CAGR (Compound Annual Growth Rate) in area and production were positive in all states except in Kerala, which was mainly due to the replacement of cashew with remunerative crops like rubber. This report emphasised the need for financing the farmers with credit plus approach comprising of loans and extension activities to rejuvenate the senile plantation as well as to practice intensive cultivation practices, besides promoting organic cashew. The report stressed the need for popularising and commercially exploiting the cashew apple preparation, so as to increase the income of cashew cultivators and also enhance rural employment.

(Johnson & Manoharan, 2009) in their research paper titled ‘Marketing Behaviour of Cashew Farmers’ discussed about the relationship of characteristics of the cashew farmers with their marketing behaviour. Marketing of cashew nut was not properly organised. The channel consisted of the producer, village merchant, wholesalers or agents and exporters. Since the activity was restricted to only three months in a year, there were no exclusive traders for raw cashew nuts. Often there were intermediaries or wholesalers between the traders and manufactures who provided the services of information and make the deal. This had resulted in middlemen playing an important role in the marketing of nuts thereby reducing the margin or dividends for the cashew farmers. The study was aimed to find the marketing behaviour of new and old farmers of Cuddalore district, Tamil Nadu. The study reflected the relationship of characteristics of the cashew farmers with their marketing behaviour. The study was conducted in four villages from

Panruti block of Cuddalore district. Two villages from Panruti block and four villages from Vridhachalam block of Cuddalore district farmers were selected for the purpose. The sample size consisted of 45 respondents each from old garden and new garden. Majority of the respondents had medium level of marketing behaviour. New garden respondents exhibited better marketing behaviour than the old garden respondents. Without value addition, the nuts were being sold as raw to the local traders. Cashew nuts were sold by majority of the respondents whenever there was fair price for nuts in the market. Cashew apples were sold rarely by the respondents. Before marketing, majority counseled their neighbours and relatives. Only few counseled extension officials. The decision making behaviour, progressiveness, annual income and age were found to be influential and crucial variables for marketing behaviour. Marketing of cashew nut was not properly organised. The channel consisted of producer, village merchant, wholesalers or agents and exporters. Since it was an activity restricted to only three months in a year, there were no exclusive traders for raw cashew nuts. Cuddalore district in Tamil Nadu state was selected for the study because this district had the maximum area and production under cashew than other districts of the state. Majority of respondents with new gardens (37.78%) had medium level of marketing behaviour, closely followed by high (33.33%) and low (29.89%) levels. Majority of the old garden owners (71.11%) had medium level of marketing behaviour. Only 4.44 per cent were found with high marketing behaviour. Most of the old garden respondents had low to medium level of marketing behaviour. The chi-square value revealed that there was significant difference between the marketing behaviour of the new and old garden owners. The overall analysis of respondents showed that more than half of the respondents (54.44%) had medium level of marketing behaviour. The low level of

marketing behaviour was observed with 26.67 per cent of the respondents, while 18.89 per cent of the respondents had high level of marketing behaviour. The findings thus, revealed that the overall marketing behavior was medium. New garden owners exhibited better marketing behaviour than the old garden respondents. New garden owners adopted improved cultivation practices in their farm with the help of development functionaries and scientists. The contact with marketing agency, high media exposure and social participation would have helped the new garden owners to exhibit high marketing behaviour than the old garden owners. It could be concluded from the correlation, regression and path values that decision making behaviour, progressiveness, annual income and age were found to be influential and crucial variables for marketing behaviour. Nuts were being sold without value addition. Infrastructure facilities were required for value addition. Government should take necessary steps to establish cashew processing industries and cashew oil extraction units considering the available export avenues. The cashew garden owners felt lack of proper marketing channel and lack of price policy as the major constraints. Hence the government should give priority in establishment of proper marketing channel for cashew produce to prevent the intervention of intermediaries and to ensure a better price for cashew growing farmers.

(Ganguly, 2011) in his report titled ‘Analysis of Pro-poor Agriculture Value Chains in Maharashtra’ discussed about the local and export market in agricultural value chains. Developing agricultural value chains (AVCs) for both local and export markets were regarded as a powerful tool for poverty reduction, particularly if farmers were able to produce commodities that had a higher potential for value addition as compared to conventional crops, and were able to access processing and distribution facilities that enhanced the

value of the final product. Under this ADB funded study for the State of Maharashtra, 4 value chains – cashew nut, pomegranate, vegetables and cotton – were covered. The purpose of the study was to examine their operational efficiency from a pro-poor perspective, both quantitatively and qualitatively. The case studies would help develop a better understanding of, and inform the stakeholders about, the various catalytic processes adopted in developing such value chains. The advanced information on the first and second value chain was collected and analysed. These preliminary findings were based on Focus Group Discussions (FGD), interviews with key informants, appraisal of balance sheets of the organisations and review of select literature. In the case of cashew nuts, households worked hard to fetch water from distant places to raise saplings in the initial 1-3 years. However, once the saplings got established the irrigation requirement was not critical. Few farmers had adopted rainwater harvesting technology, and with the available water they could cultivate vegetables in the interspaces in cashew orchards. Support mechanisms needed to be designed to create rainwater harvesting structures in these areas. Cashew nut and mango introduced by the BAIF among the tribal farmers in Nasik and Thane districts generated modest income for poor households whose lands were up till then underutilised. Even the small incremental income was sufficient to trigger a socio-economic change in the beneficiary households, as they started growing cash crops like flowers and vegetables in the interspaces of their plantations. Among the agricultural products exported from India, cashew ranked as the third highest foreign exchange earner and contributed to 0.44 per cent of the total foreign exchange earnings of the country through exports. The study identified that the major export destinations of Indian cashew were USA (40.5%), Europe (35.4%) and West Asia (16%). Cashew is a hardy plantation crop that can be

grown in areas receiving high rainfall and also performs well on marginal soils. The tree requires minimal care and relatively lower levels of inputs as compared to other horticultural crops. Cashew processing is labour intensive. During the period of the study, cashew industry in India employed over 3 lakh persons (95% women) and given the gap in existing processing capacity and utilisation (8 lakh M.T), the cashew industry could be further developed for creating additional employment in rural areas. However, there was a need for efficient tools and technologies in cashew processing, particularly for cutting the raw cashew nuts (de-shelling) where risks to life of workers were high.

(J & Mahajan, 2012) discussed about the importance of cashew in the economy as white gold in their research paper titled ‘White Gold- An Experience of Cashew’.As for the study India was the largest producer, processor and exporter of cashew in the world. With tremendous potential of production and marketing (especially export to other countries), it is termed as 'White Gold' to describe its importance in the economy. Hilly region of Kolhapur district and its environment was much suitable for cashew production. It was observed that the cashew had significant importance in the life of hilly region people of this district. Thus, cashew-nut industry could play very decisive role in the development of the hilly region. The Kolhapur district was recognised as a hilly region area district. Thousands of people were living under poverty in the hilly area of the district. The suitable environmental conditions for cashew cultivations were the natural gift for these people. The presence of cashew had made strong positive impact on the life of the hilly poor people. The developments of cashew-nut industry in this region lead the socio-economic development of hilly area of the district. Therefore cashew was the “WHITE GOLD” for the hilly people. The study

focused on the challenges and opportunity of the cashew-nut industry of hilly region area and explored the different means how the cashew-nut industry became the instrument of change in the development of hilly region people. Cashew had the tremendous business potential that could create different business opportunities to poor people. This crop could influence the life of the poor people to large extent. Therefore, it was necessary to utilise this potential to uplift the life of poor people. In this direction the study explored the seasonal issues that could be helpful to policy makers to formulate the desired policies in this direction. As cashew was cultivated well in hilly region, therefore, it was possible to cultivate cashew in waste land and hilly slope area. The old plant needed to be replaced with new plantations that will generate more cashew cultivation which would lead to more cashew production. Poor farmers were facing so many problems in raw cashew market such as intermediaries, lack of minimum price, malpractices and price fluctuations etc. Hence, emergence of marketing co-operatives was essential where farmers could sell their raw cashew with the help of marketing co-operatives and thus could enjoy better price. Thus, poor cashew farmers would get good income which could make direct impact on their life standard. The development of cashew-nut industry in this region leads to the socio-economic development of hilly area of the district. The report concluded that in every sense, cashew was the 'White Gold'.

(Sobastian, Shibu, Thomas, K.Jessy & Thomas, October 2009) in their journal 'Supply response of Cashew nuts in Kerala' evaluated the degree of response of the producers of the state of Kerala to the price and non-price factors of cashew nuts. The responses were studied in terms of the area of cultivation and the total yield produced. In the case of area response function, the average price of last three years were considered and in the case of yield

response, the price of raw cashew nuts lagged by one year was taken under the assumption that if the prices were better off, the farmers would take better management practices, that would reflect the yield per hectare of the cashew after one year period. It was observed that the average price of raw cashew nuts over the previous three years had a significant impact and positively related to the area of cultivation. The yield also proved to have a positive response to the price of cashew. Rubber, being a crop grown in the same area and with the same resources was considered as a competing crop. A three year average price of rubber was included as explanatory variable in the area response model. The price of rubber had an inverse relationship in the area and yield analysed.

Apart from the above, the technical and scientific aspects of cashew production was another area of research.

(Tolla, 2004) in his thesis titled 'Effects of Moisture Conditions and Management on Production of Cashew' studied about the impact of climate variation and management on yield of cashew using a crop-climate model and comparative performance analysis methods respectively. Moisture availability to plant is an important land quality that is relevant in a wide variety of circumstances. Efficient use of this available moisture particularly in moist arid and semi-arid regions of the world that suffer from insufficient and unreliable rainfall conditions is essential. Beside the problem of moisture in these areas, management aspects had a great impact on the production of annual as well as perennial crops. In Mozambique, Cashew was one of the major tree crops produced by many farmers. But, the production had been declining over years thereby directly affecting the economies of a number of families involved in the production of this crop. Climate factors and

management practices were among the constraints that lead to low yield of this crop in the area. Magnitude of climatic variations was estimated using Thornthwaite water balance method. The temporal and spatial variation of climate had direct influence on the variability of available soil moisture. In other words, it had an impact on the productivity of crops. Based on this fact, the impact of the critical period of available soil moisture on yield of cashew was analysed. This study showed that a number of factors affected the productivity of cashew tree. Cashew is a tree crop, which can produce yields even with less management, poor soil fertility and low moisture. This study presented empirical evidence on the determinant of cashew productivity at the farm level. Generally, improved technologies and management practices have potentials to raise on-farm cashew productivity. However, as per the study this needed support by institution, research and extension services in order to bring about the possible increases in cashew productivity to raise small holder's income, to improve food security conditions and to reduce poverty.

2.2 Research on Cashew Processing

The research conducted in cashew processing is comparatively less compared to production and marketing. The processing is mainly confined to India, Vietnam and Brazil, though other producing countries also are involved in processing in a small way.

(G & S, 2011) together studied about the cashew kernels classification in their paper titled 'Cashew Kernels Classification Using Colour Features'. Cashew is a commercial commodity that plays a major role in earning foreign revenue among export commodities in India. The purpose of this research work was to explore image processing techniques and approaches on Indian

cashew variety identification based on their kernels. Colour is an important quality factor for grading, marketing, and end consumption. The primary objective of the study was to develop a cost-effective intelligent model to identify the cashew kernels. Colour features in the RGB (red-green-blue) colour space were extracted and computed. A feed-forward neural network was trained to classify sample cashew kernels. An intelligent classification system based on computer vision system could be developed for automated grading and sorting to speed up the grading of cashew kernels. This would solve the major problems of many of the cashew export industries also. The classification system was evaluated on cashew kernels of six different grades. The result of this study revealed that, the system gave about 80 per cent classification rate. The results of this study showed that colour features and a properly trained neural network could effectively sort cashew kernels. A computer vision-based system could be developed for automated grading and sorting. The classification accuracy was acquired under laboratory setting, so it had some limits. The study suggested that in future, a large quantity of cashew kernels should be investigated to arrive at more accurate result.

(Singha, Tegegneb, & Ekenemc, 2012) studied about the opportunities and challenges of food processing industries in India in their study titled ‘The Food Processing Industry in India: Challenges and Opportunities’. The study commented that India’s agricultural base was quite strong but wastage was very high and processing of food products was very low. The country’s processing sector was reported to be very small and processing of food to consumable standards in India had reached only 10 per cent at that time. India’s share in exports of processed food in World trade had remained at about 1.5 percent or \$3.2 billion. This paper examined the trends and status of the food processing industry, identified and discussed constraints/problems slowing

down its growth. Though there were many promising dynamics which supported the potential for growth of this industry, there were some significant constraints which, if not addressed, could impede the growth prospects of the food processing industry in India. The agro food processing industry is one of the largest in India, employing around 18 per cent of the country's industrial work force and is ranked fifth in terms of production, consumption, export and expected growth (Merchant 2008). India also produces a variety of temperate to tropical fruits, vegetables and other food products. The paper commended that processing of food products played an important role in the conservation and effective utilisation of fruits and vegetables. India's strong agricultural base, variety of climatic zones and accelerating economic growth held significant potential for food processing industry that provided a strong link between agriculture and consumers. The purpose of the paper was to examine the trends and status of food processing industry in India. The paper also identified the constraints/problems encountered and discussed challenges slowing down the growth of this sector. At the end, the paper examined opportunities and offered some feasible suggestions for continuous growth of the industry. Strength, Weakness, Opportunities and Threats analysis was used to highlight opportunities and threats facing the food processing industry and it considered strategies to develop markets worldwide for processed food products. In recent decades, there were substantial changes in the patterns of production, consumption, and trade in Indian agriculture. One change was the shift in production and consumption from food grains to high value agricultural commodities such as fruits and vegetables, milk and milk products, meat, eggs, fish and processed food products. Trade in high value products was increasingly displacing exports of traditional commodities such as rice, sugar, tea, coffee, tobacco, etc. Thus,

during the 2000s, the growth rate in value of exports of rice, sugar, marine products, tea, etc. declined while high value exports (fruits and vegetables, floriculture, meat, processed fruit juices) grew by about 18 percent. Given the declining share of traditional commodities in production, consumption and trade, horticulture and other nontraditional, high value, agricultural crops represented an important area of potential income growth in rural areas. Food processing was identified as a large sector enterprise in India that covered activities such as agriculture, horticulture, plantation, animal husbandry and fisheries. It also included other industries that used agricultural inputs for manufacturing of edible products. Major constraints for the growth of the Indian food processing industry included the absence of adequate infrastructure, particularly rural road connectivity, inadequacy of information and marketing linkages, lack of electricity supply and the absence of cold chain systems. Maintaining the standards of quality was identified as another major constraint and there were two aspects to it. First, the poor infrastructure for storing raw food materials and the second poor quality standards and control methods for implementing the quality standards for both processing and packaging of the processed foods. High costs and low availability of credit remained a problem because even within the priority sector, lending by banks for agriculture, food processing received only 4.5 per cent of the earmarked credit. The regulatory framework prevented farmers from directly marketing their produce, except through designated agricultural markets. Another important constraint was the legal framework in food laws, comprising 13 central orders alone. In addition, states had their own control orders. One of the biggest constraints was that capital intensive. It created a strong entry barrier and allowed limited number of players to enter the market. Players meant competition which reduced the efforts to improve

quality standards. Major challenges faced by the Indian food processing industry included: educating consumers that processed foods could be more nutritious; dealing with low price elasticity for processed food products; need for distribution network; development of marketing channels; streamlining of food laws; improving food quality standards and strengthening food testing network and strengthening institutional framework to develop manpower for improving R&D capabilities to address global challenges. The paper concluded these challenges must be addressed to achieve full potential of the Indian food processing industry.

(Mohod, Jain, & Powar, 2010) in their study titled 'Energy Option for Small Scale Cashew Nut Processing in India' discussed about the processing operations in the small-scale cashew processing of Maharashtra that identified energy consumption for unit operations. Cashew (*Anacardium Occidentale* L.) is one of the important tropical crops. India processed about 11,80,000M.T of raw cashew nut seeds through 3650 cashew processing industries scattered in many states of country. The cashew nut processing industries were typically located in the rural and backward areas. As per the study the most significant difficulty in processing cashew nuts was that the hard outer shell, which covered the edible kernel, contained caustic oil which could burn the skin and produce noxious fumes when heated. More recently, smaller scale factories started using the steaming and cutting method. Cashew industry was facing problem of interrupted power supply which affected the economical growth of the sector. The cashew industry in India employed different unit operations/methodology for processing depends on variety of raw material, location, technological mechanisation and availability of secured energy supply. Large disparities in energy intensity for similar process in the cashew processing revealed the scope for energy conservation to be in the order of

30-48 per cent. There was good scope for effective utilisation of solar energy and biomass gasification technology for energy generation in the sector. This study dealt with the elucidation of the processing operations in the small-scale cashew processing of Maharashtra with identification of energy consumption for unit operations. The energy conservation opportunities in the cashew nut processing sector were discussed in the study. The scope for utilisation of renewable energy technologies like solar dryers for drying of cashew nut seed and cashew kernel were elaborated. The characterisation of cashew shell waste available in the processing industry revealed the scope for thermal gasification of shell for heat generation.

(Mohod, Jain, & G, 2011), in their paper titled ‘Cashew Nut Processing: Sources of Environmental Pollution and Standards’ studied about cashew nut processing and environment pollution related to it. The cashew industries in India employed different unit operations/methodology for processing depending on variety of raw material, location, technological mechanisation and availability of secured energy supply. There are two commonly followed methods of cashew nut processing, viz. Roasting process and Steam (roasting) Cooking process. Due to lack of skilled man-power for cutting process of cooked nut and difference in taste of nut, many of the industries in India are still following roasting process. In the cashew nut roasting process, thick black smoke is released from the rotating drum through the stack. The smoke, when it reaches the ground, has irritating odor and is public nuisance in the neighborhood. Borma heater is also a source of air pollution. Wastewater is generated from the quenching operation of the roasted cashew nut discharged. Cooking process also discharges wastewater from the steam cooker and emits air pollutants by Baby Boiler for steam generation and Borma heater. The sources of different environmental pollutant discharged in

to the atmosphere during the cashew nut processing were analysed in detail in the article. The environmental standards for air pollution emission for roasting, steam cooking and borma were referred to in the article. The waste water discharge from the quenching operation in roasting process and vessel discharge during steam cooking process were also detailed in the article. The solid waste disposal practice and the relocation sitting criteria were discussed for cashew processing industries. Cashew processing industries being small and of cottage category units, no conventional and techno-economically cost effective pollution abatement systems were in operation elsewhere. Hence it was necessary to study the entire cashew nut processing industry sector in India to suggest techno-economically feasible environmental standards. Even though the pollutant emission in to environment by a single cashew nut unit was low, it was observed that the total emissions load by number of such units in a cluster caused considerable environmental degradation. The article concludes that the cashew nut processing by cooking (steam roasting) process, which was relatively less pollution intensive and an alternative process to roasting process should be considered to reduce the environmental discharge load.

(Sengupta, Akolkar, Saxena, & Srivastava, 2007) together brought out the document titled ‘Comprehensive Industry Document for Cashew Seed Processing Industries’ under the guidance of Dr. B. Sengupta. It identified the cashew nut processing industry was one of the promising sectors producing valuable commodity exported to Gulf, European and Western countries. The industry was categorised as small scale/cottage units and there were about 300 units scattered in Nagercoil district, Tamilnadu, about 270 units in Kollam district, Kerala and about 130 units at Palasa-Kasibugga, Andhra Pradesh. There was also concentration of these industries in Cheerla - Andhra Pradesh, Mangalore - Karnataka and few units in Goa. The capital investment

on the units varied between 6.0 lakhs and 15.0 lakhs. Even though there was cashew nut (seeds) cultivation in the country, most of the production demand was met by importing Cashew Nut from South Africa by the units in Tamilnadu and Kerala. The units commonly followed two different methods of cashew nut processing, viz. Roasting process and Steam Cooking process. In cooking process, CNS oil is extracted from the cashew shell of the seeds, which is used in paint and adhesive industry. Due to lack of skilled manpower for cutting process of cooked nut and difference in taste of nut, most of the industries followed roasting process. In the cashew nut roasting process, thick black smoke is released from the rotating roasting drum through the stack. The study also dealt with the market potential of different by-products of the cashew industry.

(Santha, 2008) in the book ‘ The world Cashew industry – An Indian Perspective had drawn light on the history of the cashew industry in India and provided an overall view of the cashew production in different regions. The book described in detail about the cashew plant and its cultivation techniques. It also dealt with the processing techniques in India, Vietnam, Brazil and Africa. Further it emphasised on the quality management, the nutrition in cashew kernels and the trade aspects of cashew kernels with emphasis on exports. The second part of the book attempted on a general analysis of the cashew Industry in Brazil, India, Vietnam and Mozambique up to 2007. It concluded with a comparison and SWOT analysis of India and Vietnam. This book provided the firsthand information of the cashew industry.

2.2.1 Research on CNS Liquid and Cashew Apple

A lot of research papers are published in the field of processing of CNS liquid and other by-products of cashew and their relevance in the cashew trade.

(Patel, Bandyopadhyay, & Ganesh, 2008) together studied the techno-economic feasibility of refined cashew nut shell liquid (CNSL) in their paper titled 'Economic appraisal of supercritical fluid extraction of refined cashew nut shell liquid'. A simple mass transfer based mathematical model for the yield prediction was presented. The process parameters and extraction time for maximum profit and purity of the product were optimised. The optimum extraction time for maximum profit and purity was found to be 0.9 hours at 300 bar and 323 K. The influence of the different costs, such as fixed cost, raw material cost, labor cost, utility cost, etc., on profit and cost of production of the extract is also presented. This paper presented a simple method to assess the cost of extracting refined CNSL which is cardanol rich and the incidental profits by employing SFE technology. Further, cost-cum-profit optimisation was also done considering optimisation of batch time and purity as the contributing parameters based on experimental results. Benchmark studies established that further investigation for extraction of CNSL and the other essentials like costs, selling prices and profits shall be based on working conditions of 300 bar, 323 K, extraction time between 0.9 and 1.18 hours per run were technologically as well as commercially most economical and profitable. With the annual cost of the plant inclusive of its installation being by far the largest component in the total cost of extraction, multiple shifts and near continuous working of the plant should be ideally pursued. Since the monetary computations are based on 2005–2006 basis in Indian rupees, appropriate quantitative changes in the costs, profit, proportion of profit, and magnitude of IRR may be called for.

(Borhade, 2011) in her research paper titled 'Replacement of Furnace oil and light diesel oil (LDO) by Cashew nut Shells oil' discussed about how cashew nut shell oil could be used for useful purposes. It was analysed in

terms of ash contents, calorific value, relative density, flash point, kinematics viscosity, sediment, sulphur, water content, carbon residue, pour point, and copper strip corrosion. These results were compared with furnace oil and light diesel oil. Light diesel oil (LDO) & furnace oil are the residual petroleum products and hydrocarbons. All the impurities and metal content of petroleum are concentrated in these products which have many different industrial hitting applications. It was observed that the reserves of crude petroleum were stiffly depleting and the prices of the furnace oil and light diesel oil were constantly increasing. The rapid industrialisation globally had resulted in ever increasing demand for heat and steam. However, due to uncertain supplies and high cost of these fuels there was an urgent need for other renewable sources of energy. The western ghats of India are suitable for the plantation of large variety of plants. The government of Maharashtra had implemented the scheme of horticulture development since long. Cashew nut was an important plant in this scheme. India being the largest producer of cashew nut, huge quantity of nut shells was produced as byproducts. These shells were going waste. The waste material deters polluting the environment. These shells contained more percent of oil. It could be easily extracted and used for various purposes. CNS oil could easily replace furnace oil and LDO for most of the lighting applications and save valuable foreign exchange by using waste product of cashew nut industry.

(Sanger, Mohod, Khandetode, Shirame & Deshmukh, 2011) in their paper titled 'Study of Carbonisation for Cashew Nut Shell' described the methods of carbonisation for cashew nut shell. Cashew nut shell (CNS) was utilised for carbonisation in developed prototype kiln. Prototype kiln was evaluated with direct and indirect methods and characteristics of CNS and CNS char were determined by proximate and ultimate analysis. The maximum CNS temperatures obtained inside the kiln during direct and

indirect method were recorded as 452.2° C and 458.8°C respectively. It was found that nitrogen content had increased in CNS char after the carbonisation of CNS. Oxygen content in the CNS char got reduced to 13 - 14 percent, which was comparatively very less than CNS. It was observed that indirect method was more suitable for carbonisation than direct method for obtaining higher calorific value char. Also the time required for the carbonisation using indirect method was comparatively less than direct method.

(Viswalingam & Solomon, 2013) discussed about the extraction process and useful applications of cardanol in their study titled 'A Process for Selective Extraction of Cardanol from Cashew Nut Shell Liquid (CNSL) and its Useful applications'. A process for extracting cashew nut shell oil was developed at Laurengo Marques, Portuguese Africa by Sociedade Imperial De Caju E Oleos LDA, a Portuguese body corporate and was patented in India in September 1961 (Indian Patent 78612, September 25, 1961). The invention disclosed in the above patent related to an improved unitary continuous industrial method for extraction of shell oil from cashew nut which was valuable from industrial and therapeutic point of view. This method had greater advantages in respect of producing quality products at cheaper rates and higher production levels than the primitive extraction methods which entailed more labor, higher costs and lower output. Cardanol resin varnishes have good electrical insulating properties and resistance against water and chemicals. They produce superior quality Stamping Varnishes. Cardanol resin varnishes have good air drying and baking properties in addition to water and Chemical resistance. These compositions are suitable for wood finishes, food can lacquers, textile bobins and high quality paints. Chlorinated Cardanol is reported to have good insecticidal, pesticidal and germicidal properties.

(Attri, 2009) studied about the chemical concentration and qualities of the cashew apple wine in his study titled 'Effect of Initial Sugar Concentration on the Physico-Chemical Characteristics and Sensory Qualities of Cashew Apple Wine'. The technique for the production of wine from the nutritious cashew apple was standardised. The extracted cashew apple juice was treated with 0.5 per cent food grade gelatin during heating for reducing the tannin contents. The TSS of the treated juice was ameliorated with sugar syrup and 0.1 per cent diammonium hydrogen phosphite. The fermentation rate of the 'must' was found better for a week and reduced thereafter due to higher concentration of alcohol and low fermentation efficiency of yeast. After storing the base wine for six months, the physico-chemical characteristics and sensory quality of the product were assessed. The retention of ascorbic acid was better in wine with higher initial sugar concentration whereas, the titrable acidity, volatile acidity, total esters and total phenols increased and aldehydes decreased with higher initial sugar concentration. The sensory quality of the cashew apple wine revealed that the product having 8.25 per cent alcohol had an edge over other treatments. Flow diagram for the wine production as well as cost of production of the product was also described in this paper. It was concluded that the nutritious as well as medicinally important cashew apple had a good future if processed on commercial scale. The cost of production of the final product was also quite low compared to similar products available at different places in the country.

2.3 Research on Kernel Consumption

The Cashew Export Promotion Council of India had conducted two market studies of cashew kernels, one in United States and the other in Japan in the year 2007-2008. The market Study of Indian Cashew in the US Market

was conducted by TATA Consultancy Services and that in Japan by KPMG group.

The structure of the US cashew industry was well described in the report of (Tata Consultancy Service, Mar 2003) in its Market study in US. The study described the US cashew Chain as very porous with exporters from India dealing directly with the importers in US, through brokers and both the exporters and brokers dealing directly with manufactures in US. The study revealed that the retailers were at the top of the power structure enjoying maximum bargaining power. While analysing the consumption and demand, the report specified that cashew was mainly consumed (85-90%) in snack form. As per the study, the major drive factors in consumption were (1) Growing awareness of health and nutrition aspects among US consumers; (2) Health research and promotion undertaken by manufactures of other competing nuts; (3) Emergence of club/warehouse stores and private labels making the product affordable and accessible to consumers and (4) Increasing supply from various sources at attractive and stable prices. It also analysed the competitive advantage of India as a supplier to the US market, and identified that the increasing Vietnamese production, rising labour and social costs in India, weak linkage between cultivation and processing, heavy dependence on imports etc. were the main threats to India in the US market. It also suggested two Marketing strategies for India in the US market, the first one was to grow the US market to absorb the supply of Vietnam cashew in the US to ensure that the Indian supply was not disturbed while the second strategy suggested India to Grow India's market share by effectively positioning the 'Indian' brand to ensure world class supply making India the 'Supplier of Choice'. The study recommended that India should pursue supply-side initiatives through specific programs with demand drivers like

Planters and Cosco- the major brands in the cashew consumer market. This would allow competitors (Vietnamese) to contribute to increasing supply to the US market at a faster rate than if India were to grow the market at its own pace. This, in turn ensured that demand creation was creatively 'out-sourced' while supply generation was deliberately 'in-sourced'.

As per the study conducted by (KPMG, 2003) at the instance of the Cashew Export Promotion Council of India titled 'Promotion of Indian Cashews in Japan', Japan was among the top ten cashew consumer in the world with annual consumption of around 6000 M.T. and a per capita consumption of 40 grams as against 200 grams in US. India's share of cashew imports had declined from 97 per cent in 1995 to 79 per cent in 2002 in contrast to Vietnam that had increased its share from 1 per cent to 18 per cent. Further, the share of cashew among all nuts that remained at below 10 per cent had reduced to 7 per cent by 2003 while the other major nuts Almonds and Walnuts had increased their combined share to 65 per cent. The main objective of the study was to analyse the decreasing share of cashew in tree nuts and the decreasing share of India cashew nuts in Japan market. Further Indian cashew had been steadily losing market volumes and share to Vietnamese cashew in Japan. The report suggested that the efforts to increase the exports of Indian cashew to Japan resulted in addressing these two issues effectively. The report observed that Japan has always demanded high quality cashew nuts and the price realisations from Japan market was around 5-10 per cent higher than other world markets. The trade channels to Japan were so rigid that no exporter could directly penetrate the market and make direct exports to Japanese consumers. The market share of Japan in the Indian export basket was around 7 per cent only. When it came to the decreasing share of India, it should be admitted that Vietnam was having an advantage

of nearness and lower cost of logistics to Japan. Coupled to this, the fact was that Vietnamese products were better in quality owing to the new processing plants and procedures followed in Vietnam. The exports of value added products to Japan was insignificant and so was the organic cashew exports to Japan. The cashew prices in Japan indicated a reducing trend and the fluctuation in pricing were too high for Japanese comfort. It reported that although the price of cashew had been decreasing, the average price was more than that of Almonds, though the health promotion of Almonds had an added advantage in increasing its share against cashew in the Japanese market.

(Pavaskar & Kshirsagar, 2012) together presented a paper titled ‘Indian Cashew Industry Meeting Competitive Challenge of Vietnam’ in the International Conference on Cashew. As per the study, almost 70 per cent of the global raw cashew production in 2010 was accounted for by just four countries, namely, India, Nigeria, Côte d'Ivoire, and Vietnam. If three more countries, namely, Indonesia, Philippines, and Brazil, were added, then these seven countries together contributed as much as 84 per cent to the total world production in that year. While India shared nearly 19.6 per cent of the world acreage under cashew in 2010, it contributed 22.2 per cent to the world production. This was because its per hectare yield of cashews in shell at 660 Kg was then slightly higher than the global average of 585 Kg. Nevertheless, India's average yield of cashew nut in shell was much less than similar yields of other major cashew producing countries like Nigeria (2 tons), and Vietnam (1 ton), and Philippines (4.8 tons). Cashew processing industry in India gathered momentum over the previous half a century. In the early years, the industry was located mostly in Kerala, which had then over 50 per cent of the cashew plantations in the country. But land ceiling legislation

restricted the expansion of cashew sowing in Kerala, as demand for cashew nuts grew. Therefore, over the years, cashew cultivation extended to the other coastal states of the country, more particularly in the Sindhudurg district of Maharashtra. The cashew industry promptly developed in other states, too. High value added tax (VAT) of 12.5 per cent in Kerala also fuelled the growth of the industry in other states, where such tax was around 2-4 per cent only. Probably, at that time, the country had around 4000 cashew processing units, with an installed capacity of about 18 lakhs M.T. Assuming 75 per cent capacity utilisation, as in 2005-06, the utilisation was then estimated at around 14 lakh tons. Half of the capacity was utilised through domestic supplies, while for the rest the industry depended on the imports. In the fiscal year 2011-12, India exported almost 132,000 M.T of shelled cashew nuts, as against 106,000 M.T in the previous year. In fact, India's cashew nut exports increased from 82,000 M.T in 2000 to 132,000 M.T. in 2011-12, which represented an annual growth of 4.45 per cent. The exports witnessed ups and downs during the intervening years. Even though India ranked second globally in cashew exports, a small country like Vietnam, whose production was less than half of India, exported twice as much as India. Vietnam had thus emerged as India's major competitor in global cashew export trade. Worse still, India even imported, albeit, small quantities from Vietnam, of late. The real threat to India was from Vietnam only. Since the domestic supplies of raw cashew nuts in both the countries were falling short of the requirements of their processing industries, both countries were importing mainly from Cote d'Ivoire, Tanzania, Guinea, Ghana, and to some extent from Benin, Indonesia, and Mozambique. No doubt, Vietnam's exports had grown at almost 17 per cent per annum through the past over a decade, compared to just about 1.25 per cent growth witnessed in India's cashew exports. Yet, Vietnam was

perhaps not so much competing with India in the international cashew export trade as in the global markets for importing raw cashews with shell. India also had an added advantage in the sense that it could expand its cashew cultivation owing to the availability of plenty of land in its extensive coastal areas. Vietnam did not have a similar advantage. India needed to adapt a phased replanting of cashew trees with grafts of improved varieties to achieve a higher growth rate of cashew production. At the same time, the cashew industry should also improve its efficiency and viability by adapting high levels of hygiene standards to increase production of better quality kernels that can fetch higher value in the export markets.

(Eapen, Jeyaranjan, Harilal, Swaminathan, & Kanji, 2003), in their report titled ‘Liberalisation, Gender and Livelihoods: the cashew nut case’ discussed about globalisation process and economic liberalisation which lead to the fundamental changes in the livelihood sources of different groups all over the world. This report formed the part of a research project on the cashew sector in India and Mozambique. The project was responding to a policy concern that more empirical work was needed to understand the effects of trade liberalisation on poverty and gender equality and to identify approaches which enhanced the livelihoods of disadvantaged groups. India’s share in the international cashew market had reduced over time mainly due to the entry of other countries, most recently Vietnam. International prices of raw cashew and processed kernels had declined and the domestic resource cost of earning foreign exchange had increased; thus, terms of trade had deteriorated. Although international markets were expanding, yet limited research suggested that they dominated by lead buyers with considerable profits concentrated at the European and US ends of the cashew production chain. At the same time, quality requirements and standards were

increasingly applied to suppliers. An examination of the secondary data on cashew production and trade revealed that within India there was a growing domestic market for cashew kernels which accounted for almost 50 per cent of the total market. Many states had increased cashew cultivation but the dependence of the processing industry on imported raw nuts had increased over time. Their research framework, combining value chain analysis with exploring the social aspects of economic activity, had proved useful in understanding why potential benefits fail to reach poor, less powerful groups and why particular enterprises were excluded. A key challenge was to assess the policies and interventions in different parts of the chain which could help the Indian cashew industry meet international requirements while simultaneously helping to improve livelihoods, wages and working conditions within the industry.

(Ramanathan, Mahendran, & Sundaravaradarajan, 2009) together made an attempt to examine the direction of exports and imports of cashew in two periods *viz.*, pre liberalisation (1980-81 to 1991-92) and post liberalisation (1992-93 to 2003-04), with the help of a Markovchain Model in their research paper titled 'Trade performance of cashew nut in India: A Markov-chain approach'. The report commended that USA and The Netherlands were major importers of Indian cashew as indicated by the high probability of retention in both pre and post liberalisation periods. The other countries *viz.*, UK, Japan and Australia with low values of probability of retention in pre liberalisation period indicated that they were the unstable importers of Indian cashew, where as in post liberalisation period, UK and UAE were unstable importers of cashew. The results of analysis on the imports of cashew reported that Ivory Coast, Tanzania and Guinea-Bissau were major exporters of raw cashew nuts to India as reflected by the high probability of retention.

On contrary, Mozambique, Benin and Indonesia had a probability of retention of zero in post-liberalisation period indicating that they were the most unstable exporters of raw cashew nuts to India.

(Gireesh P S, 2009) in his thesis titled 'Export Competitiveness and Direction of Trade for Indian Cashew: An Econometric Approach' discussed about the competition and cashew trade in India. Although India was the global leader in the production and export of cashew, she was not in a position to produce the required quantum of raw cashew nut to meet the installed capacity of domestic processing units in the country. This was mainly due to the low productivity compared to other producing countries and this crop was susceptible to pests and diseases. Further, this crop was mainly cultivated on senile/marginal soils and it was a neglected crop unlike other plantation crops such as tea, rubber etc. On the marketing side, this crop was subjected to wide price fluctuation in the domestic as well as international market. India held a virtual monopoly position in the production and export trade of cashew prior to eighties. However, since eighties India was losing its monopoly to other new entrants like Vietnam, Brazil and Tanzania. International market for cashew became increasingly competitive exerting threat to India's export prospects. Further, the export market was exposed to increased risk because of trade liberalisation coupled with complex and continuously changing market environment. Therefore, it was imperative to study the market opportunities and to plan for appropriate export marketing strategy and policy so as to strengthen the export trade in cashew. Apart from this, in the world market, at present, India was facing stiff competition from countries like Vietnam, Brazil etc. Further there existed the competition from other tree nuts. The results of the study on the compound growth rates during the study periods had shown positive and

significant values indicating vast potential for the export of cashew from India. The growth in the imports of cashew also indicated similar phenomenon. This showed that India had vast potential for export of processed cashew kernels. Hence there was need to evolve policies directing higher yield level of raw cashew through development of quality and high yielding cashew resulting from improved varieties and production methods. The results also reported a narrow difference in the export prices and forecast prices for cashew indicating advantage on the part of the cashew trade. However through development of good market intelligence and information the margins of differences could still be narrowed. The study of the competitiveness indicated that Indian cashew exports were more competitive and had edge over cashew exports from other countries. There was a need to develop and implement policies directing cashew industry in encouraging higher production to take advantage of the situation. The direction of trade revealed that India had an edge to export cashew kernels to USA, Australia, Netherlands, Japan and UK. Hence the good policies need to be directed towards meeting the specifications and quality of cashew kernels between these countries through cordial relations and good terms of trade. The co integration analysis revealed that the prices in the domestic market were integrated with international prices thus indicating healthy terms of trade in the cashew industry. However incentives and subsidies for the better growth of industry should be provided to make it more competitive.

(Dr. Shrikrishna, Mar 2012) in the study ‘Exploring Asymmetries In Production, Export And Import In Post-Globalisation Era: A Case Of Indian Cashew-Nut Industry’ highlighted the asymmetries in India’s foreign trade of cashew in respect of cashew production, import & export in the context of globalisation. It also focused on the asymmetries in the Indian cashew industry

during the pre and post liberalisation period. They were of the opinion that the globalisation had provided dual impact in the sense that on one hand, it inculcated a number of opportunities to various countries and on the other side it threw challenges to developing as well as underdeveloped countries. The year 1991 was adopted as the base year as the globalisation was adopted in India in that year following the introduction of new economic policy. The study observed that in the pre-globalisation as well as the post-globalisation period the distribution of cashew in India was negatively skewed indicating that the growth in India's production of cashew had decreased. The trend revealed that the fluctuation in production had decreased in the period after 1991 as compared to the period before 1991. The distribution of India's export of cashew in the pre and post globalisation period was also negatively skewed showing that the growth of India's export of cashew kernels had decreased. It further revealed that the fluctuation in export had decreased in post – globalisation period as compared to pre-globalisation period. Further, the distribution of India's import of cashew in pre-globalisation was also negatively skewed, but that in the post globalisation period it was positively skewed, showing that the growth of import (of raw cashew nuts) had increased. The report concluded that there was significant difference in the production as well as import of raw cashew nuts and also the export of cashew kernels in India between the pre- globalisation period and the post-globalisation period.

(V.G & G, July 2003) in Indian Journal of Agricultural Economics analysed that the impact of liberalisation on cashew export. The report also supported that the liberalisation policy had a positive impact on cashew kernel exports from India. As for the authors, the positive growth rate in respect of cashew export was due to the increased domestic production and

increased demand for cashew kernels in the international market. The quantity of exports of cashew kernels in the post liberalisation period had grown up by 6.08 per cent, where as the export of cashew shell liquid (CNSL) had gone down by 6.43 per cent. The coefficient of multiple determination explained about 96 per cent of the variation in the export of cashew by the independent variables specified in regression analysis. Domestic production, export prices, domestic prices, domestic consumption and the world exports were the independent variable included in the study. Further, through step down analysis, it was revealed that Indian exports of cashew contributed 58 per cent of the world market but the export price had slightly affected India's cashew exports.

(Yadav, 2010) in his paper titled 'Economics of cashew in India' conducted a research study on the cashew sector in India. Cashew apart from being a major commodity of exports, it generated employment and revenue for developing countries. India was the second largest exporter of cashew kernels in the world and earned a sizeable amount of foreign exchange (₹228890 lakhs during 2007-08). Cashew generated employment in the processing and agrarian sector of India employing over 3 lakh persons with more than 95 percent of them being women. Against this backdrop, NABARD conducted a study in some of the major cashew growing States, viz., Kerala, Orissa and Tamil Nadu. The study, besides estimating the economics of cashew nut cultivation and processing of kernels and Cashew nut Shell Liquid, analysed the issues pertaining to cashew cultivation, processing and marketing in Kannur, Mallappuram and Kollam districts of Kerala, Koraput (Orissa) and Cuddalore (Tamil Nadu). The study covered a sample of 125 cultivators, 17 processing units, 4 Cashew nut Shell Liquid (CNSL) units, 16 traders/ wholesalers/ retailers and 11 export units in the

study area. Reference year for the study was 2005-06. In India, cultivation of cashew is confined to Kerala, Karnataka, Goa and Maharashtra along the west coast and Tamil Nadu, Andhra Pradesh, Orissa and West Bengal along the east coast. Among the States, the compound annual growth rate in area and production under cashew had been positive in all the States except Kerala (-4.20% [area], -5.14% [production]). The replacement of cashew with remunerative crops like rubber in Kerala was the main reason attributed. Herfindahl Index normally ranged between 0.14 to 0.17 for area under cashew and 0.15 to 0.18 for production, indicating moderate concentration among the States. Cashew nuts were imported in the country mainly for the purpose of re-export of processed kernels since India had a labour cost advantage in this commodity. High cost involved in processing cashew was the major reason for African countries to export raw cashew nuts. Moreover, consumption of cashew kernels in these countries was also low. Using a commonly accepted conversion ratio of raw nuts to kernel at 4.54, the percentage share of imports in the total quantity of nuts processed for exports was worked out. Results indicated that imports which accounted for 36.5 percent of the total quantity of raw nuts processed for exports during 1990-91, had increased to 61.6 percent (2000-01) and 116 percent of the latter during 2007-08, implying that kernels processed from imported raw nuts were also domestically consumed.

(Padmanaban, 2010) in his thesis titled 'A Statistical Investigation on Export of Cashew Nut from India' studied about the trend in cashew export and import from India. As per the study, India was the largest producer, processor, consumer and exporter of cashew in the world. The production accounted for 45 per cent of the global production. India being the leader in the world cashew economy in raw nut production and kernel processing was

also the largest supplier of cashew kernels to the major world markets. A large number of small and marginal farmers, especially living on the coastal belts of India, depended on cashew for their livelihood. Cultivation of cashew in India confined mainly to the peninsular areas. It was grown in Kerala, Karnataka, Goa and Maharashtra along the west coast and Tamil Nadu, Andhra Pradesh, Orissa and West Bengal along the east coast. To a limited extent it was being cultivated in Chattisgarh, north - eastern states (Assam, Manipur, Tripura, Meghalaya and Nagaland) and Andaman & Nicobar Islands. Cashew occupied an area of 7.70 lakhs hectares in the country with a production of 5 lakhs MT. Of these, 2.00 lakh hectores of the plantations developed from the beginning of 8th plan alone was of superior clones of high yielding varieties. It generated employment in the processing and agrarian sector employing over 3 lakh persons and 95per cent of them were women. The Cashew Export Promotion Council of India (CEPCI) 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. By its very set up, the Council provided the necessary institutional frame-work for performing the different functions to intensify and promote exports of cashew kernels and cashew nut shell liquid. The Council provided 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 extended its good offices in settling complaints amicably in the matter of exports/imports either on account of quality and /or variation in fulfillment of contractual obligations. Indian cashews are nature's proven finest diet. It's an all time all place snack. It is a storehouse of nutrients. Cashew nuts pack proteins, fats and vitamins to a high degree and proteins

the tissue builders in our system. Nutritionally they stand at par with milk, eggs and meat. It also contains a high concentration of much needed amino acids in right proportions which is very rare in nuts. Even though strong competition from other countries had reduced India's share in the global cashew exports, India's advantage in terms of less percentage of broken kernels had brought European and US buyers to its proximity. To strengthen, cashew exports, it necessitated increasing production by developing cashew as plantation crop on commercial basis, exploring new markets, strengthening non-traditional markets, and adding value to the product by introducing innovations in processing and branding them. This increased trend in export of cashew kernel was due to the fact that, there was a slight rise in cashew kernel prices in the world market during last few years. This increase in value of export of cashew kernel could be attributed to the rise in the domestic production as well as increase in import of raw cashew nut from abroad for re-export purpose. In addition to this, there was a rise in export demand for Indian cashew. The export of cashew nut shell liquid showed a declined mainly due to the stiff competition from Vietnam and Brazil. Later it had shown increasing trend due to high demand for cashew nut shell liquid in the developed countries. The trend in import of raw cashew nut to India indicated an increasing trend at the beginning due to the sharp rise in the prices of cashew shell liquid. After 2006, it had the declining trend.

(Guledgudda, 2005) in his PhD thesis titled 'Production and Export Performance of Cashew-An Economic Analysis' discussed about the nature of production and export in different states in India. The challenges of cashew export were also discussed in his thesis. Besides, very few researches were conducted on issues pertaining to production of cashew. The production of cashew gained new status after its emergence as a commercial crop. The

growth of horticulture sector in general and cashew industry in particular was a complex phenomenon due to many influencing factors. In order to understand economic performance of production, marketing and exports of cashew in Karnataka more precisely, all possible tools were employed to get meaningful results. Though India enjoyed monopoly in the supply of cashew kernels in the world since 1970's, yet there were few studies with a holistic approach encompassing production, price behaviour and export of cashew. Low productivity is mainly due to heavy incidence of pests and diseases and also due to the cultivation in senile / marginal and wastelands. This crop was very often subjected to wide price fluctuations in the domestic as well as international markets. In order to promote and export the production and export of cashew, it was necessary to reorient the policy incentives for production, export, tax structures and subsidies and hence a comprehensive study on the cashew has become imperative. Therefore, the study was undertaken with the following specific objectives. Although India was the global leader in the production and export of cashew, she was not in a position to produce the required quantum of raw cashew nut to meet the installed capacity of domestic processing units in the country. This was mainly due to the fact of low productivity compared to other producing countries and susceptibility to pests and diseases. Further, this crop was mainly cultivated on senile/marginal soils and under neglected conditions unlike other plantation crops such as tea, rubber etc. On the marketing side, this crop was subjected to wide price fluctuation in the domestic as well as international market. There was a need to exploit the full potentiality of this crop. Therefore, farmers had apprehensions for the cultivation of this crop with long-term investments. India held a virtual monopoly position in the production and export trade of cashew prior to eighties. However, since

eighties India was losing its monopoly to other new entrants like Vietnam, Brazil and Tanzania. International market for cashew became increasingly competitive exerting threat to India's export prospects. Further, the export market was exposed to increased risk because of trade liberalisation and complex and continuously changing market environment. Therefore, it was imperative for us to study the market opportunities and to plan for appropriate export marketing strategy and policy so as to strengthen the production and export trade in cashew. Apart from this, in the world market was facing stiff competition from Vietnam, Brazil and other tree nuts.

(Balamurugan & Nagarajan, 2011) studied about the problems and issues of the cashew market in their study titled 'New Issues of Cashew Market in Tamil Nadu(India) – A Study of its Problems and Prospects. As per the study, India had the maximum area (21.6%) under cashew nut and was the third largest producer (17.3%) of raw nuts in the world. After Vietnam, the country was the second largest exporter, accounting for 34 percent of the world's export of cashew kernels. India had a comparative advantage in the production and processing of cashew nuts on account of its cheap and skilled labour force. The study emphasised the need to expand and fully utilise the potential of India to keep pace with emerging global demand, to retain market share and to stay ahead of the rapidly emerging competition in the world market. Against this backdrop, NABARD conducted a study in some of the cashew emergent states, viz., Kerala, Orissa and Tamil Nadu to examine the issues related to production, processing and marketing of cashew. The report also covered the by-product of cashew, viz., cashew nut shell liquid and cashew apple. This study indicated that the adoption of improved technologies like grafts had enhanced productivity and profitability of cashew in the study area. Investments in processing and cashew nut shell

liquid was seen financially viable. Benefits of public-private partnership was highlighted citing the experience of Tamil Nadu Forest Plantation Corporation Limited (TAFCON). The study concluded that the small size farms were more cost effective and productive than the large farms. Hence, the farmers were advised to go in for small size plantations.

(Nayak & Mohanty, 2006-07) together analysed and drafted a report named 'Commodity Specific Study Cashew Nuts in Orissa' under the guidance of S. Abdul Kareem, Chief General Manager Orissa Regional Office and Bhubaneswar. The study made an in depth analysis of the issues relating to the production, processing and marketing aspects of the cashew nuts in Orissa on the basis of the primary data collected from Koraput district. It also attempted to put forth suggestions to overcome the rigidities and inefficiencies associated with the cashew sector in the state. As for the study, Cashew was an important foreign exchange earner in the agriculture sector in our country. As per estimates, Orissa had the potential to export cashew worth ₹ 300 crore in the next five years i.e. 2008-2013. Orissa, which produced around 60 thousand M.T of raw cashew nuts annually, had the potential to produce more than double this amount. Ganjam, Khurdha and Koraput districts had the potential to become major cashew hubs in the coming years. The advantage of cashew was that the crop provided employment and income to thousands of rural and tribal poor particularly during the slack agriculture season. Cashew sector in Orissa however was more of unorganised in nature. A large share of the plantations was owned by the public sector. Maximum of the existing plantations had crossed or at the verge of crossing the economic life. Seldom was any care given for the plantations. Efforts on development of infrastructure like nurseries, and extension services in the sector could pursue the cashew growers to accept

the cashew as a commercial plantation crop. Unregulated raw cashew market allowed a few traders take the control of the cashew sector. Often the gap between the farm gate price and the price the processors paid for the raw materials was pretty wide. A regulation of the cashew price could control the cashew price. Establishment of 'Cashew Clusters' among the processors would facilitate the expansion of market linkage, improvement of the quality of kernel, and development of a Brand Name of *Orissa Cashew*. Cluster approach would encourage the establishment of the other ancillary units like the cashew nut shell liquid extracting units and units producing jam and pickle from the cashew apples. Cashew nut was a financially viable plantation crop. The Financial Rate of Return in case of the plantation by traditional method was 23 per cent and in case of the improved / grafted method was 38 per cent. This clearly indicated the profitability of grafted varieties. Improved varieties were picking up slowly owing to inadequate supply of grafts. Several initiatives were undertaken under the National Horticulture Mission to improve the cashew sector in the state and Koraput district was in the forefront of the initiatives. Apart from that, other interventions could be made to improve the sector. There was a very good scope for the establishment of cashew processing cluster in Koraput district in view of successful operation of a large number of units. A development of a cluster in such an environment may facilitate control over price fluctuation, expand market linkage, and establish brand name and improvement of quality of kernels. It would also facilitate in research and development in the field of quality analysis and packaging, processing, organic certificate and adoption of Indian Standard Organisation (ISO) / Hazard Analysis and Critical Control Point (HACCP) certifications.

(Sundaram, 2010) in his article named 'Cashew: Competition Continues' discussed about the emerging high competition in the cashew industry. Indian cashew was facing a threat from Vietnam, which had emerged as a major exporter of raw cashew with 25 per cent lower prices. The bulk of the imports by the US from India were in the form of plain cashew. Roasting and salting of cashew were done by the importers or other major players who sold it as their brands. Value-added exports from the country were not taking place as it would lead to competition with the local brands. It was in this context that experts suggest collaboration with importers in the major markets. Cashew exports increased from ₹ 4,470 million in 1990-91 to ₹18,830 million in 2000-01. They stood at ₹ 25,150 million in 2005-06. India's cashew exports constituted only 0.6 per cent of the total exports from the country. During 2005-06, India exported 11,231 tons of cashew kernels to United Arab Emirates, Saudi Arabia, Bahrain, Kuwait, Oman and Qatar. Many units in the cashew industry were facing the problem of acute shortage of raw cashew nuts. In fact, the availability of raw cashew nuts from domestic sources was only 50 per cent of the requirements. The total requirement was estimated at 12 lakh M.T. as against the domestic production of 5.44 lakh M.T. Another threat to Indian cashew in the global market was the emergence of Vietnam as a major exporter of raw cashew at a competitive price, which was lower by 25 per cent. The productivity of Vietnamese worker was also higher by 30 per cent than the Indian worker. The CEPCI wanted to conduct a study to determine the nutritional value of cashew nuts. There were some misconceptions about the cashew nuts about high cholesterol levels. The CEPCI wanted to document the properties of the nut in an international perspective. It had initiated a brand promotion campaign to popularise the commodity in select international as well as domestic markets. The central

government decided to set up a cashew research and development unit in Kollam district, Kerala, with an investment of ₹ 75 million. India was laying stress on promotion of cashew as a food ingredient and building of powerful Indian cashew brands.

(Mahajan&Patil, 2012) in the paper titled 'Exploring Asymmetries in production, Export and Import in Post-Globalisation Era: A Case of Indian Cashew-Nut Industry' discussed about the asymmetries in India's foreign trade of cashew in respect of cashew production, import & export in the context of globalisation. The globalisation had provided dual impact which inculcated number of opportunities to various countries on one side and threw challenges to developing countries as well as underdeveloped countries on the other side. The globalisation had made an impact on the trade of different agricultural commodities like cashew. The cashew trade had an important contribution in India's international trade. India was a major player in the international cashew market. The globalisation had an impact on the cashew-nut industry in India as well as other countries. The asymmetries were increasing in Indian Cashew-nut industry. But the globalisation put forth some opportunities such as: (i) increase in Cashew cultivation and cashew production, (ii) employment generation, (iii) formation of cashew processing unit, (iv) alcohol production from cashew apple, (v) shell oil production, (vi) transportation facility for cashew industry etc. This industry had domestic as well as foreign market. India had tremendous potential in this regard. The globalisation had an impact on the industry as a result of the economic asymmetries in trade of cashew. Foreign trade of cashew had been contributing Indian economy by earning valuable foreign exchange. The steps to promote cashew-nut industry was required in the form of arranging campaign for awareness of cottage industry, strategy to increase domestic consumption,

strengthening the channel of market information and extra initiative from the Ministry of Commerce and Trade, Government of India. Therefore strong efforts were required to make sustainable the Indian cashew industry in the context of globalisation to face challenges and grab the opportunities.

(Cashewinfo.com, 2012) an initiative of commodityindia.com had done a special coverage on the topic 'Dynamics of Cashew and Almond Consumption in India' which revealed the domestic and international price movements of the nuts in the last financial year 2011-12. In India, Orissa units surprised buyers with a ₹ 30 per Kg reduction. The heat wave in Northern India was turning off buyers. This had in turn reduced the buying interest in Mangalore thus taming the sellers. Availability was getting easier over next two weeks with increased production. The dollar rate factor was proving crucial for cashew industry. Exporters who had committed earlier were having heavy downfall. At the same time, importers who had contracted at certain rates were finding it difficult to survive. The raw nuts prices which escalated three weeks back were coming down and expected to lower further. Cashew and Almond were the most widely consumed nuts in India. With the changing demographics, lifestyle, increased awareness of health foods, rapid urbanisation and other positive factors affecting the nuts consumption in India, a positive growth in the demand was experienced for both these nuts in the past few years. It was interesting to note that the cashew demand was consistently increasing over the years, while the increase in demand in Almond was fluctuating. The overall growth in consumption of cashew was 11.2 per cent (CAGR) in the last decade, while the same was 8.4 per cent in case of Almonds. However, in the recent years when the cashew prices were relatively higher than almonds, the growth was moderate in case of cashew (6-8%) while it was significantly higher in case of almond (14-24%).

However, this did not mean that the cashew prices had slowed down the consumption growth. The almond consumption was only 23 per cent of the total cashews consumed. There was also a tendency for the consumers to try out more of new products, which influenced the consumption of almonds.

2.4 Research on the Social Aspects of Cashew Industry

The social aspect of the cashew sector was yet another area studied in detail. The economy of production and processing and their social impacts were analysed by many a scholar.

(Divakar, Prema, & Kumar, 2012) studied about the health and nutrition knowledge of the workers in cashew industry in their study titled 'Health and Nutritional Knowledge Assessment Scale for Workers in Cashew Industry'. A major cause of malnutrition in our country was the lack of awareness regarding good nutritional and health practices. In order to chalk out any effective nutritional campaign, assessing the then present level of knowledge was essential. Cashew industry employing a large section of the organised labour constituted a significant segment of our working population. Hence, an assessment of their health was taken up with respect to their nutritional status. In this context, the level of knowledge was also assessed after standardizing a scale. This paper explained the procedure of developing and standardizing a knowledge scale to measure the level of awareness on Health and Nutrition of such a socio economically backward group. The scale was constructed by making use of the summative method to get a five- point judgment on items selected after review of literature and also discussions with subject experts. The shortlisted statements were subjected to item analysis to finally arrive at eight statements. The scale was administered on 200 respondents. It was found that majority of the workers (78.5%) had only

moderate level of knowledge on Health and Nutrition. The scale was thus constructed and standardised and has proved to be reliable, valid and also successful in assessing the knowledge. In conclusion, the developed scale was found to be a valid, reliable and clear instrument which could be used for assessment of knowledge of socio- economically underprivileged category of people. Specific finding of this knowledge scale was that, nutrition education needed to be given focus among the working population like Cashew workers. Their conditions were especially critical because they faced the doom of lean periods where they did not have wages.

(Sivasankaran & Sivanesan, 2013) in their study titled ‘A Study about the Wages and Incentives of Cashew Industries in Kanyakumari District’ analysed the wages and incentives of cashew nut industry in the prescribed location. The cashew was brought from Brazil to India by the Portuguese about 400 years ago. Initially it was cultivated to prevent soil erosion and sea winds, but later it became an important cash crop. In fact it was not Brazil but India, which introduced this commodity into international trade and India still remained to be the largest Producer, Processor and exporter of cashew. Cashew nut is a highly nutritious product. It gives more calories to the human body. Because of its nutritious content it gives more strength and stamina to the body. Larger producers sold the products on forward saless for exports. In order to study the wages and incentives in cashew factories in Kanyakumari District, the following were the objectives, (i) To study the different methods of wages and incentives payment systems in cashew industry, (ii) To identify the factors influencing the workers among the wages and incentives schemes in cashew industries in kanyakumari District, (iii) To identify the most favorable wages and incentive schemes of cashew industries in kanyakumari District, (iv) To measure the impact of cashew industries workers regarding wages and

incentives schemes provided by cashew industries in Kanyakumari district and (v) To offer suitable suggestions to improve the satisfaction of cashew industries workers in Kanyakumari District. The survey was conducted among 100 sample respondents. Random sampling method was adopted to survey the respondents. For the purpose of the survey workers of the cashew industries from different place of Kanyakumari district were contacted. For analysis and interpretation of data, simple statistical tools such as percentage, Chi – square test, Garrett ranking technique were applied. Graphs, diagrams and frequency tables were also used for interpretation of data collection. The study on wages and incentives of cashew industries in Kanyakumari district brought out various ideas about wages and incentives. The rising cost of living compelled the workers to take up the job. Unfortunately women were facing a lot of problems in their working environment. Their socio-economic status could be improved only if adequate measures were taken to overcome their problems. The state and central government should formulate many policies to increase the welfare of the workers. This study helped to suggest various aspects related to wages and incentives in cashew factories to improve the benefit level of workers.

(Srinivasan, Ateeq, & Jayanthi, 1999) in their study titled ‘Impact of Cashew Nut Processing Industry on the Labour market for Women in Kanyakumari District, Tamil Nadu’ analysed the labour market for women in the cashew industry. They met 104 cashew nut workers and collected details about their homes and workplace. Since entry into cashew nut factories was restricted, it was not possible to contact the workers at the workplace, hence information was collected at their homes. Majority of workers were in the age group of 19-25 and 36-45 (Table 3.1). Out of 103 workers, 34 belonged to 19-25 and 31 are in 36-45 age group. Nadars, a traditional toddy-tapping caste (Singh, K.N., 1998) was predominant in the

district as well as in their survey. In their survey they constituted more than 72 per cent of total sample households. In comparison to other districts, Kanyakumari has the largest proportion of Christians. This was also reflected in the survey. Forty-eight workers were Christians and the rest Hindus. Majority of the women workers in cashew nut processing industry belonged to two groups - those who are unmarried (and teenaged) and those who are married (but in the early thirties). These workers entered cashew nut labour market when they were very young. Their composition in the industry-specific labour market reflected the district level trends in caste, religion and literacy trends but majority of them studied up to middle level. They might have entered the cashew nut labour market as dropouts. One third of the cashew nut workers' families send one of their family members outside the district and in particular to Kerala for construction work. As far as the study region was concerned, construction related activity gave more employment to male workers. Nearly 70 per cent of the women workers depended on cashew nut processing industry. The concept of minimum wages was unknown to the workers as well as the trade unions. The workers were also unaware of recent wage settlements. However, the regular revision of wages and other benefits through negotiations by trade unions were more or less followed by the industry. The negotiated terms were better than the ones fixed by the state. In the last 16 years of enforcement of the Act, it was revised only thrice. Despite the influence of trade unions in wage fixation, the cashew nut processing industry was able to grow by paying just half (for men) or quarter (for women) the wages prevailing in its traditional bastion. The earnings of women workers were less than the poverty line earnings. Majority of women earned about ₹100-150 per week, which meant just half the poverty-line earnings. When compared with other industries in the region,

this was the lowest paid occupation. However, the availability of alternative opportunities was very limited. Generally they work 9-10 hours a day and more than one third go to work on Sundays also. Poverty in the families forced the workers to accept the difficult working conditions.

(Lindberg,2004) presented a paper titled ‘Modernisation and Effeminisation in India: Kerala Cashew Workers since 1930’ at the 18th European Conference on Modern South Asian Studies at Lund University. The South Indian state of Kerala was well known for its progressive policy, high social indicators, and comparatively high women’s status. Processes of modernisation, however had an ambiguous impact on women there. This paper traced changes since the 1930s in gender relations among low-caste men and women in Kerala by examining processes of modernisation in the organisation of work, trade union activities, and ideologies regarding marriage and family life. Female cashew workers, who numbered between 200,000 and 400,000, formed the majority of the factory workers in the state. Most of them were members of trade unions since the 1940s or 50s. They were literate and throughout their history they had been very militant—if the militancy was measured in terms of man-days lost due to strikes. They seemed to contrast strongly with “Third World Women”, who were often portrayed as illiterate, ignorant, and tradition-bound victims. Although the female cashew workers of Kerala had obtained better absolute conditions at work and in society, the power discrepancy between low-caste men and women had increased in favor of men because low-caste women were now seen as weaker and more dependent on men than in earlier decades. “Modernisation”, intensified capitalism, and various ideologies and discourses—whether emanating from the West or constructed locally - had increased the gap between masculinity and femininity. The concept effeminisation of women was here

introduced to denominate a process discernable at different levels in the productive and reproductive spheres that, in contrast to feminisation, was qualitative, ideological, and discursive.

(Harilal, Kanji, Jeyaranjan, Eapen, & Swaminathan, 2006) in the summary report titled ‘Power in Global Value Chains: Implications for Employment and Livelihoods in the Cashew nut Industry in India’ discussed about the impacts of expanding global market on the livelihoods of small farmers and the women employed in the Indian cashew processing industry. They undertook extensive fieldwork in Kerala and Tamil Nadu in south India and also interviewed cashew importers, roaster/salters and retailers in the UK. This paper discussed the India-UK cashew value chain and then analysed the specificities of the export chain and its implications for workers in the processing industry in India. They examined the consequences of buyer-driven chains in the changing global context for cashew producers and processors in India. In particular, it was explored whether an expanding global market provided opportunities to enhance the livelihoods of small cashew farmers in India and increase employment the processing industry, where women were the majority of workers. Our analysis indicated that concentration and consolidation in the power of retail giants tended to drive down the terms on which in-country suppliers and other even less powerful actors engage in the production and processing of cashew nuts. The paper was based on extensive fieldwork in Kerala and Tamil Nadu in south India and interviews in the UK. First, it mapped the supply chain and identified key issues based on secondary research, interviews with key informants in Kerala and the UK, and exploratory visits to a number of other states in India. This was followed by a more detailed analysis of the different ‘nodes’ of the chain, from primary producers in Kerala and Tamil Nadu in south India

through to retailers in the UK. They also surveyed women workers, who make up the majority in the cashew industry in India, and studied a fairly unique type of ‘cluster’ processing in Panruti, Tamil Nadu. It identified that India should adopt a systematic and integrated approach to develop the cashew economy, with attempts to reduce India’s dependence on imported raw nuts. In the mid-1960s the government launched a cashew development programme and in 1966 a separate Directorate of Cashew Nut Development was established under the Ministry of Agriculture. As a result, India had since witnessed remarkable expansion in the area under cultivation, with production expanding from Kerala and Tamil Nadu to include Karnataka, Orissa, Maharashtra and Andra Pradesh. This report identified that a power imbalance between intensely competing producers and relatively few buyers in the global market place gave large retailers and the supermarkets an upper hand over their supply chains. Supermarkets were increasingly able to dictate the terms on which business was done.

2.5 Cashew and Health Promotion

Nutrition and health aspects of cashew and its effects on marketing was another area that caught the interest of researchers in this field.

(Gazzola, Wander, & Gazzola, 2008), in their paper titled ‘Cashew Nut Almonds: Nutritional and Market Aspects’ discussed about the nutritional and market aspects of cashew almonds. Having the Brazilian Northeast and North as its origin, cashew trees *Anacardium occidentale* (Linnaeus) were grown in tropical areas of Asia, Africa and America for several decades. After drying and toasting the cashew nuts, its almonds were extracted. Reports of colonisers of Brazilian coast indicated that during maturation of cashew fruits the indigenous nations of the country side used to migrate to the

coastal area where they had battles against the tribes living in the coastal area because of the harvest of cashew fruits. These battles were called the ‘guerras do acayu’. During the 16th century Portuguese colonisers brought cashew tree seeds to their colonies in Asia and Africa (Mozambique and Goa). The cashew tree adapted well to India. In Goa the production and consumption of beverages made of its fruit became an important local tradition. The cashew nut almond was largely used in human nutrition due to its favorable composition. It is rich in proteins, lipids, carbohydrates, phosphor, iron, zinc, magnesium, fibers and unsaturated fat. The oil extracted from the almonds has similar composition to the olive oil and can substitute it. The positive effects on health are related to its content of mono-unsaturated fatty acid (oleic acid or omega 3) and polyphenols, which represents 60.30 per cent of fatty acids content of cashew nut almonds.

Further, there has been so many research conducted regarding the medical aspects of cashew and the pattern of Dermatoses among workers in cashew nut industry and the pollution aspects of cashew processing. Since, such studies are purely medical related, the details of such reports are not included in the present literature review.

2.6 Conclusion

An extensive survey of available literature in the field of cashew revealed that this area was put to research by many scholars in the field of production (cultivation), processing, consumption and international trade. This section focused on the review of various articles in the field of technical, nutritional and social aspects of cashew as well. Most of the research was carried out in the field of raw cashew nuts. The cultivation of raw cashew nuts, the impact of different criteria in its productivity, its social impacts

among the farmers, the trade aspects of raw cashew nuts etc. were extensively studied by scholars. The review portrays the research done on a region wise level. NGOs like African Cashew Initiative funded by 'Bill and Melinda Gates Foundation', Technoserve, Cooperation Ivory Coast, USAID, WATCH and a number of private partners have conducted a series of study in the West African Region.

Most of the research carried out in the East African regions concluded with big criticism on the World Bank for the economic reforms in Mozambique in the 1970s that witnessed the total collapse of the Mozambique cashew industry. On the other hand, the studies in Tanzania attributed full credits to the World Bank for the recovery of the cashew sector there. These are classic examples to illustrate how the same policy and treatment can produce opposing results under different environments.

A few researches only were reported from Brazil, while relatively more research was conducted in the Asian region. This chapter describes in detail the research findings in the raw cashew sectors in India, Vietnam, Sri Lanka, Thailand, Malaysia, etc.. However most of such researches were agro based only.

Most of the researches in the field of cashew processing were India based only. The socio-economic aspects of cashew processing, the environmental problems caused by cashew processing, the wages structure of cashew processing in different states in India, the occupational health related issues of cashew workers etc. were put to research by many scholars. However no literature was available on the domestic market of India, marketing of cashew kernels in domestic as well as overseas markets. Production and marketing of value added products was another area untouched.

The CEPCI had conducted a couple of market studies in USA and Japan in the year 2003 involving Tata Consultancy Services and KPMG respectively. Though there have been many research findings on the health advantage of cashew kernels, research on market promotion of cashew kernel using the health advantage of cashew as a tool was also not yet resorted to. Further there has been numerous medical research carried out regarding dermatoses among cashew workers. Since such studies were purely of medical nature, the details of such studies were not included in the literature review.

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Chapter 3

A PROFILE OF GLOBAL CASHEW INDUSTRY

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The cashew industry had undergone a process of transition in all fields of trade ever since its inception as an industry. Global production and processing of raw cashew nuts had increased drastically during the period of the study. Also there had been a steady growth in the consumption of cashew kernels worldwide.

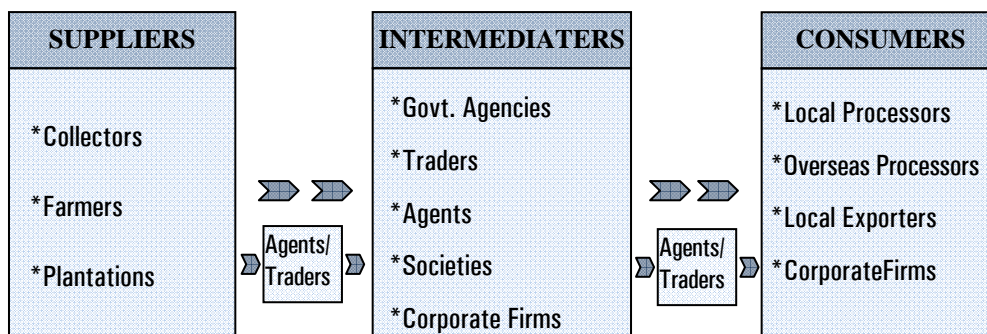
Cashew tree, traditionally grown in waste land is seldom given much care and manure even today. The farmers have to only collect/ pluck the raw cashew nuts. As the consumption of cashew kernels started picking up worldwide, the demand for raw nuts also started growing up. This had in the past resulted in high prices for raw nuts and better returns to the farmers. Slowly, cashew attained the status of a cash crop and there were collective efforts to grow cashew world over. Further the liberalisation of trade

accelerated the growth of the industry. Today cashew production is mainly spread over South American, African and Asian continents where as the processing is concentrated over India, Brazil and Vietnam and consumption over more than sixty countries in the world.

3.1 The Global Cashew Value Chain

The raw cashew nuts from the farm gate reaches the end customer as processed plain/ roasted kernels after a series of transactions and value addition at different stages. The Cashew Value chain can be classified into three distinctive sections viz. the Production chain, Processing chain and the consumption chain.

3.1.1 The Raw Nut Production Chain



* Large scale processors mostly in India, Vietnam & Brazil only

** Exports of Raw nuts banned from India & Vietnam and is restricted from Brazil.

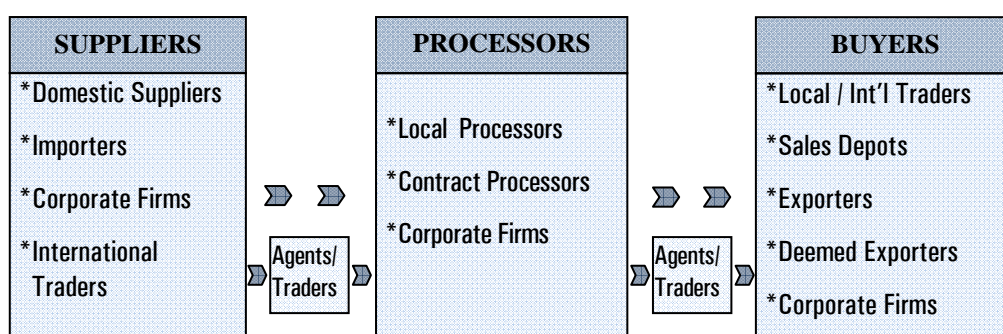
Source: Compiled during the study

Fig. 3.1 The Raw Nut Production Chain

The raw cashew nut production value chain consists of suppliers, intermediates and consumers. The ‘suppliers’ consists of (1) cashew collectors who collect cashews from open and public areas where cashew is grown, (2) small & medium farmers who cultivate the cashew in small scale

land holdings and (3) plantations– owned by Government / private firms – that cultivate cashew in a more systematic way in large scale holdings. The ‘intermediates’ consists of (1) agents, (2) traders and (3) Government agencies and societies who collect the raw cashew nuts from the sources for supply to the consumers. The ‘consumers’ consists of (1) local processors, (2) overseas processors who directly buy from producing countries, (3) Local exporters who exports the cashew to overseas buyers/ processors and (4) corporate firms who are involved in procurement, processing of raw cashew nuts and distribution of cashew kernels with their activities spread globally.

3.1.2 The Cashew Processing Chain



Source: Compiled during the study

Fig. 3.2 The Cashew Processing Chain

The cashew processing chain consists of suppliers of raw cashew nuts, Processors of raw cashew nuts to plain kernels and the buyers of the cashew kernels who ‘purchase’ these processed kernels for further supply to reach the end customer in different value added forms.

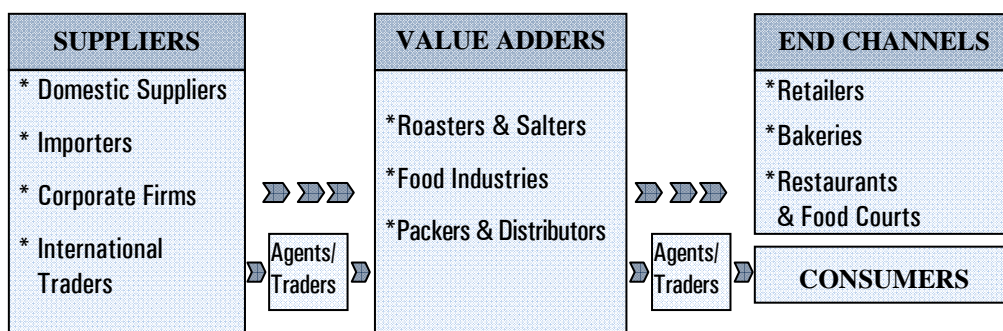
The supplier group includes domestic traders who procure the raw cashew nuts from the domestic growers and primary markets for further

supply to processing centers, the importers who imports raw cashew nuts from producing countries abroad - for self processing / domestic trading, corporate firms who imports from self procurements abroad for self processing and onward distribution to value adders /end customers - and the international traders (based in other countries) who purchases the raw nuts from producing countries and supply to the processors in other countries. Often there are inter- trade between the suppliers.

The processor group transforms the raw nuts into kernels through different stages of processing. They include local processors consisting of small, medium and large entrepreneurs who process the raw cashew nuts procured by them, the contract processors who are involved in the job works and the corporate firms who process the raw nuts procured using their own channel. The supply of raw nuts from the 'Suppliers' to 'Processors' are either direct means or through agents / traders. Here also, there is inter-trade of raw cashew nuts and finished cashew kernels between the 'Processors'.

The 'Buyers' basically connect the 'Processors' to the consumption chain. The buyer group consists of local as well as the international traders who directly buy the processed cashew kernels from the 'Processors' to the domestic/ international market, the processors who sell the products through their own sales networks, the processors who export the products and sell to the overseas buyers, 'Deemed Exporters' who sells their products through exporters for further sales to an overseas buyer and the 'Corporates' who sells their products through their own channels in the domestic as well as overseas markets. Here also the transaction between "Processors" and "Connectors" are either directly or through an agent / trader and often there is inter trade between the members of the 'Buyer Groups'.

3.1.3 The Cashew Consumption Chain



Source: Compiled during the study

Fig. 3.3 The Cashew Consumption Chain

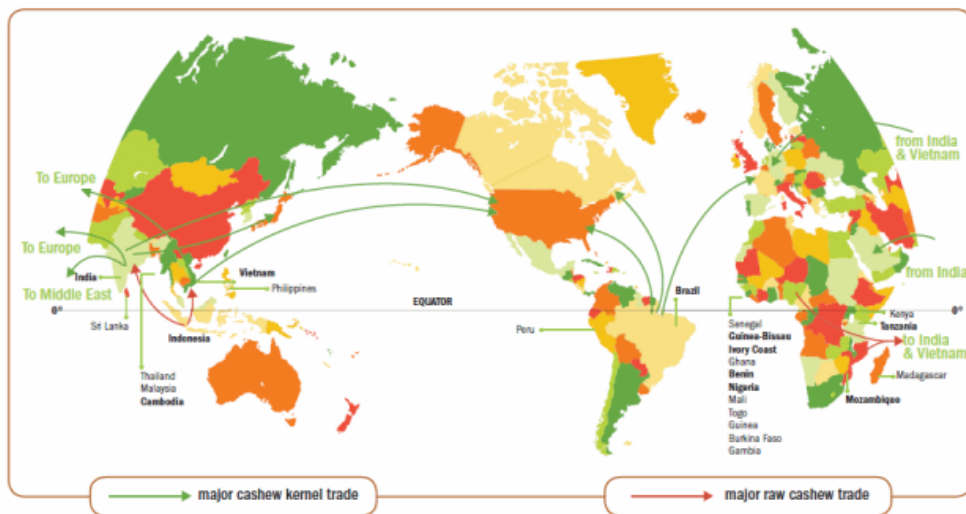
The cashew is mainly consumed in 3 distinct forms viz. Roasted form (as table snacks); Plain form (as Food ingredients) and Confectionary (Bakery & Sweets).

The domestic suppliers who collect the plain cashew kernels from processors for the domestic markets, the importers who buy the processed cashew kernels from the overseas “Processors”, the “corporates” who uses their own channel for distribution both within the country and abroad, and the “international traders” who source the processed cashew from the processing countries to the consuming/ intermediary countries are the different “Sourcers” in the cashew Consumption chain.

Roasters & Salters who give further value addition to the plain cashew kernels (and pack them in consumer packs), Food industries that make different food items using cashew as an ingredient, and distributors who pack the plain cashew in consumer packs- either in a mixed nut pack or in cashew pack - for further sales constitute the “Value Adders”.

The cashew kernels in different forms reaches the end consumer through the retailers including super markets and groceries, bakeries and restaurants & food courts that forms the “End Channels” in the cashew value chain.

3.2 International Cashew Trade Routes



Source; *Ingredient Sourcing Solution*

Fig. 3.4 International Cashew Trade

The raw cashews produced in the East and West African regions, Far East Asian countries etc. are sold to India, Vietnam and Brazil for processing. The raw nuts produced in India, Brazil and Vietnam is also processed in the respective countries. Cashew produced in small quantities in Sri Lanka is processed in the country itself. Far East Asian countries like Indonesia, Philippines, Cambodia etc. also produces raw cashew nuts, which are mostly exported and processed in Vietnam. A part of Indonesian raw nut is bought into India for further processing. The processed cashew kernels are exported to North America, UK, Europe, Middle East, Japan, Australia etc. In India, almost 2/3rd of the cashew kernels processed is being consumed domestically.

3.3 The World Raw Cashew Nut Production Scenario

The main cashew producing regions in the world include India, Vietnam, Indonesia, Brazil, West Africa (Guinea Bissau, Senegal, Ivory Coast, Ghana, Benin, Burkina Faso & Nigeria) and East Africa (Tanzania, Kenya & Mozambique). The major producing zone in the early period up to mid 1970's was the East Africa zone comprising of Mozambique, Tanzania and Kenya. Mozambique was the world's leading producer of cashew nuts with a record production of 213,000 M.T. in 1974. The late 1970's witnessed India taking a lead in the production of raw cashew nuts, but later on during the late 2000's, Vietnam took the lead. As of the latest statistics for the year 2012, India is the single largest producer of raw cashew nuts (674, 000 M.T.) followed by Ivory Coast (460,000 M.T.) and Vietnam (264,810 M.T.). The other major producing countries of cashew are Tanzania (129,000 M.T.), Brazil (79,000 M.T), and Mozambique (60,000 M.T.). Area under cashew in the world is 4.702 million hectares and production is 3.351 million tonnesⁱ

3.3.1 Factors affecting Production of Raw Cashew Nuts

Cashew is generally grown in tropical climates of about thirty countries across the globe within a band of approximately up to 30 degrees north and south latitude of the equator and up to around 200 Km from the coastal belt. The average life of a cashew tree is 30 years and the tree starts yielding from the fifth year onwards. The peak yield is during the 10-20 year period. About 110 to 120 trees are planted per hectare and the average yield per tree is 15-18 Kg per year, which gives over two tons per hectare for the high yielding breads. But the actual yield from the traditional varieties varies from 500 to 700 Kg per hectare. It is found that cashew grows normally at a temperature range of 23-29°C, exhibits slow growth at or below 20°C and is restrained at

around 18°C, whilst the trees suffer cold injury and succumb at 15°C or below (Liu Kangde 2000).

Cashew is generally considered as a “*poor man’s crop and a rich man’s food*”. Though research in the field of cashew has yielded to new varieties of cashew crops, the essence of those researches has not still reached the farms resulting in low technological innovations even under favoured climatic conditions. *Traditional labour intensive methods of agriculture with little capital investments are followed so that the semi-spontaneous produce is collected altering with grass (santha p. 2008)*. A seasonal variation in production is mainly due to climatic conditions and treatments like manure and insect control. While climatic conditions like mist and small showers at the time of flowering and moderate to extreme hot conditions at the time of harvest are more favourable for cashew production, rain at the time of harvest can badly damage the crop. Attack of insects and tea mosquitoes are to be controlled by using appropriate insecticides. Spraying of sulphur prior to flowering is a usual practice followed for healthy flowering and protection against attack by insects.

The decline in production and the corresponding trend in the East Africa in the 1970’s was mainly due to biological factors like plantation aging, traditional neglect and accompanying pathogens, socio-political factors like government instability , internal conflicts and resultant lack of training or non-availability of expertise (Donald Mitchel, June 2004). The above factors are more or less applicable for other producing countries also. The innovation in productivity brought in through constant research and its effective implementation in the farms is the main reason for the high growth of production in Vietnam and also to certain extend in India. The recent increase

in production is due to growth in Vietnam and West Africa as trees planted in the 1990s have started yielding full production. The cutting down of cashew trees for commercial use of land and also its substitution with more beneficial crops like rubber , cocoa etc apart from the biological factors like ageing of trees , tree diseases etc have resulted in lowering of production of raw cashew nuts in other parts of the world. The factors that lead to the trend in the production of raw cashew nuts in different producing countries are more or less common but yet distinct.

3.3.2 The World Cashew Production

Cashew is produced (cultivated) in around thirty countries in the World. The production is more or less concentrated in the continents of Asia, Africa and South America. Geographically, the cashew production can be grouped into four distinct sectors within the above three continents as follows:

| EAST AFRICA | WEST AFRICA | SOUTH AMERICA | ASIA |
|---------------------------------|--|--|---|
| Tanzania Mozambique Kenya | Nigeria Benin Ghana Ivory- Coast Burkinofaso Senegal Guinea Bissau Others | Brazil Peru Chille Blaze Dominique Republic | India Vietnam Indonesia Sri Lanka China Cambodia Others |

Source: Compiled during the study

Fig 3.5 The Cashew Production Sectors in the World

I. East African Sector

The East African sector consisting of mainly Tanzania, Kenya and Mozambique was the traditional producer of raw cashew nuts. The production

of cashew registered a negative trend in the 1980's and again started picking up by the mid 1990's. Changing Government policies, Political unrest, civil wars etc played a major role in the production of raw cashew in this sector.

i) Tanzania

Tanzania, a South –East African country is a traditional producer of cashew nuts that registered a steep increase in production in the late 1950's. From a mere production 1000-2000 M.T. in the 1940's, the production increased to 34,000 M.T. in 1957 and the trend continued to an all time record of 142,000 M.T. in 1975. 1980's witnessed a near collapse of cashew production in Tanzania with a production of 18,000 M.T. in 1986 and 16,000 M.T. in 1987. Combinations of problems lead to the near collapse of cashew production in Tanzania (Jaffee 1995). The co-operatives and the Tanzania Cashew marketing board were facing financial crunch that resulted in relatively huge volumes of unsold cashew in the hands of farmers. The heavy duties and taxes reduced the producer's share on export prices to less than 25 per cent.

Cashew production in Tanzania made a remarkable recovery in the early 1990's. The production has grown to 121,200 M.T. in 2000 from a mere 16,000 M.T. in 1987. This recovery has been credited to the economic reforms begun in 1986, especially trade liberalization and exchange rate adjustments, and also to the sector reforms that begun in the mid-1990s, which eliminated the monopoly of the Cashew Nut Marketing Board (World Bank OED 1998). The recovery was also aided by the decision to export raw nuts rather than processing them locally which meant that farmers were paid more quickly and they could afford to apply sulfur dust to control powdery mildew which increased yields (Donald Mitchel, June 2008-'Tanzania's cashew sector: constrains and challenges in global environment).

The recent trend in Tanzania is not that encouraging. The control exerted by the Cashew Board and the wrong fixing of indicative prices for political reasons, insistence to use costly sisal bags for exports, quality deterioration due to stoppage of grading system etc. have contributed to the present trend. Of late, the cashew Board has again intervened into the free marketing system by fixing high support prices for auction sales which are not at par with international kernel prices. This has resulted in more than 80,000 M.T. of cashew kept unsold by the end of 2011 season.

Table 3.1 Country Profile- Tanzania

| Name of the country | Tanzania | |
|----------------------------------|---------------------|----------------------------------|
| Harvest Season | OCT- JAN | |
| Quantity Produced | 75000M.T. | As of 2011 (FAO Statistics) |
| Area of Production | 80,417 He. | As of 2011 (FAO Statistics) |
| Productivity | 986.54 Kg/hectres | Last 10 years average |
| Growth Rate (Production) | 6.4% | CAGR for last 25 Years |
| Growth Rate (Area of Production) | 3.99% | CAGR for last 25 Years |
| Export % in raw nut form | 80% | |
| Nut Count | 180-190 Nos. per Kg | Average |
| Out Tern in Processing | 50-52 | Lbs per Bag of 80 Kg(Average) |

Source: Compiled during the study

ii) KENYA

Cashew accounts to only around 1 per cent of the agricultural production of Kenya with Coffee and Tea being the major products. The production of raw cashew nuts witnessed a boom in the 1970's with a record

production of 31,000 M.T. in 1975. Later on, as per the statistics of ministry of agriculture, Kenya, the production showed a declining trend to reach an all time low of 8,000 M.T. in 2008. Kenya is having an installed capacity to process 29,000 M.T. of raw cashew nuts annually(*All Africa.com 25th Oct 2011*) and the government has imposed a ban on export of Raw Cashew Nuts in 2009 to promote the domestic nut production.(*Gazette, Aug 2009, Govt. of Kenya*). The ‘Nut PAK’(*Nut Producers Association, Kenya*) estimates a total of 2 million trees in Kenya each yielding to 5 Kg nuts per annum resulting in an average production of 10,000 M.T. a year. Presently the production of raw nuts in Kenya is more or less stagnant at that level.

Table 3.2 Country Profile – Kenya

| Name of the country | Kenya | |
|-------------------------------------|--------------------|-----------------------------------|
| Harvest Season | NOV-FEB | |
| Quantity Produced | 20927M.T. | As of 2011 (FAO Statistics) |
| Area of Production | 30,455 He. | As of 2011 (FAO Statistics) |
| Productivity | 487.03 Kg/hectres | Last 10 years average |
| Growth Rate (Production) | 2.9% | CAGR for last 25 Years |
| Growth Rate (Area of Production) | 0.79% | CAGR for last 25 Years |
| Export % in raw nut form | BANNED | |
| Nut Count | 170-180 Nos per Kg | Average |
| Out Tern in Processing | 48-50 | Lbs per Bag of 80 Kg (Average) |

Source: Compiled during the study

iii) Mozambique

Mozambique was the world’s largest producer of raw cashew nuts till early 1970’s with an all time record production of 213,000 M.T. in 1974. The

production in Mozambique witnessed a collapse after 1974 and seen going down to 50,000 M.T. per annum levels currently. The main reasons of this collapse as per a study conducted by the USAID Workshop: ‘Promoting Economic Growth in a New Era’ published in June 2004 are:

- Nationalization
- Breakdown of trading system
- Export ban on raw cashews (1978)
- Civil war (until 1992): massive dislocation of rural population, destruction of infrastructure.
- Impact of export tax: farmgate price is around 28 per cent of export prices

Table 3.3 Country Profile- Mozambique

| Name of the country | Mozambique | |
|-------------------------------------|----------------------|-----------------------------------|
| Harvest Season | AUG-DEC | |
| Quantity Produced | 72263M.T. | As of 2011 (FAO Statistics) |
| Area of Production | 77,402 He. | As of 2011 (FAO Statistics) |
| Productivity | 835.08 Kg/hectres | Last 10 years average |
| Growth Rate (Production) | 3.8% | CAGR for last 25 years |
| Growth Rate (Area of Production) | 1.75% | CAGR for last 25 years |
| Export % in raw nut form | 70 | |
| Nut Count | 175-185 Nos /Kg | Average |
| Out Tern in Processing | 46-48 | Lbs per Bag of 80 Kg (Average) |

Source: Compiled during the study

II. West African Sector

The West African sector comprising of Nigeria, Benin, Ghana, Ivory Coast, Guinea Bissau and Senegal started growing cashews in the 1970's and is showing a steady growth in the production of raw cashew nuts. Though cashew is grown in the boarder areas of these states in countries like Mali, Niger, Burkina Faso, Togo etc., the produce of these countries are brought to the countries mentioned earlier and as such no reliable statistical data available on production of raw cashew nuts in those countries.

i) Nigeria

Nigeria was not a major player in cashew production till the 1980's, where the production was almost stagnant at an average level of 25,000 M.T. a year. Later on in the 1990's, like the rest of west Africa, the cashew production in Nigeria recorded a steady increase that from the production of 30,000 M.T. in 1990 to 9,500 M.T. in 1995 was which rose to 81,302 M.T by year 2012. (*FAO Statistics*) The general quality of Nigerian raw cashew nuts is considered inferior and less acceptable due to adherent testa and low 'whole yields' in production. The Nigerian Export promotion Council (NEPC) has come out with an incentive scheme that reimburses up to 7.5 per cent of FOB value of raw cashew nut exported while the same is up to 30 per cent of FOB value for the export of processed cashew kernel. Even with the high percentage of incentives, Nigeria concentrates more on the export of raw cashew nuts rather than going for production. There is significant variation in the quality parameters of raw nuts produced in the east and west regions of Nigeria. While the major share of around 80 per cent is cultivated in the Eastern side, the quality of raw nuts in the western side towards Benin is top in quality.

Table 3.4 Country Profile- Nigeria

| Name of the country | Nigeria | |
|-------------------------------------|----------------------|-----------------------------------|
| Harvest Period | FEB-MAY | |
| Quantity Produced | 81302M.T. | As of 2011 (FAO Statistics) |
| Area of Production | 330,000 He. | As of 2011 (FAO Statistics) |
| Productivity | 200.21 Kg/hectres | Last 10 years average |
| Growth Rate (Production) | 16.4% | CAGR for last 25 Years |
| Growth Rate (Area of Production) | 9.51% | CAGR for last 25 Years |
| Export % in raw nut form | 85% | |
| Nut Count | 180-190 Per Kg | Average |
| Out Tern in Processing | 46-48 | Lbs per Bag of 80 Kg (Average) |

Source: Compiled during the study

ii) Benin

Benin started cashew cultivation in a big way in the 1990's with the European Development Fund by planting cashew in about 10,000 hectare. Today, the cashew cultivation has gone up covering an area of 190,000 M.T. and more than 75 per cent of the trees are in the high yielding range of around 10 years old. Cashew accounts for 8 per cent of national revenue and 24.87 per cent of revenue from agricultural exports. The Benin cashew is considered to be of good quality due to high yield of kernels that too of big size. Cotton, which was the traditional and all time high production of agricultural product, was replaced by Cashew in the year 2008. As per the report of ACI (African Cashew initiative), 15 per cent of the raw cashew nuts exported from Benin

represents the inflow from neighbouring countries of Nigeria, Togo, Mali and Burkina Faso. As per the statistics of FAO, the production of raw cashew nut has gone up from just 1,200 M.T. in 1987 to 46,770 M.T. in 2012 (ten years ago) and 70,000 M.T. in 2011 with a peak production of 1,17,000 in the year 2009. As per the estimates of International Nut Council, (INC) Spain, the production in the year stands at 80,000 M.T.

Table 3.5 Country Profile- Benin

| Name of the country | Benin | |
|----------------------------------|-----------------|--------------------------------|
| Harvest Season | MAR-JUNE | |
| Quantity Produced | 70000M.T. | As of 2011 (FAO Statistics) |
| Area of Production | 250,000 He. | As of 2011 (FAO Statistics) |
| Productivity | 256.70 Kg/He. | Last 10 years average |
| Growth Rate (Production) | 18.3% | CAGR for last 25 Years |
| Growth Rate (Area of Production) | 14.7% | CAGR for last 25 Years |
| Export % in raw nut form | 88% | |
| Nut Count | 170-185 | Average |
| Out Tern in Processing | 48-50 | Lbs per Bag of 80 Kg (Average) |

iii) Ghana

Ghana was not a major player in the cashew map almost a decade ago and the cashew is grown in the west part of the country adjoining Ivory Coast. A considerable quantity of raw nuts produced in the Bondoukou and Bune regions of Ivory Coast is smuggled into Ghana (Sampa and Bole) regions to take advantage of the tax structure prevailing in neighbouring Ivory Coast and as such the exports of Ghana are more than its actual

production. Ghana gained importance in the Cashew trade during the civil war in Ivory Coast over the last decade, and even today, after the civil war is over in Ivory Coast, Ghana still used to receive a major share of Ivory Coast production from the boarder regions.

As per the statistics of FAO, the raw nut production in Ghana was 8,325 M.T in 2001 that rose to 36,500 M.T in 2012.

Table 3.6 Country Profile-Ghana

| Name of the country | Ghana | |
|----------------------------------|------------------|--------------------------------|
| Harvest Period | MAR- JUNE | |
| Quantity Produced | 35736M.T. | As of 2011 (FAO Statistics) |
| Area of Production | 60,223 He. | As of 2011 (FAO Statistics) |
| Productivity | 555.45 Kg/He. | Last 10 years average |
| Growth Rate (Production) | 22.5% | CAGR for last 25 Years |
| Growth Rate (Area of Production) | 21.32% | CAGR for last 25 Years |
| Export % in raw nut form | 80 | |
| Nut Count | 170-185 | Average |
| Out Tern in Processing | 50-52 | Lbs per Bag of 80 Kg (Average) |

Source: Compiled during the study

iv) Ivory Coast (Cote d'Ivoire)

Ivory Coast is the largest producer of cashew in the Africa that stands next to India and Vietnam in the international scenario. Unlike most of the other cashew producing countries, Ivory Coast was not a traditional grower of cashew. The first cashew trees were planted in 1959 and 1960 by SATMACI (*Société d'Assistance Technique et de Modernisation de l'Agriculture en Côte d'Ivoire*) and SODEFOR (*Société de Développement des Forêts*) with

a view to protect the ecosystem which was seriously affected by deforestation and bush fires (*Areca 2006*). The increasing prices of raw nuts worldwide and the resulting high returns in the early 1990's sparked the grower interest that encouraged farmers to go for the massive cultivation of cashew nuts.

As per the statistics of FAO (Food and Agricultural Organisation), the production of 6,500 M.T. of raw cashew in 1990 has gone up to 4,52,656 in 2012. Ivory Coast Cashew is grown in the Northern, North-Eastern and North-Western part of the country. This region witnessed a growth in the production of cashew registering a steady growth of 22 per cent over the last decade. According to 'ARRECA' (*Autorité de Régulation du Coton et de l'Anacarde*)- a Government body controlling the production and trade of cashew and cotton- the growth in Cashew production is divided into three periods, viz:

- Between 1990 and 1993 – registering an average rate of 40 per cent
- 1994 to 2004 – switchback growth
- From 2004 onward – Steadier growth at the rate of 22 per cent.

Today, Ivory Coast is the largest single exporter of raw cashew nuts in the world with 71 per cent exported to India and 28 per cent to Vietnam (*intercaju 2009*) Cashew cultivation is well developed in Ivory Coast. Most of the cultivations are by individual farmers though co-operative society's contribution to this area is remarkable. Ivory Coast has really benefited of the presence of NGOs like INADES, RONGEAD, ANADER, ACA (African Cashew Alliance) etc. and UN based organizations like WATCH (West African Trade and Cultural Hub) and programmes launched with the backing of certain partners (*GIZ, FIRCA*) etc.

Table 3.7 Country Profile- Ivory Coast

| Name of the country | Ivory Coast | |
|----------------------------------|--------------------|--------------------------------|
| Harvest Season | MAR-JUNE | |
| Quantity Produced | 452656M.T. | As of 2011(FAO Statistics) |
| Area of Production | 877,813 He. | As of 2011(FAO Statistics) |
| Productivity | 404.68 Kg/He. | Last 10 years average |
| Growth Rate (Production) | 20.0% | CAGR for last 25 Years |
| Growth Rate (Area of Production) | 16.33% | CAGR for last 25 Years |
| Export % in raw nut form | 82% | |
| Nut Count | 180-190 | Average |
| Out Tern in Processing | 48-50 | Lbs per Bag of 80 Kg (Average) |

Source: Compiled during the study

v) Senegal

Senegal got included in the world cashew production mark in the late 1980's and the detail of production is available from 1988 onwards. Cashew is produced in the Casamance region in the south of Senegal, that is adjoining Guinea Bissau. Considerable quantity of raw cashew is brought into Senegal from Guinea Bissau mainly due to the tax structure prevailing in Guinea Bissau and the resulting high farm gate prices in Senegal. Over the period from 1998 to 2011, Senegal registered a growth in cashew production that corresponds to an exponential growth of 7.7 per cent.

Senegal cashew is relatively small in size but with high out tern and hence though the yield of finished kernels are of lower grades, the pricing of raw cashew nuts are relatively high. According to the figures from the Chamber of commerce in Ziguinchor, the regional capital of Casamance, the

production in 2011 is worth 40 million US Dollars that employed 220,000 people.

Table 3.8 Country Profile- Senegal

| Name of the country | Senegal | |
|----------------------------------|-----------------|--------------------------------|
| Harvest Season | APR-JULY | |
| Quantity Produced | 6996M.T. | As of 2011(FAO Statistics) |
| Area of Production | 16,200 He | As of 2011(FAO Statistics) |
| Productivity | 311.26 Kg/He | Last 10 years average |
| Growth Rate (Production) | 7.7% | CAGR for last 25 Years |
| Growth Rate (Area of Production) | 6.73% | CAGR for last 25 Years |
| Export % in raw nut form | 92 | |
| Nut Count | 210-220 | Average |
| Out Tern in Processing | 52-54 | Lbs per Bag of 80 Kg (Average) |

Source: Compiled during the study

vi) **Guinea Bissau**

Guinea Bissau produces the best quality raw cashew nuts in terms of out tern in the whole of Africa, but the size of the cashew is relatively small. Due to the high yield in processing, Guinea Bissau nuts are much preferred worldwide. In Guinea Bissau, which is among the poorest nations in the world the economy is more or less dependant on the cashew production and ranks sixth in world cashew production. Guinea Bissau has registered an exponential growth rate of 8.4 per cent over the last 25 years.

With 98 per cent export earnings and 17 per cent of fiscal revenue derived from cashew, the degree of export dependence on this crop for Guinea Bissau exceeds the export dependence of OPEC country on oil exports (*Steven kyle-July 2009*). It is estimated that cashews cover more than

6.7 per cent of the national territory or about 210,000 ha. and that each Bissau Guinean produces an average of more than 53 Kg of raw cashew each year . The majority of families have at least some producing cashew plants. It is estimated that cashew area is increasing at the rate of 4 per cent per year though output is increasing at a rate of 10 per cent due to the fact that many recently planted trees are now reaching their period of highest productivity. (Henrique Mendes- July 2009)

Table 3.9 Country Profile- Guinea Bissau

| Name of the country | Guinea Bissau | |
|----------------------------------|----------------------|--------------------------------|
| Harvest Season | MAY-AUG | |
| Quantity Produced | 128684M.T. | As of 2011 (FAO Statistics) |
| Area of Production | 222,517 He. | As of 2011 (FAO Statistics) |
| Productivity | 446.08 Kg/He. | Last 10 years average |
| Growth Rate (Production) | 8.4% | CAGR for last 25 Years |
| Growth Rate (Area of Production) | 6.67% | CAGR for last 25 Years |
| Export % in raw nut form | 98 | |
| Nut Count | 220-230 | Average |
| Out Tern in Processing | 54-56 | Lbs per Bag of 80 Kg (Average) |

Source: Compiled during the study

vii) Other Regions

Cashew is produced in the adjacent area of the above mentioned countries in the West African sector. They include Mali, Burkinafaso, Togo, Niger, Guinea Conacryetc. These countries are land locked area (without any sea-port) and as such their produce has to be transported by road for further marketing. The productions in these countries are negligible that there is no presence of foreign buyers. The produce of these countries are mostly brought to the neighbouring countries and is sold as the produce of those

neighbouring countries. As such the produce of these countries are accounted for the production of the neighbouring countries and the statistical figures if at all available is very negligible and hence not reliable.

III. The South American Sector

The Caribbean sector consists of Brazil, Peru, Chile, Belize and Dominican Republic in the South America sub continental. Brazil is the major producer and the contribution of other area is marginal to negligible.

i) Brazil

Brazil is the home land for the cashew nuts from where it spread to the other parts of the world. The cashew production was almost stagnant at below 5000 M.T. level till late 1960's, when cashew was not recognised as a commodity for trade, but was rarely consumed as a food item. In Brazil, the consumption was mostly the fruit both in the raw and preserved forms. Even today, more than 25 per cent of the earning from the cashew tree product comes from the cashew fruit (Cashew Apple). Perhaps it is the only country that effectively makes use of the cashew apple commercially which otherwise is wasted in all other countries. In the 1970's, the cashew production registered a steady growth when the conditions for cultivation were brought under more organised sector with the help of Government incentives and subsidies. This has resulted in the area of production multiplied by 7.1 times and the production increased by 2.5 times -As against India that registered an increase in area by 2.9 times and production by 3.1 times - (*Dr. Rajmohan Pillai- 2008*)

The Brazil nuts are big in size and hence the nut count is low to 150 to 160 per Kg. The yield of kernel is less compared to other origin that approximately 4.8 Kg of raw cashew nuts is required to yield 1 Kg of kernel as against 4.2 Kg for most other origins including India. The production in

Brazil is very sensitive to climatic changes and pest attacks that it varies widely in the range of 30-40 per cent as evident from the statistics of FAO. Brazil is a silent player in the international trade of raw cashew nuts where they depend on their domestic production and import and export of raw nuts are very negligible and often regulated by the government.

As per the statistics of the FAO, in 2011 the total production of raw cashew nuts in Brazil stands at 2,30,785 M.T. covering an area of 7,64,472 hectares with an average productivity of 301.89 Kg/ He.

Table 3.10 Country Profile- Brazil

| Name of the country | Brazil | |
|-------------------------------------|--|-----------------------------------|
| Harvest Season | SEP-DEC | |
| Quantity Produced | 230785M.T. | As of 2011 (FAO Statistics) |
| Area of Production | 746,472 He. | As of 2011 (FAO Statistics) |
| Productivity | 253.74Kg/He. | Last 10 years average |
| Production area | in the states of Ceará, Piauí, Rio Grande do Norte, Bahia and Maranhão | |
| Growth Rate (Production) | 2.4% | CAGR for last 25 Years |
| Growth Rate (Area of Production) | 1.44% | CAGR for last 25 Years |
| Export % in raw nut form | BANNED | |
| Nut Count | 130-140 | Average |
| Out Tern in Processing | 42-46 | Lbs per Bag of 80 Kg (Average) |

Source: Compiled during the study

ii) Others

Cashew is grown in other countries in the Carribean sector like Peru, Chille, Blaze, Dominique Republic etc. The production in these countries range between 1000 to 5000 M.T. per year. The raw nuts produced in these regions are either brought into Brazil or being consumed locally. However these countries do not play a role in the international cashew trade.

IV. Asia Region

Like the other parts of the world, Cashew was introduced to the Asian countries in the early 16th century by the Portuguese and today the Asia region consisting of India, Vietnam, Indonesia, Srilanka, Combodia and Philippines is the largest producer of raw cashew nut in the world. India being the largest producer closely followed by Vietnam accounts for around 80 per cent of the production of raw cashew nuts in this region.

i) India

Cashew was introduced to the coastal belt of Goa by the Portuguese, from where it spread out to the entire south western part (konkan belt) of India. The cashew tree was recognized as a soil binding tree to prevent soil erosion. Climatic and soil conditions like hot climate and heavy rainfall followed by misty climate during flowering and prolonged summer during harvest combined with the fertility of the land all made cashew to grow in India .Later on the cashew plantations spread to the eastern coast of Tamilnadu, Andhra Pradesh, Orissa and West Bengal also. Cashew attained the status of a cash crop in the 1960's with the recognition earned as a foreign exchange earner for the country. The growth in the World kernel consumption that resulted in heavy demand for raw cashew nuts made India go for area

expansion programme combined with vast research in the field. This helped India to come up as the world leader in cashew production.

Research in cashew cultivation was initiated as early in the in the 1950's and in 1970, the Central Plantation Crop Research institute (CPCRI), Kasargod in Kerala was delegated with the mandate of cashew research as a part of 'All India Coordinated Spices and Cashew improvement Project from 1971'that spearheaded the cashew production in India . The cashew research attained further momentum with the launch of multi state cashew projects in the state of Kerala, Andhrapradesh, Karnataka and Orissa from 1982 to 86 with the aid of World Bank (E.V.V. Bhaskara Rao-2010 Integrated Production Practices Of Cashew In India). In 1986, a national research Centre for cashew was established in Puttur (Karnataka State) with an aim to improve productivity along with production of cashew in the country, under which there are 8 research centers and one sub-center in eight cashew growing areas of the country. The directorate of cocoa and Cashew Development in Cochin (Kerala) acts as a link to transfer the research into the farms by implementing specific schemes for the plantations and is a national agency primarily engaged in the overall development of Cashew and Cocoa in India.Cashew research stations at Madakkathara and Anakkayam under the Kerala Agricultural university has yielded to new breeds of cashew nuts. The combined effects of research in India have yielded to around 21 clones and 33 varieties of high yielding cashew trees.

There are no co operatives in cashew plantations in India. However there are state owned plantation corporation in Kerala and cashew development board in Karnataka. The application of pesticide (endosalphan) by the Plantation Corporation of Kerala was controversial. The Kerala state

Government had introduced the monopoly procurement scheme for cashew by introducing Kerala Raw Cashewnut (Procurement and Distribution) Act, 1981 which was quashed by the High court in 1996.

In India, the collection of raw cashew is mainly by plucking the raw cashew from the tree once it is matured in contrast to other cashew producing regions where the cashew is collected by allowing the matures ones to fall down and picking them from the ground.

During 1980's, cashew plantation was recognized by the Government of India for the waste land development programme with subsidies to the farmers. This resulted in big boost to the cashew production in the country. The area under production, as per the statistics of FAO has gone up from 5.09 Lakhs He. in 1985 to 9.50 lakhs in 2011 with the production going up from 2.21 lakhs M.T. to 6.75 M.T. during the same period coupled with the productivity boost of 438 Kg per He. to 707 Kg per He.

Table 3.11 Country profile- India

| Name of the country | India | |
|----------------------------------|------------------|-----------------------------------|
| Harvest Season | Feb - Jun | |
| Quantity Produced | 674600M.T. | As of 2011 (FAO Statistics) |
| Area of Production | 953,200 He. | As of 2011 (FAO Statistics) |
| Productivity | 690.46Kg/He. | Last 10 years average |
| Growth Rate (Production) | 4.3% | CAGR for last 25 Years |
| Growth Rate (Area of Production) | 2.67% | CAGR for last 25 Years |
| Export % in raw nut form | BANNED | |
| Nut Count | 160-180 | Average |
| Out Tern in Processing | 50-52 | Lbs per Bag of 80 Kg (Average) |

Source: Compiled during the study

ii) Vietnam

Cashew was introduced in Vietnam only in the early 1990's only and Vietnam was not a prominent figure in the world cashew production till the early 1990's, where the cashew production was almost stagnant at less than 50,000 M.T. levels and the cashew so produced was mostly exported to raw form mainly to India. The tree was mainly considered as a forest tree or a shade tree for home garden. In 1989, the crop was recognized as an industrial crop and came under the ministry of Agriculture. In 1990, the Vietnam Cashew Tree Association was set up and the since then the growth of production thereafter is amazing that from 90,000 M.T. in 1995, the production has grown up to over 700,000 M.T. in 2010, as per the statistics of CEPCI 2010. The emergence of Vietnam as a processor and exporter of finished kernels accelerated the growth in the production. Today Vietnam is the largest producer of raw cashew in the world. There has been vast research conducted in the field of cashew cultivation under the leadership of world famous Indian Scientist Dr. K.V. Ahmed Bavappa (Vinacas, 2000).

Table 3.12 Country Profile- Vietnam

| Name of the country | Vietnam | |
|----------------------------------|-------------------------|--|
| Season | February – April | |
| Quantity Produced | 27200M.T. | As of 2011(FAO Statistics) |
| Area of Production | 331,300 He. | As of 2011(FAO Statistics) |
| Productivity | 1210.50Kg/He. | Last 10 years average |
| Growing Regions | | North and East Provinces |
| Growth Rate (Production) | 14.2% | CAGR for last 25 Years |
| Growth Rate (Area of Production) | 5.73% | CAGR for last 25 Years |
| Export % in raw nut form | BANNED | |
| Nut Count | 160-180 | Average (Data gathered during the study) |
| Out Tern in Processing | 48-50 | Lbs per Bag of 80 Kg (Average) |

Source: Compiled during the study

iii) Indonesia

Cashew growing in Indonesia was originally confirmed to soil protection and afforestation programs mainly in the eastern parts of the country which is characterised by relatively hilly terrain with sparse rainfall and long dry season. Cashew was recognized as a cash crop in the 1980's and there has been a steady increase in the cashew sector both in terms of the area of production and the quantity of productions. The trees planted in the early 1980's started yielding fully in the early 1990's that according to the FAO statistics, the total production of raw cashew of 21,114 M.T. in 1985 had gone up to 57247 M.T. in 1991 (with a sharp jump in production of 29,907 M.T. in 1990). Land Survey results shows that more than 15 million hectares spread out in 9 provinces in the country are suitable for cashew cultivation (Abdullah and Las, 1995) and as such there is heavy potential for cashew production in the country.

From the processing angle, Indonesian raw nuts are the most preferred for processing as it yield more high grade nuts (of W 240 and above) which is more white and easy to process (expert interviews, 2007). However, among other problems facing the cashew production in Indonesia, the most prominent ones are of technical nature like lack of high quality planting materials, pests and disease constraints, drought effects, fire hazards and economic instability (Usman Daras, 1998).

Indonesia was a promising supplier of raw cashew nuts to Indian processing till the beginning of the current century. But with Vietnam started processing in a big way that exceeded their domestic production, they started importing from Indonesia making advantage of their market proximity. The low processing costs in Vietnam enable them to pay a better price to Indonesia than what India could offer.

Table 3.13 Country Profile - Indonesia

| Name of the country | Indonesia | |
|----------------------------------|------------------------|--|
| Season | July – November | |
| Quantity Produced | 122100 M.T. | As of 2011(FAO Statistics) |
| Area of Production | 570,600 He | As of 2011(FAO Statistics) |
| Productivity | 228.84Kg/He. | Last 10 years average |
| Growing Regions | | South –East Sulawesi, South Sulawesi, East Java, West-East Nusatenggara, Bali. |
| Growth Rate (Production) | 7.5% | CAGR for last 25 Years |
| Growth Rate (Area of Production) | 8.41% | CAGR for last 25 Years |
| Export % in raw nut form | 81% | |
| Nut Count | 160-180 | Average (Data gathered during the study) |
| Out Tern in Processing | 50-52 | Lbs per Bag of 80 Kg (Average) |

Source: Compiled during the study

iv) Sri Lanka

In Sri Lanka, geographically close to south India, the climatic and soil conditions are favorable for cashew production. But however, the production of raw cashew nut in Sri Lanka reflects a declining trend and has been fluctuating highly mainly due to climatic changes. As per the statistics of FAO, the production of cashew nuts in the late 1980's in the range of 9,000-10,000 M.T. had gone down by half to 4500-5000 M.T. range by the late 1990's and early 2000's, that has slowly picked up to 7,000 M.T. level during the 2010's. As per the above, the area of production is almost stagnant, but slightly gone down from 27,000 Hectares in 1985 to 23,090 hectares in 2011. The civil war in Sri Lanka that lasted for more than 3 decades (like Mozambique in the 1970's) had a negative impact in the production of raw cashew nuts, which is now showing slight improvement.

The cashew growing in Sri Lanka is mainly confined to the Eastern part of the country that normally experiences a dry climate and held by small family holdings. The cashew development including production of raw cashew nuts in Sri Lanka is undertaken and co ordinate by the Sri Lanka Cashew Corporation under the Ministry of Plantation Industries. In the new plantations that are established with the aid of government subsidy, relatively larger holdings are available where improved varieties such as ‘Kondachchi’, ‘Mannar’ and ‘Trinidad’ are planted and nearly 38 per cent of the crop area is covered by these improved varieties .Over 80 percent of the planting material used by farmers are seedlings. Nurseries are raised by the Sri Lanka Cashew Corporation through selected nurserymen. Softwood grafting is the only vegetative propagation method practiced. Air-layering and bud grafting are also carried out in a small way, especially for home gardens and for urban areas. (G.B.B. Surendra, Integrated Production in Asia- FAO workshop 1998)

Table 3.14 Country Profile- Sri Lanka

| Name of the country | Sri Lanka | |
|----------------------------------|--------------|---|
| Season | May-June | |
| Quantity Produced | 6890M.T. | As of 2011(FAO Statistics) |
| Area of Production | 23,090 He. | As of 2011(FAO Statistics) |
| Productivity | 282.95Kg/He. | Last 10 years average |
| Growing Regions | | Puttalam, Mannar, Vavuniya, Jaffna, Trincomalee, Batticaloa, Polonnaruwa, Moneragala and Hambantota |
| Growth Rate (Production) | -1.6% | CAGR for last 25 Years |
| Growth Rate (Area of Production) | -0.8% | CAGR for last 25 Years |
| Export % in raw nut form | BANNED | |
| Nut Count | 180-190 | Average (Data gathered during the study) |
| Out Tern in Processing | 46-48 | Lbs per Bag of 80 Kg (Average) |

Source: Compiled during the study

v) China

The cashew cultivation in China started in the 1930's and most of the plantations are confined to the southern and south-western coastal areas of Hainan Island. Like India, China has an enormous domestic demand for the cashew crop and local production is not sufficient to meet the demand and china often resorts to import of raw cashew kernels for production industry and also for domestic consumption. The climatic condition of China is not that supportive to cashew growing. The mean temperature of South Hainan island, where cashew is mostly grown, is around 19⁰C, where as cashew grows in the temperature range of 23⁰C - 29⁰C.

Majority of cashew crops in China are of seeding origin and coupled with the unfavorable climatic conditions, the productivity is low in the range of 210-220 Kg per hectare. It was only in 1977 that a research group led by Prof. Jiang Shibang of the Chinese Academy of Tropical Agricultural Sciences could successfully develop the cashew budding techniques. They launched a research programme on selection and breeding of high yielding clones as well as introduced rejuvenation practices for low yielding cashew plantations (Liu Kangde, Liang Shibang and DengSuisheng -Integrated Production Practices Of Cashew In China- FAO workshop 1998).Until late 1970's, seeding was the only method adopted and the practice of using grafted plants of improved selections started in the late 1980's only. Grant aid was given by the European Community for the development of the cashew industry from 1985-1990,Current research is concentrating on breeding and selection of cold resistant clones/seedlings for different micro-climatic zones of North Hainan, Gejiu and Yingjian in Yunnan province.

But with all these efforts, the cashew production in China is on the decline. As per the statistics of FAO, the total production in China was

6500M.T. in 1985, which went up to 8000 M.T. in the year 1998 and later on started declining to 1200 M.T. level in early 2000's, that again started going down to 700 M.T. levels by 2011, while the area of production has come down from 12,000 hectares in 1985 to 1650 hectares in 2011. Though the soil and climatic conditions are not that suitable for cashew productions, the south and south west coast of Hainan Island, has still a large area of around 40,000 Hectarsunfertile land along the coastal belt that is considered not suitable for any tropical food crop other than cashew, and that has been identified for afforestation and soil conservation project. In the late 1980's and early 1990's, some of the orchards were abandoned due to poor management. However, the cashew nut has a low rating as a farm product and its contribution to the gross national product in economic terms is negligible.

Table 3.15 Country Profile- China

| Name of the country | CHINA | |
|----------------------------------|--------------|---|
| Season | March-June | |
| Quantity Produced | 720M.T. | As of 2011(FAO Statistics) |
| Area of Production | 1,650 He | As of 2011(FAO Statistics) |
| Productivity | 360.65Kg/He. | Last 10 years average |
| Growing Regions | | Sanya of Hainan Province, coastal areas of Ledong Lingshui, Dongfang. Scattered cultivation in Wanning and Wenchang of Hainan and and trial plantings in Xishuangbanna and Gejui in Yunnan Province |
| Growth Rate (Production) | -7.6% | CAGR for last 25 Years |
| Growth Rate (Area of Production) | -6.2% | CAGR for last 25 Years |
| Export % in raw nut form | NIL | |
| Nut Count | 160-180 | Average (Data gathered during the study) |
| Out Tern in Processing | 46-48 | Lbs per Bag of 80 Kg (Average) |

Source: Compiled during the study

vi) Cambodia

Cambodia lies in the middle of Asian Cashew market. Yet the real picture of Cambodia cashew is little known to the world outside Cambodia and Vietnam. Most of the raw cashew produced in Cambodia is transported to Vietnam and as such official figures do not tally with real production and is getting treated as the production of Vietnam. The only report available for reference is the study conducted by International finance corporation, a member of World bank Group in October 2010, which estimated the indigenous production in Cambodia at 60,000 M.T. per year and the nut are of relatively good quality that is easy to shell and yields 24 per cent to 28 per cent of kernels with high percentage of higher grades. Since, most of the cashew in Cambodia is grown with only natural manure, there is high scope for organic cashew production in Cambodia.

Table 3.16 Country Profile- Cambodia

| Name of the country | CAMBODIA | |
|----------------------------------|--|-------------------------------------|
| Season | Feb- Apr | |
| Quantity Produced | 60,000 M.T | As per reports of IFC (2010 report) |
| Area of Production | 85,000 Hectares | Estimates |
| Productivity | 700 Kg / Hectare | As per reports of IFC (2010 report) |
| Growing Regions | Spread across the country, but more concentrated along the border of Vietnam | |
| Growth Rate (Production) | Not Known | |
| Growth Rate (Area of Production) | Not known | |
| Export % in raw nut form | 100 | As per reports of IFC (2010 report) |
| Nut Count | 160-180 | As per reports of IFC (2010 report) |
| Out Tern in Processing | 42 -48 Lbs per bag | As per reports of IFC (2010 report) |

Source: Compiled during the study

vii) Other Regions

The other regions of Asia that produces cashew are Philippines, Myanmar, Thailand and Malaysia. Palawan is the leading production center in Philippines that accounts to 90 per cent of production. Other areas include Llocos Region, Central Luzon, Northern Mindanao and Western Visayas. As per the statistics of FAO, the cashew production in Philippines registered a steady growth in the 1990's, that the production from 4000 M.T. levels in 1980's had gone up to 10,000 M.T. levels in early 1990's and to 15,000 M.T. levels in 2010's.

In Myanmar cashew is grown in the southern districts and currently the plantations extends to Kachin State, Kayin State, Sagaing Division, Taninthayi Division, Bago Division, Mon State, Rakhine State, Yangon Division, Shan State and Ayeyarwady Division. In 1982, cashew was given priority plantation status by the government which resulted in rapid expansion of the crop in many States and Divisions of the country. By the end of 1995, cashew growing extended to 21,009 ha with an annual production of 2,114 tons. (Maung Maung Lay- Integrated Production Practices Of Cashew In Myanmar ,1998). The production of raw cashew is almost stagnant at this level.

Cashew was introduced in Thailand from the adjacent country Malaysia in the early 1900's and the production of cashew gained importance with the change in the Government policy in 1984 to support cashew plantation in agreement with EC to reduce the production of cassava due to an international surplus of the commodity (Suwit Chaikiattiyos - Integrated Production Practices Of Cashew In Thailand – 1998). As per the statistic of FAO, the cashew production in Thailand has registered a steep increase from 22,000 M.T. in 1999 to 44,789 M.T. in 2000, the growth that continued to register an all time high production of 60,506 M.T. in 2005. The production

then started declining that in 2011, the total production reported stands at 29,060 M.T.

The production of raw cashew nuts in Malaysia was steadily going up in till the first half of the decade that started declining afterwards. As per the statistics of FAO, the production of raw cashew nuts was on the range of 15,000 M.T. in the 1990's that steadily increased to 35,000 M.T. level by 2005 and then started declining again to 15,000 M.T. level by 2011.

In common, in all cashew producing countries throughout the world, there existed vast area of land suitable for cashew production, which was yet to be explored. Further extensive research had produced high yielding varieties of cashew trees. With all these favorable factors and effective crop management system, there is immense scope for the world cashew production to grow up further.

3.4 The World Cashew Nut Processing Scenario

Cashew spread to the rest of the world from its origin in Brazil in the early 16th century, and was mainly planted as a soil binding tree to prevent erosion. The succulent fruit of the tree- commonly known as the cashew apple – was perhaps the only product in use those days. Further cashew tree was a source of fire wood for the tribes and villagers with the result that the nut of the tree was treated as a waste product meant for reproduction only. Later on, the kernel inside the nut (while in the primitive form) was extracted by cutting open the shell before it hardens and was consumed in its raw form by the tribes and villagers as an 'in-between' snack during their work. The acidic oil contained in the shell- known as CNS liquid - contaminates the kernel, that imparts a sour taste that itches the tongue and burns the inner layer of mouth made it un- acceptable for human consumption.

Later on during the early 19 century, the white kernel inside the fully matured cashew nut was extracted without much presence of the CNS liquid by some or other raw technique, which made the cashew kernel acceptable for human consumption. Slowly, cashew kernels found a way in the Mediterranean diet.

In raw form, the cashew kernel is a soft, white and pulpy nut, that turns to a golden hue on heating and the mellow pulp becomes crispy. It is a source of high energy and tastes good consumed in any form- plain, roasted or steamed. The extraction of the kernel out of the hard and matured cashew nut without getting contaminated with the CNS liquid is the essence of cashew processing.

The total processing of raw cashew nuts in the world is by three major processors viz. India, Brazil and Vietnam. Cashew is processed in small quantity by minor processors in certain origins like Benin, Nigeria, Ivory Coast, Kenya, Mozambique, Philippines, Sri Lanka etc. But the total quantity of production in these regions put together is much small and negligible compared to the leaders viz. India, Vietnam and Brazil.

| MAJOR PROCESSORS | MINOR PROCESSORS |
|------------------|------------------|
| INDIA | Ivory coast |
| BRAZIL | Ghana |
| VIETNAM | Benin |
| | Nigeria |
| | Kenya |
| | Tanzania |
| | Mozambique |
| | Sri Lanka |
| | Indonesia |
| | Philippians |

Source: Compiled during the study

Fig. 3.6 The World Cashew Processing Regions

3.4.1 Cashew Processing in India

India was the first country that pioneered cashew as an industry as early in the 19th century itself. The Cashew processing in India in a commercial way accounts to the early 1900's, when villagers used to burn/char raw cashew nuts in fire and break open the shell to extract the kernel. In this process, the CNS liquid gets sucked to the surface of the raw cashew nuts and get fired later on India started roasting raw cashew nuts (mixed with sand) in open pan. Afterwards, the shell was removed by crushing them with stones and the kernel extracted. These kernels were then sold in the local and far off markets. The processing and selling of cashew started more or less simultaneously in three centers in India in the 1920's- Kollam (in present Kerala), Mangalore (in present Karnataka),and Vettapalem (in present Andhrapradesh).

The first attempt on processing cashew at an organized level was done by a Sri Lankan, Roche Victoria in the 1920's. (Dr.J.Rajmohan Pillai and Dr. P.Shanta; World Cashew Industry - an Indian perspective; 2008) and the cashew was first exported in the same year to USA. The technical advisor of Pierce Leslie Company W. Jeffries introduced the first drum roaster in 1932, which is being used even today with slight modifications. Jeffries also introduced the hot oil bath roasting with a view to extract CNSL. (Kumar 1995).

The organized way of processing with the introduction of new machineries paved the way for the growth of a number of cashew processing centers. The local entrepreneurs in Kollam pioneered this industry further. The Vendor group (founded by Krishna Pillai), Poilakkada group (founded by Parameswaran Pillai) and Musaliar group (founded by TangalKunjuMusaliar)

were the the pioneers of this industry in Kollam, where as M/s. Pierce Leslie (PL) company pioneered this industry in Mangalore. (Dr.J.Rajmohan Pillai and Dr. P.Shanta; World Cashew Industry - an Indian perspective; 2008). With the emergence of more and more private entrepreneurs in this field, the number of processing centers increased, that provided employment to rural women. Almost all of the cashew processing were owned and managed as family business. The growth in the number of processing unit in turn resulted in corresponding growth in the export of cashew kernels.

The increase in cashew processing and export was not accompanied by the corresponding increase in production and import of raw cashew nuts was imperative and started in 1930's from East Africa. This imports grew up faster and also the domestic production improved drastically that increased to 51,000 M.T. by 1950 (CEPCI, cashew statistics 2000). The imports were almost stalled during the World War II, but the domestic production maintained the flow of processing in India.

Kerala was the major producer of cashew in India, but the land reforms act introduced in Kerala (in 1962) made the cashew plantations to grow concentrate into other parts of India. The introduction of new labour laws in Kerala (in 1950) and the scarcity of raw nuts made more and more factories to close. Again in 1976, the Kerala government introduced the Acquisition of Factories Act, by which the closed down units were forcefully taken over by the Government. All these made the entrepreneurs to shift their processing to neighboring state Tamilnadu and slowly the industry spread over to the southern belt of Tamilnadu.

Meanwhile, with the efforts of the directorate of development of Cashew and Cocoa supported with the high yielding varieties of cashew

breadths developed by National research agencies, cashew production apart from Kerala and South Karnataka had spread to other states like Goa, Maharashtra, Andhrapradesh, Orissa, West Bengal etc. This has made the processing also to grow in these regions. Today, cashew processing in India is mainly evolved in the states of Kerala, Tamilnadu, Andhra Pradesh, Odisha, West Bengal, Karnataka, Goa and Maharashtra. The major impact on cashew processing is the shift from family business to corporate levels and the adoption of new technology and quality standards in processing .Inspite of some levels of mechanization, the industry is still dependent of huge labour input in processing. As of 2012, there exists 3650 cashew processing units under both organized and un organized sector with an installed capacity of processing 16.23 Lakhs M.T. of raw cashew nuts (Venkatesh and Singh, 2012).

India still uses more or less the traditional system of cashew processing with modifications brought in over the time, that was necessary to address the then and there prevailing draw backs. The oven pan boiling has been replaced by drum roasting in Kerala, Kanyakumari belt of Tamilnadu and Orissa. Steam cooking is widely been adopted in Karnataka, Goa, Maharashtra and Andhrapradesh and West Bengal. The oil bath system is seldom practiced in India. On an experimental level, some processors have started implementing automated cutting machines. The main drawback of the automated cutting machine is the higher capital investment and the non-parity level of savings. According to industry sources, two man days are required to cut one standard bag of raw cashew nuts by investing ₹ 2500 - ₹ 3000 on a manual cutting machine, while in the automated system, the investment is around ₹ 1,50,000 – ₹ 2,00,000 that could cut 2 bags a day, but the labour saving is only 50 per cent and with additional cost of electricity to run 0.5 HP motor.

In borma, the traditional ovens of 8 feet and 12 feet are seldom used in the industry. Most of the processors are adopting the heat exchanger type borma for processing. This ensures even heating and less over scorching of Kernels. Peeling is perhaps the area where automation has succeeded and the level of automation is around 40 per cent. Grading continues to be still manual though colour sortex machines used for colour sorting of other grains with certain modifications is being used in a small way.

The packing is both in tins and flexi pouches depending on the requirement of the buyer. Mostly domestic and middle east markets prefer cashew packed in tins only where as traditional overseas markets of US, U.K, Europe, Japan etc. prefer cashew packed in pouches. Final packing in 2 Nos. of 25 Lbs pouch and single pouch of 50 Lbs depending on the requirement of buyers.

Further value addition and consumer packs are not widely practiced. The domestic market consumes cashew as an ingredient for food and sweets and as such plain broken cashew kernels are consumed. In the export market also, only plain cashew kernels (wholes) are traded as further value addition takes place in the country of destination where the same is branded and marketed. Total Quality Management is practiced and most of the firms have gone for quality certification like ISO and HACCP.

Major processing industry is operated by individuals and family business group. Corporate firms have entered the processing sector of India in the 1990's and have grown in a big way in the quantity of processing. Contract processing and Job works are mostly encouraged by the corporate firms. Cashew processing has undergone tremendous changes ever since its inception as an industry. Started as a cottage industry, it has undergone a revolution that today it has attained a corporate status.

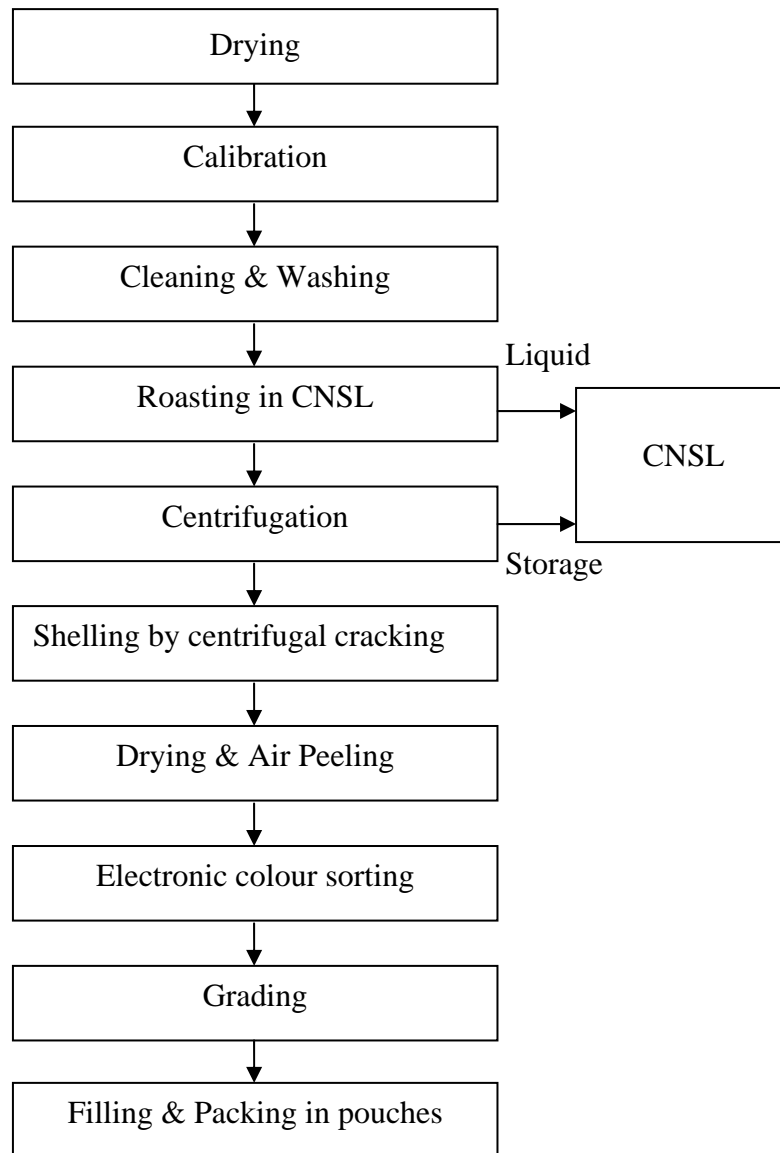
3.4.2 Cashew Processing in Brazil

America's attempts to locate a new supplier of cashew kernels encouraged processing of cashew in Brazil. Brazilian raw cashew nut is of big size (count less than 150 per Kg) and more even, that makes cashew processing with machines more attractive. Unlike India and Vietnam, major portion of cashew processing in Brazil is by big corporate.

The processing in Brazil is almost similar to India in small scale sector, that adapts the steam processing technology. The large industry sector uses automated systems. In this, the raw cashew nut is graded according to size into four groups and stored at 8 per cent moisture level. The nuts are roasted in hot oil bath of CNS liquid at 220°C, that passes through an agitating belt in a centrifuge, that breaks the shell and the cashew kernels are separated. This is also referred to as 'Shocking' or the 'percussion' system. The kernels are then heated at 80°C by an air jet, that peels off the testa. The final output of kernels are then sorted based on colour using electronic colour sorting machines and separated into wholes, Broken and Pieces by machines. The whole kernel availability is around 50 per cent, against 75-85 per cent in India and Vietnam. The Brazilian cashew industry adopted the automation in processing starting in the 1980's. At present there are 12 large processing units in Brazil capable of processing 420 M.T of kernels a day. (Antonio Lucio Sheepsindicaju. Brazil)

Brazil cashew industry sources the raw nuts from indigenous production and very rarely they go for export or import of raw cashew nuts. The processing in Brazil is more costly, owing to the inability of mechanized processing to reduce broken. But however, the pricing of raw nuts in Brazil is less compared to the rest of the world, that supports the industry inspite of the low yield in

processing. (*International finance corporation, world Bank Oct-2010*). Proximity to U.S.A, the main consuming region is an added advantage to processing.



Source: *The World Cashew Industry-An Indian Perspective*

Fig.3.7 Shocking system of processing in Brazil

3.4.3 Cashew Processing in Vietnam

Vietnam was not a processor of cashew until 1995, and almost all the cashew produced in Vietnam used to be exported to India in the raw form itself. The increased production in West Africa in the early 1990's, and its availability in better quality made India concentrate more on West African countries for its sourcing of raw cashew nuts. This resulted in a low demand for the raw cashew nuts from Vietnam, that was considered inferior in quality to African raw nuts and by 1995 Vietnam was left with a huge quantity of unsold raw cashew nuts. Vietnam lead a delegation to India to persuade India buy cashew from Vietnam. When that attempt did not materialize, Vietnam was left with no other option, but to start processing and sell its products in the International markets. Vietnam started processing adopting Indian methods of processing. The U.S buyers, who had to count on India alone , as Brazil processing was almost stagnant, supported the entry of Vietnam in the international market. The increased domestic production of raw cashew nuts accelerated the growth in processing also. Today, Vietnam is the second largest processing country in the world, next to India, that has registered an exponential growth of 22 per cent in processing (*derived from CEPCI Statistics*).

The processing in Vietnam is similar to India, but mostly adopting the hot oil bath system. But the Vietnamese cashew Industry could adopt the mechanization in processing in an effective way, that today the processing of cashew is highly mechanized and that has reduced the cost of production.

A major development in Vietnam in the cashew sector is the emergence of Vietnamese cashew processing machine manufacturers in the international market in 2009. Their innovative machines improved the processing

especially in peeling and was cost effective. As of 2010, 100 out of 225 factories in Vietnam have gone for mechanized peeling. (*International finance corporation, world Bank Oct-2010*)

On the other side, Vietnam cashew industry is highly criticised for ‘blood cashew’ production practice. ‘Blood Cashews’ refers to the production of cashew nuts under the harsh condition of forced laborcamps, acting against the international law for Human Rights. In the latest Human Rights Watch (HRW) report. Under the authority of the police force and local officials, drug users are usually detained for two years. “Post-rehabilitation management” would take place for additional two or three years after the completion of the two years of detention Based on statistics, there were close to 40,000 people with the majority being young men. They were detained at the country's 123 drug rehabilitation centers and made to carry out “labour therapy”, which involves sewing garments, making bricks or processing cashews. (<http://www.hrw.org/reports/2011/09/07/rehab-archipelago-0>).

3.4.4 Cashew Processing in Other Regions.

Apart from the major cashew processing countries in the world, ie India, Brazil and Vietnam, cashew processing is carried out in a small way in some African countries like Mozambique, Kenya, Tanzania , Benin, Ghana, Ivory Coast and Asia countries like Sri Lanka, Philippians, and Indonesia. As per the statistics, (ref. table V), the total processing of all these countries put together is less than 10 per cent of the total processing. The ‘Bill Gates foundation’ in co-operation with Kraft foods and Costco (US retailers) has committed a \$25 million funding for the development of cashew processing industry in the West Africa Region. It is expected that this region will emerge out as a major processing center in the coming years.

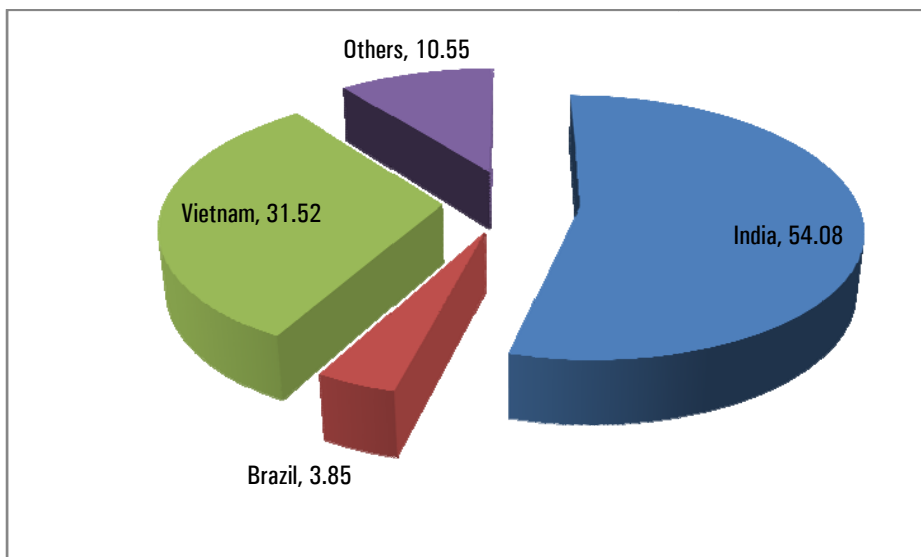
Table 3.17 Processing Comparisons of Major Processing Countries

| | INDIA | BRAZIL | VIETNAM |
|--------------------------|---------------------|----------------|----------------------------|
| Harvesting | Picked | Fall | Fall |
| Roasting | Drum/Steam Roasting | Oil Bath | Oil Bath |
| Shelling | Manual Cracking | Mechanised | Mix of Manual & Mechanised |
| Grading | Manual | Mechanical | Manual |
| Shelling Yield | 26% | 21% | 24% |
| Wholes yield | 75-80 % | 55-60% | 65-75% |
| Packing | Tin/ Flexi | Corvac | Flexi |
| Technology | Low | Medium to High | Low to Medium |
| Ownership | Individual/ Family | Corporate | Trader |
| Attitude | Conservative | Corporate | State& Entrepreneurial |
| Investment | Minimal | High | Medium |
| Performance | Not Reliable | Reliable | Very unreliable |
| Quality | Reliable if checked | Reliable | Reliable with exemptions |
| Dependence on Imports | 50% and more | Imports Banned | 20 to 25% |
| Number of Factories | 3650 | Less than 20 | 225 |
| Shelling Capacity/ annum | 1,350,000 M.T. | 450,000 M.T. | 650,000 M.T. |

*Sources: Ingredient Sourcing Solutions
Data collected for study*

3.4.5 The Share of Processing of Raw Cashew Nuts

India is the world's largest processor of cashew in the world followed by Vietnam. As per the statistics of CEPCI (2012), Indian processing accounts to 54.08 per cent of the worlds processing, where as Vietnam accounts to 31.52 per cent and at Brazil 3.85 per cent. The position of Mozambique is negligibly small where as other new processing countries (including Mozambique) accounts to 10.55 per cent of the world's processing.



Source: CEPCI Statistics (2012)

Fig. 3.8 World share of Cashew processing-2012

3.4.6 Evolution in Processing Technology

India developed some raw technique to extract the white pulpy kernels from the raw nuts without much presence of CNS liquid in the early 1900's. Even before, the villagers used to cut open the raw nuts before the shell hardens and scoop the kernels. But that kernel contained the CNS oil and was not acceptable for consumption.

In the early days, open pan method was widely used to roast raw cashew, where the raw nuts were placed over red-hot iron pans and thoroughly stirred. In this processes, the raw nuts got fired off and charred. The charred nuts were broke opened by striking with stone pallets.

The first attempt on processing cashew at an organized level in India (perhaps in the World) was done by a Sri Lankan Mr. Roche Victoria in 1920. (Dr. Rajmohan Pillai -2008). The Open pan roasting gave way to drum roasting and then to Oil bath roasting and Steaming. Still drum roasting is in use in some processing centers like Kerala, Tamilnadu, Orissa and West Bengal. The de-shelling operation from breaking with stones developed to malleting and then to manual cutting and now to mechanized cutting. The Peeling and grading operations progressed from manual peeling and grading and is now almost fully mechanized. The wooden packing gave way to tin and pouch packing with vacuumisation and gas flushing. The quality standards were introduced like ISO, HACCP, BRC, KOSCHER etc.

The newly introduced food safety standards have made the cashew processing more professional and serious in India. Strict quality standards are mostly adhered to as the export cargo undergoes quality inspection by third party professionals before exports. Better infrastructural facilities coupled with training and awareness programmes for both employees and employers have made the quality upgradations possible. Further there is strict adherence to quality standards in the importing countries. R&D (Research and Development) in processing has become an integral part of at least the major processors and exporters. In short, the processing of cashew has undergone a real transition all these days.

Table 3.18 Evolution in Processing

| Process | Phase I (Prior to 1930) | Phase II (1930 - 1950) | Phase III(1950- 1980) | Phase IV (1980- 2000) | Phase V (After 2000) |
|-------------------------|--|--|---|-----------------------------|---|
| Roasting | Open Pan Roasting | Drum Roasting/ Oil bath Roasting (<i>still continuing</i>) | Drum Roasting/ Oil bath Roasting (<i>still continuing</i>) | Steaming | Steaming |
| Shelling | Stone Crushing | Malleting | Malleting | Malleting/Cut ting | Malleting/C utting |
| Borma | Sun Drying | Single/Multi Chamber oven Heating | Tunnel Borma | Electrical Borma | Improved Hot air/ Tunnel Borma |
| Cooling | Open Air cooling | Evaporation | Rotary Humidifier | Window Humidifier | Window Humidifier |
| Peeling | Un peeled | Manual | Manual | Manual | Mechanised |
| Grading | Un Graded | Manual | Manual | Manual | Mechanised |
| Filling & Packing | Packed in mango wooden box with paper lining | Packed in Tins, vacuumised using hand operated pumps | Packed in Tins, vacummised using electric pumps, filled with CO ₂ gas | Flexy Pouch | Flexy Pouch |
| Quality Standars | N.A | Local Standards | ISO | ISO, HACCP | ISO, HACCP, BS, KOSCHER |

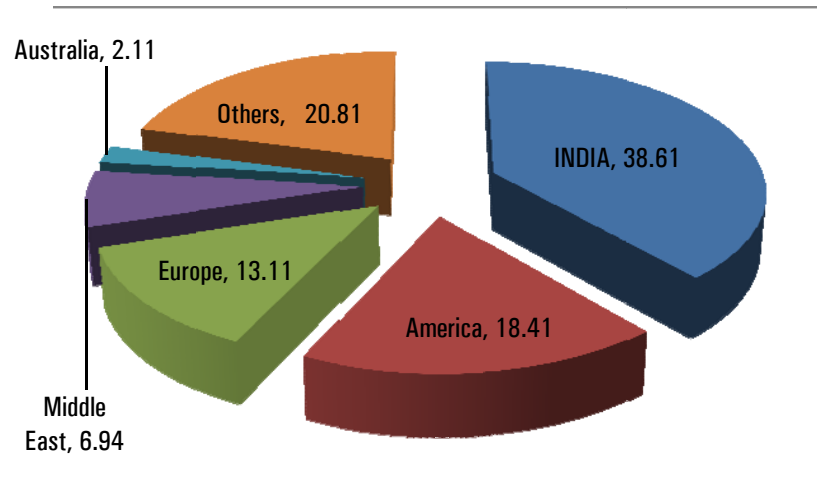
Source: Compiled during the study

3.5 Consumption of Cashew Kernels

The consumption of cashew kernels had registered a steady growth worldwide during the period of this study. The major consumers in the world include India, US, EU, Middle east, Japan and Australia. It is estimated that the demand is growing at 7 per cent rates per annum. (*World bank- IFC- 2010*). Apart from the above, the major consuming countries are China, Eastern European countries, New Zealand, Thailand, Singapore etc. Further, there is indigenous consumption of cashew kernels in small processing countries in the West and East Africa and Asian regions.

Though cashew can be classified as a health nut with a lot of health benefits, market promotion of cashew is not much carried out projecting the health advantages of cashew. Cashew comes from a range of developing and under developed countries some of which are among the poorest in the world, in contrary to its competitor in the market Almonds, which is produced in wealthy countries, where brilliantly and professionally managed promotions have propelled it to unimaginable levels of consumption and pricing.

India was the largest consumer of cashew kernel in the world (38.61%), followed by US (18.41%), EU (13.11%), Other Asian Countries (20.81%), Middle East (6.94%) and Australia (2.11 %) as per the statistics on world consumption published by CEPCI (2012). The major difference in the pattern of consumption is that in India cashew is mainly consumed in ‘broken’ form as an ingredient of food items, whereas in most other places the major consumption is in the ‘wholes’ form as a snack item. While the ‘broken’ and ‘piece’ grades are consumed in plain form in India, elsewhere the major consumption is for ‘whole’ grades in roasted and salted form.



Source: CEPCI Statistics 2012

Fig. 3.9 Share of World Consumption of Cashew Kernels-2012

The shift in consumption pattern from a snack to food ingredient was the major transition in the field of cashew consumption over the last decade. India has taken over the position as the largest consumer in the world from USA. With the emergence of Vietnam as a strong competitor to India, the share of India in the international market has declined. Also, with the processing emerging out in new countries (who were traditional raw nut exporters), the competition in the international market is still on. The International finance corporation of the World Bank group in its report on 'The prospects of Cambodia's cashew sub sector' has observed that the consumption of cashew kernels had gone up during the period of recession. The report analyses that during the recession period, people generally cut short their restaurant and shopping mall visits and week end and long tours. Instead they spend more time at home watching TV and engaging into other home entertainment activities and private parties during their free time. Along with they consumed snacks both as in between meals and party snacks. This had increased the level of consumption of cashew kernels also.

Another important transition in the consumption of cashew kernel was the withdrawal of Russia from the world market. The Russian factor was so crucial to India up to the 1980's, when there was an 'escrow' arrangement between India and Russia. Against huge supply of arms and amenities, the payment back was mostly adjusted against exports from India. Cashew kernels, being a high value item dominated in such exports. The prices also started shooting up whenever Russia entered into the market for Cashew purchases. With the fall in the economy of Russia and the withdrawal of 'escroe' arrangement, there was a withdrawal of Russia from the cashew market as well.

Also a series of factors have changed the buying patterns of established buyers. Far forward buying was reduced to short term buying, inventory levels had reduced to 'hand to mouth' levels, Contract integrity and reliability level reduced, promotions and volatility levels which have been a driving factor in western world had reduced or even disappeared. As per the above study, the major factors that lead to the situation were:

- 1) Loss of confidence due to economic situation
- 2) Reduced availability of funding
- 3) Absence of price-based promotions in the retail market
- 4) Lack of supplier contract integrity
- 5) Globalisation of the industry.

The fair trade in cashew is still in the infancy. The problems of the fair-trade practice of cashew have been recognized by the fair trade federation in UK as back in 2006. The primary problem with fair-trade minimum price in cashew as laid out in the 'Fair-trade labeling standards of nuts & Oil seeds' was that it does not allow price differentiation between different grades of cashew, which otherwise have a huge difference between the grades.

Cashew is basically an organic product by default, where as there is little in the way of organic certified growing and processing. It is estimated that 70 per cent of world's cashew production is organic, but only a tiny portion of that is certified. Reasons for lack of organically –certified cashews differ from country to country, but the complex certification procedure and high cost of certification are common hindrance everywhere. Lack of proper marketing of organic cashew is another common issue. However, the major factor is that the natural evolution of cashew production does not require and that the farmers cannot afford to agro chemicals and manures.

3.6 The Cashew Calendar

Raw Cashew nut is always produced and available at some or other parts of the world. The level of availability differs from place to place and season to season. The imbalance in the quantity of production during different season and in different regions, demands the bulk storage of raw nuts to ensure uninterrupted processing. As already discussed the main raw nut producing regions include India, Vietnam, East and West African countries, Brazil, Sri Lanka and the Far –East Asian countries. The main processing countries are India, Vietnam and Brazil while the consumption is mainly by India, US, Europe and the Middle East.

Based on the production, processing and consumption of cashew nuts, a cashew calendar was prepared during the study. It should be noted that due to climatic changes the exact months of production may slightly vary and would be either short or long also in certain season.

Table 3.19. The Cashew Calender

| | U.s (kernels) | Europe (kernels) | Middle –east (kernels) | India | Vietnam | Brazil | East-africa | West-africa | Far-east asia |
|-----|-------------------|---------------------|---------------------------|--|-----------------------------|------------------|----------------------|---|------------------------|
| JAN | Scattered Imports | Scattered Imports | Medium imports | Flowering | Flowering | Harvest Finishes | Mozambique shipments | Nig & Benin harvest starts | |
| FEB | Scattered Imports | Scattered Imports | Medium imports | Harvest begins | Harvest | | | Nig & ben harvest | Combodia Harvest |
| MAR | Scattered Imports | Scattered Imports | Medium imports | Harvest in full swing | Harvest in full | | | Nigeria & Benin harvest & shipments Others-flowering | Combodia Harvest |
| APR | Scattered Imports | Scattered Imports | Scattered Imports | Harvest in full | Harvest finishes | | | Harvest starts in ivc, Ghana | Combodia harvest ends |
| MAY | Import starts | Import starts | Scattered Imports | Harvest in full. Imports of rcn from West Africa | | | | Shipment starts from ivc, Ghana./ Bissau & Senegal harvest | |
| JUN | Medium Imports | Medium imports | Scattered Imports | Season ends. W.Africa Imports | W. Africa RCN Import starts | | | Bissau & Senegal shipments | |
| JUL | Medium Imports | Medium imports | Medium imports | W.Africa RCN Imports | W.Africa RCN Imports | Flowering Starts | | Season ends in IVC & Ghana . Bissau & Senegal harvest | |
| AUG | Heavy imports | Heavy imports | Heavy imports | W.Africa RCN Imports | W.Africa RCN Imports | Harvest | Flowering starts | | Indonesia Flowering |
| SEP | Heavy imports | Heavy imports | Heavy imports | Indonesia imports | Indonesia imports | Harvest in full | Harvest | | Indonesia harvest |
| OCT | Heavy imports | Heavy imports | Medium imports | Indonesia imports | Indonesia imports | Harvest in full | Harvest in full | | Indonesia harvest |
| NOV | Import reduces | Import reduces | Medium Imports | E.Africa RCN Imports | E.Africa RCN Imports | Harvest in full | Harvest in full | | Indonesia harvest ends |
| DEC | Import reduces | Scattered imports | Medium imports | E.Africa RCN Imports | E.Africa RCN Imports | Harvest reduces | Harvest in full | | |

Source: Compiled during the study

3.7 Conclusion

Cashew nut, which was regarded as the waste product of the cashew tree is today a world favorite food item. The world of cashew is spread across the continents of America, Africa, Europe, Asia and Australia. India is the world largest producer and processor of raw nuts and also the largest consumer of cashew kernels. Apart from India, raw cashew nuts are produced in Vietnam, East & West Africa, Vietnam, Brazil and the Far-East Asia. India, Vietnam and Brazil are currently the main processing hub of the cashew nut in the world. Other cashew producing countries have of late resorted to cashew processing in a small way. The success story of Vietnam is encouraging to the new processors. Vietnam enjoys the premier position in the export of cashew kernels to the world. After India, U.S is the largest consumer of cashew kernels in the world. But the Middle-East has recently emerged out as a promising market for cashew kernels. The consumption in other parts of the world is also picking up. In short, the cashew industry has undergone a true transformation in all the fields of production, processing and consumption worldwide.

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Chapter 4

DATA ANALYSIS (SAMPLE PROFILE AND BASIC ANALYSIS)

| | |
|----------|--|
| Contents | 4.1 <i>Profile of Indian Exporters</i> |
| | 4.2 <i>Profile of Overseas Buyers</i> |
| | 4.3 <i>Conclusion</i> |

The primary data was collected separately from Indian Exporters and Overseas buyers of Cashew kernels. The primary data was collected during the period 2011 to 2012. The members of the ‘Cashew Export Promotion Council of India’ (CEPCI) – an apex body of Government of India formed the sample frame for the Indian Exporters. Some of the Indian Exporters had multiple firms, who were all members of CEPCI. Such firms were grouped together in terms of common identities (common promoters, address, contact numbers etc.) and considered as a single member. This reduced the total sample frame size to 93 from a total membership of 181. Since the population was finite and small in size, the census method was adopted and 43 of them responded. Three responses were incomplete and the efforts to get the same corrected were in vain and finally those responses were discarded. The data was analysed with the rest of 40 responses available.

Members (Dry fruit division engaged in Cashew imports) of ‘Association of Food Industry’ (AFI), U.S.A, ‘Combined Edible Nuts Traders Association’ (CENTA), UK together formed the sample frame for Overseas Buyers. Both

AFI and CENTA are international bodies having members worldwide. Certain members were common to both the organisation. A combined list of the two organisation was prepared eliminating repetition of common members that formed the final sample frame of 62 for the overseas buyers. Here also, since the population was finite and small, the census method was adopted and 35 members responded to the survey. Of these, three response were defective and had to be discarded. Thus the data collected from 32 overseas buyers were analysed for the study.

Table 4.1 Response Ratio of Sample Selected

| Sample Types | Sample Frame (Nos.) | Sample Size (Nos) | Responses (Nos) | | | Ratios (%) | | |
|------------------|---------------------|-------------------|-----------------|-----------|----------|-----------------------------|-------------------------|-------------------------|
| | | | Received | Discarded | Accepted | Sample size to Sample Frame | Response to Sample Size | Accepted to Sample Size |
| Indian Exporters | 93 | 45 | 42 | 2 | 40 | 48.39 | 93.33 | 88.89 |
| Overseas Buyers | 62 | 35 | 33 | 1 | 32 | 56.45 | 94.28 | 91.43 |

4.1 Profile of Indian Exporters

The profile of the respondents were analysed for different criteria and was found to be having sufficient representation from all classes like the geographical representation, representation by volume exported, representation by experience etc.

4.1.1 Geographic Regions

In India, cashew processing is spread across the states of Kerala, Tamilnadu, Karnataka, Maharastra, Goa, Andhrepradesh, Orissa and West

Bengal. Of these, the exporters are mainly based in the states of Kerala, Tamilnadu and Karnataka, where other states are mainly newcomers in the field of cashew processing and are concentrating in domestic market only. As such, the sample frame contained respondents from these three states mainly. Some of the exporters are having operations in more than one state. In such cases, the state where they are registered is considered as their base.

Table 4.2 Geographic regions - Indian Exporters

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|------------|------------------|----------------|----------------------|---------------------------|
| Valid | Kerala | 20 | 50.0 | 50.0 | 50.0 |
| | Tamil Nadu | 11 | 27.5 | 27.5 | 77.5 |
| | Karnataka | 7 | 17.5 | 17.5 | 95.0 |
| | Others | 2 | 5.0 | 5.0 | 100.0 |
| | Total | 40 | 100.0 | 100.0 | |

Of the total of 40 Indian exporters surveyed, 20 Nos. (50%) were based in Kerala, 11 nos (27.5%) in Tamilnadu, 7 Nos (17.5%) in Karnataka and 2 Nos in other states (1 each in Andhrapradesh and Goa, representing 5%).

4.1.2 Experience in Cashew Exports

The sample contained First generation entrepreneurs of exporters of less exposure to Third generation entrepreneurs of very long exposure in the field of cashew exports from India. The sample consisted of exporters with just 5 years upto 85 years of experience in the field, with a mean of 25.20 years of experience with a standard deviation of 16.123.

Table 4.3 Experience in Cashew Exports- Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---------------------|----|---------|---------|-------|----------------|
| Years of Experience | 40 | 5 | 85 | 25.20 | 16.123 |
| Valid N (listwise) | 40 | | | | |

Further the exporters were classified into three groups as per the normal norms in the industry viz. New, Medium and Long. Exporters upto 10 years of experience were classified as New entrants whereas those with 11 to 25 years of experience were classified into medium levels and those with more than 25 years of experience were classified into long levels.

Table 4.4 Experience levels of Exports

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|--------|-----------|---------|---------------|--------------------|
| Valid | New | 8 | 20.0 | 20.0 | 20.0 |
| | Medium | 16 | 40.0 | 40.0 | 60.0 |
| | Long | 16 | 40.0 | 40.0 | 100.0 |
| | Total | 40 | 100.0 | 100.0 | |

20 per cent of the exporters surveyed were new entrants to the exports with less than 10 years experience while 40 per cent fell under medium levels with experience of 11 to 25 years and another 40 per cent were in the long experience level with more than 25 years of experience.

4.1.3 Volume of Exports

As per the normal norms of the industry, the export volumes were used as the criteria for classifying the exporters as small, medium and large

shippers (exporters) Generally, exporters with less than an export volume of 100 containers (TFE – Twenty Feet Equivalent) were considered as small exporters. Those with an exposure above 100 and upto 200 TFE were considered as medium level exporters and those with an exposure of more than 200 TFE were considered as Big Exporters.

Table 4.5 Exporters classified on the Volume Exported

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|--------|------------------|----------------|----------------------|---------------------------|
| Valid | Small | 13 | 32.5 | 32.5 | 32.5 |
| | Medium | 17 | 42.5 | 42.5 | 75.0 |
| | Big | 10 | 25.0 | 25.0 | 100.0 |
| | Total | 40 | 100.0 | 100.0 | |

32.5 per cent of the exporters surveyed were ‘Small’ category exporters whereas 42.5 per cent of them were ‘Medium’ exporters while the rest 25 per cent fell under the category of ‘Big’ exporters.

4.1.4 Marketing Methods

The cashew exporters surveyed were marketing their products abroad using mixed strategies viz. direct marketing, marketing through an intermediate agent and using a mix of the above strategies.

Table 4.6 Marketing strategies adopted

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|--------|------------------|----------------|----------------------|---------------------------|
| Valid | Direct | 5 | 12.5 | 12.5 | 12.5 |
| | Agent | 11 | 27.5 | 27.5 | 40.0 |
| | Both | 24 | 60.0 | 60.0 | 100.0 |
| | Total | 40 | 100.0 | 100.0 | |

12.5 per cent of the exporters were directly marketing their products to overseas buyer who either had direct contacts with or were engaged in contract manufacturing for their overseas clients. 27.5 per cent of the exporters were marketing their produce through agents only while a vast majority of 60 per cent of them was adopting a mixed strategy of direct marketing to the regular clients and through agents to others. Sometimes, with the same overseas clients, they market their produce directly as well as through agents, as the agents act as a source of dissimulation market positions.

Further among small category of exporters, 4 exporters (30.77%) each were involved in direct marketing and through agents whereas 5 exporters (38.46%) were involved in a combination of both. In the case of medium level shippers, only 1 exporter (5.88%) was engaged in direct marketing whereas 4 of them (23.53%) exclusively used agents and 12 (70.59%) adopted the mixed strategy. It should be noted that among top exporters, none adopted the direct marketing strategy, 3 of them (30%) made use of agents exclusively and 24 exporters (70%) adopted a mixed strategy for marketing their produce.

Table 4.7 Vol. Exported Vs. Marketing Methods

| Count | | Sales methods | | | Total |
|---------------|--------|---------------|-------|------|-------|
| | | Direct | Agent | Both | |
| Vol. Exported | Small | 4 | 4 | 5 | 13 |
| | Medium | 1 | 4 | 12 | 17 |
| | Top | 0 | 3 | 7 | 10 |
| Total | | 5 | 11 | 24 | 40 |

4.1.5 Exposure to Exports

The level of exposure to exports of the Indian Exporters were analysed by grouping them into four categories viz. casual (with less than 25% by volume), occasional (between 25-50% by volume), regular (between 51-75% by volume) and export oriented (above 75% by volume). The casual group normally concentrates on domestic market and occasionally exports to meet the bank's requirement (as they avail the export finance from banks). The second group also concentrates on the domestic market, but exports those grades which find a better price in the export market. They are not much quality concerned, as they concentrate in the domestic market. The third group concentrates more on the export market and sells those grades which find a better price in the domestic markets. They are more quality concerned as they concentrate on the export market. The last group concentrates only in the export market and is quality oriented. They sell mostly the non-exportable grades in the domestic market.

Table 4.8 Percentage of Exports

| | | Classification | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|--------------|-----------------------|------------------|----------------|----------------------|---------------------------|
| Valid | less than 25 | Casual | 4 | 10.0 | 10.0 | 10.0 |
| | 25-50 | Occasional | 11 | 27.5 | 27.5 | 37.5 |
| | 51-75 | Regular | 7 | 17.5 | 17.5 | 55.0 |
| | above 75 | Export- oriented | 18 | 45.0 | 45.0 | 100.0 |
| | Total | | 40 | 100.0 | 100.0 | |

The majority of the exporters (18 nos. accounting to 45%) surveyed were export oriented, as they were into exports of more than 75 per cent by volume of their production. It should be noted that the processing of cashew would yield to up to 25 per cent of broken cashew, which finds a market in the domestic level only. The occasional group was next in size, with 11 members (27.5%) falling in the group.

4.2 Profile of Overseas Buyers

The profile of the overseas buyers who participated in the survey conducted was analysed and found to contain representation from different criteria like geographical area of operation, size of business, experience in the field etc.

4.2.1 Geographic Region

The main market of cashew kernels in the world include U.S.A., U.K., Europe, Middle East countries like U.A.E, Kingdom of Saudi Arabia, Bahrain, Kuwait etc and the Far East countries like Japan, Australia etc. Though cashew is consumed in other parts of the world they seldom import directly from the processing countries, but get them sourced as re-exports from the above major buying countries.

Table 4.9 Respondents by Geographical Regions

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------|-----------|---------|---------------|--------------------|
| Valid | America | 9 | 28.1 | 28.1 | 28.1 |
| | Europe | 11 | 34.4 | 34.4 | 62.5 |
| | Middle East | 8 | 25.0 | 25.0 | 87.5 |
| | Far East | 4 | 12.5 | 12.5 | 100.0 |
| | Total | 32 | 100.0 | 100.0 | |

Out of the total 32 responses received, 9 respondents (28.1%) were from U.S.A., 11 from Europe (34.4 %), 8 from the Middle East (25 %) and the rest 4 from Far East region (12.5 %). Though volume wise U.S.A accounts to be the biggest player, the individual buyers deal in big volumes and the number of importers are less compared to Europe. As such, the geographical distribution of the respondents was fair as it represented all the cashew importing regions of the world.

4.2.2 Experience of Overseas Importers

The overseas importers consisted of a composite group of new entrants to highly experienced in the international trade of cashew.

Table 4.10 Experience of Overseas buyers

| Descriptive Statistics | | | | | |
|-------------------------------|----------|----------------|----------------|-------------|-----------------------|
| | N | Minimum | Maximum | Mean | Std. Deviation |
| Experience | 32 | 5 | 80 | 26.63 | 16.98 |
| Valid N(listwise) | 32 | | | | |

The overseas buyers surveyed consisted of 32 members with an experience of 5 years to 80 years in dealing with cashew imports. The mean experience was 26.63 with standard deviation of 16.98

Further, as in the case of Indian Exporters, the overseas importers were also grouped into three categories. The first category consisted of new entrants with 3 to 10 years experience (low level) where as the Medium level consisted of importers with 11 years to 25 years of experience and the Highly Experienced group consisted of those with more than 25 years of experience.

Table 4.11 Overseas buyers grouped on the basis of Experience

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|--------|-----------|---------|---------------|--------------------|
| Valid | High | 13 | 40.6 | 40.6 | 40.6 |
| | Medium | 14 | 43.8 | 43.8 | 84.4 |
| | Low | 5 | 15.6 | 15.6 | 100.0 |
| | Total | 32 | 100.0 | 100.0 | |

The overseas buyers surveyed consisted of 5 numbers (15.6%) with experience up to a maximum of 10 years who fell under the new entrants (low level) group, 14 numbers (43.8 %) with an experience of above 10 years and up to 25 years who were categorized as Medium experienced group and 13 numbers (40.6 %) in the highly experienced group of more than 25 years in the field of cashew imports.

4.2.3 Trade of Competitive Nut Products

In the trade of edible nuts, Almonds, Walnuts, Pistachio, Hazel Nuts and Brazil nuts are the competitors to Cashew nuts. It was reported that these nuts have substitution effects on each other. Normally in the supermarket, a mix of the above nuts are packed in consumer packs and sold. When the price of a particular edible nut goes up, the content of that particular nut goes down in the mixed packet, keeping the price of the packet more or less the same.

Table 4.12 Engagement in other edible Nuts Trade

| Type of Nuts | Numbers | Valid Percent |
|--------------|---------|---------------|
| Almonds | 27 | 84.40 |
| Wal Nuts | 22 | 68.80 |
| Pistachio | 23 | 71.90 |
| Hazel nuts | 17 | 53.10 |
| Brazil Nuts | 17 | 53.10 |

None of the overseas importer traded in a single commodity. Of the 32 importers of cashew nuts, 27 were dealing in Almonds, 22 in Walnuts, 23 in Pistachio 17 each in hazelnuts and Brazil nuts. This indicated a close trade of cashew with Almonds. It was observed that the mix of edible nuts packet sold in the supermarkets, the main components were Almonds and cashew.

4.2.4 Volume of Imports

As in the case of exporters, the importers of cashew kernels were also classified as Small, Medium and Top. The normal norms followed in the industry was also the same, ie importers with a turnover of less than 100 TFE (Twenty Feet Equivalent) containers were classified as ‘Small’ importers, those with turnover ranging from 100 to 200 as ‘Medium’ importers and those with more than 200 as ‘Top’ Importers.

Table 4.13 Classification of Importers by volume of Trade

| | | Classification | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|---------------|-----------------------|------------------|----------------|----------------------|---------------------------|
| Valid | Less Than 100 | Small | 8 | 25.0 | 25.0 | 25.0 |
| | 100-200 | Medium | 9 | 28.1 | 28.1 | 53.1 |
| | above 200 | Top | 15 | 46.9 | 46.9 | 100.0 |
| | Total | | 32 | 100.0 | 100.0 | |

The sample surveyed consisted of 8 importers (25%) in the ‘small importers’ category, 9 importers (28.1 %) in the ‘Medium Importers’ category

and 15 importers (46.9 %) in the ‘Top importers’ category. Thus the volume players were more in numbers compared to small and medium level players.

4.2.5 Sourcing Methods

For sourcing their purchase of cashew kernels through imports, the overseas buyers generally adopted the different strategies like buying direct, buying through an agent and also a combination of both. Exclusive direct purchasing was adopted when there was a buy back arrangements, ie overseas buyers arranges to supply raw nuts to the processors, who in turn sells the cashew kernels produced to that overseas buyer exclusively. Agents were involved to add a comfort to trade as they handled most of the trade issues and also they acted as a source of information. When the overseas buyers had good confidence in certain suppliers, they opted to buy from them directly and involved the service of agents to procure from other suppliers.

Table 4.14 Purchase strategy of overseas buyers

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|--------|-----------|---------|---------------|--------------------|
| Valid | Direct | 3 | 9.4 | 9.4 | 9.4 |
| | Agent | 6 | 18.8 | 18.8 | 28.1 |
| | Both | 23 | 71.9 | 71.9 | 100.0 |
| | Total | 32 | 100.0 | 100.0 | |

As in the case of exporters, majority of importers (23 Nos. accounting to 71.9%) were adopting the mixed strategy of direct buying and involving the agents, where as only 9.4 % of them were exclusively into direct buying and 18.8 % exclusively made use of the service of an agent in sourcing their imports of cashew kernels.

Table 4.15 Volume of cashew * Buying mode Crosstabulation

| | | Buying mode | | | Total |
|------------------|---------------|-------------|-------|------|-------|
| | | Direct | Agent | Both | |
| Volume of cashew | Less Than 100 | 1 | 1 | 6 | 8 |
| | 100-200 | 2 | 1 | 6 | 9 |
| | above 200 | 0 | 4 | 11 | 15 |
| Total | | 3 | 6 | 23 | 32 |

Further, among different classes of importers, out of 8 small importers surveyed, 1 importer each (12.5%) exclusively adopted either direct purchase or purchase through an agent, where as 6 of them (75%) adopted the combined strategy. Among medium level importers also 2 out of 9 (22.22 %) adopted the direct buying only and only one (11.11%) adopted buying through an agent. Here also majority of 6 (66.66%) adopted the mixed strategy. None of the ‘Top’ importers opted for direct purchase exclusively, where as 4 nos (26.66%) adopted purchase exclusively through an agent and 11 nos. (73.33%) had adopted the mixed strategy. In short majority of all classes of importers adopted the mixed strategy of buying directly from trusted sources and engaging an agent to deal with others.

4.3 Conclusion

In general, the sample of both Indian Exporters and overseas buyers surveyed were of composite nature in terms of different criteria considered like the geographical regions, experience in trade, volume of trade etc.. The mean of experience of Indian Exporters in the trade was 25.10 years where as the mean of experience of overseas buyers were 26.63 years. On the basis of classification of respondents by volume of trade, the medium level exporters

were more in number whereas in the case of overseas buyers, the top level importers were more in numbers.

Majority of both Indian Exporters and overseas buyers were adopting the mixed strategy of directly trading with trusted sources and dealing through agents in all other cases. A major difference found between Indian Exporters and overseas buyers was that when the Indian Exporters deal in Cashew only, almost all overseas buyers of cashew deal in other dry fruit items also.

Since the census method was adopted and the responses received were sufficient in numbers, the results could be generalized to the whole population.

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Chapter **5**

THE TRANSITION OF WORLD CASHEW INDUSTRY (ANALYSIS OF SECONDARY DATA)

| | | |
|----------|------|---|
| <i>C</i> | 5.1 | <i>The World Cashew Production</i> |
| <i>o</i> | 5.2 | <i>Area of Production</i> |
| <i>n</i> | 5.3 | <i>The World Productivity of Raw Cashew Nuts</i> |
| <i>t</i> | 5.4 | <i>World Cashew Processing</i> |
| <i>e</i> | 5.5 | <i>World Cashew Consumption</i> |
| <i>s</i> | 5.6 | <i>Export of Cashew by Major Processing Countries</i> |
| | 5.7 | <i>Comparative Advantage of Competing Countries in World Cashew trade</i> |
| | 5.8 | <i>Cause and Effect of Increased Domestic Consumption in India</i> |
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| | 5.11 | <i>Characteristics of International Market of Cashew Nut</i> |
| | 5.12 | <i>Conclusion</i> |

Cashew industry worldwide had undergone different phases of transition ever since its inception as an industry in the early 19th Century. The transition of the industry need be analysed in the fields of production (cultivation), processing and consumption to draw a real picture. Cashew tree that was planted to prevent soil erosion has now attained the status of a cash crop. The cashew processing that evolved from tiny units had undergone a big transition all the way to reach the status of a corporate industry today. Also, the processing industry today is spread across the continents of Asia,

Africa and South America. The production of raw nuts has spread across the continents. The transition of the cashew nut from ‘waste product’ to world’s most favoured nut was a long story. The journey of the cashew industry all the way was highly painful, but fruitful.

The growth of the industry in the recent past over the last two decades was commendable especially after the trade liberalization. The establishment of World Trade Organisation in 1995 that was created in Uruguay rounds from 1986 to 1994 had accounted for a boost in the international trade which was reflected in the trade of cashew nut and allied products across the countries. The trade of cashew nuts prior to the liberalization (to say prior to Uruguay rounds) was dominated by imposition of duties, taxes and other trade barriers in respective countries, especially the producing countries. But afterwards, the trade barriers were withdrawn in a phased manner and the cashew sector also witnessed a drastic change in the fields of production (cultivation), processing and marketing. The goal of the WTO to help producers of goods and services, exporters, and importers conduct their business had produced positive results in the world cashew industry and that lead to a real transition of the cashew industry across the world.

The expert interviews with cashew producers, processors and traders pointed out to the general trend in the cashew sector that the cashew trade is cyclic in nature that repeated every five years. The production, processing and pricing all witnessed a peak and off-peak level in every five years. Transition of World cashew industry over the last twenty five years - that just overlapped the pre-liberalization period – was analysed in the fields of production, processing and consumption of cashew nuts with the secondary data available. Published data worldwide is available till 2012 only. As such

the secondary data from 1988 to 2012 was used to analyse the transition of world cashew industry.

The production of cashew refers to the cultivation, the processing to the transformation of raw cashew nuts into plain cashew kernels and subsequent packing and the consumption refers to the import of plain cashew kernels and its purchase by end consumers either in the plain form or value added products in different forms. The word ‘transition’ is used in its literary meaning *movement, passage, or change from one position, state, stage, subject, concept etc to another.*

5.1 The world Cashew Production

Cashew is a tropical commodity and the cashew tree normally grows in the tropical regions mostly along up to 200 km inside from the costal belt. Most of the cashew trees are of seeding origin and of late the graft cashew trees are being planted. Cashew trees seldom receive proper nursing care and the productivity is mostly low. Large cashew plantations are less compared to small house hold plantations worldwide. Hence, it is usually referred to as the ‘poor man’s crop,.

The major producing countries in the world today are India, Vietnam, West African countries (Nigeria, Benin, Ghana, Ivory Coast, Guinea Bissau, Senegal, Burkina Faso etc.), the East African countries (Mozambique, Tanzania, Kenya), South African countries (mainly Brazil), other Asian countries (Sri Lanka, Indonesia, Cambodia, Philippines etc.). For a proper analysis, the whole raw cashew production regions are catagorised into India, Vietnam, Brazil, West African zones, East African Zones and the rest of the producing countries are catagorised as ‘others’.

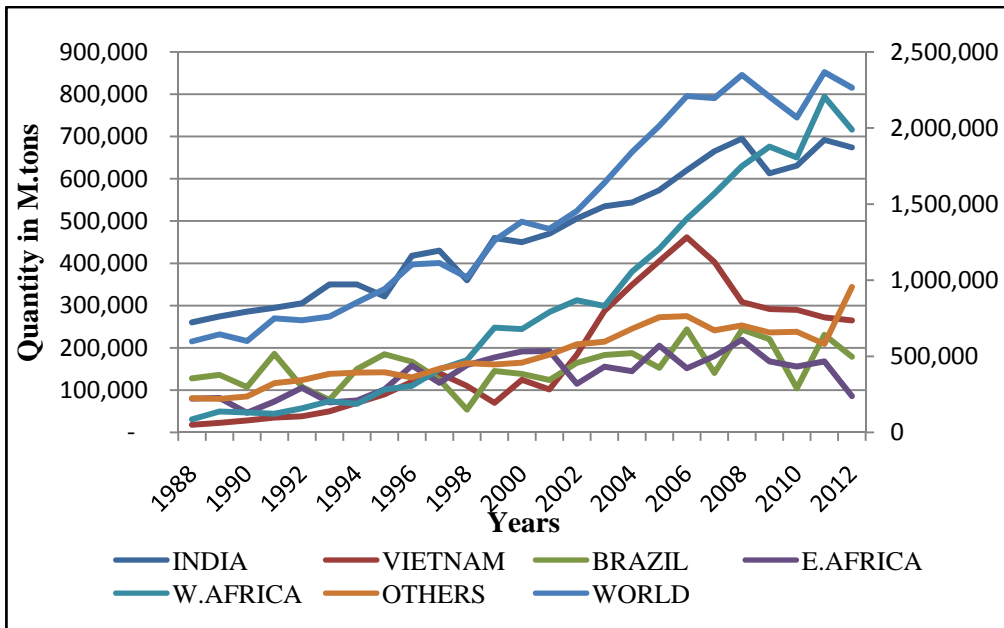
Table 5.1 Production of Raw Cashew Nuts by Different Regions of the World

| Year | India | Vietnam | Brazil | E. Africa | W. Africa | Others | World |
|------|----------|----------|----------|-----------|-----------|----------|-----------|
| 1988 | 2,60,260 | 18,000 | 1,28,080 | 79,870 | 30,823 | 81,050 | 5,98,083 |
| 1989 | 2,74,330 | 22,500 | 1,36,130 | 81,885 | 49,501 | 79,489 | 6,43,835 |
| 1990 | 2,85,590 | 28,200 | 1,07,664 | 46,584 | 47,158 | 85,036 | 6,00,232 |
| 1991 | 2,94,590 | 35,000 | 1,85,965 | 72,984 | 44,117 | 1,16,483 | 7,49,139 |
| 1992 | 3,05,310 | 38,000 | 1,07,955 | 1,05,517 | 56,922 | 1,23,696 | 7,37,400 |
| 1993 | 3,49,000 | 50,000 | 77,098 | 71,235 | 73,633 | 1,38,708 | 7,59,674 |
| 1994 | 3,48,000 | 70,000 | 1,49,804 | 75,600 | 67,419 | 1,41,683 | 8,52,506 |
| 1995 | 3,21,640 | 90,000 | 1,85,229 | 1,01,823 | 1,01,251 | 1,42,148 | 9,42,091 |
| 1996 | 4,17,830 | 1,20,000 | 1,67,211 | 1,58,210 | 1,10,143 | 1,30,117 | 11,03,511 |
| 1997 | 4,30,000 | 1,40,000 | 1,25,397 | 1,17,479 | 1,49,261 | 1,51,057 | 11,13,194 |
| 1998 | 3,60,000 | 1,10,000 | 54,124 | 1,59,431 | 1,70,805 | 1,63,814 | 10,18,174 |
| 1999 | 4,60,000 | 70,000 | 1,45,437 | 1,77,480 | 2,47,893 | 1,60,763 | 12,61,573 |
| 2000 | 4,50,000 | 1,24,559 | 1,38,608 | 1,91,594 | 2,44,404 | 1,64,990 | 13,14,155 |
| 2001 | 4,70,000 | 1,01,836 | 1,24,073 | 1,92,540 | 2,84,479 | 1,83,945 | 13,56,873 |
| 2002 | 5,06,000 | 1,84,287 | 1,64,539 | 1,15,208 | 3,12,650 | 2,08,706 | 14,91,390 |
| 2003 | 5,35,000 | 2,87,405 | 1,83,094 | 1,55,518 | 2,99,109 | 2,14,587 | 16,74,713 |
| 2004 | 5,44,000 | 3,48,848 | 1,87,839 | 1,45,130 | 3,80,229 | 2,45,145 | 18,51,191 |
| 2005 | 5,73,000 | 4,05,292 | 1,52,751 | 2,05,241 | 4,34,575 | 2,72,522 | 20,43,381 |
| 2006 | 6,20,000 | 4,61,512 | 2,43,770 | 1,51,570 | 5,05,197 | 2,75,098 | 22,57,147 |
| 2007 | 6,65,000 | 4,03,356 | 1,40,675 | 1,80,515 | 5,65,128 | 2,41,679 | 21,96,353 |
| 2008 | 6,95,000 | 3,08,541 | 2,43,253 | 2,19,100 | 6,30,079 | 2,53,264 | 23,49,237 |
| 2009 | 6,13,000 | 2,91,900 | 2,20,505 | 1,68,100 | 6,76,131 | 2,36,458 | 22,06,094 |
| 2010 | 6,31,000 | 2,89,842 | 1,04,342 | 1,55,800 | 6,50,390 | 2,38,011 | 20,69,385 |
| 2011 | 6,92,000 | 2,72,000 | 2,30,785 | 1,68,190 | 7,94,278 | 2,09,387 | 23,66,640 |
| 2012 | 6,74,000 | 2,64,810 | 1,79,200 | 85,900 | 7,16,400 | 3,44,100 | 22,64,410 |

Source: 1. FAO Statistics

2. CEPCI -The Cashew Export Promotion Council of India

3. INC – international Nuts and dried fruit council



Source: 1. FAO Statistics
 2. CEPICI -The Cashew Export Promotion Council of India
 3. INC – international Nuts and dried fruit council

Fig. 5.1 Quantity of Production of Raw Cashew Nuts

Table 5.2 Exponential Growth of Raw Cashew Nut Production

| Sl.No | Region | Growth % (Overall) | | Recent Trend (last 10 years) |
|-------|------------------|--------------------|---|------------------------------|
| 1 | India | 4.30 | ⇒ | 2.58 |
| 2 | Vietnam | 12.32 | | (-)3.51 |
| 3 | Brazil | 2.11 | | (-)0.25 |
| 4 | East Africa | 3.72 | | (-)3.14 |
| 5 | West Africa | 13.87 | | 9.71 |
| 6 | Others | 5.06 | | 1.25 |
| 7 | WORLD PRODUCTION | 6.35 | | 2.94 |

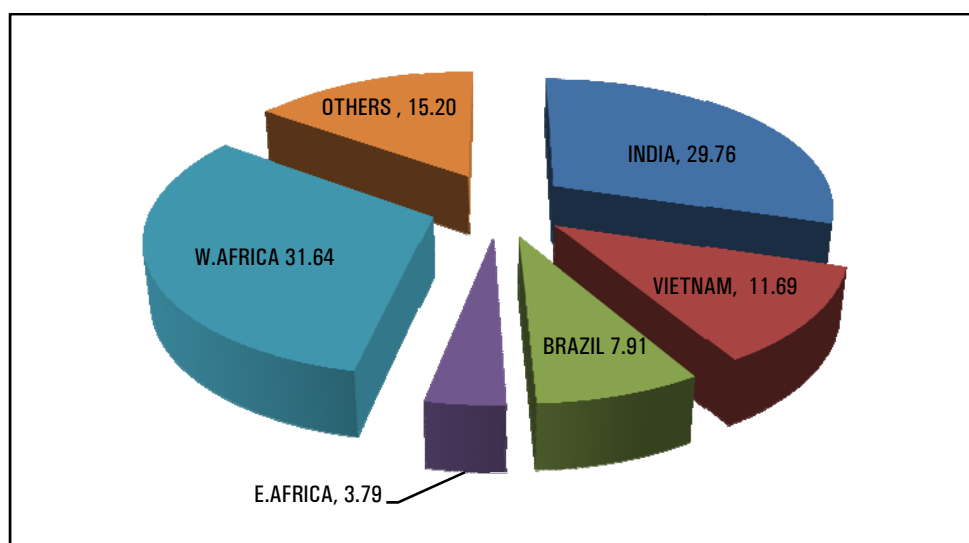
Source: Computed from Secondary Data

An analysis of the world production of raw cashew nuts during the period of study reveals that the growth rate was the maximum in the west African region (13.87%) closely followed by Vietnam (12.32%) whereas the same was at the least in Brazil (2.11%). Indian growth rate (4.30%) was not that promising and the same was less than the global growth of production (6.35%) of raw nuts. None of the regions showed a decline in the growth rate.

But the recent trends (over the last ten years) yield a totally different picture. West African growth during the last ten years was 9.71 per cent against India at 2.58 per cent. Vietnam had a negative growth rate of (-) 3.51 per cent and other regions reported a growth rate of 1.25 per cent. But the recent trend in and East Africa showed a decline of 3.14 per cent. Brazil's growth rate was almost stagnant registering a slight decline of 0.25 per cent. The overall growth rate stood at 2.94 per cent.

The decline in the growth rate of Vietnam rises serious concern to India as Vietnam with high growth rates in processing had slowly concentrated the West African regions for sourcing their raw nuts that had adverse effects on the supply positions of India, which otherwise was depending on imported raw nuts for her processing. This had resulted in high competition in the raw nut market. Vietnam with relatively low cost of processing could offer a better price and beat India in the raw nut market.

Further the negative growth rate in the east Africa region also had adverse impact on India as that region was a major supplier of raw cashew nuts to India from the beginning. The change in the growth rate of Brazil is not likely to have much effect in the raw nut sourcing of India.



Source: FAO Statistics

Fig. 5.2 World Production of Raw Nuts by Percentage-2012

India continued to be the single largest producer of raw nuts in the world in 2012. But as a region, West Africa enjoyed to be the largest producer in the world. Vietnam enjoyed 11.96 per cent of the world production against 7.91 per cent by Brazil. The East Africa region, which was the largest producer till the 1960's, lost its share to 3.79 per cent by 2012. The other non-traditional regions contributed 15.20 per cent of production, which may be looked upon as an opportunity to India for sourcing the raw nuts.

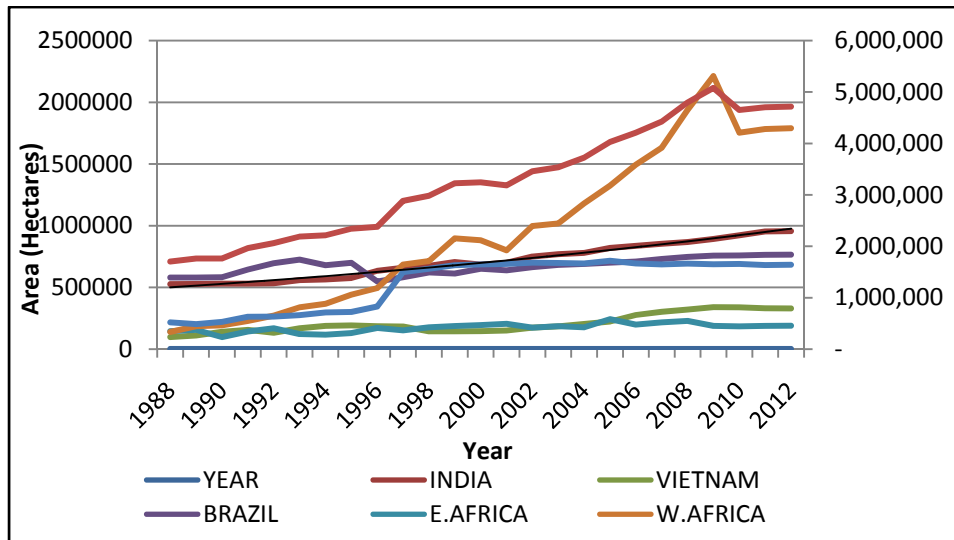
5.2 Area of Production

The growth in production can be attributed to two factors viz. growth in the Area of Production and the growth in productivity. While land is a constrain for certain countries like India, the same is available in bulk in certain other regions like the West Africa, East Africa, Far east Asia etc.

Table 5.3 Area of Production of Raw Cashew Nuts by Major Producing Regions (Area in Hectares)

| Year | India | Vietnam | Brazil | E.Africa | W.Africa | Others | World |
|------|----------|----------|----------|----------|-----------|----------|-----------|
| 1988 | 5,27,395 | 97,000 | 5,80,000 | 1,45,000 | 1,39,150 | 2,15,837 | 17,04,382 |
| 1989 | 5,29,287 | 1,10,000 | 5,80,000 | 1,55,000 | 1,86,100 | 2,01,999 | 17,62,386 |
| 1990 | 5,30,869 | 1,40,000 | 5,82,818 | 97,000 | 1,92,900 | 2,20,343 | 17,63,930 |
| 1991 | 5,31,849 | 1,55,000 | 6,44,608 | 1,43,000 | 2,28,762 | 2,62,252 | 19,65,471 |
| 1992 | 5,33,549 | 1,32,000 | 6,95,483 | 1,68,000 | 2,71,322 | 2,63,257 | 20,63,611 |
| 1993 | 5,60,000 | 1,69,100 | 7,26,140 | 1,22,000 | 3,38,290 | 2,74,905 | 21,90,435 |
| 1994 | 5,65,000 | 1,88,000 | 6,80,615 | 1,17,000 | 3,67,920 | 2,96,871 | 22,15,406 |
| 1995 | 5,77,000 | 1,92,600 | 6,99,936 | 1,30,000 | 4,41,378 | 3,01,152 | 23,42,066 |
| 1996 | 6,35,000 | 1,86,000 | 5,47,720 | 1,70,687 | 4,94,574 | 3,45,055 | 23,79,036 |
| 1997 | 6,59,000 | 1,82,300 | 5,82,210 | 1,50,900 | 6,85,229 | 6,23,566 | 28,83,205 |
| 1998 | 6,75,000 | 1,44,500 | 6,21,419 | 1,75,870 | 7,14,099 | 6,50,989 | 29,81,877 |
| 1999 | 7,06,000 | 1,43,700 | 6,12,735 | 1,86,405 | 8,97,328 | 6,79,798 | 32,25,966 |
| 2000 | 6,86,000 | 1,45,800 | 6,51,169 | 1,94,000 | 8,81,728 | 6,86,803 | 32,45,500 |
| 2001 | 7,00,000 | 1,49,900 | 6,38,556 | 2,05,043 | 8,00,987 | 6,90,719 | 31,85,205 |
| 2002 | 7,50,000 | 1,73,200 | 6,65,014 | 1,73,106 | 9,97,810 | 7,00,693 | 34,59,823 |
| 2003 | 7,70,000 | 1,84,200 | 6,82,503 | 1,84,752 | 10,17,976 | 6,98,328 | 35,37,759 |
| 2004 | 7,80,000 | 2,04,300 | 6,91,059 | 1,75,695 | 11,79,814 | 6,93,921 | 37,24,789 |
| 2005 | 8,20,000 | 2,23,700 | 7,00,367 | 2,42,430 | 13,24,650 | 7,16,410 | 40,27,557 |
| 2006 | 8,37,000 | 2,76,800 | 7,10,181 | 1,97,791 | 14,94,384 | 6,93,764 | 42,09,920 |
| 2007 | 8,54,000 | 3,02,800 | 7,31,412 | 2,16,347 | 16,31,010 | 6,87,151 | 44,22,720 |
| 2008 | 8,68,000 | 3,21,100 | 7,47,434 | 2,28,000 | 19,38,800 | 6,93,594 | 47,96,928 |
| 2009 | 8,93,000 | 3,40,500 | 7,58,085 | 1,87,297 | 22,12,432 | 6,88,226 | 50,79,540 |
| 2010 | 9,23,000 | 3,39,400 | 7,58,988 | 1,84,453 | 17,52,961 | 6,90,600 | 46,49,402 |
| 2011 | 9,53,200 | 3,31,300 | 7,64,472 | 1,88,274 | 17,82,972 | 6,81,765 | 47,01,983 |
| 2012 | 9,56,200 | 3,30,100 | 7,65,842 | 1,89,353 | 17,89,362 | 6,83,335 | 47,14,192 |

Source: *FAO Statistics*



*Total values shown in secondary Axis

Source: FAO Statistics

Fig. 5.3 Area of Production of Raw Cashew Nuts

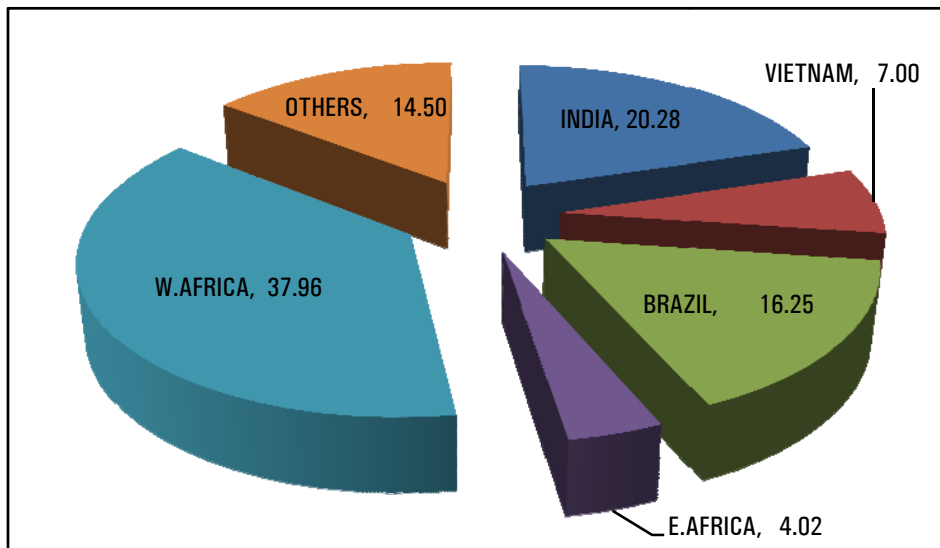
Table 5.4 Exponential Growth of Area of production of Raw Cashew Nuts

| Sl. No | Region | Last 25 years (%) | Last 10 years (%) |
|--------|--------------|-------------------|-------------------|
| 1 | India | 2.79 | 2.52 |
| 2 | Vietnam | 4.45 | 6.91 |
| 3 | Brazil | 1.00 | 1.43 |
| 4 | East Africa | 2.13 | (-)0.47 |
| 5 | West Africa | 11.07 | 6.50 |
| 6 | Others | 5.71 | (-)0.31 |
| 7 | WORLD GROWTH | 4.78 | 3.38 |

Source: Computed from Secondary Data

During the period of study, the growth in the area of production in the West Africa region was commendable at 11.07 per cent. Vietnam registered a growth rate of 4.45 per cent, where as Indian growth rate was nominal at 2.79 per cent and Brazil was almost stagnant at 1.00 per cent levels. The other regions had recorded a growth rate of 5.71 per cent in total. The growth rate of area of production world over was 4.78 per cent.

But over the recent past (last ten years), the scenario was slightly different. Indian growth rate was slightly less at 2.52 per cent. Vietnam had scored high from 4.45 per cent to 6.91 per cent and Brazil slightly improved its position from 1.00 per cent to 1.43 per cent. East Africa registered a decline of 0.47 in the area of production. The other regions remained almost stagnant, but with a decline of 0.31 per cent growth where as the growth rate of West Africa 6.5 per cent. The overall growth rate over the last decade was 3.38 per cent.



Source: FAO Statistics

Fig. 5.4 Area of World Raw Nut Production by Percentage- 2012

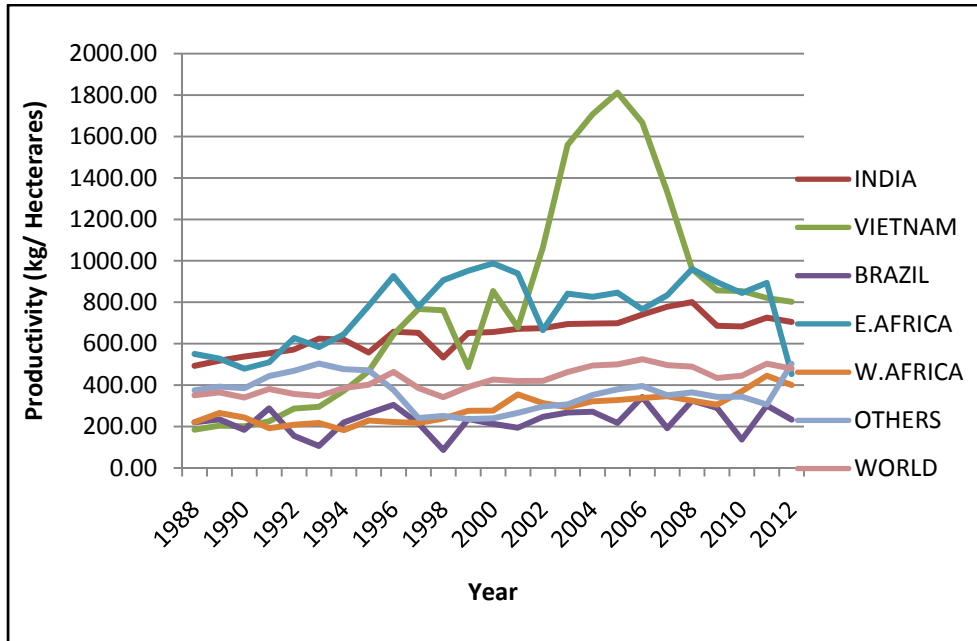
5.3 The World Productivity of Raw Cashew Nuts

Productivity refers to the production in metric tons per hectare of land of cultivation. It is a measure of the quality (variety) of the cashew tree, senility (the age of the tree), climatic conditions, manuring, pest control and the overall management in production. Steep fall and rise in the productivity is often due to climatic changes and all other factors contribute to gradual change only.

Table 5.5 World Productivity of Raw Cashew Nuts (Kg Per Hectares)

| Year | India | Vietnam | Brazil | E.Africa | W.Africa | Others | World |
|-------------|--------------|----------------|---------------|-----------------|-----------------|---------------|--------------|
| 1988 | 493.48 | 185.57 | 220.83 | 550.83 | 221.51 | 375.51 | 350.91 |
| 1989 | 518.30 | 204.55 | 234.71 | 528.29 | 265.99 | 393.51 | 365.32 |
| 1990 | 537.97 | 201.43 | 184.73 | 480.25 | 244.47 | 385.93 | 340.28 |
| 1991 | 553.90 | 225.81 | 288.49 | 510.38 | 192.85 | 444.17 | 381.15 |
| 1992 | 572.22 | 287.88 | 155.22 | 628.08 | 209.80 | 469.87 | 357.33 |
| 1993 | 625.00 | 295.68 | 106.18 | 583.89 | 217.66 | 504.57 | 347.27 |
| 1994 | 619.47 | 372.34 | 220.10 | 646.15 | 183.24 | 477.25 | 385.71 |
| 1995 | 557.44 | 467.29 | 264.64 | 783.25 | 229.40 | 472.01 | 402.25 |
| 1996 | 658.00 | 645.16 | 305.29 | 926.90 | 222.70 | 377.09 | 463.85 |
| 1997 | 652.50 | 767.96 | 215.38 | 778.52 | 217.83 | 242.25 | 386.10 |
| 1998 | 533.33 | 761.25 | 87.10 | 906.53 | 239.19 | 251.64 | 341.45 |
| 1999 | 651.56 | 487.13 | 237.36 | 952.12 | 276.26 | 236.49 | 391.07 |
| 2000 | 655.98 | 854.31 | 212.86 | 987.60 | 277.19 | 240.23 | 426.48 |
| 2001 | 671.43 | 679.36 | 194.30 | 939.02 | 355.16 | 266.31 | 419.71 |
| 2002 | 674.67 | 1064.01 | 247.42 | 665.53 | 313.34 | 297.86 | 420.65 |
| 2003 | 694.81 | 1560.29 | 268.27 | 841.77 | 293.83 | 307.29 | 463.49 |
| 2004 | 697.44 | 1707.53 | 271.81 | 826.03 | 322.28 | 353.28 | 494.58 |
| 2005 | 698.78 | 1811.77 | 218.10 | 846.60 | 328.07 | 380.40 | 500.15 |
| 2006 | 740.74 | 1667.31 | 343.25 | 766.31 | 338.06 | 396.53 | 524.99 |
| 2007 | 778.69 | 1332.09 | 192.33 | 834.38 | 346.49 | 351.71 | 496.61 |
| 2008 | 800.69 | 960.89 | 325.45 | 960.96 | 324.98 | 365.15 | 489.74 |
| 2009 | 686.45 | 857.27 | 290.87 | 897.51 | 305.61 | 343.58 | 434.31 |
| 2010 | 683.64 | 853.98 | 137.48 | 844.66 | 371.02 | 344.64 | 445.09 |
| 2011 | 725.98 | 821.01 | 301.89 | 893.33 | 445.48 | 307.12 | 503.33 |
| 2012 | 704.87 | 802.21 | 233.99 | 453.65 | 400.37 | 503.56 | 480.34 |

Source: Computed from secondary data



Source: Computed from secondary data

Fig.5.5 World Productivity of Raw Cashew Nut

Table 5.6 Exponential Growth Rate of World Productivity of Raw Cashew Nuts

| Sl.No | Region | Growth % | Last 10 Years (%) |
|-------|-------------|----------|-------------------|
| 1 | India | 1.51 | 0.06 |
| 2 | Vietnam | 7.87 | (-)10.42 |
| 3 | Brazil | 1.11 | (-) 1.68 |
| 4 | East Africa | 1.59 | (-) 2.67 |
| 5 | West Africa | 2.81 | 3.21 |
| 6 | Others | (-)0.65 | 1.56 |
| 7 | WORLD TOTAL | 1.57 | (-)0.44 |

Table 5.7 Comparison in the Growth Rate of Production, Area and Productivity of Cashew (Percentages), 1998-2012

| Sl.No | Region | Production | Area | Productivity |
|-------|-------------|------------|-------|--------------|
| 1 | India | 4.30 | 2.79 | 1.51 |
| 2 | Vietnam | 12.32 | 4.45 | 7.87 |
| 3 | Brazil | 2.11 | 1.00 | 1.11 |
| 4 | East Africa | 3.72 | 2.13 | 1.59 |
| 5 | West Africa | 13.87 | 11.07 | 2.81 |
| 6 | Others | 5.06 | 5.71 | (-)0.65 |
| 7 | WORLD TOTAL | 6.35 | 4.78 | 1.57 |

The world cashew production and area of production had recorded a positive growth rate during the entire period of study. The productivity of non-traditional producing countries had registered a negative growth during these days. It was observed that Vietnam could achieve a growth rate of 12.32 per cent in production mainly by increasing the productivity where as West Africa's high growth rate of 13.87 per cent in the quantity of production was mainly due to increase in the area of production. Though other raw nut producing countries registered a growth rate of 5.06 per cent in production of raw cashew nuts, this achievement was mostly due to growth in area of production (5.71%) and the growth in productivity was slightly less, which in other words meant that these countries had not taken cashew cultivation seriously. There exists an opportunity to increase the World production by effective crop management in these countries. India's growth rate in production was also mainly due to increase in area of production. Brazil's growth rate in all fields of production, area and productivity showed an almost stagnancy in the cashew sector.

Table 5.8 Comparison in The Growth Rate of Production, Area and Productivity of Cashew (Percentages), 2003-2012

| Sl.No | Region | Production | Area | Productivity |
|-------|-------------|------------|---------|--------------|
| 1 | India | 2.58 | 2.52 | 0.06 |
| 2 | Vietnam | (-)3.51 | 6.91 | (-)10.42 |
| 3 | Brazil | (-) 0.25 | 1.43 | (-)1.68 |
| 4 | East Africa | (-)3.14 | (-)0.47 | (-)2.67 |
| 5 | West Africa | 9.71 | 6.50 | 3.21 |
| 6 | Others | 1.25 | (-)0.31 | 1.56 |
| 7 | WORLD TOTAL | 2.94 | 3.38 | (-)0.44 |

The recent past (over the last 10 years of the study) revealed that Indian productivity had not improved and almost remained stagnant. The productivity of Vietnam had gone down drastically by 10.42 per cent. One of the reasons pointed out by experts was that Vietnam had found it lucrative to source raw nuts from imports that resulted in low raw material prices for processing compared to domestic supply. This had discouraged the local farmers from applying manure and plant management. The East African region registered a decline in production, area of production and also the productivity. Brazil was just able to bridge the decline in productivity with a slight increase in area of production. West Africa had a promising figure in all fields of production, area of production and productivity.

5.4 World Cashew Processing

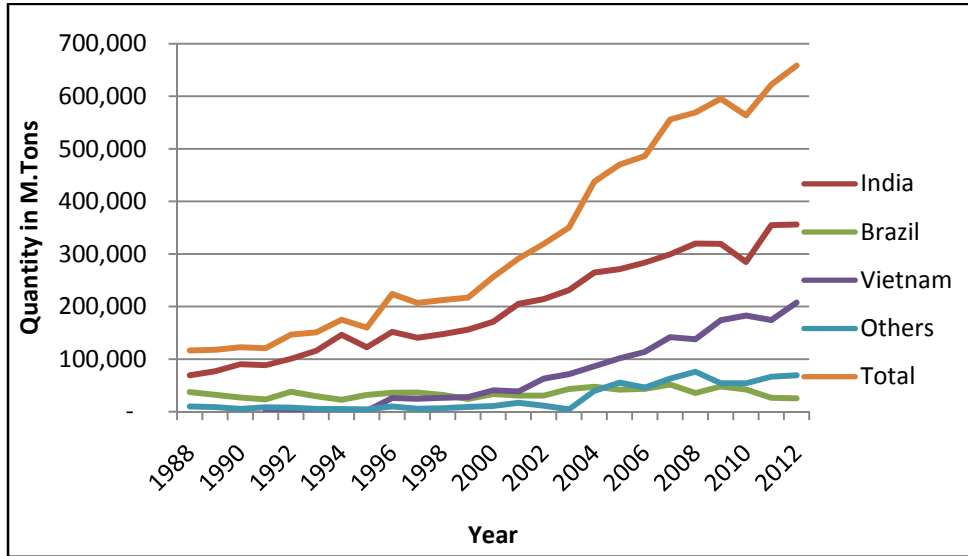
Processing of cashew today is more or less concentrated in three regions viz. India, Vietnam and Brazil. Processing in Mozambique that was a major processor in the 1970's is almost stagnant and negligible during the period of study. Other cashew producing countries in the African and Asian

continents are also processing cashew nuts in a small way. Such countries except Sri Lanka concentrate mainly in the export of raw cashew nuts to mainly India and Vietnam. Recently such countries have encouraged processing raw cashew nuts, but their share in processing is far less to production of raw cashew nuts.

Table 5.9 World Processing of Cashew Kernels (Quantity – Cashew Kernels in Metric Tons)

| Year | India | Brazil | Vietnam | Others | World |
|-------------|--------------|---------------|----------------|---------------|--------------|
| 1988 | 69,238 | 37,400 | - | 9,927 | 116,565 |
| 1989 | 76,754 | 32,000 | - | 8,878 | 117,632 |
| 1990 | 90,216 | 27,057 | - | 5,307 | 112,580 |
| 1991 | 88,290 | 23,429 | 544 | 8,459 | 1,20,722 |
| 1992 | 1,00,590 | 37,740 | 340 | 7,983 | 1,46,653 |
| 1993 | 1,15,534 | 29,506 | 204 | 5,353 | 1,50,597 |
| 1994 | 1,45,804 | 22,703 | 771 | 5,125 | 1,74,403 |
| 1995 | 1,22,635 | 31,752 | 1,315 | 4,491 | 1,60,193 |
| 1996 | 1,51,905 | 36,220 | 26,105 | 9,934 | 2,24,164 |
| 1997 | 1,40,425 | 36,350 | 24,500 | 5,590 | 2,06,865 |
| 1998 | 1,47,599 | 31,880 | 26,500 | 6,584 | 2,12,563 |
| 1999 | 1,56,046 | 24,100 | 28,000 | 8,973 | 2,17,119 |
| 2000 | 1,70,980 | 33,588 | 40,734 | 10,989 | 2,56,291 |
| 2001 | 2,04,934 | 30,618 | 38,556 | 16,955 | 2,91,063 |
| 2002 | 2,14,309 | 30,618 | 63,000 | 11,514 | 3,19,441 |
| 2003 | 2,31,166 | 43,092 | 71,442 | 4,530 | 3,50,230 |
| 2004 | 2,64,650 | 47,442 | 86,379 | 39,350 | 4,37,821 |
| 2005 | 2,71,106 | 41,853 | 1,01,484 | 55,450 | 4,69,893 |
| 2006 | 2,83,684 | 43,235 | 1,13,755 | 45,829 | 4,86,503 |
| 2007 | 2,99,499 | 51,560 | 1,41,900 | 25,795 | 5,18,754 |
| 2008 | 3,20,000 | 35,410 | 1,37,696 | 58,997 | 5,52,103 |
| 2009 | 3,19,241 | 37,765 | 1,74,182 | 34,173 | 5,65,361 |
| 2010 | 2,84,711 | 32,177 | 1,82,897 | 34,047 | 5,33,832 |
| 2011 | 3,54,829 | 26,302 | 1,74,342 | 36,617 | 5,92,090 |
| 2012 | 3,56,107 | 25,334 | 2,07,533 | 39,456 | 6,28,430 |

Source : Compiled from various sources (Cepci, DGCI&S,INC, Vinacas, Sindcaju, UN trade statistics)



Source : Compiled from various sources (Cepci, DGCI&S,INC, Vinacas, Sindcaju, UN trade statistics)

Fig.5.6 World Processing of Cashew Kernels

Table 5.10 Exponential Growth Rate of World Processing of Cashew Kernels

| Sl.No | Region | Overall Growth % | Recent Trend (last 10 years) |
|-------|---------------|------------------|------------------------------|
| 1 | India | 6.78 | 4.00 |
| 2 | *Vietnam | 31.08 | 11.34 |
| 3 | Brazil | 1.11 | (-)5.42 |
| 4 | Others | 9.43 | 9.99 |
| 5 | WORLD AVERAGE | 7.93 | 5.26 |

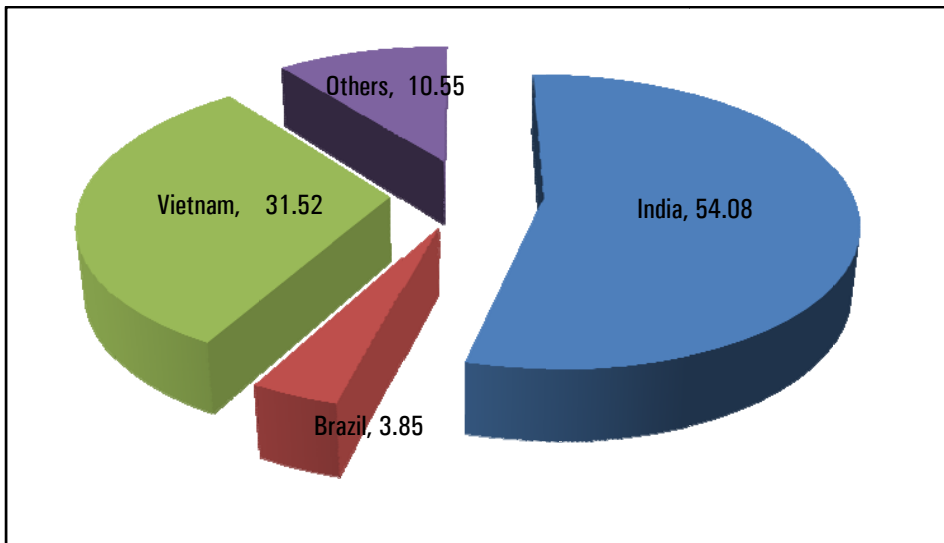
*Vietnam started processing from 1991 onwards

The Overall growth rate of Vietnam was commendable at 31.08 per cent. Vietnam was a sole supplier of raw cashew nuts to India till 1990 and even though they started processing in a small way in 1991, they have gone in a big way in processing from 1996 onwards. Their growth in domestic production (at 12.32 %) had mainly accounted for their growth in the processing and as such they were more dependent on domestic production for their processing. Though

the growth rate of other processing countries accounted for 9.43 per cent, the impact was not much due to the low volume of processing. Indian growth rate (6.78%) was slightly less than the world average (7.93%) where as Brazil seemed to be either at a saturated level or that of late she was not much concentrating on the cashew processing.

The recent trend (over the last 10 years) showed that Vietnam still lead the growth pattern with 11.34 per cent and the processing in other countries had registered an exponential growth of 9.99 per cent, where as Indian growth rate had moved down to 4 per cent. The overall growth rate stood at 5.26 per cent in the recent past. The net result was that, on analyzing on absolute quantities, the World was getting more concentrated in India and Vietnam for processing of Cashew nuts. But the recent low growth levels in India read along with higher growth levels in Vietnam and other countries pointed to the situation that World was more concentrating to Vietnam as a processing hub and that other producing countries were preparing in a big way to process the raw cashew nuts at the origin itself. This will badly affect the supply positions of India in future, who otherwise depends on imported nuts for more than half of the processing in the country.

As per the statistics of the Cashew Export Promotion Council of India (CEPCI) for the year 2012, India still continued to be the largest processor in the world with 54.08 per cent share in the world market. Vietnam stood second with 31.52 per cent, whereas the share of Brazil was comparatively very low. The new generation processing countries contributed to 10.55 per cent of processing, which is likely to improve in the wake of mechanization and automation in these countries. This has to be looked upon as a threat to India in the future.



Source: CEPCI Statistics 2012

Fig.5.7 World Processing of Cashew by Percentage - 2012

5.5 World Cashew Consumption

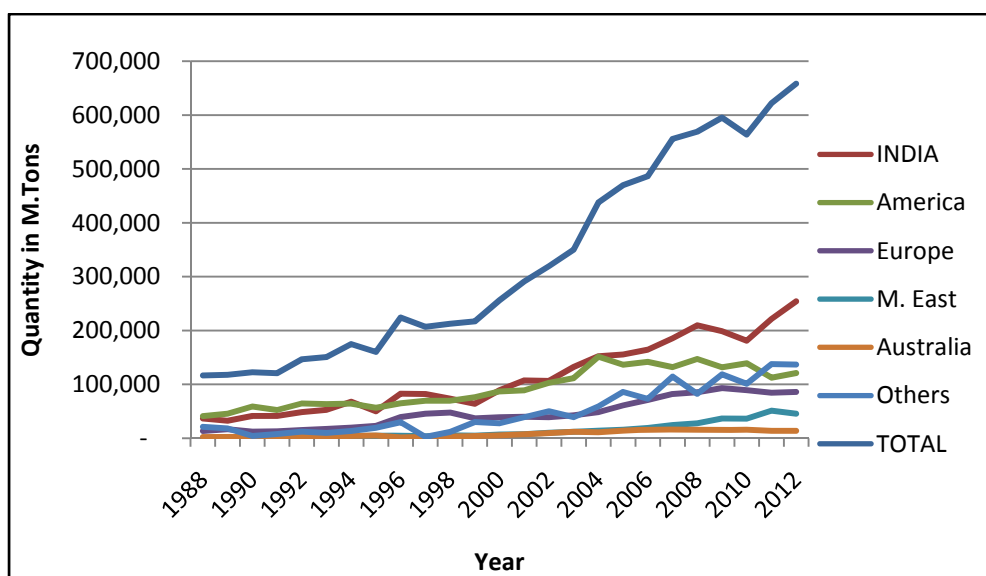
Cashew consumption had undergone a big transition over the period of this study and as evident from the secondary data, the pattern and quantum of consumption had virtually switched to the Asian countries from the traditional markets of America and Europe. India had emerged out as the largest consumer of cashew kernels in the world. There was no statistical data readily available as to the exact domestic consumption of cashew kernels in India. Only an estimation was possible by converting the total quantity of raw cashew kernels processed in India, ie the sum of domestic production and imports into equivalent kernels based on the conventional processing out terns (approximately 23.8 per cent) and deducting the export quantity from that value of total kernel output.

Table 5.11 World Consumption of Cashew Kernels (Quantity in M.Tons)

| Year | India | America | Europe | M. East | Australia | *others | World |
|-------------|--------------|----------------|---------------|----------------|------------------|----------------|--------------|
| 1988 | 36,783 | 41,331 | 13,605 | 1,030 | 2,423 | 21393 | 116,565 |
| 1989 | 32,557 | 45,744 | 17,102 | 1,155 | 2,695 | 18379 | 117,632 |
| 1990 | 41,452 | 59,185 | 12,530 | 1,803 | 3,036 | 4574 | 122,580 |
| 1991 | 41,449 | 52,591 | 13,226 | 2,031 | 3,311 | 8114 | 120,722 |
| 1992 | 48,661 | 64,752 | 15,415 | 2,320 | 2,948 | 12557 | 146,653 |
| 1993 | 52,788 | 63,481 | 17,711 | 3,040 | 3,765 | 10050 | 150,835 |
| 1994 | 68,020 | 64,457 | 19,872 | 4,415 | 4,491 | 13624 | 174,879 |
| 1995 | 49,995 | 56,814 | 23,324 | 4,913 | 5,534 | 19613 | 160,193 |
| 1996 | 82,850 | 65,249 | 39,517 | 4,568 | 1,844 | 30136 | 224,164 |
| 1997 | 82,063 | 69,776 | 45,947 | 3,703 | 2,685 | 2691 | 206,865 |
| 1998 | 73,639 | 69,987 | 47,861 | 5,528 | 3,721 | 11827 | 212,563 |
| 1999 | 63,962 | 76,325 | 37,279 | 5,012 | 4,320 | 30221 | 217,119 |
| 2000 | 89,319 | 87,035 | 39,160 | 6,894 | 5,842 | 28041 | 256,291 |
| 2001 | 107,523 | 89,104 | 40,073 | 7,521 | 7,479 | 39363 | 291,063 |
| 2002 | 106,579 | 103,277 | 39,157 | 10,282 | 9,773 | 50373 | 319,441 |
| 2003 | 132,508 | 111,654 | 42,709 | 12,048 | 12,179 | 39132 | 350,230 |
| 2004 | 152,418 | 151,581 | 48,719 | 14,283 | 11,340 | 59480 | 437,821 |
| 2005 | 155,490 | 136,667 | 61,282 | 15,926 | 14,369 | 86159 | 469,893 |
| 2006 | 164,514 | 141,955 | 71,470 | 19,250 | 15,916 | 73398 | 486,503 |
| 2007 | 185,626 | 132,169 | 82,427 | 24,460 | 16,722 | 77,350 | 518,754 |
| 2008 | 209,713 | 147,441 | 85,667 | 28,017 | 15,697 | 65,568 | 552,103 |
| 2009 | 198,724 | 131,835 | 93,332 | 36,763 | 15,723 | 98,984 | 575,361 |
| 2010 | 181,054 | 139,317 | 89,451 | 36,401 | 16,139 | 81,470 | 543,832 |
| 2011 | 221,429 | 112,739 | 84,635 | 51,427 | 13,988 | 107,872 | 592,090 |
| 2012 | 254,241 | 121,215 | 86,344 | 45,720 | 13,909 | 107,001 | 628,430 |

* Others include consumption by other regions, quantity not reported and quantity consumed by the processing countries

Sources: INC, CEPCI, UN trade statistics and others.



Sources: INC, CEPCI, UN trade statistics and others.

Fig. 5.8 World Consumption of Cashew Kernels

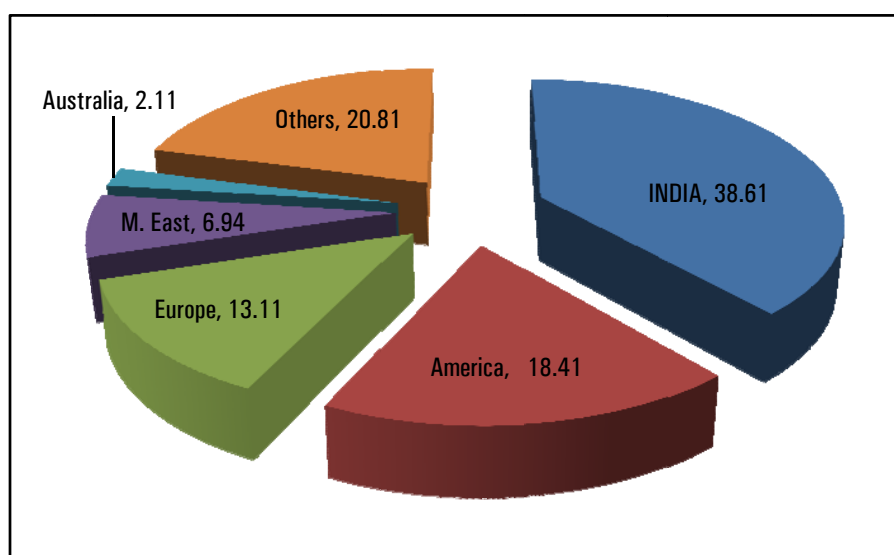
Table 5.12 Exponential Growth Rate of World Consumption of Cashew Kernels

| Sl.No | Region | Overall Growth % | | Recent Trend (last 10 years)% |
|-------|---------------|------------------|---|-------------------------------|
| 1 | India | 8.44 | ⇒ | 6.02 |
| 2 | America | 5.09 | | (-)0.82 |
| 3 | Europe | 8.79 | | 7.84 |
| 4 | Middle East | 15.57 | | 16.47 |
| 5 | Australia | 9.25 | | 1.91 |
| 6. | Others | 11.46 | | 8.29 |
| 7. | WORLD AVERAGE | 7.93 | | 5.26 |

For decades together, US enjoyed the premium position in global cashew consumption. Cashew was considered to be the food for the rich, and US and Europe were the traditional market of cashew kernels in the world. The growth rate in US during the period of study stood at only 5.09 per cent

exponentially against 8.44 per cent of India and 15.57 per cent of the Middle East. Australian growth rate was also satisfactory at 9.25 per cent during this period, where as other regions recorded a growth rate of 11.46 per cent during the entire period of study. The World consumption during this time registered an overall exponential growth of 5.26 per cent.

But analyzing the recent trends over the last ten years only, the US consumption was almost saturated and the growth rate was declining at 0.82 per cent exponentially. Indian growth rate (exponential) of 6.02 per cent in the recent past was low compared to Middle East at 16.47 per cent and others at 8.27 per cent. Europe registered a growth rate of 7.84 per cent. Australian consumption registered a very low growth rate of 1.91 per cent in the recent past compared to the overall growth rate of 9.25 per cent. The World consumption over the last decade had recorded an exponential growth of 5.26 per cent.



Source: CEPCI Statistics 2012

Fig 5.9 World Consumption by Percentage -2012

The high volume of consumption of cashew kernels in India with a steady growth rate had put India in a commanding position in world trade of cashew kernels. In the year 2012, the share of Indian cashew kernel consumption was 38.61 per cent of the world consumption against 18.41 per cent of USA, the immediate individual competitor. The increasing consumption of other non-traditional consumers (share 20.81%) was a positive indication and has to be looked upon as an opportunity to India. The consumption pattern in India was different from other regions in the sense that she consumed more broken cashew kernels mainly as food ingredients against other regions using whole cashew kernels mainly as snacks.

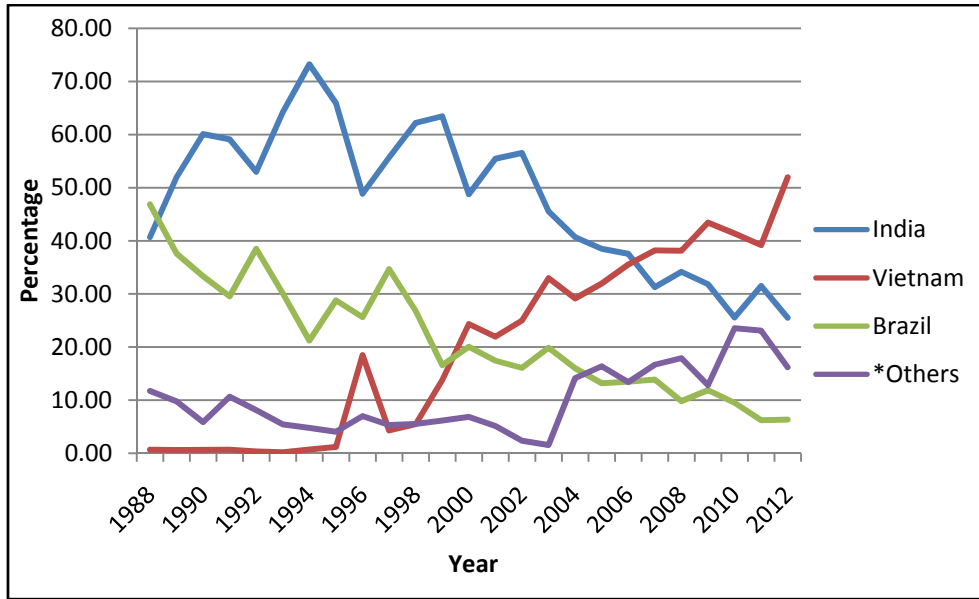
5.6 Export of Cashew by Major Processing Countries

Apart from India, there was not much domestic consumption of cashew kernels in other processing countries. India had a well established market for cashew kernels and her consumption of cashew kernels were mainly the 'broken' and 'pieces' that was widely used as ingredients in food items. The domestic consumption of other processing countries was negligible and limited to that quantity which could not be exported or which otherwise was wasted due to long storage or quality problems. Also, there were always undeclared exports from some of the processing countries to neighboring countries, the prominent among them being the undeclared exports from Vietnam and Indonesia to China. Also, a lion share of cashew kernels processed in Cambodia was reported as transported across to Vietnam which then got labeled as Vietnamese produce. But such undeclared exports were negligible and could be ignored while analyzing the international trade of cashew kernels.

Table 5.13 Export of Cashew Kernels and Market Share of Major Exporters

| Year | Quantity of Exports (M.Tons) | | | | | Market Share% | | | |
|------|------------------------------|----------|--------|----------|----------|---------------|---------|--------|--------|
| | India | Vietnam | Brazil | Others | Total | India | Vietnam | Brazil | Others |
| 1988 | 32,455 | | 37,400 | 9,927 | 79,782 | 40.68 | 0.00 | 46.88 | 12.44 |
| 1989 | 44,197 | | 32,000 | 8,878 | 85,075 | 51.95 | 0.00 | 37.61 | 10.44 |
| 1990 | 48,764 | | 27,057 | 5,307 | 81,128 | 60.11 | 0.00 | 33.35 | 6.54 |
| 1991 | 46,841 | 544 | 23,429 | 8,459 | 79,273 | 59.09 | 0.69 | 29.55 | 10.67 |
| 1992 | 51,929 | 340 | 37,740 | 7,983 | 97,992 | 52.99 | 0.35 | 38.51 | 8.15 |
| 1993 | 62,984 | 204 | 29,506 | 5,353 | 98,047 | 64.24 | 0.21 | 30.09 | 5.46 |
| 1994 | 78,260 | 771 | 22,703 | 5,125 | 1,06,859 | 73.24 | 0.72 | 21.25 | 4.80 |
| 1995 | 72,640 | 1,315 | 31,752 | 4,491 | 1,10,198 | 65.92 | 1.19 | 28.81 | 4.08 |
| 1996 | 69,055 | 26,105 | 36,220 | 9,934 | 1,41,314 | 48.87 | 18.47 | 25.63 | 7.03 |
| 1997 | 58,362 | 4,500 | 36,350 | 5,590 | 1,04,802 | 55.69 | 4.29 | 34.68 | 5.33 |
| 1998 | 73,960 | 6,500 | 31,880 | 6,584 | 1,18,924 | 62.19 | 5.47 | 26.81 | 5.54 |
| 1999 | 92,084 | 20,000 | 24,100 | 8,973 | 1,45,157 | 63.44 | 13.78 | 16.60 | 6.18 |
| 2000 | 81,661 | 40,734 | 33,588 | 11,503 | 1,67,486 | 48.76 | 24.32 | 20.05 | 6.87 |
| 2001 | 97,411 | 38,556 | 30,618 | 9,072 | 1,75,657 | 55.46 | 21.95 | 17.43 | 5.16 |
| 2002 | 1,07,730 | 47,628 | 30,618 | 4,536 | 1,90,512 | 56.55 | 25.00 | 16.07 | 2.38 |
| 2003 | 98,658 | 71,442 | 43,092 | 3,402 | 2,16,594 | 45.55 | 32.98 | 19.90 | 1.57 |
| 2004 | 1,20,493 | 86,379 | 47,442 | 41,911 | 2,96,225 | 40.68 | 29.16 | 16.02 | 14.15 |
| 2005 | 1,22,192 | 1,01,484 | 41,853 | 52,063 | 3,17,592 | 38.47 | 31.95 | 13.18 | 16.39 |
| 2006 | 1,20,228 | 1,13,755 | 43,235 | 42,926 | 3,20,144 | 37.55 | 35.53 | 13.50 | 13.41 |
| 2007 | 1,16,205 | 1,41,900 | 51,560 | 62,061 | 3,71,726 | 31.26 | 38.17 | 13.87 | 16.70 |
| 2008 | 1,23,369 | 1,37,696 | 35,410 | 64,753 | 3,61,228 | 34.15 | 38.12 | 9.80 | 17.93 |
| 2009 | 1,27,721 | 1,74,182 | 47,765 | 51,536 | 4,01,204 | 31.83 | 43.41 | 11.91 | 12.85 |
| 2010 | 1,13,050 | 1,83,221 | 42,117 | 1,04,107 | 4,42,495 | 25.55 | 41.37 | 9.53 | 23.55 |
| 2011 | 1,32,660 | 1,65,339 | 26,285 | 97,391 | 4,21,675 | 31.50 | 39.18 | 6.23 | 23.09 |
| 2012 | 1,01,866 | 2,07,533 | 25,335 | 67,414 | 4,02,148 | 25.33 | 51.61 | 6.30 | 16.76 |

Source : CEPCI Statistics



Source : CEPCI Statistics

Fig 5.10 Market Share of Cashew Kernels in the International Trade

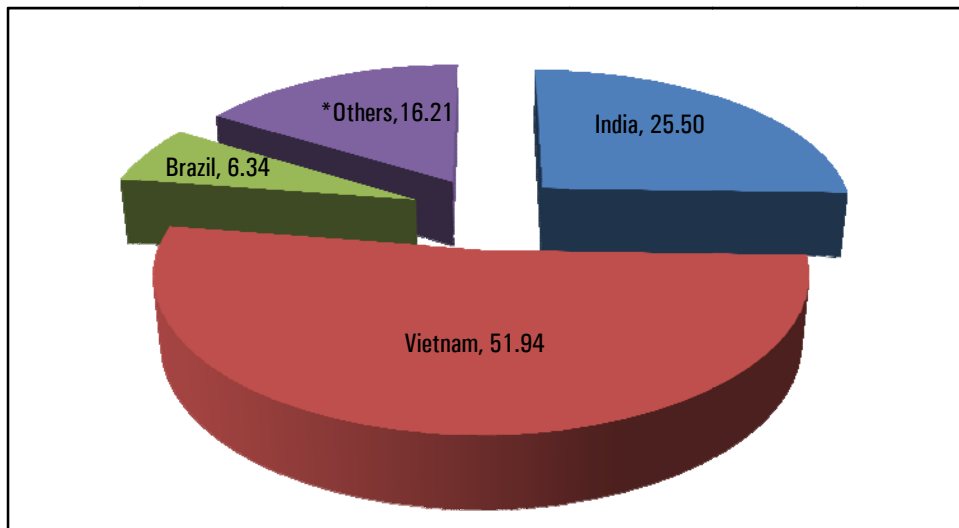
Table 5.14 Growth in the Market Share of Cashew Kernels in International Trade

| Sl.No | Country | Last 25 Years | Last 10 years |
|-------|---------|---------------|---------------|
| 1 | India | (-) 3.25 | (-)5.77 |
| 2 | Vietnam | 23.76 | 4.84 |
| 3 | Brazil | (-) 7.08 | (-)11.70 |
| 4 | Others | 3.95 | 16.06 |

Definition : For the purpose of this analysis, the Market share and international market share are used interchangeably in the same sense that represents the ratio of export of a country to the overall exports of all countries, where as export share was used in the sense that represents the ratio of the export quantity of a country to the total processed quantity in that country, all expressed in percentages. International market is

defined as that market of all countries excluding processing countries where as World market is defined as that inclusive of processing countries.

The growth rate of India in the international market share had declined by 3.25 per cent exponentially during the entire period of the study. But the decline in the market share over the last 10 years was more alarming at 5.77 per cent. Brazil also exhibited a similar trend, where by the decline had gone up from 7.08 per cent during the entire period to 11.70 per cent over the recent past. Vietnam showed an exponential growth of 23.76 per cent over the period of the study, whereas during the last 10 years, the same was 4.84 per cent. What was more alarming to India was the abnormal growth rate of market share of other (non-traditional) countries that had shot up to 16.06 per cent towards the last 10 years of the study. This is to be treated as a big threat to India.



Source: CEPCI Statistics 2012

Fig 5.11 Market Share of Regions in the International Cashew Kernel Market- 2012

As of 2012, Vietnam had more than double the market share of India in the international market. The other the countries put together contributed to 16.21 per cent of the market share, where as Brazil was far behind with 6.34 per cent only.

5.7 Comparative Advantage of Competing Countries in World Cashew Trade

In economics, **comparative advantage** (formulated by David Ricardo) refers to the ability of a nation to produce a particular good or service at a lower marginal and opportunity cost over another. **Competitive advantage** (Michael Porter, 1985) on the other hand is the advantage gained over competitors by offering customers greater value, either through lower prices or by providing additional benefits and service that justify similar, or possibly higher, prices. As for Michael Porter, the theory of Comparative Advantage could lead to specialize in exporting primary goods and raw materials that trap countries in low-wage. Rather a nation makes Competitive Advantage when it has resources and capabilities that are superior to its competitors, enabling it to deliver the products at competitive costs.

The **revealed comparative advantage (RCA)** is an index used in international economics for calculating the relative advantage or disadvantage of a certain country in a certain class of goods or services as evidenced by trade flows. It is based on the Ricardian comparative advantage concept. It most commonly refers to an index – RCA (Revealed Comparative Advantage) introduced by Béla Balassa (1965):

$$RCA_{ij} = (X_{ij} / X_{in}) / (x_{rj} / X_{rn})$$

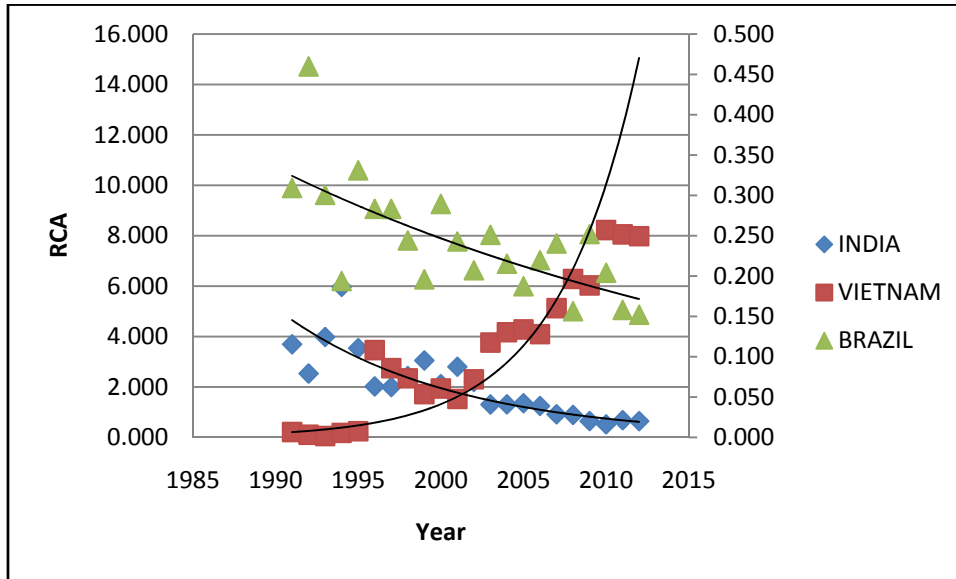
where RCA_{ij} represents the revealed Comparative advantage of country 'i' for a group of products 'j', and X_{ij} denotes total exports of country 'i' in group of products 'j'; subscript r denotes all countries excluding the country 'i' and subscript 'n' denotes all group of products excluding the product 'j'. The value of RCA varies from '0' to infinity, the value being less than unity means that the country 'i' has comparative disadvantage and the value of RCA more than unity reveals that the country 'i' has comparative advantage on the group of product 'j'. The RCA values are used to compare the comparative advantage of nations on a particular group of products.

The revealed Comparative advantage of the competing countries India, Vietnam and Brazil was computed from the secondary data availed from UN trade statistics and trading economics.com; and the hypothesis wastested using the computed values.

Table 5.15 Revealed Comparative Advantage in International Trade of Cashew Kernel

| Year | RCA | | | Year | RCA | | |
|------|-------|---------|--------|------|-------|---------|--------|
| | India | Vietnam | Brazil | | India | Vietnam | Brazil |
| 1991 | 3.696 | 0.213 | 0.309 | 2002 | 2.197 | 2.305 | 0.207 |
| 1992 | 2.534 | 0.102 | 0.460 | 2003 | 1.305 | 3.761 | 0.251 |
| 1993 | 3.983 | 0.052 | 0.301 | 2004 | 1.309 | 4.172 | 0.215 |
| 1994 | 5.977 | 0.178 | 0.194 | 2005 | 1.355 | 4.283 | 0.187 |
| 1995 | 3.542 | 0.244 | 0.331 | 2006 | 1.245 | 4.097 | 0.220 |
| 1996 | 2.021 | 3.464 | 0.283 | 2007 | 0.918 | 5.128 | 0.240 |
| 1997 | 1.998 | 2.746 | 0.283 | 2008 | 0.889 | 6.289 | 0.156 |
| 1998 | 2.437 | 2.343 | 0.244 | 2009 | 0.646 | 6.030 | 0.252 |
| 1999 | 3.053 | 1.718 | 0.196 | 2010 | 0.515 | 8.230 | 0.204 |
| 2000 | 2.110 | 1.939 | 0.289 | 2011 | 0.680 | 8.056 | 0.158 |
| 2001 | 2.802 | 1.524 | 0.243 | 2012 | 0.642 | 7.983 | 0.152 |

Source: Computed from Secondary data



Note: The Brazil data is represented by secondary axis (on the right)

Source: Computed from Secondary data

Fig. 5.12 Revealed Comparative Advantage of Nations in International Cashew Trade

Table 5.16 Model Summary

| Sl.No | Country | Model | R ² Value | Growth Rate |
|-------|---------|-------------|----------------------|-------------|
| 1 | India | Exponential | 0.846 | (-) 9.00% |
| 2 | Vietnam | Exponential | 0.742 | (+) 20.20% |
| 3 | Brazil | Exponential | 0.538 | (-) 3.00% |

The RCA analysis revealed that both India and Brazil had a negative growth in RCA while Vietnam had a commendable positive growth. The decline in the growth rate of India was severe.

5.8 Transition in Indian Cashew Sector

India, being the leading producer, processor and consumer of cashew nuts had contributed a major role in the transition of cashew in the world. The major transitions in India during the period of this study as already

analysed above were the boom in domestic consumption and the decline in her share in the international market, Also, out of her total processed cashew kernels, the export share had declined. Her dependence on imported raw nut had gone high. On the other hand, the export share of total processing had come down drastically. The Revealed comparative advantage of India in the international trade had suffered a major setback during the period of the study. The cause and effects of the boom in domestic consumption of cashew kernels were analysed in detail and the following hypothesis formulated.

5.9 Cause and Effect of Increased Domestic Consumption in India

The major transition in India over the period of study was the steep increase in the domestic consumption of India. The root cause of the increase in domestic consumption and its effects on other factors were analysed that lead to the forthcoming hypothesis.

H1: The domestic consumption in India was Co-integrated to the income level

The cashew kernel is considered as the poor man's crop and the rich man's food. The spending pattern moves along with the income levels. When the income levels are better of, there would be more spending on non-essential and luxurious commodities. Over the last twenty five years, there has been significant increase in the Gross Domestic product of our country and the per capita income. On the other side, cashew kernels prices were more or less steady with very little fluctuations. Cashew kernels, which was not affordable to the middle class before, is now a common item in the monthly purchase basket of many a middle class family. There is not much cashew promotion in India, and as such it cannot be assumed that the promotion of cashew kernels has

contributed to the growth of cashew consumption in India. It is assumed that the increase in the per capital income has contributed to the boom of domestic consumption of cashew kernel in India.

Table 5.17 Per Capita GDP and Domestic Consumption of Cashew Kernels in India

| Year | GDP Per Capita(USD)-inflation adjusted | Domestic Consumption - India (MT) | Year | GDP Per Capita(USD)-inflation adjusted | Domestic Consumption-India (MT) |
|------|--|-----------------------------------|------|--|---------------------------------|
| 1987 | 344.00 | 33,102 | 2000 | 564.21 | 89,319 |
| 1988 | 350.03 | 36,783 | 2001 | 576.93 | 1,07,523 |
| 1989 | 375.67 | 32,557 | 2002 | 595.60 | 1,06,579 |
| 1990 | 389.81 | 41,452 | 2003 | 608.99 | 1,32,508 |
| 1991 | 403.09 | 41,449 | 2004 | 647.31 | 1,52,418 |
| 1992 | 399.33 | 48,661 | 2005 | 687.31 | 1,55,490 |
| 1993 | 413.11 | 52,788 | 2006 | 740.12 | 1,64,514 |
| 1994 | 424.58 | 68,020 | 2007 | 797.26 | 1,85,626 |
| 1995 | 444.48 | 49,995 | 2008 | 863.46 | 2,09,713 |
| 1996 | 469.47 | 82,850 | 2009 | 885.17 | 1,98,724 |
| 1997 | 495.92 | 82,063 | 2010 | 947.75 | 1,81,054 |
| 1998 | 506.98 | 73,639 | 2011 | 1034.24 | 2,24,801 |
| 1999 | 529.10 | 63,962 | 2012 | 1085.73 | 2,58,589 |

Source: CEPCI, Tradingeconomics.com

Analysis: Dickey-Fuller (DF) and Augmented Dickey- Fuller test (ADF) were conducted to test the stationarity in the data pertaining to Domestic consumption of cashew Kernels and the Per Capita GDP (After adjusting inflation). The second stage involved testing of co-integration adopting Johansen test. The basic requirement to conduct Johansons test of correlation is that the variables should be non-stationary and their first differences should be stationary. The software ‘e-view’ was used to conduct the analysis.

DF Unit Root Tests are based on the following three regression forms:

- I. Without Constant and Trend : $\Delta Y_t = \delta Y_{t-1} + U_t$
- II. With Constant : $\Delta Y_t = \alpha + \delta Y_{t-1} + U_t$
- III. With Constant and Trend : $\Delta Y_t = \alpha + \beta T + \delta Y_{t-1} + U_t$

The hypothesis is:

$H_0 : \delta = 0$ (Unit root), ie the data has unit root, meaning that the data is not stationary.

$H_1 : \delta \neq 0$

Step.1 Unit root tests (Test for Stationarity)

Augmented Dickey-Fuller Tests

Table 5.18 Test Statistics of Null Hypothesis: Domestic Consumption of India has a Unit Root

| Extraneous | t-statistics | Prob |
|------------------------|--------------|--------|
| Constant | 1.468342 | 0.9986 |
| Constant, Linear Trend | -2.022980 | 0.5600 |
| None | 2.820893 | 0.9979 |

Table 5.19 Test Statistics of Null Hypothesis - GDP of India has a Unit Root

| Extraneous | t-statistics | Prob |
|------------------------|--------------|--------|
| Constant | 5.812263 | 1.0000 |
| Constant, Linear Trend | 1.291435 | 0.9999 |
| None | 11.03482 | 1.0000 |

All the three models in the above two cases failed to reject the null hypothesis as the P values were all above 5 per cent, the level of significance.

Thus the data on domestic consumption and GDP of India proved to be non-stationary.

Engle and Granger pointed out that a linear combination of two or more non-stationary series would be stationary. If such a stationary linear combination exists, the non-stationary time series are said to be *cointegrated*. The stationary linear combination is called the *cointegrating equation* and may be interpreted as a long-run equilibrium relationship among the variables. The purpose of the cointegration test is to determine whether groups of non-stationary series are cointegrated or not.

Step 2. Johansen Cointegration Test

Table 5.20 Test Statistics - Unrestricted Co-integration Rank Test (Trace)

| Hypothesized | Eigenvalue | Trace | 0.05 | Prob.** |
|--------------|------------|-----------|----------------|---------|
| No. of CE(s) | | Statistic | Critical Value | |
| None * | 0.711438 | 31.31964 | 15.49471 | 0.0001 |
| At most 1 * | 0.276126 | 6.462758 | 3.841466 | 0.0110 |

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 5.21 Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

| Hypothesized | Eigenvalue | Max-Eigen | 0.05 | Prob.** |
|--------------|------------|-----------|----------------|---------|
| No. of CE(s) | | Statistic | Critical Value | |
| None * | 0.711438 | 24.85688 | 14.26460 | 0.0008 |
| At most 1 * | 0.276126 | 6.462758 | 3.841466 | 0.0110 |

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values.

Step 3.

Table 5.22 Test Statistics - Granger Causality Test

| Null Hypothesis: | Obs | F-Statistic | Prob. |
|-----------------------------------|------------|--------------------|--------------|
| GDP does not Granger Cause DOMCOM | 23 | 5.23098 | 0.0162 |
| DOMCOM does not Granger Cause GDP | | 1.65167 | 0.2195 |

Result: Both Trace test and the Maximum Eigen Value test rejected the null hypothesis, establishing that the domestic consumption of cashew kernel in India is correlated to the per capita GDP. Further, Granger Causality test established that it was the change in GDP that caused the change in domestic consumption.

H2: Import of raw nuts had more effect on the domestic consumption in India than the domestic production of raw cashew nuts

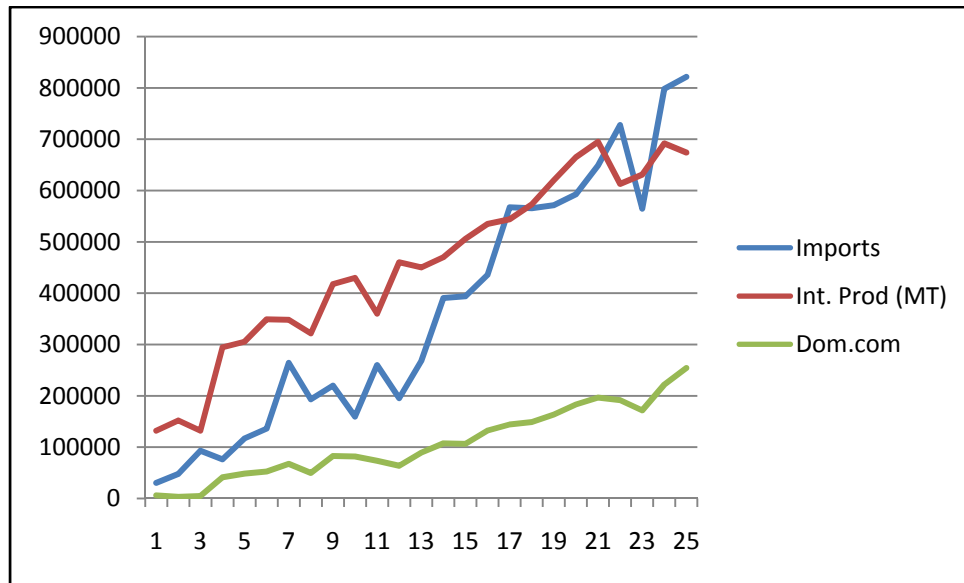
India in spite of being the largest producer of raw cashew nuts in the world was also the largest importer of the world. Apart from her domestic production of raw cashew nuts, a large volume was imported to meet her processing. Thus India turned out to be the processing hub in the world. Earlier, a major portion of her processing output was exported. With the increase in domestic consumption, the situation changed gradually. This transition can be analysed in three phases. In the first phase, apart from the entire imports, a major portion of domestic production of raw nuts was used to meet the exports. The second phase witnessed an equilibrium situation where the imports of raw nuts were balanced against the exports of kernels where as the domestic raw nuts were balanced against domestic consumption. In the third phase, apart from the entire domestic production of raw nuts, a major portion of imported nuts were used to cater the needs of domestic demand of kernels. resulting in a negative trade balance in cashew trade. However, the increase in domestic consumption was commendable. During

the same time we witness an increase in both imports and domestic production of raw nuts. This hypothesis was formulated on the assumption that the increase in imports had supported the domestic consumption than the domestic production of raw nuts in India

Table 5.23 Imports of Raw Cashew Nuts, Domestic Production of Raw Cashew Nuts and Domestic Consumption of Cashew Kernels

| Year | Indian Imports (M.T) | Domestic Production (M.T) | Domestic Consumption (M.T) |
|------|----------------------|---------------------------|----------------------------|
| 1988 | 30539 | 132000 | 6245 |
| 1989 | 48038 | 152000 | 3431 |
| 1990 | 93318 | 132000 | 4883 |
| 1991 | 76228 | 294590 | 41449 |
| 1992 | 117166 | 305310 | 48661 |
| 1993 | 136242 | 349000 | 52550 |
| 1994 | 264377 | 348000 | 67544 |
| 1995 | 193425 | 321640 | 49995 |
| 1996 | 220170 | 417830 | 82850 |
| 1997 | 159783 | 430000 | 82063 |
| 1998 | 259917 | 360000 | 73639 |
| 1999 | 195395 | 460000 | 63962 |
| 2000 | 268118 | 450000 | 89319 |
| 2001 | 390722 | 470000 | 107523 |
| 2002 | 394099 | 506000 | 106579 |
| 2003 | 435897 | 535000 | 132508 |
| 2004 | 567532 | 544000 | 144157 |
| 2005 | 565645 | 573000 | 148914 |
| 2006 | 571474 | 620000 | 163456 |
| 2007 | 592896 | 665000 | 183294 |
| 2008 | 648999 | 695000 | 196631 |
| 2009 | 727814 | 613000 | 191520 |
| 2010 | 564785 | 631000 | 171760 |
| 2011 | 798281 | 692000 | 221984 |
| 2012 | 821648 | 674000 | 254241 |

Source: Computed from Secondary data



Source: Computed from Secondary data

Fig 5.13 The growth Rate of Imports, Domestic Production and Domestic Consumption in India

Table 5.24 Test Statistics – Growth rates of Imports, Domestic Production and Domestic Consumption

| Sl.No | Variables | Model | R ² Value | Growth Rate |
|-------|----------------------|-------------|----------------------|-------------|
| 1 | Imports | Exponential | 0.892 | 11.6% |
| 2 | Domestic Production | Exponential | 0.816 | 6.01% |
| 3 | Domestic Consumption | Exponential | 0.836 | 13.4% |

During the period of the study, the imports had grown up exponentially by 11.6 per cent against the growth of domestic production at 6.01 per cent, where as the domestic consumption had registered an exponential growth of 13.4 per cent. Apparently it appears that the imports have contributed more to the increase in domestic consumption than the domestic production of raw nuts in India.

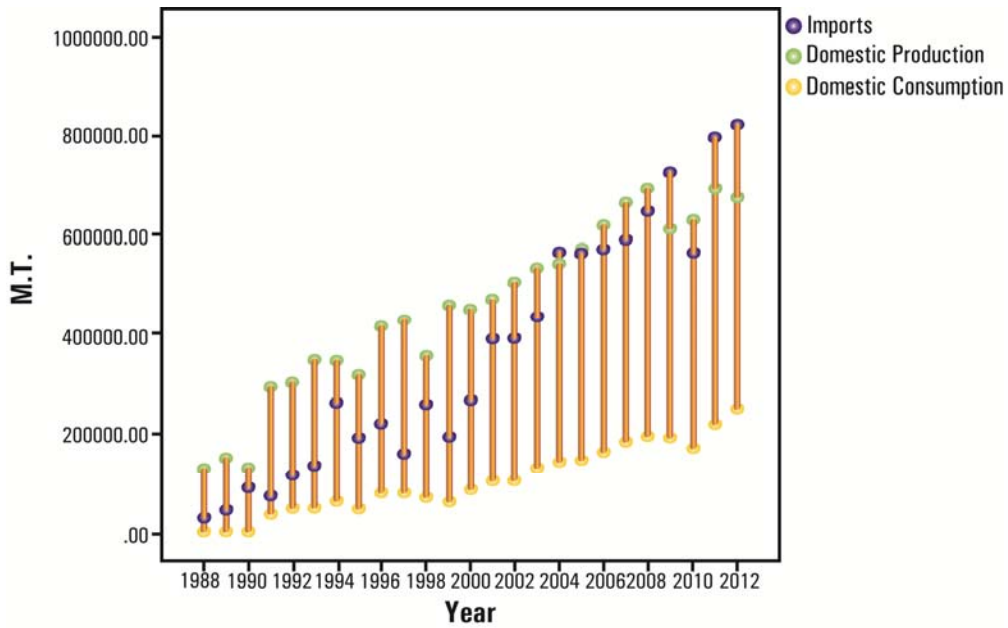


Fig. 5.14 Dropline Chart- Imports, Domestic Production and Domestic Consumption of India.

Drop line chart from 1988 to 2012 clearly depicts the relative change in all the three variables in a particular time period. Imports have taken over the domestic production of raw nuts from the year 2009 onwards. The argument that Indian domestic consumption has gone up, more at the cost of increased imports than domestic supply is very strong as evidenced in the drop line chart and hence the further exposed to a hypothesis testing.

Analysis : The regression analysis is done to test the hypothesis. The R^2 value of 0.974 per cent is very high that the model explains 97.4 per cent of the relationship.

Table 5.25 Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .987 ^a | .974 | .971 | 11446.99298 |

a. Predictors: (Constant), Domestic Consumption, Internal Production, Imports

Table 5.26 ANOVA^b

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|----|-------------|---------|-------------------|
| 1 | Regression | 1.065E11 | 2 | 5.327E10 | 406.509 | .000 ^a |
| | Residual | 2.883E9 | 22 | 1.310E8 | | |
| | Total | 1.094E11 | 24 | | | |

- a. Predictors: (Constant), Internal Production, Imports
 b. Dependent Variable: Domestic Consumption

Table 5.27 Coefficients^a

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|-------|----------------|-----------------------------|------------|---------------------------|--------|------|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -21158.774 | 14289.481 | | -1.481 | .153 |
| | Imports | .191 | .030 | .698 | 6.260 | .000 |
| | Dom.Production | .138 | .052 | .299 | 2.680 | .014 |

- a. Dependent Variable: Domestic Consumption

Result: Test was significant and the standardized beta coefficients proved that the change in domestic consumption was caused mainly by the change in the imports (0.698) than by the change in domestic production (0.299).

H 03: The Market Share of India in The International Market and The Domestic Consumption were Co-Integrated.

The international market share of a country in the international market was defined for the purpose of this study as the share of that country's export to the total export of all the countries in the particular commodity. In other words the domestic consumption in the processing countries was not considered in the international market share.

India was enjoying an unbeatable share in the international market over years, but later on her position looked shaky recently that her position was taken over by competing country Vietnam. This hypothesis was formulated on the basis that the increased domestic consumption had resulted the decrease in the market share of India in the international market.

Table 5.28 The Market Share of India in the International Market Vs Domestic consumption in India.

| Year | Market Share of India (%) | Domestic Consumption of India (MT) | Year | Market Share of India (%) | Domestic Consumption of India (MT) |
|------|---------------------------|------------------------------------|------|---------------------------|------------------------------------|
| 1987 | 49.87 | 33,102 | 2000 | 48.76 | 89,319 |
| 1988 | 40.68 | 36,783 | 2001 | 55.46 | 1,07,523 |
| 1989 | 51.95 | 32,557 | 2002 | 56.55 | 1,06,579 |
| 1990 | 60.11 | 41,452 | 2003 | 45.55 | 1,32,508 |
| 1991 | 59.09 | 41,449 | 2004 | 40.68 | 1,52,418 |
| 1992 | 52.99 | 48,661 | 2005 | 38.47 | 1,55,490 |
| 1993 | 64.24 | 52,788 | 2006 | 37.55 | 1,64,514 |
| 1994 | 73.24 | 68,020 | 2007 | 31.26 | 1,85,626 |
| 1995 | 65.92 | 49,995 | 2008 | 34.15 | 2,09,713 |
| 1996 | 48.87 | 82,850 | 2009 | 31.83 | 1,98,724 |
| 1997 | 55.69 | 82,063 | 2010 | 25.55 | 1,81,054 |
| 1998 | 62.19 | 73,639 | 2011 | 31.50 | 2,24,801 |
| 1999 | 63.44 | 63,962 | 2012 | 25.5 | 2,58,589 |

Source: DGCIS, CEPCI & Computed from Secondary data.

Analysis: The data on domestic consumption is already found to be non-stationary while testing the hypothesis H1. The non-stationarity of data on market share was tested with unit root analysis using E-views software.

Step.1 Unit root tests (Test for Stationarity)

Augmented Dickey-Fuller Tests

Table 5.29 Test Statistics - Null Hypothesis: Market Share of India has unit root

| Extraneous | t-statistics | Prob |
|------------------------|--------------|--------|
| Constant | 0.388072 | 0.9776 |
| Constant, Linear Trend | -3.315204 | 0.0887 |
| None | -1.245661 | 0.1890 |

Table 5.30 Test Statistics - Null Hypothesis: Domestic Consumption of India has a Unit Root

| Extraneous | t-statistics | Prob |
|------------------------|--------------|--------|
| Constant | 1.468342 | 0.9986 |
| Constant, Linear Trend | -2.022980 | 0.5600 |
| None | 2.820893 | 0.9979 |

Step 2. Johansen Cointegration Test

Table 5.31 Unrestricted Cointegration Rank Test (Trace)

| Hypothesized | | Trace | 0.05 | |
|--------------|------------|-----------|----------------|---------|
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.** |
| None * | 0.627748 | 20.53918 | 15.49471 | 0.0080 |
| At most 1 | 0.038033 | 0.775504 | 3.841466 | 0.3785 |

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

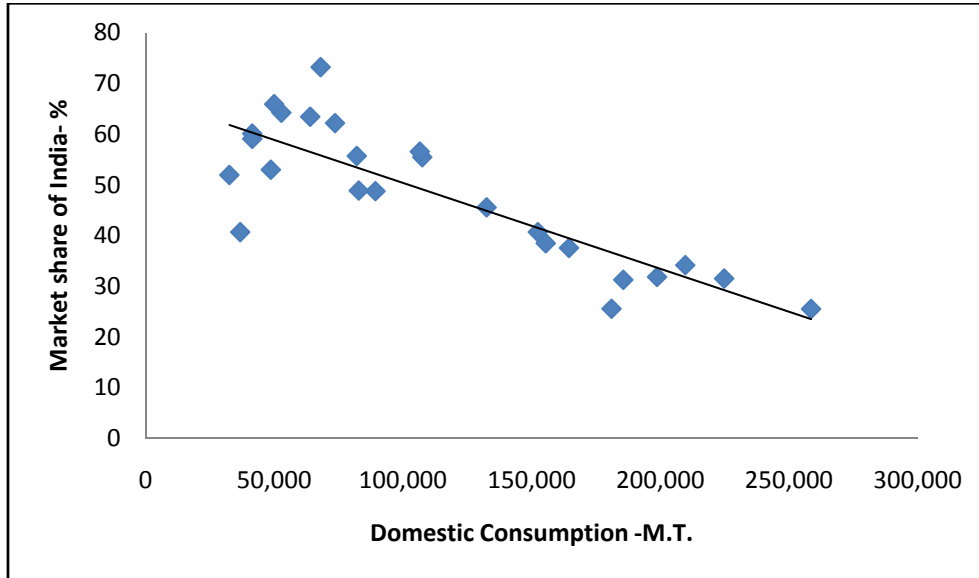
* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values.

Step 3. Pairwise Granger Causality Test

Table 5.32 Test Statistics – Granger Causality Test

| Null Hypothesis: | Obs | F-Statistic | Prob. |
|--|-----|-------------|--------|
| Market Share does not Granger Cause Domestic Consumption | 23 | 1.05043 | 0.3703 |
| Domestic Consumption does not Granger Cause Market Share | | 9.01436 | 0.0019 |

Step 4. Scatter Plot**Fig. 5.15 Domestic Consumption Vs Market Share**

The scatter plot depicted the trend of movement of the market share of India in the international market to the change in domestic consumption of cashew kernels in India. Here, the market share had gone down with the increase in the domestic consumption in India.

The data on both domestic consumption and market share of India were found to be non-stationary in all the three models considered. Thus the primary criterion was satisfied. The data was then tested with Johansen test for co-integration. The trace test rejected the null hypothesis and established co-integrations between the variables tested. Further, the Granger causality test established that the Domestic Consumption caused the change in the market share and not the other way. The scatter plot depicts that the market share had gone down with the increase in the domestic consumption in India.

Result: Failed to reject the null hypothesis and established that the increase in domestic consumption had caused the decline of market share of India in the international market.

H4: The domestic consumption in India and the export prices of cashew were co-integrated.

The cashew processed in India was consumed in both the overseas and the domestic market. The domestic prices are driven by the domestic demand. With the increased domestic demand and the resulting high prices, the produce of India got more diverted to domestic market. This had reduced the supply of cashew kernels in the international market. The international markets normally work on committed supplies and forward positions. India stood as a major supplier of cashew kernels in the international market, and the reduced supply positions from India as a result of increased domestic demand here had made the international market to pay high prices for the imports to meet their demand. The increased demand and the resulting high prices in India also prompted other processing countries to market their product here. Thus it was assumed that the increased domestic consumption had caused the export prices also to go up and hence the above hypothesis was formulated.

Analysis: Augmented Dickey-Fuller test was conducted to test for unit root in data pertaining to both domestic consumption and export prices. The failure to reject the unit root null hypothesis established the non-stationarity nature of the data. Having satisfied with this primary condition, the test for co-integration was done with Eagle-granger test using E-views software. The Eagle causality test was also done using the E-views software.

Table 5.33 Export Prices and Domestic Consumption in India

| Year | Export Prices (Rs/Kg) | Domestic Consumption-India (MT) | Year | Export Prices (Rs/Kg) | Domestic Consumption-India (MT) |
|------|-----------------------|---------------------------------|------|-----------------------|---------------------------------|
| 1987 | 80.954 | 33,102 | 2000 | 275.124 | 89,319 |
| 1988 | 78.022 | 36,783 | 2001 | 220.161 | 1,07,523 |
| 1989 | 84.107 | 32,557 | 2002 | 207.214 | 1,06,579 |
| 1990 | 86.816 | 41,452 | 2003 | 194.725 | 1,32,508 |
| 1991 | 139.605 | 41,449 | 2004 | 228.846 | 1,52,418 |
| 1992 | 140.876 | 48,661 | 2005 | 245.350 | 1,55,490 |
| 1993 | 160.670 | 52,788 | 2006 | 220.229 | 1,64,514 |
| 1994 | 165.544 | 68,020 | 2007 | 222.005 | 1,85,626 |
| 1995 | 178.885 | 49,995 | 2008 | 305.640 | 2,09,713 |
| 1996 | 242.699 | 82,850 | 2009 | 287.663 | 1,98,724 |
| 1997 | 208.672 | 82,063 | 2010 | 330.719 | 1,81,054 |
| 1998 | 224.324 | 73,639 | 2011 | 448.913 | 2,24,801 |
| 1999 | 274.086 | 63,962 | 2012 | 447.981 | 2,58,589 |

Source : *DGCI&S, Kolkatta, CEPCI*
Computed from secondary data.

Eagle-Granger co-integration test was conducted to test the hypothesis.

Step 1: testing for unit root in Domestic consumption

Augmented Dickey-Fuller test for Domestic consumption

including 7 lags of (1-L)consumption

sample size 17

unit-root null hypothesis: $a = 1$

test with constant

model: $(1-L)y = b_0 + (a-1)*y(-1) + \dots + e$

1st-order autocorrelation coeff. for e: 0.176

lagged differences: $F(7, 8) = 1.065 [0.4602]$

estimated value of $(a - 1)$: 0.154097

test statistic: $\tau_c(1) = 0.820597$

asymptotic p-value 0.9944

Step 2: testing for a unit root in Export prices

Augmented Dickey-Fuller test for Export Prices
 including 7 lags of (1-L)Export Prices
 sample size 17
 unit-root null hypothesis: $a = 1$

test with constant
 model: $(1-L)y = b_0 + (a-1)*y(-1) + \dots + e$
 1st-order autocorrelation coeff. for e: -0.064
 lagged differences: $F(7, 8) = 0.566 [0.7663]$
 estimated value of $(a - 1)$: 0.0501462
 test statistic: $\tau_c(1) = 0.126378$
 asymptotic p-value 0.9678

Step 3: Cointegrating regression

Cointegrating regression
 OLS, using observations 1905/06/10-1905/07/04 (T = 25)
 Dependent variable: consumption

Table 5.34 Test Statistics

| | coefficient | std. error | t-ratio | p-value |
|---------------|----------------------|-------------------|--------------------|----------------|
| Constant | $\hat{a}^{*}20928.9$ | 19898.9 | $\hat{a}^{*}1.052$ | 0.3038 |
| Export Prices | 598.749 | 81.8871 | 7.312 | 1.94e-07 *** |

| | | | |
|--------------------|-----------------------|--------------------|----------|
| Mean dependent var | 113643.1 | S.D. dependent var | 67520.14 |
| Sum squared resid | 3.29e+10 | S.E. of regression | 37827.82 |
| R-squared | 0.699204 | Adjusted R-squared | 0.686125 |
| Log-likelihood | $\hat{a}^{*}297.9512$ | Akaike criterion | 599.9024 |
| Schwarz criterion | 602.3401 | Hannan-Quinn | 600.5785 |
| rho | 0.783253 | Durbin-Watson | 0.432013 |

Step 4: testing for a unit root in uhat

Augmented Dickey-Fuller test for uhat

including 7 lags of (1-L)uhat

sample size 17

unit-root null hypothesis: $a = 1$

model: $(1-L)y = (a-1)*y(-1) + \dots + e$

1st-order autocorrelation coeff. for e: 0.026

lagged differences: $F(7, 9) = 1.051 [0.4610]$

estimated value of $(a - 1)$: -0.532139

test statistic: $\tau_c(2) = -1.62158$

asymptotic p-value 0.7134

There is evidence for a cointegrating relationship if:

- (a) The unit-root hypothesis is not rejected for the individual variables.
- (b) The unit-root hypothesis is rejected for the residuals (uhat) from the cointegrating regression.

Step 5. Scatter Plot

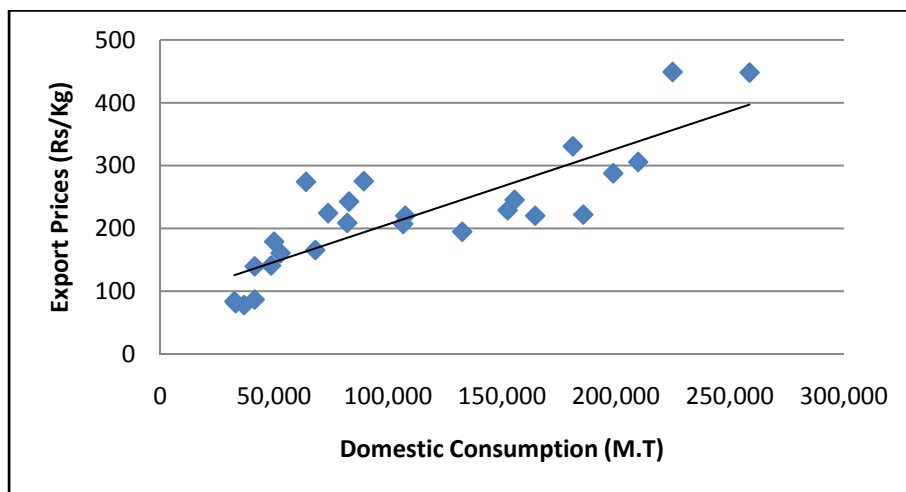


Fig. 5.16 Domestic Consumption Vs Export Prices

Step 6: The Granger Causality Test

Pairwise Granger Causality Tests

Sample: 1988 2012

Lags: 2

Table 5.35 Test Statistics – Granger Causality Test

| Null Hypothesis: | Obs | F-Statistic | Prob. |
|---|------------|--------------------|--------------|
| Export Prices does not Granger Cause Domestic Consumption | 23 | 0.88477 | 0.4300 |
| Domestic Consumption does not Granger Cause Export Prices | | 5.04648 | 0.0182 |

Failed to reject the null hypothesis in step 1 and step 2, as the ‘p’ values are 99.44 per cent and 96.78 per cent respectively. But in step 3, the unit root hypothesis is rejected as the ‘p’ value is extremely small as 1.94e-7. Thus it could be concluded that there existed evidence of co-integrating relationship between the domestic consumption and export prices of cashew kernels. The scatter plot indicated that the variables are positively co-integrated. The Granger Causality test rejected the null hypothesis that Domestic consumption did not Granger cause export prices establishing that the increased domestic consumption in India export prices also to go up.

Result : Working Hypothesis that the domestic consumption in India and the export prices of cashew were co-integrated was accepted.

5.10 Indian Cashew in the International Market.

The cashew processing worldwide had registered a growth during the period of this study. During the period of study, Vietnam had registered the highest growth rate of exports among all the countries/ regions. Apart from the hypothesis that the increased domestic consumption had resulted in the decrease in the market share of India in the International market, another hypothesis drawn was that the increased exports of cashew nuts in Vietnam had more adverse effect on the share of India than Brazil or other processing countries put together.

H5: The effect of Vietnam on the market share of India was more when compared with other competitors.

The effect of the processing of Vietnam, Brazil and other countries on the market share of India in the international market was tested with the hypothesis formulated. Since Vietnam made an entry into the international market only in 1991, the data of market share of India, Vietnam, Brazil and Others from 1991 only was considered for the analysis. The market share of India was calculated as the ratio of exports of cashew kernel from India to the overall exports of cashew kernels by all countries put together. However, the quantity of cashew kernel consumed domestically is not considered for arriving at the market share.

The Analysis was done with multiple regression with the market share of India in the International market as the dependent variable and the export volumes of Vietnam, India and other countries as the independent variable.

Table 5.36 Market Share of India Vs Export Quantities of Competing Countries

| Year | Indian market Share % | Vietnam Export Quantity (M.T) | Brazil Export Quantity (M.T) | Other Countries Export Quantity (M.T) |
|-------------|------------------------------|--------------------------------------|-------------------------------------|--|
| 1991 | 59.09 | 544 | 23,429 | 8,459 |
| 1992 | 52.99 | 340 | 37,740 | 7,983 |
| 1993 | 64.24 | 204 | 29,506 | 5,353 |
| 1994 | 73.24 | 771 | 22,703 | 5,125 |
| 1995 | 65.92 | 1,315 | 31,752 | 4,491 |
| 1996 | 48.87 | 26,105 | 36,220 | 9,934 |
| 1997 | 55.69 | 4,500 | 36,350 | 5,590 |
| 1998 | 62.19 | 6,500 | 31,880 | 6,584 |
| 1999 | 63.44 | 20,000 | 24,100 | 8,973 |
| 2000 | 48.76 | 40,734 | 33,588 | 11,503 |
| 2001 | 55.46 | 38,556 | 30,618 | 9,072 |
| 2002 | 56.55 | 47,628 | 30,618 | 4,536 |
| 2003 | 45.55 | 71,442 | 43,092 | 3,402 |
| 2004 | 40.68 | 86,379 | 47,442 | 41,911 |
| 2005 | 38.47 | 1,01,484 | 41,853 | 52,063 |
| 2006 | 37.55 | 1,13,755 | 43,235 | 42,926 |
| 2007 | 31.26 | 1,41,900 | 51,560 | 62,061 |
| 2008 | 34.15 | 1,37,696 | 35,410 | 64,753 |
| 2009 | 31.83 | 1,74,182 | 47,765 | 51,536 |
| 2010 | 25.55 | 1,82,897 | 42,117 | 1,04,107 |
| 2011 | 31.50 | 1,65,254 | 26,285 | 97,391 |
| 2012 | 25.50 | 2,07,533 | 25,344 | 64,783 |

Source : INC Statistics, Computed from secondary data

The analysis yielded the following result.

Table 5.37 Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .961 ^a | .923 | .910 | 4.27178 |

a. Predictors: (Constant), Others_Exp, Brazil_Exp, Vietnam_Exp

Table 5.38 ANOVA^b

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|----|-------------|--------|-------------------|
| 1 | Regression | 3943.377 | 3 | 1314.459 | 72.033 | .000 ^a |
| | Residual | 328.466 | 18 | 18.248 | | |
| | Total | 4271.844 | 21 | | | |

a. Predictors: (Constant), Others_Exp, Brazil_Exp, Vietnam_Exp

b. Dependent Variable: market Share of India

Table 5.39 Coefficients^a

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|-------|-------------|-----------------------------|------------|---------------------------|--------|------|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 75.436 | 4.205 | | 17.939 | .000 |
| | Vietnam_Exp | .000 | .000 | -.824 | -7.927 | .000 |
| | Brazil_Exp | .000 | .000 | -.220 | -3.176 | .005 |
| | Others_Exp | -5.955E-5 | .000 | -.075 | -.701 | .492 |

a. Dependent Variable: market Share of India

The regression model yielded the R^2 value of 92.3 per cent and the P values were negligibly small in the case of Vietnam and Brazil, while the same was 49.2 per cent in the case of other countries. Hence the standardized coefficients in the case of Vietnam and Brazil could be relied on, which implied that the export of every metric ton of cashew kernel from Vietnam

reduced the market share of India by 0.824 per cent, while the export of every metric ton of cashew kernel from Brazil reduced the share of market share of India by 0.22 per cent. Thus it could be concluded that the decline in market share of India was more due to increase in exports of Vietnam than Brazil, while the effect of other countries were insignificant.

Result: The working hypothesis that the effect of Vietnam on the market share of India was more compared to Brazil was accepted, while the same on other countries could not be established.

H6: The international Market share of India was co-integrated to her global supply share of raw nuts

The global supply share of raw nuts was defined for the purpose of this study as the ratio of the total supply of raw nuts (imports and domestic crop) in the country to the global production of cashew kernels. India very much depended on the imports of raw cashew nuts to cater the processing activities. With the increase in processing capacity in countries like Vietnam, they started importing raw cashew nuts from other processing countries that otherwise were depending on India only to sell their products. Further, some producing countries like Mozambique, Nigeria, Benin, Ghana, Ivory Coast etc., started processing in a small way and that also had reduced the share of their exports of cashew in the raw nut form. Such countries had imposed restrictions on the export of raw nuts. Though the production of raw cashew nuts in India had gone up slightly high but that was not sufficient to cater the needs of the processing. This hypothesis was formulated on the argument that had India received more shares from the global production of raw nuts, she could have produced more cashew kernels to overcome the domestic demand and maintained her market share in the international market.

Table 5.40 International Market Share of India Vs Global Supply Share

| Year | International Market Share% | Global Supply Share % | Year | International Market Share% | Global Processing Share % |
|------|-----------------------------|-----------------------|------|-----------------------------|---------------------------|
| 1987 | 49.87 | 65.23 | 2000 | 48.76 | 66.71 |
| 1988 | 40.68 | 59.40 | 2001 | 55.46 | 70.41 |
| 1989 | 51.95 | 65.25 | 2002 | 56.55 | 67.09 |
| 1990 | 60.11 | 73.60 | 2003 | 45.55 | 66.00 |
| 1991 | 59.09 | 73.13 | 2004 | 40.68 | 60.45 |
| 1992 | 52.99 | 68.59 | 2005 | 38.47 | 57.70 |
| 1993 | 64.24 | 76.75 | 2006 | 37.55 | 58.31 |
| 1994 | 73.24 | 83.65 | 2007 | 31.26 | 53.87 |
| 1995 | 65.92 | 76.55 | 2008 | 34.15 | 56.23 |
| 1996 | 48.87 | 67.77 | 2009 | 31.83 | 53.62 |
| 1997 | 55.69 | 67.88 | 2010 | 25.55 | 50.50 |
| 1998 | 62.19 | 69.44 | 2011 | 31.50 | 57.04 |
| 1999 | 63.44 | 71.87 | 2012 | 25.50 | 54.08 |

Source: Computed from secondary sources

Johansen's test was conducted to test the association between the variables to test whether the global share of supply of raw nuts to India had any effect on the market share of India in the international market.

Unit root tests (Test for Stationarity)

Augmented Dickey-Fuller Tests

Table 5.41 Test Statistics of Null Hypothesis – International arketshare of India has a unit root

| Extraneous | t-statistics | Prob |
|------------------------|--------------|--------|
| Constant | 0.388072 | 0.9776 |
| Constant, Linear Trend | -3.315204 | 0.0887 |
| None | -1.245661 | 0.1890 |

Table 5.42 Test Statistics of Null Hypothesis - Global Production share of India has unit root

| Extraneous | t-statistics | Prob |
|------------------------|---------------------|-------------|
| Constant | -1.178117 | 0.6665 |
| Constant, Linear Trend | -3.812677 | 0.0344 |
| None | -0.365700 | 0.5421 |

All the three models of the variables under analysis were found to be non stationary, and hence Johansons test was applied to test the null hypothesis that there existed no longstanding association between the Global share of supply of raw nuts and the international market share of India, which yielded the following test values.

Table 5.43 Unrestricted Cointegration Rank Test (Trace)

| Hypothesized | | Trace | 0.05 | |
|---------------------|-------------------|------------------|-----------------------|----------------|
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.** |
| None | 0.345950 | 10.58720 | 15.49471 | 0.2382 |
| At most 1 | 0.035110 | 0.822043 | 3.841466 | 0.3646 |

Table 5.44 Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

| Hypothesized | | Max-Eigen | 0.05 | |
|---------------------|-------------------|------------------|-----------------------|----------------|
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.** |
| None | 0.345950 | 9.765153 | 14.26460 | 0.2278 |
| At most 1 | 0.035110 | 0.822043 | 3.841466 | 0.3646 |

Both tests failed to reject the null hypothesis which concluded that there was no long term association between the global share of supply of raw cashew nuts to India and the market share of India in the international market.

Result: Working hypothesis rejected

H7: Indian cashew enjoyed a premium price in the international market compared to her competitors.

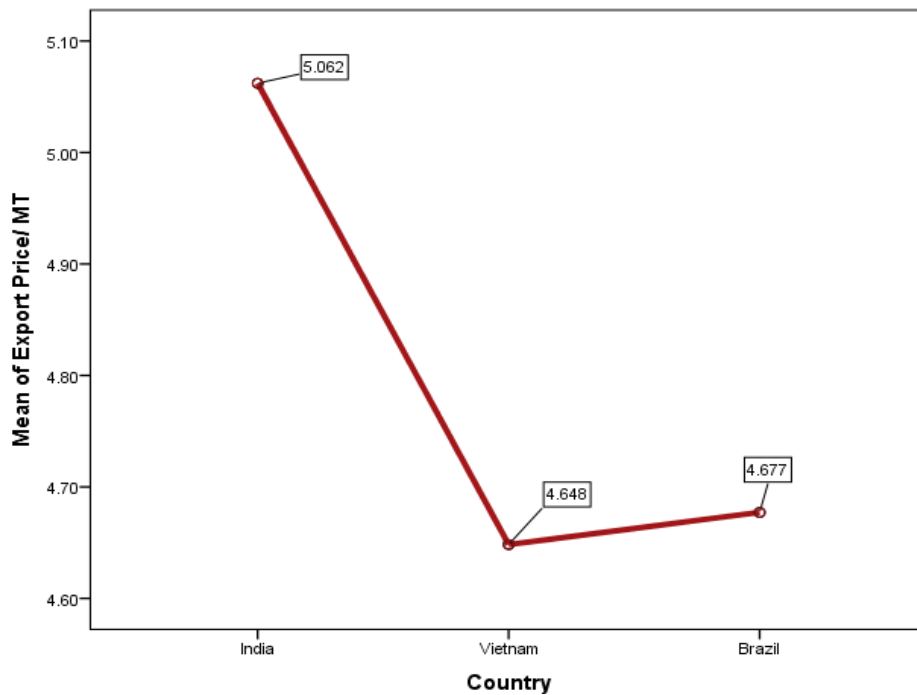
India was the first country to hit the world market with cashew kernels way back in 1920. Later on the 1940's. Brazil entered the world market. Vietnam entered the world market in 1991 only. Earlier, India was enjoying a monopoly in the international market. She used to get a price for her product at par with her production costs. But with more and more countries entering the market, the competition began that reflected on the unit average prices realized by different countries in the competition. The price of the product is assumed to be a function of quality among other variables.

India used the drum roasting technology, where as brazil, Vietnam and others were using either steam roasting or oil bath roasting technology. The drum roasted cashew was more acceptable in the market for their taste and long shelf life. The overall quality of drum roasted cashew was considered to be better compared to other methods of processing. Coupled with many other factors in the trade like rapport with stake holders, quantity of supply and contractual obligations, the pricing factors were different and accordingly the prices also varied among competing countries. The general concept was that due to the drum roasting methods adopted in processing coupled with other factors India always used to get a premium price in the market. This concept was formulated into a hypothesis and tested for acceptance or rejection. Since, Vietnam came into picture from 1990 onwards, the data from 1990 onwards only was considered for the analysis.

Table 5.45 Average Export Prices of Cashew Kernels

| Year | Price /M.T in US Dollars | | | Year | Price /M.T in US Dollars | | |
|------|--------------------------|---------|--------|------|--------------------------|---------|--------|
| | India | Vietnam | Brazil | | India | Vietnam | Brazil |
| 1990 | 4,891 | 3,501 | 3,741 | 2002 | 3,453 | 3,734 | 3,491 |
| 1991 | 5,697 | 3,865 | 4,589 | 2003 | 3,849 | 3,885 | 3,458 |
| 1992 | 4,925 | 3,637 | 3,547 | 2004 | 4,427 | 4,904 | 3,929 |
| 1993 | 4,774 | 3,902 | 3,845 | 2005 | 4,747 | 4,904 | 4,471 |
| 1994 | 5,164 | 4,742 | 4,732 | 2006 | 4,503 | 3,967 | 4,368 |
| 1995 | 5,257 | 4,841 | 4,619 | 2007 | 4,756 | 4,268 | 5,537 |
| 1996 | 5,295 | 4,753 | 4,624 | 2008 | 5,436 | 5,492 | 4,851 |
| 1997 | 4,936 | 4,251 | 4,317 | 2009 | 4,506 | 4,734 | 5,443 |
| 1998 | 5,053 | 4,457 | 4,472 | 2010 | 4,964 | 4,631 | 4,957 |
| 1999 | 6,185 | 5,885 | 5,897 | 2011 | 6,669 | 6,297 | 6,618 |
| 2000 | 5,352 | 4,892 | 4,914 | 2012 | 7,516 | 7,270 | 7,330 |
| 2001 | 4,074 | 4,099 | 3,824 | | | | |

Source: The Public ledger, U.K.



Source: The Public ledger, U.K.

Fig. 5.17 Box Mean Export Prices

Table 5.46 Descriptives

| Export Price/ MT | | | | | |
|------------------|----|--------|----------------|---------|---------|
| | N | Mean | Std. Deviation | Minimum | Maximum |
| India | 23 | 5.0621 | .87921 | 3.45 | 7.52 |
| Vietnam | 23 | 4.6483 | .90756 | 3.50 | 7.27 |
| Brazil | 23 | 4.6771 | .98019 | 3.46 | 7.33 |
| Total | 69 | 4.7959 | .92926 | 3.45 | 7.52 |

Table 5.47 ANOVA

| Export Price/ MT | | | | | |
|------------------|----------------|----|-------------|-------|------|
| | Sum of Squares | df | Mean Square | F | Sig. |
| Between Groups | 2.456 | 2 | 1.228 | 1.440 | .244 |
| Within Groups | 56.264 | 66 | .852 | | |
| Total | 58.719 | 68 | | | |

Mean price high for India compared to others. Hypothesis test result showed that the test was not significant ($p > 0.05$): Failed to reject the null hypothesis. The sample did not provide enough evidence to support the claim that Indian cashew enjoyed a premium price in the international market than her competitors.

Result: Failed to reject the null hypothesis. Hence working hypothesis rejected.

5.11 Domestic Factors Affecting the Market Share of India

One of the major drives for export of goods and service from any country was the export incentives offered by the respective Governments. Certain incentives provide direct monetary benefits where as some others

provide indirect monetary benefits and supports. These incentives are introduced, withdrawn and modified from time to time depending on the then policies of the Government. The exports incentives that was introduced/ withdrawn / modified as applicable to the cashew exports during the period of the study were (1) VKUGY, (2) Interest Subvention and (3) 80 HCC benefits.

VKGUY stands for 'Vishesh Krishi Gram Udyog Yojana', and this scheme was introduced with an aim to compensate high transport cost related to exports and to promote exports of Agricultural produce, Minor Forest products, Gram Udyog products etc. and by virtue of this scheme, the exporters are eligible to get transferable duty credit of 5 per cent of the FOB value of exports and an additional benefit of another 5 per cent for certain type of exports by status holders.

Interest subvention refers to the interest refund provided by the Government on the export credit facilities extended by the Banks. These refunds are paid directly to the Banks and the interest less subvention only was charged on the exporters. Current rate of subvention was 3 per cent.

80 HCC under income tax was provided to exporters by which the exporters were exempted from income tax on earnings from exports. This facility was withdrawn in a phased manner from 2001 onwards.

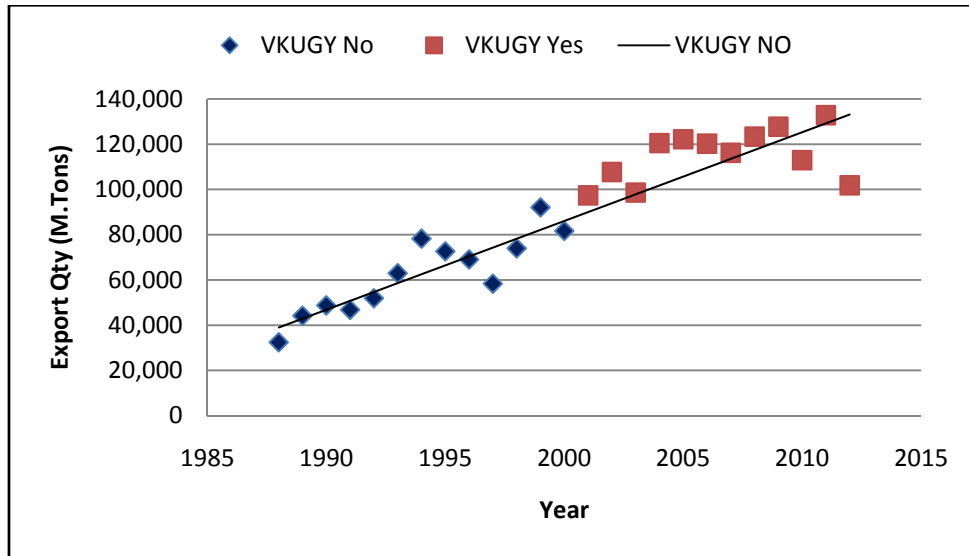
H 8: Government policies had significant effects on export of cashew kernels from India

The hypothesis that these policy changes have effects on the exports of cashew from India is tested with secondary data available on exports quantities of cashew kernels from India.

Table 5.48 Export Incentives Available to Cashew Exports from India.

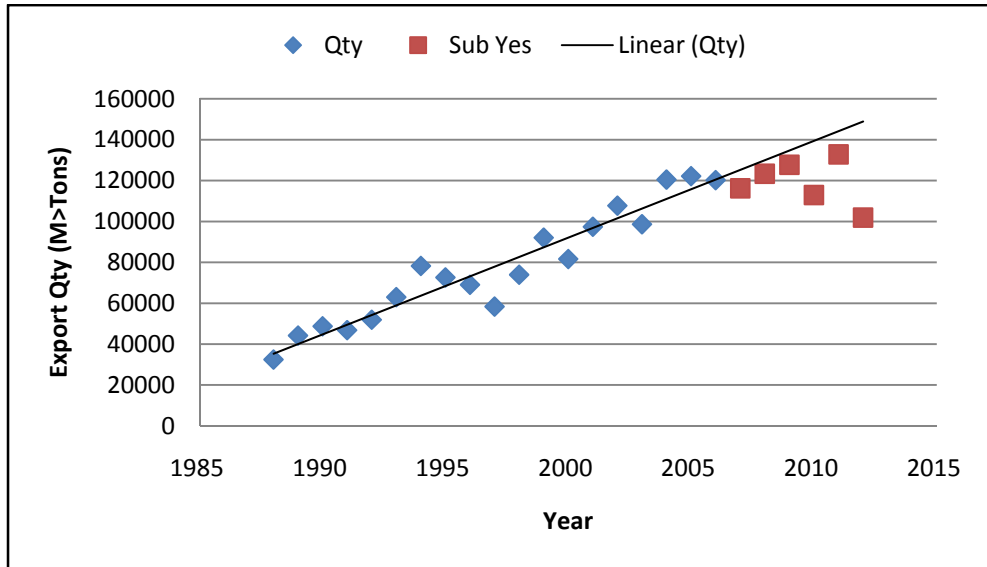
| Year | Exports (M.T.) | Incentives | | | Year | Exports (M.T.) | Incentives | | |
|------|----------------|------------|---------------------|------------|------|----------------|------------|----------------------|------------|
| | | VKUGY | Interest Subvention | Sec 80 HCC | | | VKUGY | Interest Subvention. | Sec 80 HCC |
| 1988 | 32,455 | No | No | Yes | 2001 | 97,411 | yes | No | No |
| 1989 | 44,197 | No | No | Yes | 2002 | 1,07,730 | yes | No | No |
| 1990 | 48,764 | No | No | Yes | 2003 | 98,658 | yes | No | No |
| 1991 | 46,841 | No | No | Yes | 2004 | 1,20,493 | yes | No | No |
| 1992 | 51,929 | No | No | Yes | 2005 | 1,22,192 | yes | No | No |
| 1993 | 62,984 | No | No | Yes | 2006 | 1,20,228 | yes | No | No |
| 1994 | 78,260 | No | No | Yes | 2007 | 1,16,205 | yes | yes | No |
| 1995 | 72,640 | No | No | Yes | 2008 | 1,23,369 | yes | yes | No |
| 1996 | 69,055 | No | No | Yes | 2009 | 1,27,721 | yes | yes | No |
| 1997 | 58,362 | No | No | Yes | 2010 | 1,12,951 | yes | yes | No |
| 1998 | 73,960 | No | No | Yes | 2011 | 1,32,845 | yes | yes | No |
| 1999 | 92,084 | No | No | Yes | 2012 | 1,01,866 | yes | yes | No |
| 2000 | 81,661 | No | No | Yes | | | | | |

Source: miscellaneous



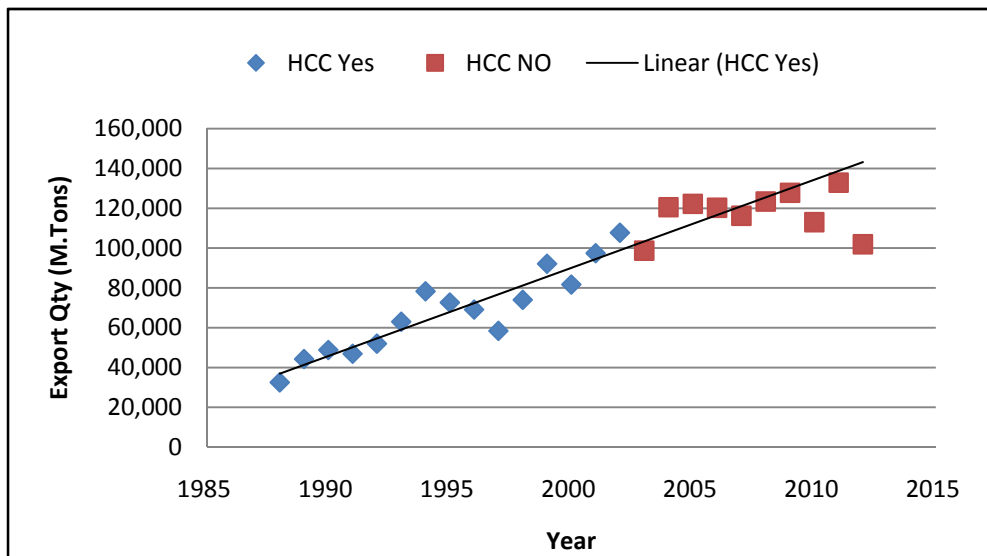
Source: miscellaneous

Fig. 5.18 Scatter Plot – VKUGY



Source: miscellaneous

Fig. 5.19 Scatter Plot- Interest Submersion



Source: miscellaneous

Fig. 5.20 Scatter Plot- 80 HCC Benefit

Multiple Regression analysis was applied to find whether export initiatives VKUGY, interest subvention and 80HCC (independent variables) given during

the study period (1988-2012) have significantly affected the export performance (Exports in M.T—dependent variable). The independent variables VKUGY, Interest subvention and 80HCC were coded as 0 during the periods when incentives were not given and as 1 when the periods the incentives were given).

Table 5.49 Summary Output

| <i>Regression Statistics</i> | |
|------------------------------|----------|
| Multiple R | 0.888447 |
| R Square | 0.789338 |
| Adjusted R Square | 0.760611 |
| Standard Error | 15389.91 |
| Observations | 26 |

Table 5.50 ANOVA

| | <i>df</i> | <i>SS</i> | <i>MS</i> | <i>F</i> | <i>Significance F</i> |
|------------|---------------------|-----------------------|---------------|----------------|-----------------------|
| Regression | 3 | 1.95E+10 | 6.51E+09 | 27.47754 | 1.26E-07 |
| Residual | 22 | 5.21E+09 | 2.37E+08 | | |
| Total | 25 | 2.47E+10 | | | |
| | <i>Coefficients</i> | <i>Standard Error</i> | <i>t Stat</i> | <i>P-value</i> | <i>Lower 95%</i> |
| Intercept | 73577.11 | 13948.29 | 5.274991 | 2.71E-05 | 44650.12 |
| VKUGY | 41815.64 | 11633.68 | 3.594361 | 0.001613 | 17688.87 |
| Int | 3766.75 | 9934.144 | 0.379172 | 0.708195 | -16835.4 |
| HCC | -12822.3 | 13328.05 | -0.96205 | 0.34648 | -40462.9 |

The regression analysis resulted in a p-value of 0.16 per cent for VKUGY, where as the p-value for Interest submersion and 80HCC were 70.81 per cent and 34.64 per cent. This implied that the effect of VKUGY was significant and the exports had gone up by an average of 41815.64 M.T. during the period when VKUGY was in existence as evidenced by the coefficient.. The effect of Interest Submersion and 80HCC were both insignificant.

Result: Working hypothesis accepted for the effect of VKUGY and rejected for the effect of Interest Submersion and 80HCC.

H 9: The exchange rate fluctuations had influenced the exports of cashew kernel from India

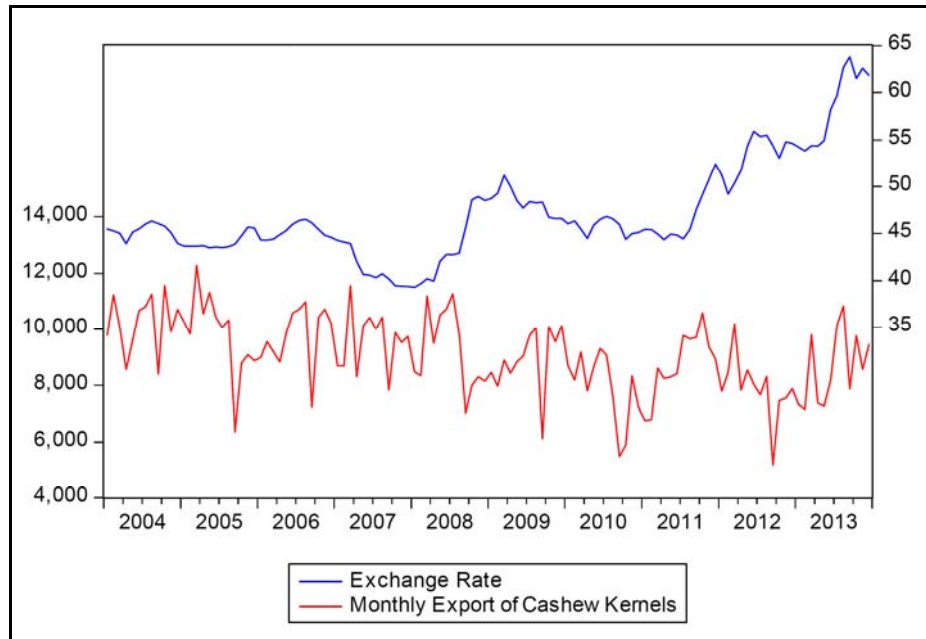
Exchange rate fluctuation of the domestic currency plays an important role in the decision to export the product, as a weak domestic currency would lead to more unit price when converted in domestic currency compared to domestic market. Accordingly the exports finds a boost and the share of domestic production may go up. The exchange rate fluctuates very often, and the average monthly exchange rate was analysed against the monthly of exports from India, as an analysis on yearly basis may not portrait the true relationship due to the fact that the effects on short term spikes in the exchange rates gets nullified when analysed with averages over long period. The monthly export quantity of cashew kernels for last 10 years was compared to the monthly average export rates of Indian Rupees to US Dollars. Johansen-cointegration technique was adopted to check the co-integration.

The peculiarity of cashew trade in India was that India was depending on imports of raw nuts for processing and almost 55 per cent of the quantity of raw nuts consumed for processing was sourced out of imports. Further, the domestic price levels were always high compared to international market on common grades. It was also opinioned by the experts that the fluctuations in exchange rates mostly have an effect on the quantity sold on forward basis. But sometimes, the effect got nullified when the raw material was also bought on forward basis. This arguments were opposed by some other exports who were of the opinion that almost half of the raw material was sources from domestic supply and hence the exchange rate fluctuation would definitely have some effects on the export of kernels from the country.

Table 5.51 Monthly Exchange Rate Vs. Export from India

| Month | Ex.Rate | Qty (Mt) | Month | Ex.Rate | Qty | Month | Ex.Rate | Qty |
|--------|----------|----------|--------|----------|-------|--------|---------|-------|
| Jan-04 | 45.43968 | 9787 | May-07 | 40.67006 | 10131 | Sep-10 | 45.9336 | 5492 |
| Feb-04 | 45.24561 | 11248 | Jun-07 | 40.58964 | 10433 | Oct-10 | 44.358 | 5897 |
| Mar-04 | 44.98088 | 10075 | Jul-07 | 40.34495 | 10014 | Nov-10 | 44.965 | 8333 |
| Apr-04 | 43.88041 | 8561 | Aug-07 | 40.7409 | 10441 | Dec-10 | 45.073 | 7230 |
| May-04 | 45.12132 | 9616 | Sep-07 | 40.20535 | 7826 | Jan-11 | 45.4072 | 6757 |
| Jun-04 | 45.47002 | 10679 | Oct-07 | 39.46681 | 9887 | Feb-11 | 45.3862 | 6798 |
| Jul-04 | 45.99405 | 10821 | Nov-07 | 39.41642 | 9527 | Mar-11 | 44.9216 | 8608 |
| Aug-04 | 46.29626 | 11257 | Dec-07 | 39.38791 | 9740 | Apr-11 | 44.3099 | 8246 |
| Sep-04 | 46.03701 | 8402 | Jan-08 | 39.28473 | 8483 | May-11 | 44.8963 | 8300 |
| Oct-04 | 45.74026 | 11558 | Feb-08 | 39.67987 | 8344 | Jun-11 | 44.8045 | 8417 |
| Nov-04 | 45.05154 | 9909 | Mar-08 | 40.22675 | 11201 | Jul-11 | 44.3916 | 9781 |
| Dec-04 | 43.92858 | 10719 | Apr-08 | 39.95694 | 9493 | Aug-11 | 45.367 | 9656 |
| Jan-05 | 43.63702 | 10291 | May-08 | 42.05803 | 10516 | Sep-11 | 47.5165 | 9713 |
| Feb-05 | 43.60894 | 9827 | Jun-08 | 42.79860 | 10734 | Oct-11 | 49.1486 | 10608 |
| Mar-05 | 43.62139 | 12284 | Jul-08 | 42.77809 | 11276 | Nov-11 | 50.7056 | 9377 |
| Apr-05 | 43.67983 | 10556 | Aug-08 | 42.94015 | 9797 | Dec-11 | 52.4366 | 8939 |
| May-05 | 43.44052 | 11326 | Sep-08 | 45.59563 | 7028 | Jan-12 | 51.1994 | 7800 |
| Jun-05 | 43.54075 | 10444 | Oct-08 | 48.57309 | 8003 | Feb-12 | 49.1578 | 8454 |
| Jul-05 | 43.48049 | 10076 | Nov-08 | 48.90147 | 8308 | Mar-12 | 50.3417 | 10199 |
| Aug-05 | 43.56027 | 10337 | Dec-08 | 48.50335 | 8148 | Apr-12 | 51.7047 | 7824 |
| Sep-05 | 43.84841 | 6373 | Jan-09 | 48.71137 | 8460 | May-12 | 54.3352 | 8547 |
| Oct-05 | 44.72873 | 8796 | Feb-09 | 49.26321 | 7968 | Jun-12 | 55.9357 | 8038 |
| Nov-05 | 45.65749 | 9097 | Mar-09 | 51.18478 | 8898 | Jul-12 | 55.3785 | 7660 |
| Dec-05 | 45.56413 | 8883 | Apr-09 | 49.96075 | 8425 | Aug-12 | 55.5341 | 8316 |
| Jan-06 | 44.26824 | 8991 | May-09 | 48.49682 | 8835 | Sep-12 | 54.4154 | 5191 |
| Feb-06 | 44.25121 | 9559 | Jun-09 | 47.70116 | 9035 | Oct-12 | 53.0624 | 7464 |
| Mar-06 | 44.3602 | 9189 | Jul-09 | 48.3825 | 9789 | Nov-12 | 54.8236 | 7549 |
| Apr-06 | 44.85304 | 8827 | Aug-09 | 48.24914 | 10052 | Dec-12 | 54.6524 | 7893 |
| May-06 | 45.26719 | 9858 | Sep-09 | 48.31328 | 6129 | Jan-13 | 54.2447 | 7320 |
| Jun-06 | 45.95357 | 10588 | Oct-09 | 46.69925 | 10101 | Feb-13 | 53.8474 | 7150 |
| Jul-06 | 46.37613 | 10723 | Nov-09 | 46.5612 | 9550 | Mar-13 | 54.4053 | 9804 |
| Aug-06 | 46.48888 | 10987 | Dec-09 | 46.56873 | 10136 | Apr-13 | 54.3663 | 7379 |
| Sep-06 | 46.10073 | 7228 | Jan-10 | 46.00664 | 8694 | May-13 | 54.9552 | 7258 |
| Oct-06 | 45.40381 | 10432 | Feb-10 | 46.3173 | 8182 | Jun-13 | 58.2713 | 8188 |
| Nov-06 | 44.77729 | 10723 | Mar-10 | 45.44903 | 9191 | Jul-13 | 59.7516 | 10147 |
| Dec-06 | 44.55911 | 10222 | Apr-10 | 44.45229 | 7802 | Aug-13 | 62.6958 | 10844 |
| Jan-07 | 44.23944 | 8700 | May-10 | 45.84117 | 8646 | Sep-13 | 63.7968 | 7875 |
| Feb-07 | 44.06607 | 8690 | Jun-10 | 46.4759 | 9314 | Oct-13 | 61.511 | 9763 |
| Mar-07 | 43.88953 | 11564 | Jul-10 | 46.78516 | 9076 | Nov-13 | 62.5923 | 8567 |
| Apr-07 | 42.04229 | 8312 | Aug-10 | 46.5335 | 7625 | Dec-13 | 61.8379 | 9447 |

Source: DGCI&S, Kolkaata, Various Customs Houses & ICEGATE, World Bank Statistics



Note: Exchange rates plotted in the secondary axis.

Source: DGCI&S, Kolkaata, Various Customs Houses & ICEGATE, World Bank Statistics

Fig 5.21 Monthly Exchange Rates and Exports from India

Unit root tests (Test for Stationarity)

Augmented Dickey-Fuller Tests

Table 5.52 Test Statistics for Null Hypothesis - Monthly Exports from India has a Unit Root

| Extraneous | t-statistics | Prob |
|------------------------|--------------|--------|
| Constant | -2.498179 | 0.1186 |
| Constant, Linear Trend | -3.514347 | 0.0526 |
| None | -0.495872 | 0.4993 |

Table 5.53 Test Hypothesis for Null Hypothesis - Monthly Exchange Rate (USD-INR) has Unit Root

| Extraneous | t-statistics | Prob |
|------------------------|--------------|--------|
| Constant | -0.296160 | 0.9210 |
| Constant, Linear Trend | -1.690002 | 0.7498 |
| None | 0.983582 | 0.9134 |

In both the cases, the absolute value of the t-statistics was less than the critical value value at 5 per cent levels and p-values more than 5 per cent,. Hence failed to reject the null hypothesis. Hence the data was found to be non-stationary. Engle and Granger pointed out that a linear combination of two or more non-stationary series may be stationary. Having satisfied with the primary conditions, Johansons test for cointegration was conducted.

Table 5.54 Unrestricted Cointegration Rank Test (Trace)

| Hypothesized | | Trace | 0.05 | |
|--------------|------------|-----------|----------------|---------|
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.** |
| None | 0.049143 | 5.823990 | 15.49471 | 0.7162 |
| At most 1 | 0.000252 | 0.029016 | 3.841466 | 0.8647 |

Trace test indicates no cointegration at the 0.05 level

Table 5.55 Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

| Hypothesized | | Max-Eigen | 0.05 | |
|--------------|------------|-----------|----------------|---------|
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.** |
| None | 0.049143 | 5.794974 | 14.26460 | 0.6397 |
| At most 1 | 0.000252 | 0.029016 | 3.841466 | 0.8647 |

Max-eigenvalue test indicates no cointegration at the 0.05 level

Result: Since the P values were more than 0.05, the test failed to reject the null hypothesis. Thus it was concluded that the exchange rate of Indian rupee to US Dollars had no effect on the export volumes of cashew kernels from India

5.12 Characteristics of International Market of Cashew Nut

H 10: Demand drives caused the change in international market price of cashew kernels than the supply positions of raw cashew nuts

Cashew, being an agricultural product, the supply position depends on a various factors including climatic conditions. The demand drivers also

caused the consumption of cashew kernels to fluctuate. The common concept was that when supply positions comes down, the price of the kernels may go up and vice-versa. Similarly the price of kernels was expected to go up with the demand and vice-versa. The economic theory of supply and demand was tested in the global cashew trade that the change in supply and demand caused the change in the price. Further the hypothesis that the demand drive had more effects in prices than the supply. The data pertaining to world supply of raw cashew nuts, the world consumption of cashew kernels and the cashew kernel prices in the international market were analysed.

Table 5.56 Supply, Demand and Average Market Price of Cashew kernels

| Year | supply (M.T.) | Demand (M.T.) | Avg. Price (USD/M.T.) | Year | supply (M.T.) | Demand (M.T.) | Avg. Price (USD/M.T.) |
|------|---------------|---------------|-----------------------|------|---------------|---------------|-----------------------|
| 1987 | 5,04,470 | 79,809 | 6,952.82 | 2000 | 13,84,155 | 2,56,291 | 6,127.07 |
| 1988 | 5,98,083 | 86,027 | 5,611.43 | 2001 | 13,36,873 | 2,91,063 | 4,644.39 |
| 1989 | 6,43,835 | 88,506 | 5,183.88 | 2002 | 14,55,390 | 3,19,441 | 4,277.39 |
| 1990 | 6,00,232 | 86,011 | 4,976.52 | 2003 | 16,39,713 | 3,50,230 | 4,180.13 |
| 1991 | 7,49,139 | 1,20,722 | 5,754.56 | 2004 | 18,42,191 | 4,37,821 | 5,048.09 |
| 1992 | 7,37,400 | 1,46,653 | 5,433.44 | 2005 | 20,14,381 | 4,69,893 | 5,561.89 |
| 1993 | 7,60,674 | 1,50,597 | 5,264.62 | 2006 | 22,10,147 | 4,86,503 | 4,859.08 |
| 1994 | 8,54,506 | 1,74,403 | 5,275.63 | 2007 | 21,96,353 | 5,18,754 | 5,367.38 |
| 1995 | 9,42,091 | 1,60,193 | 5,517.85 | 2008 | 23,49,237 | 5,52,103 | 7,022.55 |
| 1996 | 11,03,511 | 2,24,164 | 6,850.06 | 2009 | 22,06,094 | 5,65,361 | 5,941.73 |
| 1997 | 11,13,194 | 2,06,865 | 5,756.40 | 2010 | 20,69,385 | 5,33,832 | 7,229.90 |
| 1998 | 10,18,174 | 2,12,563 | 5,435.27 | 2011 | 23,66,640 | 5,92,090 | 9,609.90 |
| 1999 | 12,61,573 | 2,17,119 | 6,369.29 | 2012 | 21,64,410 | 6,28,430 | 8,380.45 |

Source: CEPCI, UN Trade Statistics, Public Ledger, UK

Table 5.57 Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .487 ^a | .237 | .204 | 1095.96412 |

a. Predictors: (Constant), Demand (M.T.)

Table 5.58 ANOVA^a

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|----|-------------|-------|-------------------|
| 1 | Regression | 8600642.837 | 1 | 8600642.837 | 7.160 | .013 ^b |
| | Residual | 27626159.031 | 23 | 1201137.349 | | |
| | Total | 36226801.868 | 24 | | | |

a. Dependent Variable: Price/M.T.

b. Predictors: (Constant), Demand (M.T.)

Table 5.59 Coefficients^a

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|-------|-------------|-----------------------------|------------|---------------------------|--------|------|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 4787.798 | 445.995 | | 10.735 | .000 |
| | Demand (MT) | .003 | .001 | .487 | 2.676 | .013 |

a. Dependent Variable: Price/M.T.

Table 5.60 Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .431 ^a | .185 | .150 | 1132.65576 |

a. Predictors: (Constant), Supply (M.T.)

Table 5.61 ANOVA^a

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|----|-------------|-------|-------------------|
| 1 | Regression | 6719893.088 | 1 | 6719893.088 | 5.238 | .032 ^b |
| | Residual | 29506908.779 | 23 | 1282909.077 | | |
| | Total | 36226801.868 | 24 | | | |

a. Dependent Variable: Price/M.T.

b. Predictors: (Constant), Supply (M.T.)

Table 5.62 Coefficients^a

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | |
|-------|-----------------------------|------------|---------------------------|------|-------|------|
| | B | Std. Error | Beta | | | |
| 1 | (Constant) | 4622.496 | 573.035 | | 8.067 | .000 |
| | Supply (M.T.) | .001 | .000 | .431 | 2.289 | .032 |

a. Dependent Variable: Price/M.T.

Multiple regressions were not possible because of multicollinearity issues. Simple linear Regression was significant in both the cases. Standardised coefficient was greater for demand (0.487) when compared to supply (0.431). Both were significant ($p < 0.05$). Hence Prices were more influenced by the demand than supply positions.

Result: The working hypothesis was accepted.

5.13 Conclusion

The world cashew industry had undergone a real transition ever since its inception as a commodity for international trade in 1920. The data related to production and processing of raw cashew and consumption of cashew kernels over the period from 1988 to 2012 was analysed for the purpose of the study. The secondary data available with the Cashew Export Promotion Council of India, Director General of Customs Statistics and Intelligence, icegate- the official website of the Indian customs, INC (International Nut Council, Spain), The London Public ledger, UN trade statistics, and various other trade journals and publications were relied on for the analysis. It was observed that the world production of raw cashew nut had grown up exponentially at 6.3 per cent during the period, where as the world processing registered a growth rate of 8.1 per cent and the consumption also at 8.7 per cent

levels. The market share of India had shown a deep decrease of 3 per cent. India registered a deep decline of 9 per cent on the revealed comparative advantage against 20.2 per cent growth in Vietnam.

The major transition in India during this period was her emergence as the largest consumer of cashew kernels in the world with 38.61 per cent share in the year 2012. Out of the total cashew processed in India, the export share had dropped to 33 per cent. Certain hypothesis formulated on the cause and effect of increased domestic consumption, the reason for decline in market share in the international market, the characteristics of Indian cashew in the International market, and the nature of international market of cashew kernels were tested using appropriate statistical tools. Thus an analysis on the transition of world cashew Industry with specific reference to the Indian transition was conducted and conclusions drawn. This could draw a clear picture of the world cashew industry and the transition of the industry worldwide.

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**INDIAN CASHEW INDUSTRY- THE
EXPORTER'S PERSPECTIVE**
(AN INDIAN EXPORTER'S SURVEY)

| | |
|--|---|
| C o n t e n t s | 6.1 <i>Profile of Indian Exporters Surveyed</i> |
| | 6.2 <i>Sales Method and Volume of Exports</i> |
| | 6.3 <i>Dependence on Imports of Raw Nuts</i> |
| | 6.4 <i>Analysis of the Trade</i> |
| | 6.5 <i>Exporting of Value Added Products</i> |
| | 6.6 <i>Stimuli for Exports</i> |
| | 6.7 <i>Managing Currency Exchange Risk</i> |
| | 6.8 <i>Conclusion</i> |

A survey was conducted among Indian Cashew Exporters with an aim to analyse the pattern and drive for export of cashew kernels from India. Factors affecting the decision to export or to sell in the domestic market, drive factors for going for exports, the effect of export incentives, the significance of raw nut imports, the added exports, the handling of exchange risk and the challenges in the export market that India faces were analysed in detail with the aid of primary data collected from Indian Exporters.

6.1 Profile of Indian Exporters Surveyed

Census method was adopted to survey the Indian exporters owing to the small and finite size of the population. A total of 40 responses were accepted after editing. The responses were coded and analysed. The sample frame

consisted of Indian Exporters, who are the members of the CEPCI (Cashew Export Promotion Council of India) – the sole body representing the Indian Cashew Exporters. The respondents analysed consisted of small, medium and Big exporters and also exporters with low, medium and long experience in the exports of cashew nuts from India. They were from all states of India where cashew is being exported, ensuring the geographical distribution of the respondents. Further, the respondents surveyed had an experience from 5 to 85 years in cashew processing and exports. As such, the sample of Indian Exporters surveyed were true representation of the universe.

Based on the responses received from the respondents, certain hypotheses were tested and the pattern and preference of the Indian Exporters analysed.

6.2 Sales Method and Volume of Exports

The Indian exporters adopted different strategies for sales to overseas buyers. Some of them adopted direct sales to the overseas buyers. Mostly such exporters used to have exclusive tie up with the overseas buyers who used to pre-finance the procurement of raw nuts. Some others sold their products to the overseas market exclusively through an agent. In majority of the cases, the strategy adopted was a combination of the above two methods, viz. direct sales as well as sales through an agent.

A hypothesis to test whether there existed any association between the sales method and the volume of trade was formulated as under:

H 11: The sales methods and volume exported were associated

Loglinear multinomial test was conducted to test whether there existed any difference between small, medium and top shippers in the strategy used

for selling their produce in the export market. The null hypothesis tested was that there existed no difference in the sales method adopted by small, medium and top exporters in their strategy to sell their produce in the overseas market.

Table 6.1 Cell Counts and Residuals^{a,b}

| Sales methods | Vol. Exported | Observed | | Expected | | Residual | Standardized Residual | Adjusted Residual | Deviance |
|---------------|---------------|----------|-------|----------|-------|----------|-----------------------|-------------------|----------|
| | | Count | % | Count | % | | | | |
| Direct | Small | 4 | 10.0% | 1.625 | 4.1% | 2.375 | 1.902 | 2.424 | 2.684 |
| | Medium | 1 | 2.5% | 2.125 | 5.3% | -1.125 | -.793 | -1.088 | -1.228 |
| | Top | 0 | 0.0% | 1.250 | 3.1% | -1.250 | -1.136 | -1.380 | .000 |
| Agent | Small | 4 | 10.0% | 3.575 | 8.9% | .425 | .236 | .321 | .948 |
| | Medium | 4 | 10.0% | 4.675 | 11.7% | -.675 | -.332 | -.484 | -1.117 |
| | Top | 3 | 7.5% | 2.750 | 6.9% | .250 | .156 | .204 | .723 |
| Both | Small | 5 | 12.5% | 7.800 | 19.5% | -2.800 | -1.117 | -1.929 | -2.109 |
| | Medium | 12 | 30.0% | 10.200 | 25.5% | 1.800 | .653 | 1.175 | 1.975 |
| | Top | 7 | 17.5% | 6.000 | 15.0% | 1.000 | .443 | .745 | 1.469 |

a. Model: Multinomial

b. Design: Constant + X5 + X4

Table 6.2 Goodness-of-Fit Tests^{a,b} Results

| | Value | df | Sig. |
|--------------------|-------|----|------|
| Likelihood Ratio | 7.484 | 4 | .112 |
| Pearson Chi-Square | 6.977 | 4 | .137 |

a. Model: Multinomial

b. Design: Constant + X5 + X4

The test yielded a p-value of 13.7 per cent that failed to reject the null hypothesis of no association. Concluded that there existed no association between sales methods and volume exported

Result: Working Hypothesis rejected

6.3 Dependence on Imports of Raw Nuts

Majority of Indian exporters sourced their raw material from both domestic production and imports as domestic supply was not adequate to meet the processing demand. Of the total exporters surveyed, only 7.5 per cent were sourcing their raw materials exclusively from the domestic market, where as the rest 92.5 per cent were either partially or fully dependent on imports for their production. 42.5 per cent of the exporters surveyed were sourcing more than 75 per cent of their processing needs out of imported raw nuts.

Table 6.3 Share of Imports to Total Usage

| Share of Imports | | Frequency | Percent |
|------------------|--------------|-----------|---------|
| Valid | less than 25 | 7 | 17.5 |
| | 25-50 | 5 | 12.5 |
| | 50-75 | 8 | 20.0 |
| | above 75 | 17 | 42.5 |
| | Total | 37 | 92.5 |
| Missing | System | 3 | 7.5 |
| Total | | 40 | 100.0 |

It was observed that some exporters depended less and some more on imported raw nuts, where as some of them were less and some more export oriented. An analysis was done to test whether there used to be any association between percentage of imports of raw nuts and percentage of export of cashew kernels by formulating a hypothesis:

H 12: Export share of cashew kernels was associated with import share of raw cashew nuts

The research hypothesis was tested for the null hypothesis that share of exports of cashew kernels was not associated with the share of imports of raw cashew nuts using Kruskal Wallis Test. The test variable was the export share to the total sales of cashew kernels against the grouping variables of the import share of raw cashew nuts to the total purchase.

Table 6.4 Import Share of Raw Nuts Vs Export Share of Kernels - Crosstabulation

| | | % of Exports | | | | Total |
|--------------|--------------|--------------|-------|-------|----------|-------|
| | | less than 25 | 25-50 | 50-75 | above 75 | |
| % of imports | less than 25 | 0 | 4 | 1 | 2 | 7 |
| | 25-50 | 1 | 2 | 0 | 2 | 5 |
| | 50-75 | 0 | 2 | 4 | 2 | 8 |
| | above 75 | 1 | 3 | 2 | 11 | 17 |
| Total | | 2 | 11 | 7 | 17 | 37 |

Table 6.5 Kruskal Wallis Test

| | % of Exports | N | Mean Rank |
|--------------|--------------|----|-----------|
| % of imports | less than 25 | 2 | 19.50 |
| | 25-50 | 11 | 14.18 |
| | 50-75 | 7 | 18.29 |
| | above 75 | 17 | 22.35 |
| | Total | 37 | |

Table 6.6 Kruskal Wallis Test Statistics^{a,b}

| | % of imports |
|-------------|--------------|
| Chi-Square | 4.348 |
| df | 3 |
| Asymp. Sig. | .226 |

The test statistics resulted in the Chi-square value of 4.348 at degrees of freedom of 3 against the table value of 7.815 for significance level 5 and the associated p-value was 22.6 per cent. Failed to reject null hypothesis.

Result: The research hypothesis was rejected.

6.4 Analysis of the Trade

An analysis of different drive factors in the foreign trade of cashew was analysed with the help of primary data collected during the survey. The significance of Imports for sustainability of the industry, chance of avoiding imports by increased domestic production, the reasons for sticking on to imports, the export of value added products, the stimuli for exports, the export incentive schemes and the management of currency exchange risk by exporters were analysed in detail.

6.4.1 Significance of Imports of Raw Nut

The various reasons why Indian Exporters go for imports of raw nuts were discussed in detail during the expert interviews. Based on the above, following five specific factors were arrived at:

- a. **Import of raw cashew nuts (RCN) ensures uninterrupted production:** Cashew being a seasonal product, the availability of domestic product is inadequate and limited to the local season only. Domestic production

could support the processing more or less during the domestic season only.

- b. Imported raw cashew nuts are less costly compared to domestic raw cashew nuts:** Due to scarcity of raw cashew nuts produced, there was huge demand for domestic raw nuts especially by the small and un-registered processors – who could not afford to import and wholly depended on domestic production only. On the other side imported raw nuts were less costly by around 20-25 per cent. Further, the export market is more or less based on the international RCN prices and the domestic prices were not at par with the export prices.
- c. Imported RCN is free from tax burden:** The import of RCN was free from any sort of import duty or taxes while for domestic purchase of raw nuts, most of the states in India levied Value added tax (VAT)
- d. Imported RCN is available round the year:** Due to the different harvest period worldwide, raw cashew nuts were always available at some or other part of the world. This meant that the processors did not have to stock the raw materials for their entire processing, but could practice the ‘just in time’ purchase of the raw nuts for their processing.
- e. Imported RCN is available in Bulk Quantity:** Due to the bulk availability of RCN in the international market and due to the bulk volume transported by sea, the purchase quantity available for imports were comparatively larger in container loads, compared to truck loads available for domestic supply. This meant the easy management of sourcing of raw material.

The respondents were provided with the above five reasons and were requested to mark their agreement on a five point scale. The response collected on a five point scale with significance marked from less to more was analysed to ascertain their significance. An option to mark any other reasons was also provided. But no responses were marked against that option. The cronbach alpha test for reliability of the questionnaire yielded a result of 0.82. The coded responses were analysed using Kendall’s W Test to arrive at the following results.

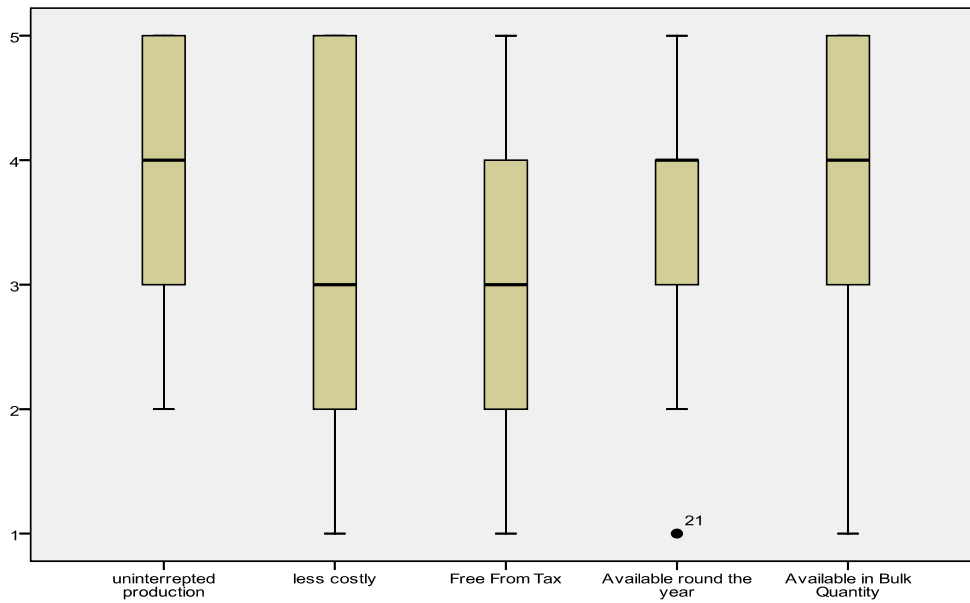


Fig. 6.1 Box Plot –Responses to Significance of Imports

Table 6.7 Ranking of Factors

| Factors | Significance |
|----------------------------|--------------|
| Un-interrupted processing | 3.53 |
| less costly | 2.85 |
| Free From Tax | 2.30 |
| Available round the year | 3.07 |
| Available in Bulk Quantity | 3.26 |

Table 6.8 Kendall’s Test Statistics

| | |
|--------------------------|--------|
| N | 37 |
| Kendall's W ^a | .120 |
| Chi-Square | 17.789 |
| df | 4 |
| Asymp. Sig. | .001 |

a. Kendall's Coefficient of Concordance

Result: The test results indicated that the imports of Raw Cashew Nuts were significant for all factors considered. The most significant among the reasons analysed was that Indian Exporters go for imports of raw nuts mainly to ensure un-interrupted processing of cashew. The Chi-Square test value obtained was 17.789 against the table value of 3.841 with degrees of freedom of 4 and the p-value at 0.1 per cent at 5 per cent significance level.

6.4.2 Import Substitution of Raw Nuts

The cashew industry in India is heavily dependents on import. As seen from the latest statistics nearly 55 per cent of cashew processed in India was from imported cashew and only the rest 45 per cent accounted for domestic produce. The cashew Industry was a net importer in the sense that as per the data available from DGCI&S, the total exports of cashew kernels from the country accounted to ₹ 4036 crores where as the total imports of raw cashew nuts was ₹5300 crores that resulted in a negative trade balance during the previous financial year 2012-13. The domestic production was not adequate to support the processing in the country. The issue primarily analysed was that whether India could completely avoid imports of raw cashew nuts and depend entirely on domestic produce, had domestic production was increased

to meet the entire requirement of processing. This was further reduced to the following hypothesis:

H13: Import of raw cashew nut was inevitable for Indian cashew industry

The responses were collected from the respondents to the hypothetical condition whether India could avoid imports and fully depend on domestic supply of raw nuts, had the domestic supply was adequate to meet the processing demand. This was coded for further analysis.

Table 6.9 Analysis of Opinion- Can India Avoid Imports of Raw Nuts

| Opinion | Observed N | Expected N | Residual |
|---------|------------|------------|----------|
| yes | 11 | 20.0 | -9.0 |
| No | 29 | 20.0 | 9.0 |
| Total | 40 | | |

Table 6.10 Test Statistics

| | |
|-------------|--------------------|
| Chi-Square | 8.100 ^a |
| df | 1 |
| Asymp. Sig. | .004 |

The observed frequencies were tested against the expected frequency using the Chi-Square test against the null hypothesis that India can avoid imports of raw Cashew Nuts. The null hypothesis was rejected as the test Chi-Square value of 8.100 was higher than the table value of 3.841 at 5 per cent significance level. The significance level was too low at 0.4 per cent. Further, in the ongoing analysis, it was observed that the difference in opinion was significant.

The experts pointed out the main reasons why increased imports cannot substitute the imports of raw nut viz.

- a) High cost of Storage
- b) Risk of market fluctuations
- c) Quality deterioration in storage
- d) Weight shortage in storage
- e) Lack of storage facility.

The respondents were provided with the above reasons and the significance they attribute was collected on a five point scale ranging from less significant to more significant. An option to mark/suggest any other reason was also provided. But no such suggestions were marked. The responses received were coded and further analysed using Kendall's W Test.

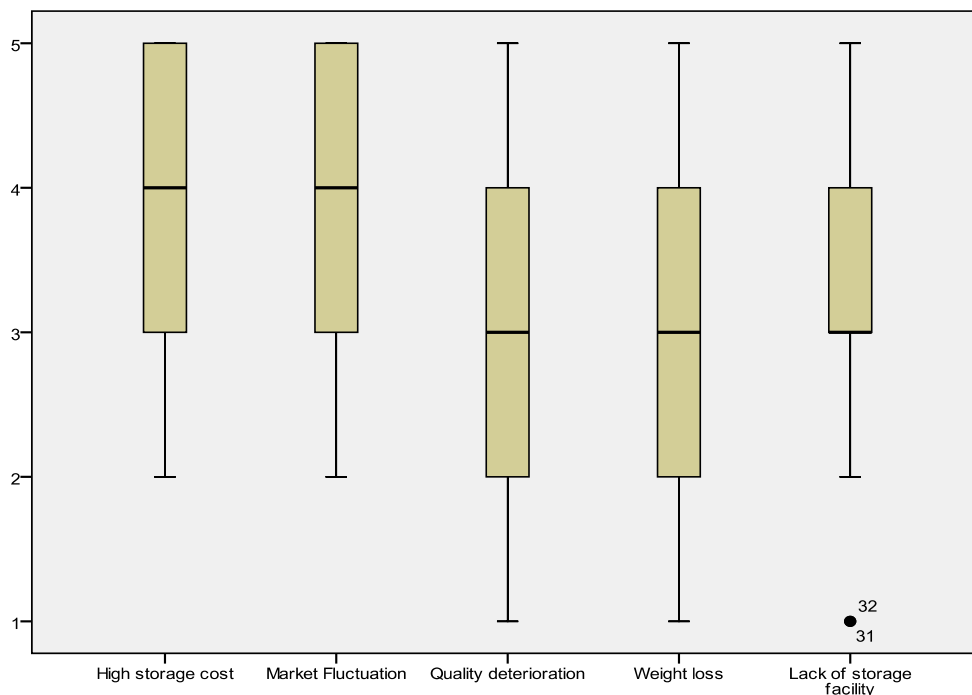


Fig. 6.2 Box Plot - Insistence on Imports of Raw Nuts

Table 6.11 Ranking of reasons- Substitution of imports by increased domestic production

| Reasons | Significance Level |
|--------------------------|--------------------|
| High storage cost | 3.24 |
| Market Fluctuation | 3.93 |
| Quality deterioration | 2.50 |
| Weight loss | 2.47 |
| Lack of storage facility | 2.86 |

Table 6.12 Kendall's Test Statistics

| | |
|--------------------------|--------|
| N | 29 |
| Kendall's W ^a | .201 |
| Chi-Square | 23.262 |
| df | 4 |
| Asymp. Sig. | .000 |

a. Kendall's Coefficient of Concordance

The Kendall's W test result indicated that Market fluctuation was the main reason why Indian exporters felt that they cannot fully depend on the domestic raw nuts by avoiding imports. If they were to procure the domestically produced raw cashew nuts during the local season and store the same throughout until the next season, any fluctuation in the market price of cashew kernels not in their favour could adversely affect their business. Other reasons listed above were also significant. It should be noted that none of the respondents selected the option 'Other reasons' that was provided as an option.

The result of the test could be relied on as the test chi-square value of 23.262 was above the table value of 3.841 (for degrees of freedom of 4 and at 5 per cent significance level) and the p-value was much negligible.

Result: The working hypothesis was accepted.

6.5 Exporting of Value Added Products

Hardly 12.5 per cent of the Indian exporters surveyed were exporting value added products like roasted & salted cashew kernels, spice coated cashew nuts, honey coated cashew nuts etc..

Table 6.13 Descriptive Statistics- Export of Value Added Products

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------|-----------|---------|---------------|--------------------|
| Valid | Yes | 5 | 12.5 | 12.5 | 12.5 |
| | No | 35 | 87.5 | 87.5 | 100.0 |
| | Total | 40 | 100.0 | 100.0 | |

Sundaram (2010), in his article named ‘Cashew: Competition Continues’ had observed and commented that “Value-added exports from the country are not taking place as it would lead to competition with the local brands”. It was in this context that experts suggested collaboration with importers in the major markets. Further, the expert survey came out with certain other possible reasons. One of the reasons expressed by the experts was that due to strong brand image and preference of native brands in the consuming countries, it was extremely difficult to penetrate into the foreign market. Lack of advanced production technique was another reason suggested. This also included the attractive packing and technology to keep the shelf life period long. Any Indian exporter entering into value added production and marketing in the consumer country, would be looked as a competitor to the existing processors abroad, who are otherwise bulk purchasers of plain cashew kernels from India. This may result in those buyers boycotting the produce of that exporter (*a few instances also cited*) which would result in the exporter losing his client abroad. High transit cost and transit time was yet

another probable reason suggested. A normal 20 Ft. container could accommodate 15.8 M.T. of plain cashew kernels with proper packing, where as in the case of value added packages, the same was reduced to around 5 M.T.. This considerably increased the transit cost by three times. Further, the normal shelf life period is only one year and the transit with other shipping formalities may consume around 2 months time. High cost of marketing was also a reason. The plain cashew is being imported into many consuming countries as an industrial raw material for further value addition and hence exempted from import duty. But when the value added product is imported, it is considered as a final product and is subjected to different types of duties and taxes. The relative impact of these reasons were analysed in the survey, where the respondents (who were not exporting value added kernels) were asked to rank their reasons for the above reasons cited.

The scope of going for contract manufacturing was also discussed, but the experts (both Indian and overseas) ruled out the scope for the same due to high capacity of installed value added units in major importing countries which are running short of their capacity and also due to the fact that ensuring food safety specifications could be well adhered to only if production is carried out under strict vigilance in the importing countries.

Respondents views on the reasons why they were not involved into export of value added kernels were collected during the survey. They were provided with the different reasons assigned and requested to assign ranks in the order of preferences. The reasons assigned to them were:

- a) Low demand Strong brand image of foreign brands in respective markets
- b) Lack of advanced production techniques

- c) Can badly affect existing business
- d) High cost of marketing abroad
- e) Impact of marketing abroad.

Here also a provision was provided to mark any other reasons, but no such responses were received. These were analysed in two different dimensions- perceived (trade related) factors and objective (product related) factors.

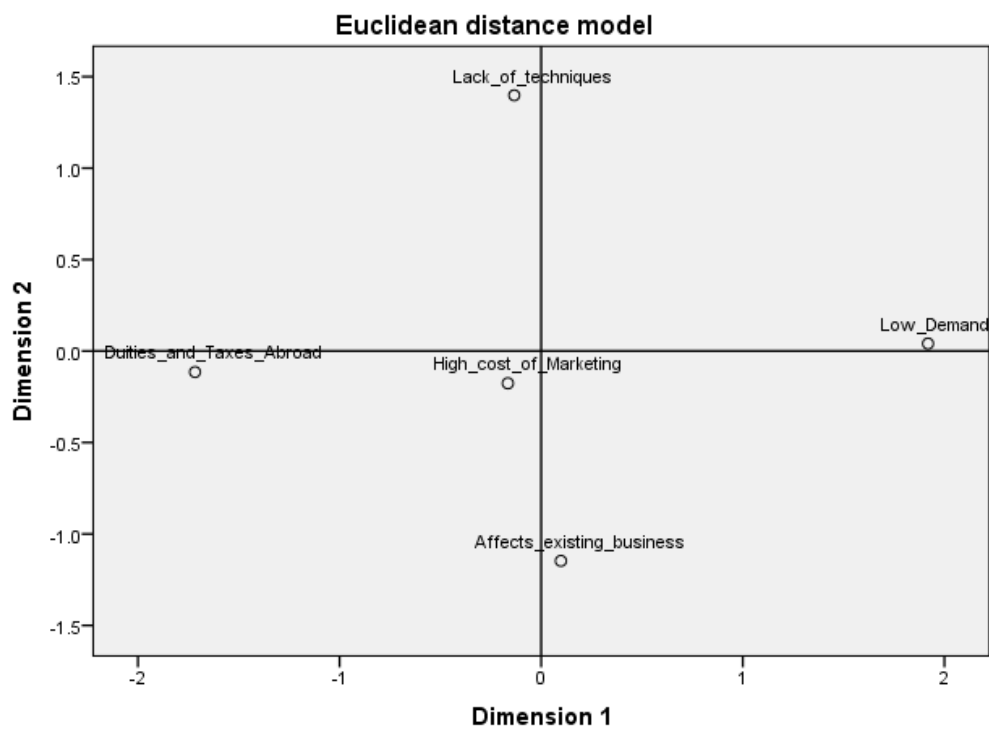
The various stimuli were analysed with Multi Dimensional Scaling using Euclidean distance model based on the ranks assigned by different respondents. Multidimensional scaling (MDS) is a classical approach to the problem of finding underlying attributes or dimensions, which influence how subjects evaluate a given set of objects or stimuli (An Introduction to MDS Florian Wickelmaier - Sound Quality Research Unit, Aalborg University, Denmark May 4, 2003). In the case of exports of value added products, Indian exporters were seen prejudiced on certain aspects based on pure stimuli. As such, multi dimensional scaling was used to analyse the given situation.

Stress and squared correlation (RSQ) in distances RSQ values are the proportion of variance of the scaled data (disparities) in the partition (row, matrix, or entire data) which is accounted for by their corresponding distances.

The Configuration derived in 2 dimensions. Stress values using Kruskal's stress formula yielded the stress value as 0.00220 and RSQ as 0.99995.

Table 6.14 Stimulus Coordinates

| No | Stimulus | Dimension1 | Dimension2 |
|----|--|------------|------------|
| 1 | Low Demand | 1.9183 | .0405 |
| 2 | Lack of advanced production technology | -.1337 | 1.3981 |
| 3 | Affects existing Business | .0977 | -1.1475 |
| 4 | High cost of marketing abroad | -.1653 | -.1764 |
| 5 | Impact of Duties and taxes | -1.7170 | -.1148 |

**Fig. 6.3 MDS- Derived Stimulus Configuration**

Dimension 1: Perceived (Trade related) Factors

Dimension 2: Objective (Product related) Factors

From the trade point of low demand and from the product related dimensions, the lack of technology were the main reasons for not getting involved into value added products. However, the fear that getting into value

added products would adversely affect existing business was second in the perceived factors.

The above responses were also analysed using Kendall’s W test also. From the ranks 1 to 5 assigned by the respondents, the mean ranks were calculated.

Table 6.15 Ranking of Reasons- Involving into Value Added Products

| Reasons | Mean Rank |
|---------------------------|-----------|
| Low demand | 2.36 |
| Lack of techniques | 3.24 |
| affects existing business | 2.90 |
| High Cost of Marketing | 2.40 |
| Duties & Taxes abroad | 4.10 |

Table 6.16 Test Statistics

| | |
|--------------------------|--------|
| N | 35 |
| Kendall's W ^a | .207 |
| Chi-Square | 28.980 |
| df | 4 |
| Asymp. Sig. | .000 |

Kendall’s W test yielded that the Low demand due to strong brand image of native brands of the overseas countries and the resulting difficulty in penetrating the foreign market was the overall main reason closely followed by the high cost of marketing abroad why the export of value added cashew kernels were not feasible from the country. The results were significant as the p-value was too negligible.

An analysis was made to test the difference in the above stimuli among various class of exporters in their views regarding the export of value added products by formulating the hypothesis:

H14: There existed no significant difference between Small, Medium and Top Exporters in their attitude towards the export of value added products from India.

The above hypothesis was tested adopting Kruskal Wallis test with small, medium and top exporters as grouping variables and the various reasons assigned as test variables.

Table 6.17 Kurskal Wallis Test Results

| | Vol. Exported | N | Mean Rank |
|---------------------------|----------------------|----------|------------------|
| Low demand | Small | 12 | 17.29 |
| | Medium | 16 | 18.34 |
| | Top | 7 | 18.43 |
| | Total | 35 | |
| Lack of techniques | Small | 12 | 14.50 |
| | Medium | 16 | 19.22 |
| | Top | 7 | 21.21 |
| | Total | 35 | |
| affects existing business | Small | 12 | 20.33 |
| | Medium | 16 | 16.13 |
| | Top | 7 | 18.29 |
| | Total | 35 | |
| High Cost of Marketing | Small | 12 | 19.96 |
| | Medium | 16 | 17.25 |
| | Top | 7 | 16.36 |
| | Total | 35 | |
| Duties & Taxes abroad | Small | 12 | 18.25 |
| | medium | 16 | 19.56 |
| | Top | 7 | 14.00 |
| | Total | 35 | |

Table 6.18 Test Statistics^{a,b}

| | Low demand | Lack of techniques | affects existing business | High Cost of Marketing | Duties & Taxes abroad |
|-------------|-------------------|---------------------------|----------------------------------|-------------------------------|----------------------------------|
| Chi-Square | .098 | 2.449 | 1.221 | .795 | 1.693 |
| df | 2 | 2 | 2 | 2 | 2 |
| Asymp. Sig. | .952 | .294 | .543 | .672 | .429 |

Result: The test failed to reject the null hypothesis which implied that there was no significant difference among the small, medium and top exporters the reason assigned toward the attitude for exporting value added products.

6.6 Stimuli for Exports

The various stimuli (both trade related- monetary and monetary) were analysed during the study. The non-monetary stimuli were purely trade related that supported the smooth flow of trade, where as the monetary related were the incentive based analysis.

6.6.1 Trade Related Factors

Exporters of cashew nuts are all involved in the local sales of cashew kernels as well as the exports. The two markets of domestic and overseas are very distinct and the drive factors are different. Of late, the export share of processing is steadily decreasing. Exporters switch between exports and domestic sales and this decision is influenced by many a factor. The survey conducted among Indian Exporters analysed the various factors (non-monetary) behind the decision to sell in domestic market or to export viz.

- a. **The Grade of the Cashew Kernels:** The consumption of cashew kernels in the overseas market is mainly in the form of snacks and hence there is more demand for whole grades, where as in India cashew is mainly consumed as an ingredient for food items and hence the demand here is more for broken and pieces. Based on the demand, some exporters policy is to export whole grades and locally sell the broken and pieces.
- b. **Quantity of Cashew Kernels:** Domestic sales are mostly in boxes of 22.68 Kg or truck loads of 350 boxes where as the minimum tradable quantity in export trade is one container of 700 boxes. As such, exporters prefer selling those grades available in bulk quantities in the export market and those grades available in small quantities in the domestic market.
- c. **Net Price Realised:** Yet another approach is to calculate the net price realized in exports including the incentives and to compare the same with that for the same grade in the domestic market and to choose that trade which yields the maximum net price.
- d. **Bank Commitment:** Exporters avail export finance at low levels of interest and has obligation to export the goods. Further there is time restrictions to repay the finance availed by submitting export bills. As such, the exporter has an obligation to export the goods.
- e. **Export Oriented:** Certain exporters used to sell their products only in the overseas market as a policy. They are mostly adopting high quality standards and are very professional in the business. They explore different market to sell all grades of cashew kernels. Often they have a premium price in the export market owing to their quality and reliability.

The responses of the Indian Exporters were collected on a five point scale for the above factors with significance from low to high. Though there was a provision to assign any other factor, no response was received. The responses were edited, tabulated and analysed using Kruskal-wallis test.

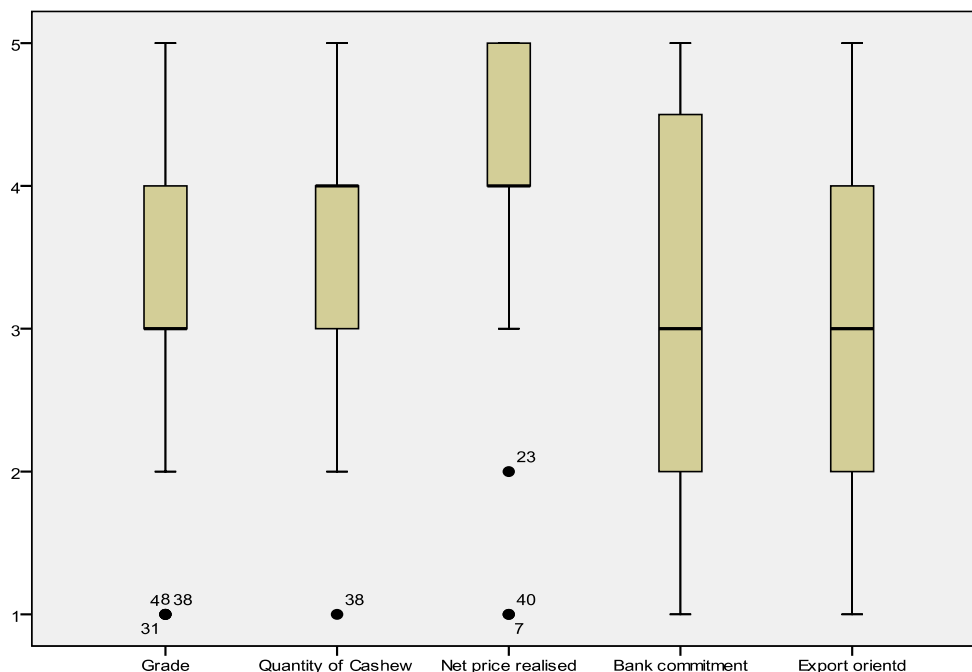


Fig. 6.4 Box Plot of Observations- Decisions for Export Vs Domestic Sales.

Table 6.19 Kruskal Wallis Test Result

| Factors | N | Mean Rank |
|---|-----|-----------|
| Significance Grade of the cashew kernel | 40 | 69.05 |
| Quantity of cashew kernels | 40 | 112.70 |
| Nett price realizable | 40 | 53.00 |
| Bank commitment | 40 | 116.50 |
| Export Oriented | 40 | 151.25 |
| Total | 200 | |

Table 6.20 Test Statistics

| | Significance |
|-------------|---------------------|
| Chi-Square | 77.457 |
| df | 4 |
| Asymp. Sig. | .000 |

'Net price realisable' was ranked high which indicated that the main trade related stimuli in deciding whether to opt exports or domestic sale was the net price realized. In case of exports, the net price realized is the sum of the FOB value of the sales converted into local currency and the monetary part of the export incentive less the brokerage and direct expenses, whereas in the case of domestic sale, the same represented the sale value less brokerage. The change in exchange rate has a bearing on the net price realized in export sales. The chi-square test support the finding as the test value is higher than the table value of 9.488 and the p value was negligibly small.

An analysis was done to check whether there existed any difference among different classes of exporters regarding their trade related stimuli for exports by formulating the hypothesis:

H 15: There exists no difference among Small, Medium and Top Exporters in the Trade related factors for exports

The research hypothesis was tested using Kruskal Wallis Test. The test variable was the trade related stimuli for exports against the grouping variables of the classes of exporters based on the volume exported

Table 6.21 Kruskal Wallis Test Results

| | Vol. Exported | N | Mean Rank |
|--------------------|----------------------|----------|------------------|
| Grade | Small | 13 | 19.12 |
| | Medium | 17 | 23.21 |
| | Top | 10 | 17.70 |
| | Total | 40 | |
| Quantity of Cashew | Small | 13 | 20.00 |
| | Medium | 17 | 22.06 |
| | Top | 10 | 18.50 |
| | Total | 40 | |
| Net price realised | Small | 13 | 20.69 |
| | Medium | 17 | 18.65 |
| | Top | 10 | 23.40 |
| | Total | 40 | |
| Bank commitment | Small | 13 | 18.27 |
| | Medium | 17 | 21.97 |
| | Top | 10 | 20.90 |
| | Total | 40 | |
| Export orientd | Small | 13 | 23.35 |
| | Medium | 17 | 22.00 |
| | Top | 10 | 14.25 |
| | Total | 40 | |

Table 6.22 Kruskal Wallis Test Statistics

| | Grade | Quantity of Cashew | Net price realised | Bank commitment | Export orientd |
|-------------|--------------|---------------------------|---------------------------|------------------------|-----------------------|
| Chi-Square | 2.025 | .671 | 1.200 | .797 | 4.103 |
| df | 2 | 2 | 2 | 2 | 2 |
| Asymp. Sig. | .363 | .715 | .549 | .671 | .129 |

Result: The test statistics resulted in the Chi-square value of less than the table value of 5.991 at degrees of freedom of for significance level 5 and the associated p-values were all above 5 per cent. Failed to reject null hypothesis of the difference was not significant. Hence the research hypothesis that there existed no difference in trade related factors among different class of exporters was accepted.

6.6.2 Incentives Based Stimuli

The Government of India from time to time announces different incentives and packages to boost exports from the country. Certain incentives are general in nature for the exports as a whole, while certain others are specific to certain class of industries. Cashew being an agricultural commodity enjoys certain incentives in addition. Further based on the large employment it generates, the sector enjoys some specific incentives also. The various incentives that the cashew sector enjoyed were:

- a. **Lower rate of Interest:** Export is a priority sector and enjoys a special treatment in interest rates. Prior to 1st July 2010, the interest rate in India was based on BPLR (Benchmark Prime Lending Rate) system, where the interest rate on export finance was limited to 2.5 per cent less than BPLR. Now after 1st July 2010, the banks in India works on Base rate system, where the interest on export credit is at par or above the base interest rate of the Bank. In any case the Government has come up

with an interest subvention incentive that worked out at 2 per cent prior to 1st August 2013 and 3 per cent afterwards subject to a floor rate of 7 per cent.

- b. VAT Refund on Export:** The basic principle on foreign trade is that no duties or taxes be exported or imported. The Value Added Tax input is paid back to the exporters on export of the goods or services. As such, the exports are free from Value added tax.
- c. VKUGY & DEPB:** VKUGY stands for Visesh Krishi Gram Upaj Yojana. To encourage the Exports of Agriculture Products and Gram Udyog Products, Govt. of India Introduced VISHESH KRISHI AND GRAM UDYOG YOJANA (VKGUY), It provides Export Incentive in the form of Duty Credit Script Equivalent to 5 per cent of FOB Value of exports for export made from 27.8.2009 onwards, which is transferable.

Duty Entitlement Pass Book Scheme in short DEPB is an export incentive scheme. Notified on 1/4/1997, the DEPB Scheme consisted of (a) Post-export DEPB and (b) Pre-export DEPB. The pre-export DEPB scheme was abolished w.e.f. 1/4/2000. Under the post-export DEPB, which is issued after exports, the exporter is given a duty entitlement Pass Book Scheme at a pre-determined credit on the FOB value. Cashew presently enjoys DEPB of 1 per cent.

- d. Advance License:** An advance license is granted for the import of inputs without payment of basic customs duty. Such licences shall be subject to the fulfillment of a time-bound export obligation, and value addition as maybe specified. Advance licences maybe either value based or quantity based.

- e. **MDA Scheme:** Market Development scheme is introduced to facilitate various measures being undertaken to stimulate and diversify the country's export trade. It provides individual exporters and export promotion councils financial assistance to undertake marketing of their products abroad. A major portion of such expenses including the travel expenses is refunded to the exporter.

The impacts of these incentives as perceived by the exporters were surveyed and the response collected to test the hypothesis formulated:

H16: Direct Monetary Incentives were More Motivating to Indian Exporters than Indirect Incentives

The respondents were asked to rate the above on the basis of the ranks they assign to these incentives. Here also, a provision was provided to specify other stimuli, but that indicated no response.

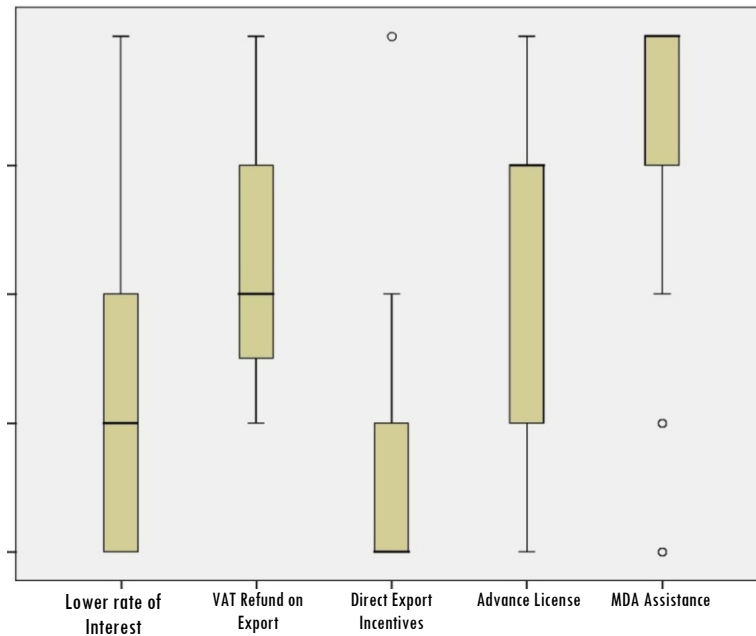


Fig 6.5 Box Plot – Export Incentives Preference

Lower rate Vat refund Export – Advance MDA of interest Incentives License Assistance

Table 6.23 Friedman’s Test Results

| | Mean Rank |
|---------------------------|------------------|
| Lower rate of interest | 2.24 |
| Vat refund | 3.29 |
| Directs Export incentives | 1.79 |
| Advance License | 3.41 |
| MDA assistance | 4.28 |

Table 6.24 Test Statistics

| | |
|-------------|--------|
| N | 40 |
| Chi-Square | 63.435 |
| df | 4 |
| Asymp. Sig. | .000 |

Result: Test statistics revealed that all the stimuli factors considered were significant. Among the various incentives available for exports from India, the Cashew Exporters perceived the direct monetary incentives like VKUGY& DEPB as the most important stimuli for going for exports. Failed to reject the null hypothesis of no difference between direct and indirect monetary benefits. Working hypothesis accepted.

Here also, an analysis was done to test the difference in stimuli among different class of exporters. Kruskal Wallis Test was used to test whether there exists any difference in the incentive based stimuli among different

class of exporters with grouping variable as classes of exporters based on the volume of sales and test variables as the incentive based stimuli.

Table 6.25 Kruskal Wallis Test Results

| | Vol. Exported | N | Mean Rank |
|------------------------|----------------------|----------|------------------|
| Lower rate of interest | Small | 13 | 15.15 |
| | Medium | 17 | 19.94 |
| | Top | 10 | 28.40 |
| | Total | 40 | |
| Vat refund | Small | 13 | 21.12 |
| | Medium | 17 | 18.21 |
| | Top | 10 | 23.60 |
| | Total | 40 | |
| Export incentives | Small | 13 | 26.42 |
| | Medium | 17 | 19.91 |
| | Top | 10 | 13.80 |
| | Total | 40 | |
| Advance License | Small | 13 | 23.04 |
| | Medium | 17 | 22.68 |
| | Top | 10 | 13.50 |
| | Total | 40 | |
| MDA assistance | Small | 13 | 17.96 |
| | Medium | 17 | 23.15 |
| | Top | 10 | 19.30 |
| | Total | 40 | |

Table 6.26 Test Statistics

| | Lower rate of interest | Vat refund | Export incentives | Advance License | MDA assistance |
|-------------|-------------------------------|-------------------|--------------------------|------------------------|-----------------------|
| Chi-Square | 7.977 | 1.512 | 8.138 | 5.225 | 2.205 |
| df | 2 | 2 | 2 | 2 | 2 |
| Asymp. Sig. | .019 | .469 | .017 | .073 | .332 |

The test statistics rejected the null hypothesis for the incentives ‘Lower rate of interest ‘ and ‘Export incentives’ which implied that the different classes of exporters had different stimuli on these factors. The test failed to reject the other three factors viz. ‘Vat refund’, ‘Advance License’ and ‘MDA assistance’.

6.7 Managing Currency Exchange Risk

One of the major issues the exporters face is the fluctuations in the exchange rate of local currency with the currency of foreign trade. Currency equivalent of US\$ 1.5 trillions of different currencies are traded on a daily basis in the world market. Currency risk is the most managed risk in any international trade. If the currency of the exporting country appreciates against that of the currency of transaction, the exporter starts losing which upsets his very existence in the trade. On the other hand, the depreciation of the local currency make him more benefited. Almost all exports of cashew kernels are in US Dollars. The time of the exchange rate fluctuation is also of prime importance to the industry. Since the industry is involved in both imports of raw cashew nuts and export of finished kernels both invoiced in US Dollars, a weakening Indian Rupee at the time of peak imports is disadvantageous to the industry, where as the weakening Indian Rupee at the time of peak export will be of advantageous to the industry and vice versa. The method adopted by the Government to protect its currency can have a

direct impact on the exporter as well. The factors that affect a change in the exchange rate are:

- Change in government Policy
- Demand and Supply positions
- Economic recession in own/ foreign country.
- Change in interest rates of own currency
- Government level protections.

Currency risk Management is a major portfolio for major exporters and importers. With effective management of currency, the exporter cannot only be well protected against loss but also take advantage of the currency exchange fluctuations to its favour. While some of the measures ensure a protection from currency fluctuations, some other measures aims to trade with the changes in the forex market. Different approaches adopted for Management of risk in General are (1) Risk Avoidance (2) Risk Reduction (3) Risk Sharing and (4) Risk Retention. One approach to the Risk avoidance is to avoid risk by not performing an activity that involves risk. International Standards Organisation recommends the adoption of HACCP (hazard Analysis at Critical Control Points) principles for risk avoidance. Risk reduction aims at reducing the impact of risk by adopting apt techniques. For eg. Anti-virus software is used in computers to reduce the risk of virus, though the antivirus software can not completely avoid the risk. Sharing of risks transfers a part of the impact of risk with a third party mainly the underwriters (insurers). It should be noted that the entire risk is be transferred in this and in case of a peril, only a part of the loss is compensated. Risk Retention method involves absorbing the impact of the risk by the organisation itself and often the organisation makes provisions for the same

in the budgets. The commonly adopted measure for protection against fluctuation includes:

- Maintaining EEFC (Exchange Earners foreign Currency) current accounts
- PCFC (Pre-shipment in foreign Currency) at LIBOR linked rates
- Billing in Local Currencies
- Netting (Simultaneous buying and selling by adopting simultaneous imports and exports)
- Forward contracts (buying / selling of forex for a later period)
- Options (Optional buying / selling of forex for a later stage)

The view pointed out by majority among the experts in the field (during expert interviews) was that the exporters prefer taking a chance that they normally go for buying and selling at current exchange rates (risk retention), as in long run the same is beneficial to them in view of the depreciation of Indian rupee in long run, where as some others were of the opinion that PCFC (risk avoidance) is the preferred method of risk management. The methods adopted by Indian Cashew Exporters in managing the exchange fluctuations were surveyed and the responses collected by ranking the different method adopted.

The exporters were provided with different approaches they adopt and were requested to rank them in the order of approaches they adopted. The different approaches furnished to the respondents were:

- a) Importing when the exchange rate is less (*Rupee stronger*) and exporting when exchange rate is more (*Rupee weaker*)

- b) Importing and exporting at current exchange rates
- c) By opting forward booking / options
- d) Availing PCFC (*loans in foreign currency*)
- e) Maintaining EEFC accounts / transacting at matching rates

Of the above, approaches (a) involved risk reduction technique, (b) involved Risk retention technique, (c) involved risk sharing technique, (d) and (e) involved risk avoidance technique. The responses collected were edited, tabulated and analysed using Friedman’s test and was also analysed Figically by box plot.

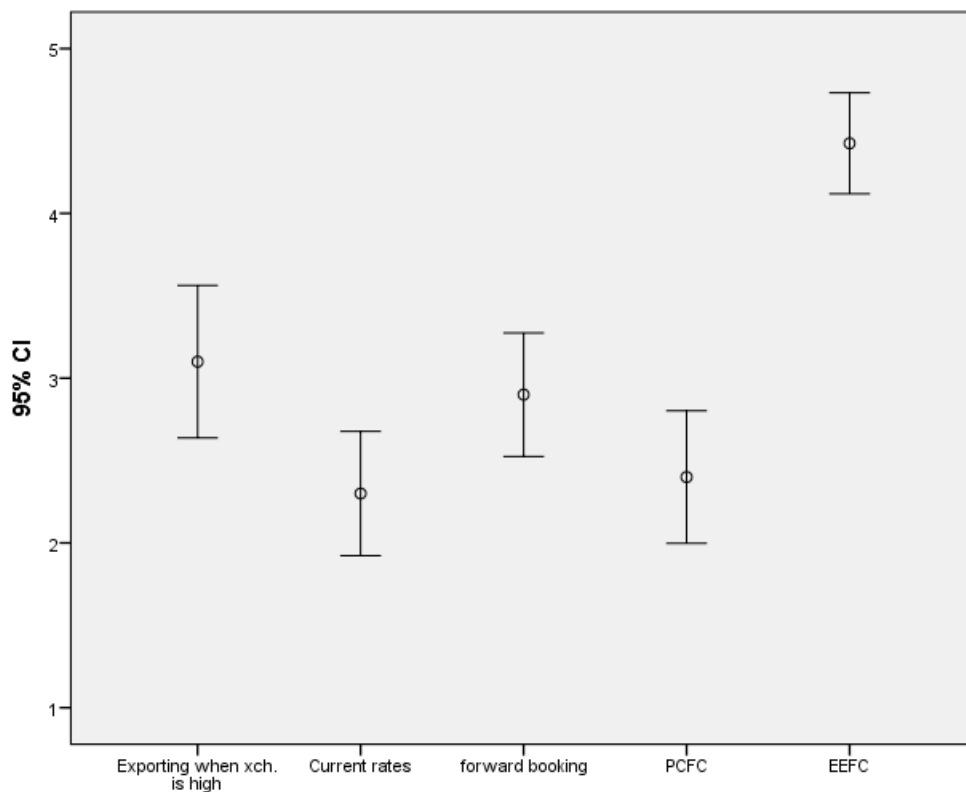


Fig. 6.6 BOX PLOT – Exchange Risk Management

Table 6.27 Friedman Test Results

| | Mean Rank |
|-----------------------------|------------------|
| Exporting when xch. is high | 3.09 |
| Current rates | 2.26 |
| forward booking | 2.91 |
| PCFC | 2.35 |
| EEFC | 4.39 |

Table 6.28 Test Statistics^a

| | |
|-------------|--------|
| N | 40 |
| Chi-Square | 46.861 |
| df | 4 |
| Asymp. Sig. | .000 |

The high ranking for ‘exporting/importing at then current levels’ implied that the exporters adopted risk retention technology and they fully absorbed the risk of fluctuations in the currency level. Since, the exporters were engaged in import of raw cashew nut also, they perceived less risk in exporting / importing at the then prevailing rate as the losses/ gains may square off in long run. The second option was for PCFC credit facility adopting risk avoidance approach whereby they completely isolated themselves from the exchange risk.

The observed preference pattern of Indian exporters also explained why the exchange rate and export volumes were not integrated as analysed in chapter no.5 (ref. hypothesis H9)

Further it was tested whether there existed any association between the exchange rate management and the experience in export trade by formulating the hypothesis:

H17: Foreign exchange rate management of Indian exporters was associated with experience in export trade

The research hypothesis was tested for the null hypothesis that the exchange rate management was not associated with the experience of the exporter. Kruskal Wally test was employed to test the null hypothesis. The grouping variable was the different class of exporters classified on the basis of the experience and the test variable was the different strategies adopted for exchange rate management.

Table 6.29 Kruskal Wally Test Results

| | Experience | N | Mean Rank |
|--------------------------------------|------------|----|-----------|
| Exporting when exchange rate is high | Low | 8 | 20.19 |
| | Medium | 16 | 18.13 |
| | High | 16 | 23.03 |
| | Total | 40 | |
| Current rates | Low | 8 | 18.44 |
| | Medium | 16 | 20.47 |
| | High | 16 | 21.56 |
| | Total | 40 | |
| forward booking | Low | 8 | 21.38 |
| | Medium | 16 | 17.88 |
| | High | 16 | 22.69 |
| | Total | 40 | |
| PCFC | Low | 8 | 22.44 |
| | Medium | 16 | 26.56 |
| | High | 16 | 13.47 |
| | Total | 40 | |
| EEFC | Low | 8 | 25.38 |
| | Medium | 16 | 18.56 |
| | High | 16 | 20.00 |
| | Total | 40 | |

Table 6.30 Test Statistics^{a,b}

| | Exporting when xch. is high | Current rates | forward booking | PCFC | EEFC |
|-------------|--|--------------------------|----------------------------|-------------|-------------|
| Chi-Square | 1.483 | .409 | 1.500 | 11.089 | 2.595 |
| df | 2 | 2 | 2 | 2 | 2 |
| Asymp. Sig. | .476 | .815 | .472 | .004 | .273 |

Result: Null hypothesis rejected for strategy PCFC only. Failed to reject the null hypothesis for all other factors. The inference was that there existed no significant difference in the strategy adopted other than PCFC among exporters with low, medium and high experience. In case of PCFC, exporters with more experience preferred PCFC.

6.8 Conclusion

The exporters in India were much experienced in the cashew processing and they were depending to a great extent on imports of raw cashew nuts. The significance of raw nut imports was mainly that it ensured un-interrupted processing of cashew nuts.. There is a need for improving the domestic production of raw cashew nuts. But still imports cannot be ruled out if at all India could produce enough raw cashew nuts for its processing, mainly because long storage of the raw cashew nuts can badly affect the business in case of an adverse fluctuation in the cashew prices. A balanced level of domestic production supported with imports will make the cashew industry in India optimize the production. Indian exporters didn’t feel that export of value added products was feasible mainly because the foreign markets were predominated by strong brand image of the native brands and hence penetration into the foreign market was very difficult. Further they took a

rational decision in diverting their produce into export market or in the domestic market based on the net price realized. Also they were motivated to do exports due to the export incentives available for export. The Indian Exporters perceived more importance to monetary benefits like VKUGY & DEPB. The risk of exchange rate fluctuations were often managed by risk retention strategy, and there was no difference in the strategy adopted between less experienced, medium experienced and long experienced exporters.

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**INDIAN CASHEW INDUSTRY- THE
OVERSEAS BUYERS PERSPECTIVE**
(AN INDIAN EXPORTER'S SURVEY)

| | |
|--|--|
| C o n t e n t s | 7.1 <i>The Profile of the Respondents.</i> |
| | 7.2 <i>Import of Value Added Products</i> |
| | 7.3 <i>India- the Supplier of Choice</i> |
| | 7.4 <i>The Quality of Indian Cashew Kernels</i> |
| | 7.5 <i>Cashew Kernels Buying Criteria</i> |
| | 7.6 <i>Performance of Competing Countries in the International Market.</i> |
| | 7.7 <i>Conclusion</i> |

The views and perception of the overseas buyers of Indian Cashew on the Indian Cashew they import including the quality, trade terms and the relative position of Indian Cashews compared to the produce from competing countries were collected in the survey conducted among overseas buyers of Indian Cashew. For decades together, India was enjoying a monopoly in the business. In their efforts to locate a new supplier and break the monopoly of India in the international market, the overseas buyers, especially the US, promoted Brazil. But though the presence of Brazil could bring in some competition to India, they could not come up to their expectation. But in the new century, Vietnam emerged out as a promising supplier to the world and the overseas buyers encouraged Vietnam as a true competitor to India.

Vietnam could over perform and the success story of Vietnam encouraged a lot of raw nut producing countries to start processing. Now, apart from India, Brazil and Vietnam, the international market source cashew kernels in a small way from Mozambique, Kenya, Ghana, Ivory Coast, Sri Lanka etc.. In this context, the perception of the overseas buyers about the Indian Cashew and its trade in comparison with other suppliers is significant. The three major suppliers viz. India, Vietnam and Brazil were considered for the survey and their relative acceptance in the international market was analysed in the survey conducted.

7.1 The Profile of the Respondents.

The overseas buyers surveyed consisted of importers in USA, Canada, Britain, Europe and the Middle East. A total of 32 overseas buyers were surveyed. All the importers were dealing in other dry fruits items in addition to cashew nuts. They consisted of small, medium and major importers with experience ranging from 5 years to 80 Years with a mean experience of 26.63 years in cashew imports.

Though cashew consumption was spread across the world, the majority of imports of kernels were into USA, UK, Europe Middle East and the Far East. The sample frame consisted of cashew importers of the above countries and was a true representation of the universe. For the purpose of the study, the importers and overseas buyers are considered to be one and the same as the overseas buyers surveyed are all direct importers of cashew kernels from processing countries.

The overseas buyers were grouped into three categories as per the normal trade practice based on their experience in the trade. Those up to 10 years experience were categorized in the 'Low' category, with experience ranging

from 11 to 25 years in the ‘Medium’ category and those with more than 25 years in the ‘High’ category.

The overseas buyers consisted of different classes classified on the basis of the volume of trade. Based on the normal practice followed in the industry, the overseas buyers with imports of up to 100 TFE (twenty feet equivalent) were grouped as ‘Small Importers’, those between 101 and 200 as ‘Medium Importers’ and those above with more than 200 as ‘Top’ importers.

Like the Indian Exporters, the overseas buyers also were involved in the import of cashew kernels through direct deals, by engaging the service of an agent and also by using a combination of both.

7.2 Import of Value Added Products

The overseas buyers surveyed were all importers of cashew kernels from the processing origins. The trade was mostly oriented into the imports of raw cashew kernels and the importers were either selling their cashew imported to value adders (roasters & salters), or they themselves were engaged into value addition of the cargo imported.

Table 7.1 Respondents into Purchase of Value Added Products

| | | Frequency | Percent |
|-------|-------|------------------|----------------|
| Valid | Yes | 3 | 9.40 |
| | No | 29 | 90.60 |
| | Total | 32 | 100.0 |

Those who imported value added products were only 9.40 per cent of the overseas buyers surveyed where as 90.6 per cent of them were into import

of plain cashew kernels only. Even for those involved in imports of value added products, the share was less than 10 per cent of their total imports.

Even though an attempt was made to analyse why the overseas buyers were not involved into import of value added product, the overseas buyers in the focus group refused to respond and they were of the opinion that such an attempt will make the overseas buyers feel that the survey was to tap their strategies-which they did not want to disclose- and hence the same was dropped from the final questionnaire.

7.3 India - The Supplier of Choice

As far as the Expert's opinion the long rapport with stake holders in the International market and the ability to supply bulk quantities at any specified time coupled with other favourable factors make India the supplier of choice in the international market. Perhaps, these factors were favourable to India in the past, but with the changed scenario today, does India still enjoy the same status among the overseas buyers. An opinion survey was conducted among the overseas buyers to test the hypothesis.

H18: Overseas Buyers had no Specific Preference to any Supplier Even under Identical Purchase Criteria Conditions

The preference of competing countries was analysed using the responses collected from the overseas buyers. They were asked to rank the competing countries viz. India, Vietnam, Brazil and others on the basis of their preference they attribute for purchase of cashew kernels when all the purchase criteria remained the same. Though a 'No Preference' option was also provided, none of the respondents opted it.

The responses collected were analysed using Kendall's W test. A 'low' value in the mean rank obtained implied a high level of preference.

Table 7.2 Preference of Countries -Mean Rank

| | Mean Rank |
|---------|------------------|
| India | 1.52 |
| Brazil | 2.48 |
| Vietnam | 2.29 |
| Others | 3.71 |

Table 7.3 Kendall's Test Statistics

| | |
|--------------------------|--------|
| N | 21 |
| Kendall's W ^a | .495 |
| Chi-Square | 31.171 |
| df | 3 |
| Asymp. Sig. | .000 |

The p-value of the test statistics was much negligible that signified the difference in the preference. India was the most preferred supplier for the overseas buyers when all other criteria remained the same.

Result: The results failed to reject the null hypothesis that the difference in preference was not significant. India was seen the most preferred, when all purchase criteria were identical. Thus the Working hypothesis was also rejected.

7.4 The Quality of Indian Cashew Kernels

Cashew is an agricultural commodity and within the general specification of the quality of the end product, ie the cashew kernel, its quality may vary

from origin to origin and the methods of processing. The selection of the right raw material from the right source, the techniques adopted in processing and the adherence to quality standards all ensure the right quality of the end product. The general specifications of cashew kernels and the tolerance levels are mostly specified by the Cashew Export Promotion Council of India (CEPCI) and Association of Food Industries (AFI), USA. Still, within the tolerance limits fixed by the above, the quality of cashew kernels varies and also the acceptance. There can be a general nature of cashew kernels exported from a country that may vary from the produce of another country. The same applies to the produce of different exporters within the exporting country. The general quality of cashew kernel exported from a country will brand the product of the country, marking the level of acceptance / preference of the produce of the country.

The 'Vision2020' proposes the specific marketing of Indian cashew kernels under the common brand name "Indian cashew". An attempt was made to analyse whether "Indian Cashew" stands out in its quality compared to her competitors of other origins.

As per the experts in the cashew trade, the quality of the cashew kernel is measured in terms of eight parameters viz. taste, Colour, infestation Crispness, Broken percentage, Odour, Presence of foreign matter and Uniformity in size. The specification criteria of cashew kernels by both CEPCI and AFI also confirms the same parameters.

- a. **Taste:** Taste is relative and cannot be measured in absolute terms. The taste of cashew kernels depends more or less on the method and technique of processing. India normally uses the drum roasting

methods, which is an oil expulsion process and as such the presence of CNS liquid is almost nil in Indian Cashew. Other competitors use different types of processing that retain a portion of the CNS liquid in the kernels. As such the cashew kernels may not be that sweet as that of drum roasted. Taste of the cashew kernel is an important parameter in its acceptance in the international market, especially when used in confectionary items.

- b. Colour:** Colour is the first catching parameter for the product. The inherent colour of the cashew kernel is slight ivory to grey, which can be preserved as such in good processing. This would result in a golden hue after roasting, which is much accepted in the market. The processing issues would result the colour to be slightly brownish to dark brown. Also, the removal of skin using knife and damaging the outer coating of the kernel will result in patch marks after roasting.
- c. Infestation:** Infestation in cashew kernels leads to rejection of the kernels by the health authorities of the importing countries. Processing under un-hygienic conditions, long exposure of cashew kernels, and improper packing results in the cashew kernels getting infested.
- d. Crispness:** Crispness refers to less moisture contents and better results in value addition process. The acceptable level of moisture in plain cashew kernel is less than 4 per cent.
- e. Broken:** The cashew kernels is subjected to breakage during handling and transit. Lesser levels of moisture results in more broken. Since, whole cashew fetches more prices, some exporters try to mix the

maximum broken cashew with the wholes. The acceptable level of broken is maximum 5 per cent by weight.

- f. Odour:** Cashew is susceptible to rancidity if not properly preserved. More levels of moisture, long storage and improper packing all leads to rancidity in the cashew kernels that results in un-acceptable odour.
- g. Foreign Matter:** The presence of foreign matter is unacceptable. Mostly hair, coins, glass pieces, ornaments and jewelery parts, etc. are found in the cashew packets. Sometimes, the parts of the machines used in processing are also found in cashew packets.
- h. Uniformity:** The cashew kernels should be uniform in size, lest that would result in over roasting of small nuts and under roasting of bigger nuts when further processed for value addition. This would make the value added product less acceptable to end consumers.

The perceptions of overseas buyers on the above parameters were surveyed using a five point Linkert scale to test the hypothesis:

H19: The Quality of Indian Cashew Kernel was Superior to that of Other Origins

The respondents were requested to comment on their level of agreements to various arguments related to the above quality parameters. One argument each was proposed against each parameter analysed. The arguments put forward were:

- a) The **taste** of Indian Cashew is superior to other origins.
- b) The **colour** of Indian Cashew is superior to others.

- c) Indian cashew is **crispier** than others.
- d) Indian Cashew is **uniform** in size compared to other origins
- e) **Foreign matter** in Indian Cashew is **more** compared to other origins.
- f) The **infestation level** in Indian cashew is **more** compared to other origins.
- g) The **odour** of Indian Cashew is **more** acceptable compared to other origins
- h) The **Broken percentage** of Cashew in Indian Cashew is **more** compared to other origins.

Of the above, items 'e', 'f', and 'h' described negative aspects of the parameters and the more the level of acceptance, less favorable was the product. In such cases the responses were reverse coded.

The experts were of the opinion that all the above eight factors were more or less significant, equal weightage were given to all factors and accordingly the analysis was done.

The scores recorded in individual cases for summated for each criteria and the mean score for each criteria was calculated. The average of such criteria was calculated. The minimum average score was 1 and the maximum 5. The mean score for each criteria varied between 2.34 and 3.78 with the average score of 3.07 with a standard deviation of 0.26.

Table 7.4 Descriptive Statistics & Mean Rank for Quality Parameters for India

| | N | Minimum | Maximum | Mean | Std. Deviation |
|--------------------|----------|----------------|----------------|-------------|-----------------------|
| taste | 32 | 2 | 5 | 3.78 | .832 |
| Colour | 32 | 2 | 5 | 2.97 | .999 |
| Crispness | 32 | 2 | 5 | 3.44 | .878 |
| Uniformity | 32 | 1 | 4 | 2.44 | .801 |
| Foreign matter | 32 | 1 | 5 | 3.22 | .906 |
| Infestation | 32 | 1 | 4 | 2.97 | .822 |
| Odour | 32 | 2 | 5 | 3.44 | .914 |
| Brokens | 32 | 1 | 4 | 2.34 | .787 |
| Valid N (listwise) | 32 | | | 3.07 | |
| Mean Score | | | | | |

As seen from the result, the value is slightly above the neutral value of 3. The test results showed that the quality of Indian cashew kernel was slightly more acceptable in the international market. The significance of this was tested with one sample t-test against the null hypothesis that the quality of Indian cashew was not superior to other origins in the international market.

Table 7.5 One-Sample Statistics

| | N | Mean | Std. Deviation | Std. Error Mean |
|-----|----------|-------------|-----------------------|------------------------|
| avg | 32 | 3.0742 | .26155 | .04624 |

Table 7.6 One-Sample Test Results

| | Test Value = 3 | | | | | |
|-----|----------------|----|--------------------|--------------------|--|-------|
| | t | df | Sig. (2-tailed) | Mean Difference | 95% Confidence Interval of the Difference | |
| | | | | | Lower | Upper |
| avg | 1.605 | 31 | .119 | .07422 | -.0201 | .1685 |

Result: The significance level of the null hypothesis tested was 11.9 per cent and as such the test failed to reject the null hypothesis. The working hypothesis rejected.

7.5 Cashew Kernels Buying Criteria

When entering into a contract to purchase cashew kernel from a processing country, the decision of the overseas importer is influenced by different criteria. The decision to purchase from a particular country/ supplier is knowingly or unknowingly influenced by such factors that are perceived by the importer based on his experience or general thinking. The following trade related criteria were analysed for their relevance and importance, as suggested in the expert interview.

- a. Pricing of the product:** The price quoted for the cashew kernel converted in CIF (cost, Insurance and Freight) landed terms is an important criteria. The market is very price sensitive and the competitive pricing determine the profit margins as in any trade.
- b. Quality of the Product:** Often, the pricing of the product is a function of its quality. A premium price can be enjoyed for high quality products in certain market where as some other market look for FAQ (fair

average Quality) at reasonable prices only. In any case an inferior quality if at all offered at low price is not acceptable to any market.

- c. Promptness in Shipment:** The cashew kernels are often purchased by value adders on a forward basis on the basis of the production plan of the value added processing. In turn, the importers (may be value adders or traders) makes forward purchasing from their overseas suppliers. If the shipment schedules are not strictly adhered, the production schedule is affected and the trader will be made to compensate the losses.
- d. Packing of the Product:** Since the cashew kernel reaches the destination after multiple handling and a quite long transit time, the retention of the original characteristics including the shape and crispness of the kernel is important lest that would find less acceptable to the value adders. The strength of the packing material, its permeability, bursting strength, purity and quantity of gases flushed etc. counts high compared to the appearance.
- e. Rapport with the Supplier:** Rapport with the supplier provides an added comfort for the importer. A longstanding relationship with the stake holders in the industry and the experience and expertise of the supplier will be an added advantage in the trade. Further, this would add flexibility on the part of the supplier to support the importer in case of an emergency or unexpected circumstances.
- f. Trade Norms:** Trade norms are an important factor that provides reasonable comforts and advantages to the parties in the trade. It relates to the payment relaxations, flexibility in conditions, Government

imposed restrictions in trade, willingness of the supplier to supply as per the requirements of the importer, furnishing of different certifications etc.,

- g. Service of an Agent:** Many an importer prefers to involve an agent to work with as he may take care of dealing with different suppliers. Also the agent can keep the importers update with the market, as he is considered to be a source of market information. The agent would negotiate and settle any disputes between the supplier and the importer. Mostly agents are stationed in the exporting countries and the services are widely used when dealing with new and small exporters. They will also serve as a communication link between the supplier and importer.
- h. After Sales Support:** Cashew being an agricultural product, the quality and physical parameters may change from product to product. Also there can be deviations in the specifications due to transit damages or in transit infestation. Mostly the payments are effected much before the consignment is received by the importer. In case of any defects in the material received, the importer will be at risk unless a proper after sales support is extended by the seller.
- i. Payment Terms:** The cost of the material and flexibility of operation depends largely on the payment terms offered by the seller. Letter of Credit requires sufficient backing by a financial institution and involves additional costs. CAD (Cash Against Documents) offers flexibility in operations, where as usance terms (credit facilities) offer leverage in operations.

- j. Contractual Obligations:** Since most of the contracts are on forward basis, the prices at the time of actual shipment may vary from the contracted rates. Some suppliers may default if the contracted rates are lower than the prevailing prices at the time of shipment. Also, certain suppliers may sell forward without ensuring the supply of materials and may try to mobilize the same at the time of shipment, which may result in non availability of materials for shipment. This will upset the production schedules of the importer and also his supply schedules.

The respondents were requested to rank their preference to the above 10 criteria when they were to purchase cashew kernels of an overseas origin. The ranks assigned were 1 to 10, and the criteria ranked “1” were the most significant one and that ranked “10” was the least significant. The preference of the overseas buyers the above criteria was surveyed and the responses analysed using Friedman’s test.

Table 7.7 Buying Preference of Overseas Buyers

| Criteria | Mean Rank |
|-------------------------|-----------|
| Pricing of Product | 2.64 |
| Promptness | 4.20 |
| Packing of Product | 5.28 |
| Quality of the product | 1.63 |
| Rapport | 5.94 |
| Trade Norms | 8.31 |
| Service of Agent | 8.47 |
| After sales Support | 7.09 |
| Payment terms | 7.72 |
| Contractual Obligations | 3.72 |

Table 7.8 Friedman's Test Statistics

| | |
|-------------|---------|
| N | 32 |
| Chi-Square | 183.349 |
| df | 9 |
| Asymp. Sig. | .000 |

Result: The test statistics indicated that all the preference criteria assigned were significant and overseas buyers assigned maximum importance to the quality of the product than the pricing of the product. However, the service of an agent and the trade norms were less important criteria for them.

With the above responses collected, it was analysed whether there existed any significant difference in the preference criteria among small, medium and top class of overseas buyers by testing the hypothesis formulated:

H20: There Existed no Significant Difference Among Small, Medium and Top Classes of Overseas Buyers Regarding their Perception to Various Purchase Criteria of Cashew Kernels

This null hypothesis was tested using Kruskal walls test with the different class of importers by volume of imports viz. small, medium and top as grouping variable and the different preferential criteria as test variables.

Table 7.9 Preference of Different Classes of Overseas Buyers

| | Class of Respondents | N | Mean Rank |
|------------------------|-----------------------------|----------|------------------|
| Pricing of Product | Small | 8 | 14.13 |
| | Medium | 9 | 18.44 |
| | Top | 15 | 16.60 |
| | Total | 32 | |
| Promptness | Small | 8 | 19.56 |
| | Medium | 9 | 12.28 |
| | Top | 15 | 17.40 |
| | Total | 32 | |
| Packing of Product | Small | 8 | 13.44 |
| | Medium | 9 | 15.78 |
| | Top | 15 | 18.57 |
| | Total | 32 | |
| Quality of the product | Small | 8 | 15.81 |
| | Medium | 9 | 17.50 |
| | Top | 15 | 16.27 |
| | Total | 32 | |
| Rapport | Small | 8 | 15.81 |
| | Medium | 9 | 18.17 |
| | Top | 15 | 15.87 |
| | Total | 32 | |
| Trade Norms | Small | 8 | 14.63 |
| | Medium | 9 | 16.17 |
| | Top | 15 | 17.70 |
| | Total | 32 | |
| Service of Agent | Small | 8 | 12.81 |
| | Medium | 9 | 16.39 |
| | Top | 15 | 18.53 |
| | Total | 32 | |
| After sales Support | Small | 8 | 19.00 |
| | Medium | 9 | 17.17 |
| | Top | 15 | 14.77 |
| | Total | 32 | |
| Pricing of Product | Small | 8 | 15.19 |
| | Medium | 9 | 14.50 |
| | Top | 15 | 18.40 |
| | Total | 32 | |
| Promptness | Small | 8 | 20.63 |
| | Medium | 9 | 16.61 |
| | Top | 15 | 14.23 |
| | Total | 32 | |

Table 7.10 Kruskal -Walls Test Statistics

| | Pricing of Product | Promptness | Packing of Product | Quality of the product | Rapport | Trade Norms | Service of Agent | After sales Support | Payment terms | Contractual Obligations |
|-------------|--------------------|------------|--------------------|------------------------|---------|-------------|------------------|---------------------|---------------|-------------------------|
| Chi-Square | .963 | 2.942 | 1.700 | .198 | .410 | .610 | 2.063 | 1.148 | 1.224 | 2.489 |
| df | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Asymp. Sig. | .618 | .230 | .427 | .906 | .815 | .737 | .357 | .563 | .542 | .288 |

Result: The test statistics all yielded the p-value above 5 per cent and as such the difference in the mean ranks arrived at were not significant. Hence failed to reject the null hypothesis, which supported the research hypothesis also. Research hypothesis accepted.

7.6 Performance of Competing Countries in the International Market

India is the first country to hit the international market with cashew kernels as a commodity for trade and it is she who pioneered cashew as an industry. India is having bulk processing capacity and the ability to supply any grade and quantity at short supply periods. India used to enjoy a monopoly in the international market. But of late, with more raw nut producing countries entering into processing and competing in the international market, the overseas buyers today have a wide option to source their cashew kernels from different regions. Since the major portion of the raw cashew nuts produced in the raw nut producing countries in

Africa and far East Asia are still exported to other processing hubs, those hubs preferred by the overseas importers will have the added advantage and will be in a position to divert the raw cashew produced in such countries. As such, in view of the increased international competition, the exporting countries will have to tune up to the requirements and satisfaction of the overseas buyers to promote their produce in the international market.

H21: There Existed No Significant Difference in the Performance of Competing Countries in the International Cashew Trade Measured on the Basis of Buyer's Preference

On the basis of the weightage in preference of different criteria adopted by the overseas buyers (as analysed above), the performance of India, Brazil and Vietnam in the international market as perceived by the overseas buyers were surveyed to test the hypothesis that the performance of India is better than her competitors in the international market.

The responses from the overseas buyers against each criteria was collected for India, Brazil and Vietnam on a 10 point scale with value '1' for low and '10' for high scores. The high score for criteria 'pricing of the product' implied a less favorable condition and hence the scores obtained for the same was reverse coded. For all other criteria, a high score implied a more favorable condition.

The responses collected against individual items were coded using the ordinal scales and the from the summated value the mean score was determined for each country for each criteria.

Table 7.11 Mean Scores for Different Criteria for Purchase

| Criteria | India | Brazil | Vietnam |
|------------------------|--------------|---------------|----------------|
| Pricing of the Product | 4.188 | 4.000 | 4.531 |
| Promptness in shipment | 6.531 | 7.406 | 5.969 |
| Packing of the Product | 7.094 | 8.031 | 7.250 |
| Quality of the Product | 7.094 | 7.844 | 6.875 |
| Rapport with suppliers | 6.969 | 7.969 | 6.250 |
| Trade Norms | 6.313 | 6.625 | 6.000 |
| Service of the Agennt | 6.719 | 7.000 | 6.438 |
| After sales Service | 6.406 | 7.031 | 5.875 |
| Payment Terms | 7.750 | 7.594 | 6.844 |
| Contractual Obligation | 6.281 | 7.469 | 5.313 |

The mean values so obtained were converted into weighted scores by multiplying them by the weightage (reverse code for ranks) arrived at in table 7.7 to yield the following table.

Table 7.12 Weighted Scores for Different Criteria for Purchase

| Criteria | Weighted Scores | | | Max. Score |
|------------------------|------------------------|----------------|----------------|-------------------|
| | INDIA | BRAZIL | VIETNAM | |
| Pricing of the Product | 35.005 | 33.438 | 37.878 | 83.60 |
| Promptness in shipment | 44.392 | 50.339 | 40.569 | 68.00 |
| Packing of the Product | 40.567 | 45.929 | 41.461 | 57.20 |
| Quality of the Product | 66.504 | 73.535 | 64.453 | 93.80 |
| Rapport with suppliers | 35.279 | 40.342 | 31.641 | 50.60 |
| Trade Norms | 16.965 | 17.805 | 16.125 | 26.90 |
| Service of the Agennt | 17.007 | 17.719 | 16.295 | 25.30 |
| After sales Service | 25.024 | 27.466 | 22.949 | 39.10 |
| Payment Terms | 25.430 | 24.917 | 22.456 | 32.80 |
| Contractual Obligation | 45.735 | 54.382 | 38.682 | 72.80 |
| TOTAL | 351.909 | 385.871 | 332.509 | 550.00 |

The test result calculated the weighted score of India as less compared to Brazil. The significance of the difference in scores was tested with one-sample t test against the null hypothesis that there exists no difference in the performance of the three competing countries.

Table 7.13 One-Sample Statistics

| | N | Mean | Std. Deviation | Std. Error Mean |
|------|----|----------|----------------|-----------------|
| IND | 10 | 35.19080 | 15.153921 | 4.792091 |
| BRAZ | 10 | 38.58720 | 17.858586 | 5.647381 |
| VIET | 10 | 33.25090 | 14.725217 | 4.656522 |

Table 7.14 One-Sample Test Results

| Test Value = 55 | | | | | | |
|-----------------|--------|----|-----------------|-----------------|---|-----------|
| | | | | | 95% Confidence Interval of the Difference | |
| | t | df | Sig. (2-tailed) | Mean Difference | Lower | Upper |
| IND | -4.134 | 9 | .003 | -19.809200 | -30.64966 | -8.96874 |
| BRAZ | -2.906 | 9 | .017 | -16.412800 | -29.18806 | -3.63754 |
| VIET | -4.671 | 9 | .001 | -21.749100 | -32.28289 | -11.21531 |

The significance level for the three observations was all less than 5 per cent and test rejected the null hypothesis which implied that the test values were significant. Hence it could not be concluded that there existed no difference in the performance among the competing countries. Since the test values were significant for all the three cases, it could be concluded that the performance of Brazil was more close to the preference of the overseas buyers.

Result: Working hypothesis rejected.

7.7 Conclusion

The overseas importers of Indian cashew kernels surveyed consisted of representatives from all categories classified in terms of geographical regions, experience and volume of trade. Out of 32 overseas buyers surveyed, only 3 were importing value added products. The level of their import of value added products was less than 10 per cent by value.

The overseas buyers preferred to buy from India, had all other purchase criteria remained the same. Though India wanted to project the exports of cashew kernels under the generic brand “Indian Cashew”, the survey result did not support the claim that Indian cashew kernels are superior to other origins in the international market.

Regarding the various criteria for purchase of cashew kernels, the overseas buyers attributed more importance to the quality of cashew kernels than its pricing. In other words, they were more willing to pay premium prices to quality products. Further there was no difference in the pattern of significance attributed to different criteria of purchase among small, medium and top importers.

In spite of the fact that India was the supplier of choice for the overseas buyers, the performance of India in the international cashew trade was behind that of Brazil. In other words, Brazil stood close to the expectation of overseas buyers in the international market followed by India and Vietnam in that order.

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**CHALLENGES TO INDIA IN THE
WORLD CASHEW MARKET**
(INDIAN AND GLOBAL PERSPECTIVE-A FACTOR ANALYSIS)

Contents

- 8.1 *Exploratory Factor Analysis*
 - 8.2 *Challenges to India*
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-

“Companies achieve competitive advantage through the acts of innovation. They approach innovation in its broadest sense including both new technologies and new ways of doing things. They perceive a new basis for competing or find better means for competing in old ways. Innovation can be manifested in a new product design, a new production process, a new marketing approach or a new way of conducting training”

-Maichael E. Porter (Harward business review-1990)

India is the largest producer, processor and consumer of cashew in the world. For years together, India was enjoying an unparallel and un challenged monopoly in the production, processing and marketing of cashew in the world. But with more and more producing countries acquiring the knowhow of processing and entering the international market, the premium position enjoyed by India started shaky with the result that her share in the International market started declining from 65 per cent from 25 years ago to 29 per cent as

of now. On the other hand, the domestic consumption in India had gone up beyond imagination, that today she is the largest consumer in the world. But this position she achieved was at the cost of her lowering the share in the international market.

Had India geared up to the changing world scenario in the world cashew, she could have still enjoyed the commanding position in the Industry. Heavy dependence on imported raw materials, un-utilised processing capacities, high cost of processing, lack of mechanization, modernization and innovation all dragged India in the race. Lack of man power is another problem facing the processing sector, which mostly adopts the traditional ways of processing that uses 7 to 9 man days to process a bag of cashew weighing 80 Kg. As a result, her processing costs are among the highest in the world.

Another 10 years (or perhaps less than that) down the lane, what would be position of India in the international scenario? Mechanisation has brought in a feel of comfort for raw nut producing countries to process the nuts and export in the world market. This could have multiple impacts to India in the sense that on one side it could reduce the supply of raw nuts to India and on the other side it could result in strong competition in the international kernel market with these countries entering in the international market. Many raw nut producing countries have imposed some or other restrictions on the export of raw nuts. This should be seen as the complete ban on exports in future as the processing of cashew nuts is established in a phased manner. Further, India would face competitions from other countries in her own domestic market, as other processing countries would explore the ever increasing domestic market. Domestic production of raw nuts in India already faces stiff competition from other crops like rubber, spices etc. Such other

cash crops yield better returns to the farmers. Ageing of trees and low productivity would be another concern for the low growth rate of raw nut production in India. The ever increasing domestic consumption and huge demand of kernels in the international market would be still another problem to address with. Will the 'Indian Cashew' be the most preferred nuts in the International market?

8.1 Exploratory Factor Analysis

The survey was conducted on both Indian Exporters and Overseas buyers with the main objective to analyse the challenges that India is likely to face in the international cashew sector in the years to come. Effective utilization of Strength and Opportunities and minimizing the effects of weakness and threats was the core meaning of the word 'Challenges' in the context of this study. The analysis was done in a phased manner.

The first step was to conduct an expert interview with Indian exporters and overseas buyers, who had adequate experience in the international trade of cashew kernels. A total of 12 experts were contacted individually and interviews conducted. They included four overseas buyers and eight Indian Exporters. The objective of the study was detailed to them and their responses and observations were consolidated. The expert while analyzing the challenges oriented their views on five core objects viz.

- The growing domestic market
- The competition from other exporting countries
- The effect of mechanization in processing
- India's supply chain of Raw nuts
- The changing international trends

Table 8.1 Variables Identified

| Specific Areas | Variables/ Challenges |
|---|---|
| 1. Growing Domestic Market | 1. India to concentrate more on Domestic Market due to high domestic prices 2. India to adopt forceful reduction of the international market share due to scarcity of product. |
| 2. The competition from other exporting countries | 3. India to face further reduction in market share of traditional Markets(USA,UK etc.) 4. India to explore new markets to overcome competition 5. India to face complete withdrawal from Lost markets (Japan, Australia etc.) |
| 3. The effect of mechanization in processing | 6. India to face stiff competition from raw nuts producing countries – as they commence mechanised processing 7. India to stand benefited due to increased processing with mechanisation 8. Indian processors to establish processing units in raw nut producing countries 9. Cashew processing to evolve round big corporate-small processors wiped out |
| 4. India's supply chain of Raw nuts | 10. India to increase raw nuts production to overcome shortage from traditional suppliers. 11. India to encourage cultivation and source raw nuts from non-traditional suppliers |
| 5. The changing international trends | 12. India to emerge out as the supplier of choice- her products preferred over others. 13. Indian share of processing to reduce further. 14. India to face competition in her own domestic market – with imports of cashew kernels from competing countries. |

A proper coding and summing up of these outcomes resulted in identifying 14 variable of the study. The variables identified under the specific areas of concern are summarised in table 8.1 above.

The growing domestic market in India can lead mainly to two challenges. On one side, Indian exporters will be concentrating on the domestic market due to the better price realizable in the domestic market. In the analysis of the survey on Indian Exporters, it was observed that the main stimulus for Indian Exporters in switching their produce in the domestic or export market was the net price realisable. The second factor is that India will be forced to reduce the exports due to high shortage of kernels for domestic consumption, which otherwise would lead to overpricing of cashew kernels in the domestic market that would attract the Government level intervention to regulate exports or to encourage imports of cashew kernels.

The competition from other countries is predicted to be still stiff that India would face further reduction in the traditional markets of USA, UK, Australia etc., as new processing countries would be entering these markets with highly competitive prices that India cannot match with. This may further reduce or totally wipe off the presence of Indian in the lost markets of Japan, Australia etc. May be to overcome this situation, India would be left with an option to explore new markets only.

The effect of mechanization can have both positive as well as negative impacts on India. First of all, the traditional suppliers of raw nuts like the East and West African countries would start processing domestically that would result in a cut of supply of raw nuts to India. On the other side, India could stand benefited with the increased production possible with mechanization, especially when she is facing a shortage of labors. The backbone of the cashew Industry in India in the older days was the skilled labour force here, which is no more relevant in view of the mechanization. To avoid extra voyage expenses and export duty imposed on export of raw nuts by

many processing countries, Indian exporters may slowly shift their processing to the raw nut producing countries, which will be another threat for India. Further organisations like Bill Gates Foundation, African Cashew Alliance etc, are providing a lot of assistance for starting processing in Africa continents. The respective Governments are also providing huge export incentives for the export of processed cashew kernels from Africa. All these are attracting factors for Indian exporters to concentrate their processing on cashew producing countries. Further, mechanization would result in huge capital investment and traditional processing would not be viable in the years to come. This can result in processing evolving round big processors.

A major setback to India may be her cut in the supply positions of raw nuts. It was already analysed in chapter 6 that India cannot substitute imports fully with increased production alone. She has to go for a balanced trade in raw nuts where a major portion is produced here for which the domestic production should increase. To ensure an interrupted supply of raw nuts, India should tie up with other countries where cashew can be grown to encourage raw cashew production and to ensure the supply to India.

And finally, India has to tune up with the changing cashew scenario in the world. India should emerge out as the supplier of choice. In chapter 7 (the overseas buyers survey), it was found that even though India was the most preferred supplier of cashew kernels, her quality is not outstanding and hence not worth to go for branding of Indian Cashew, Also it was found that the performance of India was not to the near expectation of the overseas buyers. India has to overcome these to make advantage of the loyalty that she still enjoys in the international market. The changing market scenario would only push India's position with the current situations in force. A major

challenge that India may be facing will be the competition when her own competitors start marketing their produce in her own domestic market.

Based on the above 14 variables identified, a questionnaire was prepared under the framework of a five-point Likert scale. The 14 variables identified were presented as arguments/statements and the responses were coded on a five-point scale.

A Pilot study and Protocol analysis was conducted adopting Newel and Simon (1973 method) on a group of 12 members who consisted of 3 overseas buyers and 9 Indian Exporters, selected at convenience from among the participants of 'Kaju India 2010' – a Buyer Seller Meet conducted in Kollam, Kerala. The questionnaire so prepared was circulated to the group and the responses collected from the members without explaining the contents. Later on, the content of the questionnaire used was explained to them and the responses again collected. The arguments that had variations in the responses were modified to make a clear understanding of the questionnaire used.

The third stage was the data collection. The modified questionnaire was included in the questionnaires circulated to both Indian Exporters and Overseas buyers. A total of 72 responses were accepted for analysis, that included 40 responses from Indian Exporters and 32 responses from Overseas buyers. Reliability test using Cronbach's Alpha yielded a result of 0.724. Nunnally (1978, p.245) recommends that the instrument used in basic research should have a score of 0.7 or more. Having satisfied with the reliability of the questionnaire used, the exploratory factor analysis was attempted.

All the statements were taken for further analysis based on the high communalities (Communalities with values more than 0.5 was taken as

important as a thumb rule). The responses, which are in five point scale, were used with factor analysis to reduce dimensions and to identify such dimensions resulting from the exercise. The results and the findings are narrated below.

Table 8.2 KMO and Bartlett's Test Results

| | | |
|--|--------------------|---------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .620 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 202.764 |
| | df | 91 |
| | Sig. | .000 |

Kaiser-Meyer-Olkin Measure of Sampling Adequacy test is the minimum standard which should be passed before a factor analysis (or a principal components analysis) should be conducted. Kaiser-Meyer-Olkin Measure of Sampling Adequacy measure varies between 0 and 1, and values closer to 1 are better. Here in this case the value is 0.620 which is satisfactory and hence the standard is met. Bartlett's Test of Sphericity generally tests the null hypothesis that the correlation matrix is an identity matrix. In this case the test was significant with chi square = 202.764, df = 91, $p < 0.05$ and hence the null hypothesis was rejected.

Principal Component Analysis was conducted to extract communalities in these 14 variables analysed that yielded the values ranging between 0.702 and 0.916. It was observed that the communalities showed sufficiently large values suggesting that the statements were equally important for the contemplated problem.

Table 8.3 Communalities of the Variables

| Communalities | | |
|----------------------|----------------|-------------------|
| Variables | Initial | Extraction |
| 1 | 1.000 | .808 |
| 2 | 1.000 | .739 |
| 3 | 1.000 | .814 |
| 4 | 1.000 | .857 |
| 5 | 1.000 | .873 |
| 6 | 1.000 | .916 |
| 7 | 1.000 | .816 |
| 8 | 1.000 | .778 |
| 9 | 1.000 | .873 |
| 10 | 1.000 | .702 |
| 11 | 1.000 | .769 |
| 12 | 1.000 | .862 |
| 13 | 1.000 | .793 |
| 14 | 1.000 | .733 |

The Eigen values derived from the Principal component analysis yielded values from 0.119 to 3.280. It was seen that 79.21 per cent variation in the responses on 14 variables could be reduced to six different factors using the standard procedure to consider those factors having Eigen values greater than 1.

Table 8.4 Total Variance Explained

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|-----------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 3.280 | 23.431 | 23.431 | 3.280 | 23.431 | 23.431 | 2.425 | 17.324 | 17.324 |
| 2 | 2.127 | 15.193 | 38.624 | 2.127 | 15.193 | 38.624 | 2.076 | 14.832 | 32.156 |
| 3 | 1.676 | 11.974 | 50.599 | 1.676 | 11.974 | 50.599 | 1.944 | 13.886 | 46.042 |
| 4 | 1.608 | 11.486 | 62.084 | 1.608 | 11.486 | 62.084 | 1.821 | 13.008 | 59.050 |
| 5 | 1.281 | 9.151 | 71.236 | 1.281 | 9.151 | 71.236 | 1.440 | 10.289 | 69.339 |
| 6 | 1.116 | 7.974 | 79.210 | 1.116 | 7.974 | 79.210 | 1.382 | 9.871 | 79.210 |
| 7 | .766 | 5.473 | 84.683 | | | | | | |
| 8 | .529 | 3.776 | 88.459 | | | | | | |
| 9 | .472 | 3.374 | 91.833 | | | | | | |
| 10 | .378 | 2.703 | 94.536 | | | | | | |
| 11 | .303 | 2.168 | 96.703 | | | | | | |
| 12 | .211 | 1.508 | 98.211 | | | | | | |
| 13 | .131 | .935 | 99.147 | | | | | | |
| 14 | .119 | .853 | 100.000 | | | | | | |

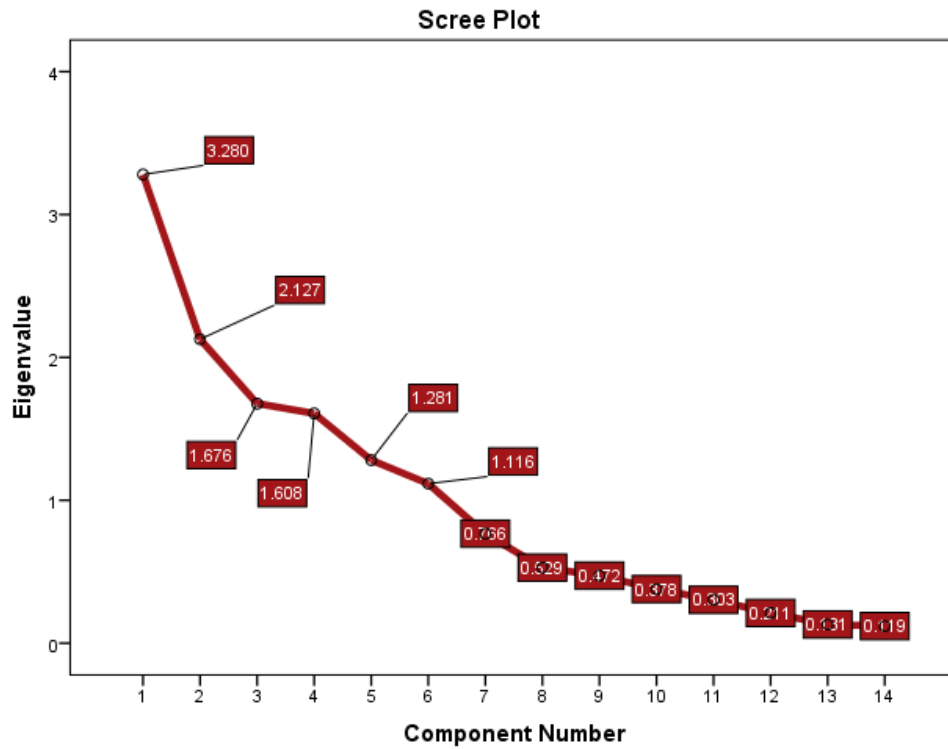


Fig. 8.1 Screen Plot of Eigen values

In the rotation Component analysis conducted using Varimax with Kaiser Normalisation method, the rotations got converged in 11 iterations. In the Rotated Component Matrix table, the variables having high loadings are indicated. These variables were collected and organised based on their loadings.

Table 8.5 Rotated Component Matrix

| | Component | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|-------------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| concentrate on domestic | .869 | .192 | -.077 | -.053 | -.049 | -.070 |
| reduce exports | .797 | .020 | -.044 | .199 | .091 | -.232 |
| India increases production | .711 | -.105 | .036 | .087 | .143 | .337 |
| Indian cashew best preferred | .557 | .262 | .188 | .115 | -.380 | .538 |
| India's processing increased | .288 | .777 | .246 | -.236 | -.104 | .037 |
| Imports from new countries | .090 | .759 | -.012 | .281 | .069 | -.029 |
| Competition from overseas in domestic market | -.156 | .746 | .016 | .297 | .025 | .251 |
| Faces competition from producing countries | -.029 | -.017 | .947 | -.003 | .100 | -.088 |
| Withdraws from traditional markets | -.028 | .174 | .882 | .250 | -.012 | .026 |
| Looses share | -.016 | .162 | .288 | .830 | -.122 | .040 |
| India's share reduces | .262 | .164 | .003 | .759 | .138 | .047 |
| Processing evolves round only big corporate | .165 | .255 | .238 | -.217 | .823 | -.015 |
| Indians open processing abroad | -.039 | -.253 | -.113 | .399 | .718 | .157 |
| Explores new market | -.067 | .101 | -.102 | .045 | .112 | .904 |

Based on the common thread seen among the statements in each group, appropriate names were suggested after discussion with experts. Thus the information contained in the responses may imply the information contained in factors named as:

Table 8.6 Exploratory Factors Identified

| Sl.No | Factor | Variance % | Cumulative % |
|--------------|---|-------------------|---------------------|
| 1 | Internal Opportunities <ul style="list-style-type: none">▪ High price in domestic market▪ High consumption in India▪ India to increase rcn production▪ General preference to Indian product | 17.324 | 17.324 |
| 2 | Foreign entrants to Indian market <ul style="list-style-type: none">▪ Competitors entering Indian market▪ Dependence on new country for rcn▪ To increase processing by mechanisation | 14.834 | 32.156 |
| 3 | Threats from foreign Players <ul style="list-style-type: none">▪ Competition from rcn producing countries▪ Withdraws from traditional market | 13.886 | 46.042 |
| 4 | Reduction in Market share <ul style="list-style-type: none">▪ Losses markets▪ Share reduces | 13.008 | 59.050 |
| 5 | Centralisation of Processing <ul style="list-style-type: none">▪ Processing evolving around corporates▪ Indian corporates processing in rcn producing country. | 10.289 | 69.339 |
| 6 | Exploring new markets <ul style="list-style-type: none">▪ Explores new market | 9.871 | 79.210 |

Table 8.7 Basic Statistics of Factors Analysed

| Statistics | | | | | | |
|----------------|------------------------|-----------------------------------|------------------------------|---------------------------|-----------------------------|------------------------|
| | Internal Opportunities | Foreign Entrants to Indian market | Threats from Foreign Players | Reduction in Market Share | Globalisation of Processing | New Market Exploration |
| Mean | 6.5500 | 5.1538 | 5.7500 | 4.7436 | 5.6500 | 2.1500 |
| Std. Deviation | 2.55152 | 2.00707 | 1.97094 | 1.58476 | 1.59406 | .73554 |
| Variance | 6.510 | 4.028 | 3.885 | 2.511 | 2.541 | .541 |

The histogram further explained the normality of the six factors arrived at. Figure explains about the normality of all the six factors. From the histogram – normal curve, it could be seen that, the data was almost normal. The concentration of the data was to the centre.

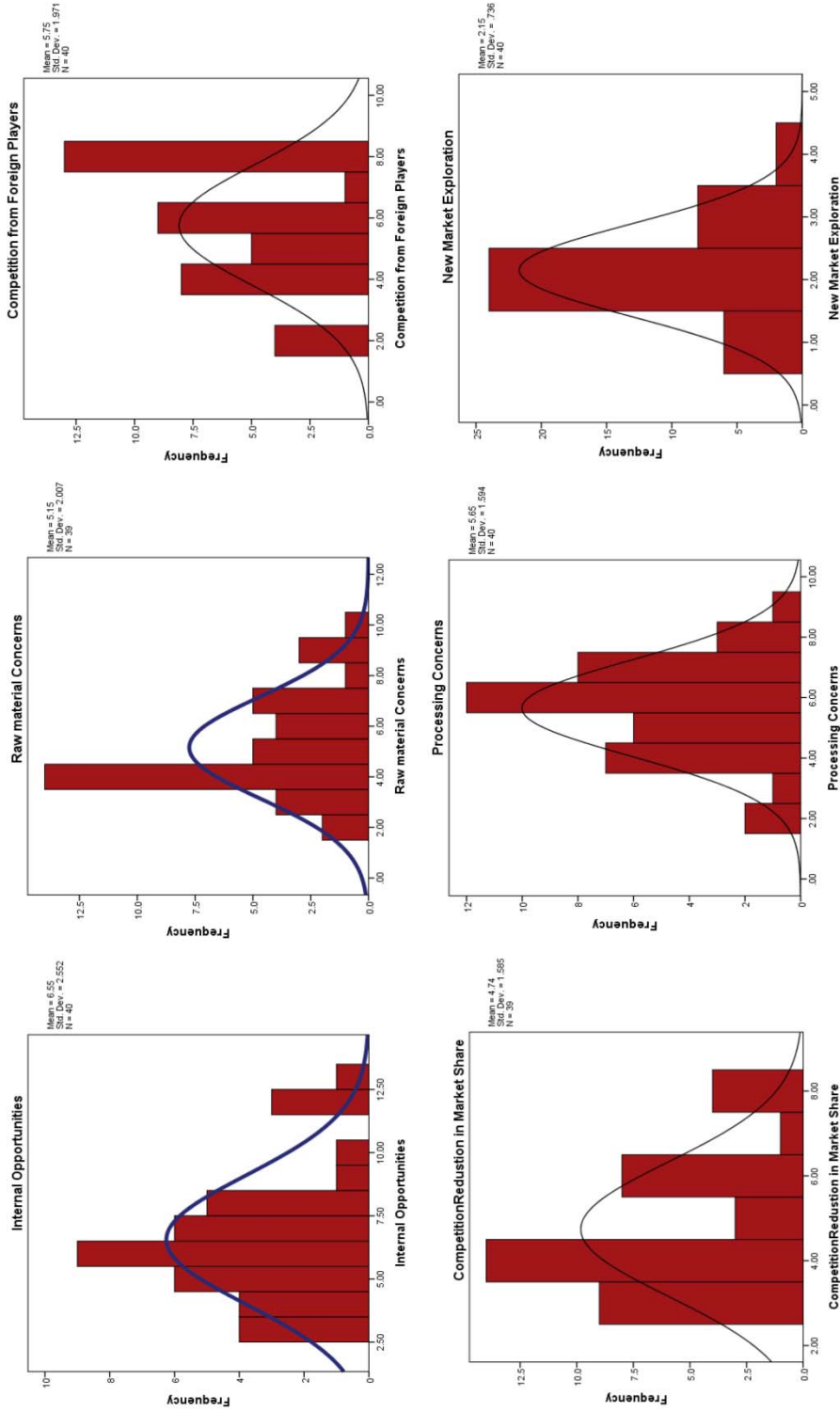


Fig. 8.2 Histogram with Normal Plot

8.2 Challenges to India

Based on the above analysis, the main challenge for India in the future will be to make use of her internal opportunities. The inability to make use of an opportunity is also a challenge in the context of this study. The high demand in the domestic market resulting out of increased domestic consumption would lead to heavy shortage of cashew kernels in the domestic market leading to high domestic prices compared to international market. The domestic prices can even go multiple times higher than international prices due to high scarcity of cashew kernels. This may attract Government level initiatives like controlling exports and encouraging imports of cashew kernels (like Onion, Sugar etc.). The increased domestic consumption may demand for more production of raw cashew nuts as well. India will be forced to increase domestic production of raw nuts either by increasing the area of production or by increasing the productivity or both. Since the rest of the world will be sourcing a major share of the cashew kernels from new processing countries and countries like Vietnam and Brazil, Indian cashew will be a scare item in the International market. Since Indian domestic market can offer a better price for cashew kernels here, overseas buyers will have to pay a parity levels for purchase of Indian cashew, which otherwise would be seen as a premium price compared to other sources. It would finally place the Indian cashew as a premium product in the world market.

Foreign entrants in the domestic market of India will be yet another challenge that is awaited in the near future. The high market prices in India will attract other processing regions to market their produce in the Indian market. Even though certain protective steps from the Government side may give some sort of relief in the beginning, the same would be withdrawn in a phased manner if the domestic market would face scarcity of the product. To

overcome such a situation, India would be forced to identify new sources for raw nuts – as the traditional suppliers start processing of raw nuts. Also to match the domestic processing in tune with demand and also to overcome the scarcity of labour force, India would have to adopt mechanization and process automation in processing in a big way.

Further, India would be exposed to challenges from foreign suppliers of raw nuts as well as customers in the international market. The competition from traditional suppliers would be more severe as they start processing of raw nuts. This would result in gradual cut in supply chain of raw nuts. Further, these new entrants with existing competitors would be capable of capturing the traditional international market with relatively low prices, as they have cost advantages over India. This could even result in India withdrawing fully or partially from the traditional kernel markets of US, UK, Europe, Japan and Australia.

Reduction in the international market share is more or less a reality even in the present stage itself. As already seen, the competition from new and existing competitors would lower the share in the international market. Further, the high domestic demand would still lower the share of exports from total domestic processing.

Yet another challenge for India would be a total shift in the processing. The processing would be more sophisticated in technology and more capital intensive. It would also demand more professional approach to processing and marketing. As a result, the processing would evolve around big corporates who could dictate their terms and the small processors would stand to lose in the game. Further, to make use of the competitive advantage of the new processing countries, the processors in India would relocate their

plants to those regions. This would eventually lead to globalisation of processing where India stands to lose her position as the world's processing hub of cashew nuts. This would have an adverse effect on the economy of rural India as well, where more than one million womenfolk from the economically and socially backward sector presently make their gainful employment.

And finally India would be facing a new challenge to identify new market to export her cashew. Cashew export has been a major foreign exchange earner to the country all these days and it accounts to around USD 1,000,000,000 as of now. Cashew accounts to the third position – next to rice and tea- among the export of Agricultural products from the country. With the effective utilization of labour strength coupled with mechanization and automation in processing, India would have to be in a position to cater the needs of her domestic market while maintaining her status as the world's largest exporter of Cashew kernels. To achieve this status, India has to look for new markets in lieu of her reduced market shares in the traditional markets.

Thus the five core areas considered for the purpose of the study yielded 14 variable to be considered which were further reduced to six factors in the exploratory factor analysis. These six factors put together could explain 79.210 per cent of the challenges await India in the near future in the field of cashew production, processing and marketing.

8.3 Conclusion

Indian cashew industry is to face stringent challenges in the years to come. Any strength, weakness, Opportunity or threat if not properly addressed would lead to a real challenge in the future. The main strength of India in the

cashew sector is her ever increasing domestic market. Addressing the internal opportunities, threats of foreign entrants to the domestic market, threats from foreign players in the international market, further reduction in international share, orientation of processing to big sectors and the exploring of new markets are the main challenges anticipated for India. India should be equipped and geared up to cater the ever increasing demand of the domestic market, still maintaining the premier position in the international market that it used to enjoy till a decade back. In addition the industry should contribute in a better way to the growth of the country by providing gainful employment and fetching foreign exchange to the nation. The above challenges identified, if properly addressed would be capable of guiding this industry in the proper directions in the years to come.

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Chapter 9

SUMMARY OF FINDINGS, SUGGESTIONS AND CONCLUSION

| | |
|------------------------|---|
| <i>C o n t e n t s</i> | 9.1 <i>The Transition of World Cashew Industry</i> |
| | 9.2 <i>Transition in Indian Cashew Sector</i> |
| | 9.3 <i>The Views and Pattern of Indian Exporters</i> |
| | 9.4 <i>Views and Patterns of Overseas Buyers</i> |
| | 9.5 <i>Challenges to India in the World Cashew Market</i> |
| | 9.6 <i>The Summary</i> |
| | 9.7 <i>Suggestions</i> |
| | 9.8 <i>For Further Study and Research</i> |
| | 9.9 <i>Conclusion</i> |

This study on the transition of the world cashew industry and the challenges to India had analysed the global cashew scenario pertaining to the production of raw cashew nuts, its trade, processing into cashew kernels, marketing and consumption of cashew kernels and its transition over the past twenty five years (1988 to 2012). The views and pattern of international trade of cashew was analysed with the help of response collected from both Indian exporters and overseas buyers using separate questionnaires and using appropriate statistical tools. Further, the challenges that await India in the years to come was also analysed with the help of responses collected from both Indian exporters and overseas buyers of Indian cashew using explorative factor analysis. The inference derived at from such analysis is summarised with certain suggestions in this chapter.

9.1 The Transition of World Cashew Industry

The world cashew industry had undergone a process of transition in all fields of production (cultivation), processing and consumption during the period of study. This transition was analysed with the help of available secondary data. The establishment of world trade organisation in 1995 had triggered the international trade in general which was also evident in the cashew industry also.

9.1.1 The Transition in Production of Raw Cashew Nuts

During the period of study (1988- 2012), the world cashew production had undergone an exponential growth of 6.35 per cent. From the production of 5,98,083 M.T. in 1988, the same had grown up to 22,64,410 M.T. in 2012. The growth rate in West Africa (13.87%) and Vietnam (12.32%) were commendable. India registered an overall growth of 4.3 per cent which was slightly less than the world growth rate. During the period West African production had grown up from 30,823 M.T. to 7,16,400 M.T., and Vietnam from 18,000 M.T. to 2,64,810 M.T. while India's growth was from 2,60,260 M.T. to 6,74,000 M.T. None of the regions registered a decline in the growth rate. But, the scenario over the last decade (2003-2012) yielded a slightly different picture. The last decade, world's growth rate in production stood at 2.94 per cent (from 16,74,713 M.T. to 22,64,410 M.T.) . West Africa again topped the list with 9.71 per cent (from 2,99,109 M.T. to 7,16,400 M.T.), whereas India's growth rate was at 2.58 per cent (from 5,35,000 M.T. to 6,74,000 M.T.) being slightly at par with the world growth rate. But Vietnam (from 2,87,405 M.T. to 2,64,810 M.T.) and East Africa (from 1,55,518 M.T. to 85,900 M.T.) registered a decline in growth rate by 3.51 per cent. and 3.14 per cent respectively. Brazil's production was almost stagnant (from 1,83,094 to

1,79,200 M.T.) with a slight decline of 0.25 per cent over the last decade. Other regions registered a growth rate of 5.1 per cent during the entire period of the study (from 81,050 M.T. to 3,44,100 M.T.), whereas the same dropped down to 1.25 per cent (from 2,14,587 M.T. to 3,44,100 M.T.) during the last 10 years period.

During the period of study, the area of production worldwide had one up by 4.78 per cent exponentially. In absolute terms the growth was from 17,04,382 He. in 1988 to 47,14,192 He. in 2012. During the same period West Africa registered the maximum growth rate of 11.07 per cent (from 1,39,150 He. to 17,89,362 He.) followed by Vietnam at 4.45 per cent (from 97,000 He. to 3,30,000 He.) whereas the area of production in India had gone up by only 2.79 per cent.(from 5,27,395 He. to 9,56,200 He.). Here also, Brazil reported almost a stagnant figure in the area of production that registered a growth rate of 1 per cent (5,80,000 He. to 7,65,842 He.) during the period. It is worth notice that the other regions of production reported 4.78 per cent exponential growth (from 2,15,837 He. to 6,83,335 He.) while the East Africa's rate of growth in the area of production was at 2.13 per cent (1,45,000 He. to 1,89,353 He.) during the said period.

Over the last decade (From 2003 to 2012), the World area of production registered an exponential growth of 3.38 per cent (From 35,37,759 He. to 47,14,192 He.). Vietnam topped the list with a growth rate of 6.91 per cent (From 1,84,200 He. to 3,30,000 He.) closely followed by West Africa at 6.50 per cent (From 10,17,976 He. to 17,89,362 He.). Indian growth rate was at 2.52 per cent (From 7,70,000 He. to 9,56,200 He.) where as Brazil's was at 1.43 per cent (From 6,82,503 He. to 7,65,842 He.). The growth rate of other regions negative at (-) 0.31 per cent (From 6,98,328 He. to 6,83,335 He.),

while East Africa registered a negative growth rate of 0.47 per cent (From 1,84,752 He. to 1,89,353 He.).

The productivity (quantity of raw nuts produced per hectare) of raw cashew nut had also undergone only slight changes over the last 25 years. The world's average growth rate was stood at 1.57 per cent exponentially (From 350.91 Kg/ He. to 480 kg/He.). Vietnam's growth rate was commendable at 7.87 per cent (From 185.57 kg/ He. to 802.21 Kg/ He.). India's growth rate was at 1.51 per cent (From 493.48 Kg/ He. To 704.87 kg.He.) while West Africa was at 2.81 per cent (From 221.51 Kg/He. to 400.37 Kg/He.). East Africa and Brazil registered a low growth rate of 1.59 per cent (From 550.83 Kg/He. to 453.65Kg/He.) and 1.11 per cent (220.83 Kg/He. to 233.09 Kg/He.) respectively whereas, the growth in productivity over other regions was negative at (-)0.65 per cent (375.51Kg/He. in 1988 to 307.12Kg/He. in 2011 and 503.56/ He. in 2012) .

The last decade (2003-2012) portrayed a different scene. The Worlds productivity registered a decline 0.44 per cent exponentially (463.49 Kg/He. to 480.34 Kg/He.). India was stagnant at 0.06 per cent (694.81 Kg/He. to 704.87 Kg/He). West Africa registered an exponential growth rate of 3.21 per cent,(293.83 Kg/He. to 400.37 Kg/He.) while the other countries registered the same at 1.56 per cent.(307.29 Kg/He. to 307.12Kg/He. in 2011 and 503.56/ He in 2012). Vietnam's growth rate of (-) 10.42 per cent (1560 Kg/He. to 802.21 Kg/He.) indicated serious concerns. East Africa (841.77 Kg/He. to 453.65) and Brazil (268.27 Kg/He. to 233.99 Kg/He.) also had a negative growth rates at (-) 2.67 per cent and (-) 1.68 per cent respectively.

A comparison of the volume of production, the area of production and the productivity over the last 25 years indicated that the West African growth

rate of production (13.87%) was mainly due to the increase in the area of production (11.07%) whereas, the increase in production of raw nuts in Vietnam (12.32%) was mainly due to the increase in the productivity (7.87%). The other regions registered a growth rate of 5.06 per cent with an increase in area of production at 5.71 per cent annually registering a negative growth in the productivity levels which implied that those regions had not taken cashew cultivation seriously.

9.1.2 The Transition in World Cashew Processing

Vietnam was only supplying its raw nuts produced only to India till 1990's. The size and quality of Vietnam cashew was not much appreciated for the processing in India. 1990's witnessed a steep increase in the volume of raw nuts produced in the West Africa region. The size and quality of the West Africa raw nuts were more accepted for Indian processing and the Indian processors started concentrating on the West African region neglecting Vietnam. Vietnam was slowly left with huge unsold raw nuts that resulted in Vietnam going for processing of raw cashew nuts during the mid 1990's. The Western buyers who were in lookout for a strong competitor to India encouraged the Vietnamese to process cashew nuts. This resulted in Vietnam processing 544 M.T. in 1991 which rose up to 2,07,533 M.T. in 2012, registering an exponential growth of 31.08 per cent . The world average rate of growth in processing stood at 7.93 per cent (1,16,565M.T. in 1988 to 6,28,430M.T. in 2012) whereas India registered a growth rate of 6.78 per cent (From 69,238 M.T. in 1988 to 3,56,107 M.T. in 2012) and other regions (countries newly into processing) at 9.43 per cent (From 9,927 M.T. in 1988 to 39,456 M.T. in 2012) during the period. The cashew processing in Brazil reported to be almost stagnant with a growth rate of 1.11 per cent only (From 37,400 in 1988 to 25,334 in 2012) during the last 25 years.

But the recent trend over the last 10 years from 2003 to 2012 revealed a slightly different picture. Vietnam topped the list with an exponential growth rate of 11.34 per cent (From 71,442 M.T. in 2003 to 2,07,533 M.T. in 2012) followed by other regions at 9.99 per cent (from 4,530M.T. in 2003 to 39,456 M.T. in 2012) . It should be noted that of late, the processing in other regions are picking up fast. India's growth rate of 4 per cent (From 2,31,166 in 2003 to 3,56,107 M.T.) was less than the world average of 5.26 per cent. (from 3,50,230 M.T. in 2003 to 6,28,430 M.T. in 2012) The decline in growth rate at (-) 5.42 per cent of Brazil (From 43,092 M.T. in 2003 to 25,334 M.T. in 2012) was worth notice. In short, the last 10 years witnessed new processing countries and Vietnam strongly emerging into processing creating a big threat to India.

Cashew processing had undergone different phases of transition in technology also ever since its inception as an industry in the early 19th century. This evolution in processing can be traced in five phases as:

- Phase I - prior to 1930
- Phase II - 1930 to 1950
- Phase III - 1950 to 1980
- Phase IV - 1980 to 2000
- Phase V - 2000 onwards

The first phase described above characterised roasting of raw nuts in open pans and de-shelling by stone crushing. The borma (de-humidifying) was mostly sun drying and cooling in open air. Unpeeled and ungraded cashew was exported packed in mango wooden box with paper lining. There was no much adherence to any quality standards nor was any quality standards specified.

The second phase witnessed the drum and oil bath roasting methods which are being continued till now. The shelling was done by malleting with wooden blocks and the de-humidification done with single / multi chamber heating ovens. Cooling was mostly in a closed room with water spread over the ground and the nuts got cooled with the natural operation of water. Peeling and grading were manual and packing was done in tins which were vacuumised using hand operated pumps. Some local standards were specified for quality control.

Drum roasting/ oil bath roasting continued to be in practise during the third phase also. Here again, malleting with wooden blocks was the main means of de-shelling. Single/ multi chamber oven heating was replaced by tunnel borma and cooling by rotary humidifiers. Filling and packing continued to be in tins, but vacuumised with electric pumps and flushed with CO₂ gas to prevent infestation. ISO standards were slowly introduced in this phase.

While drum and oil bath roasting continued to be used during the fourth phase also, steaming of nuts was in practise followed by cutting of steamed cashews with mechanical cutters. Electric borma was introduced for drying and window humidifier for cooling operations. Here also, peeling and grading continued to be manual, but filling started in flexi pouch with 2 numbers of 25 lbs pouches in a box, though tin packing was also in use. ISO and HACCP quality standards were in use by major exporters.

The current phase of five still continues with both steaming and roasting operations. The shelling is being partly mechanised and the new cutting machines are being introduced. Improved hot air and steam borma are used for de-humidification and cooling still continues with modified humidifiers. Peeling is almost mechanised and automated. Grading operations

are partly mechanised. Packing is still in flexi pouches but instead of two numbers of 25 lb pouch, a single 50 lb pouch is used in a box. More quality standards like BRC, KOSCHER etc are in use.

9.1.3 Transition in the Consumption of Cashew Kernels

The major transition in the consumption of cashew kernel during the period of the study was the shift in consumption to Asian countries from the traditional market of U.S. and Europe. India emerged out as the largest consumer of cashew in the world. The world consumption had grown up at 7.93 per cent exponentially (From 116,565 M.T. in 1988 to 6,28,430 M.T. in 2012), exactly at par with the growth rate in processing. This implied that the consumption is limited to the supply only and had there been more processing, the consumption might have gone up accordingly. During this period, the Middle- East region registered the highest growth rate of 16.47 per cent (From 1,030 M.T. in 1988 to 45,720 M.T. in 2012), followed by India at 8.44 per cent (From 36,783 in 1988 to 2,54,241 in 2012). The growth rate of US was 5.09 per cent (From 41,331 in 1988 to 1,21,215 in 2012) while the European countries registered the same at 8.79 per cent, (From 13,605 M.T. in 1988 to 86,344 M.T. in 2012). Australia's growth rate was at 9.2 per cent (2,423 M.T. in 1988 to 13,909 M.T. in 2012) while the other regions registered the growth rate at 11.46 per cent (From 21,393 M.T. in 1988 to 1,07,001 M.T. in 2012).

The growth rate over the last decade (2003-2012) was 5.26 per cent worldwide (From 350,230 M.T. in 2003 to 6,58,430 M.T. in 2012) while the Middle-East registered the growth rate of 16.47 per cent.(From 12,048 M.T. in 2003 to 45,720in 2012) India's growth rate over the last 10 years was at 6. per cent only (From 1,32,508 in 2003 to 2,54,241 in 2012). Though

India's growth rate stood at 6.02 per cent. The consumption was too high here - at more than twice the U.S. consumption, the second highest consuming region in the world. U.S. consumption was stagnant registering slight negative growth rate at (-)0.82 per cent (1,11,654 M.T. in 2003 to an all time high of 1,51,581 in 2004 and then dropping to 1,21,000M.T. in 2012). Europe's growth rate stood at 7.84 per cent (From 42,048 M.T. in 2003 to 45,720 M.T. in 2012) while other countries registered the same at 8.29 per cent. (From 39,132 M.T. in 2003 to 1,37,001 M.T. in 2012) Australia's growth rate was only 1.91 per cent (From 12,179M.T. in 2003 to 13,909 M.T. in 2012) during the last decade. From the above, it should be concluded that the Middle-East consumption is catching up in the recent past, which other regions the same is slowing down. Further, in the other regions, the consumption is growing at a faster rate than traditional consumers in the recent past. India should adopt suitable measures to make use of this opportunity.

The International Finance Corporation of the World Bank group in its report on 'The prospects of Cambodia's cashew sub sector' had observed that the consumption of cashew kernels had gone up during the recession period also, owing to the reason that people spend more time back at home engaging into home entertainment activities and private parties during free time, consuming snacks both as an in between meal and party snack. This had increased the consumption of cashew also.

9.1.4 Comparison of Production, Processing and Consumption

An analysis of the world's production, processing and consumption revealed that growth in the consumption was at par with (7.93%) the growth in processing over the entire period of study. The same applied to the growth

rate of 5.26 per cent over the last ten years. Again the growth in production of raw nuts were low (6.35%) worldwide, when compared to processing and consumption. The growth in production for the entire period was low at 6.35 per cent compared to the 7.93 per cent growth in both processing and consumption during the period of study. This in other words meant that the growth in consumption was restricted to the processing only, which could not grow better due to low growth in production. In short, the key area to be improved was the production of raw nuts. This also meant that the world is likely to face a shortage in production compared to the demand drives. The scenario over the last decade was still alarming. The growth rate in production was only 2.97 per cent against 5.26 per cent growth rate in both processing and consumption.

The Vietnamese scenario was also of great concern. The growth in production during the period of the study was at 12.32 per cent while that of processing was at 31.08 per cent. The recent picture over the last decade of the period of the study registered a negative exponential growth rate of 3.51 per cent in production compared to 11.34 per cent growth rate of processing. This could mean that Vietnam was mostly sourcing its raw nuts supply from other origins for meeting its processing needs. This in turn resulted in a strong competition to India from Vietnam in raw nut procurements from other producing countries.

The growth rate of production in Brazil was at 2.11 per cent against the 1.11 per cent growth in processing over the period of study. During the last decade, this has gone down and the production witnessed almost a stagnant figure (declining at 0.25 per cent exponentially), but the processing had witnessed a negative growth rate of 5.42 per cent. As such, it was assumed

that the competition to India from Brazil was not as severe compared to that from Vietnam in the international market.

9.1.5 Transition in the Pattern of Trade

A series of factors had changed the trade patterns of both raw nuts and cashew kernels in the international market. More and more processors had established direct contacts at production sources and started buying directly from the suppliers in foreign countries. The long forward purchase practise had given way to short term contracts for both raw nut and kernel trade. There was a shift from bulk cargo to containerised cargo for raw nut trade. The term also witnessed the shift from East Africa to West Africa in the sourcing of raw nuts. The average inventory levels had gone up for raw nuts whereas the same had reduced to 'hand to mouth levels' for cashew kernels.

Further, the integrity and reliability levels of forward contracts had also reduced between buyers and sellers. This situation could be attributed to

- 1) Loss of confidence due to economic situation
- 2) Reduced availability of funding and narrow margins in the trade
- 3) Absence of price based promotions in retail market
- 4) Lack of supplier/buyer contract integrity
- 5) Globalisation of the industry.

The fair trade in cashew was still in the infancy stage. Though cashew is an organic product by default, there was little in the way of organic certified growing and processing. In spite of the fact that more than 70 per cent of the world's cashew production is organic, only a tiny portion remained certified.

The cashew kernel prices were fluctuating widely throughout during the period of study. The pricing of a commodity in general is a function of supply and demand. The same was analysed in the case of pricing of cashew kernels in the international market. The test result of the hypothesis formulated revealed that the pricing of cashew in the international market was more sensitive to demand than the supply positions of raw nuts.

9.1.6 Transition in the Field of Export by Processing Countries

India continued to be the world's largest exporter of cashew kernels, the position which was lost to Vietnam in 2007. The last decade witnessed India's export share declining from 56.55 per cent in 2002 to 25.33 per cent in 2012 whereas the Vietnamese share registered a steady growth from 25 per cent to 51.61 per cent during the same period. Brazil's export share was fluctuating between 12.85 per cent and 23.55 per cent over the last decade.

The comparative advantage of India in international trade of cashew kernels had suffered a major setback ever since the emergence of Vietnam as a competitor in 1991. The revealed competitive advantage of India was above unity all these times till 2006. But the same started declining to less than unity (which implied an unfavourable situation) levels to end up at 0.642 levels in 2012 from all time high of 5.977 in 1994. On the other side, Vietnam had the revealed comparative advantage of less than unity till 1995 after which it registered steady growth to reach an all time high of 8.056 in 2011 and 7.983 in 2012. This revealed that Vietnam was moving to more favourable situations in international trade of cashew whereas India was moving to less favourable situations. The revealed comparative advantage of Brazil was always less than unity that showed an always unfavourable situation for Brazil all these days.

9.2 Transition in Indian Cashew Sector

The major transition in India during the period was the boom in the domestic consumption and the decline in her share in the international market. The domestic prices had gone up due to high domestic demand. But still there was no official data pertaining to the volume of consumption and the domestic prices in India.

9.2.1 The Cause and Effect of Increased Domestic Consumption

While analysing the cost and effect of increased domestic consumption in India, the following hypothesis were formulated and tested using appropriate statistical tools. The test result established the following.

- 1) The domestic consumption in India was co-integrated to income levels and hence the increase in income levels had contributed to the increased domestic consumption in India.
- 2) The Indian domestic consumption had gone up more at the cost of imports than domestic supply.
- 3) The market share of India in the international market had declined at the cost of increased domestic consumption.
- 4) The export price of cashew in the international market had gone up at the cost of domestic consumption in India.

9.2.2 Indian Cashew and the International Market

The external factors that lead to the decline of market share of India in the international market were analysed by formulating certain hypothesis. These hypotheses were tested to arrive at the following conclusions:

- 1) The market share of India in the international market had declined more at the cost of Vietnam than any other competitors.
- 2) The change in global supply share of raw nuts to India had no effect on her market share in the international market.
- 3) It could not be concluded that India enjoyed a premium price to her competitors in the international market for cashew kernels.

9.2.3 Other Domestic Factors Influencing Market Share of India

The effect of other domestic factors like change in government policies and the change in exchange rates were also analysed by formulating appropriate hypothesis and testing them with relevant statistical tools. This helped in arriving at the following conclusions.

- 1) The export incentive VKUGY (Vishesh Krishi Udyog and Grameen Yojana) which was issued as transferable scrip for 5 per cent of FOB value of exports had a positive impact on boosting exports of cashew kernels from India.
- 2) Neither the introduction of interest subvention nor the withdrawal of 80HCC benefit on income tax had any impact on the exports of cashew kernels from India.
- 3) The above indicated that the Indian exports of cashew kernels were more influenced by direct incentives than indirect incentives.
- 4) The exchange rate fluctuation didn't produce any effect on the export of cashew kernels from India.

9.3 The Views and Pattern of Indian Exporters

The views and patterns of Indian exporters were analysed by conducting a survey on Indian exporters. Factors affecting the decisions to switch between export and domestic sales, other drive factors for export, the effect of incentives, the significance of raw nut imports, exporting value added products, handling of exchange risks etc. were analysed based on the responses collected.

9.3.1 Classification of Exporters

Exporters were classified on the basis of their experience in exports, the volume of exports and the export share by volume to their total processing.

The exporters surveyed were having an experience ranging between 5 and 85 years with a mean of 25.2 years in the field of cashew exports. They were grouped into three categories based on their experience in cashew exports. Exporters with up to ten years experience were classified as new entrants whereas those with 11 to 25 years were classified as medium experienced groups and those with more than 25 years as highly experienced groups.

Further exporters were grouped on the basis of the volume of exports as small, medium and top exporters. Exporters with export volumes of upto 100 containers per year were included in the small category, those with export volumes between 101 and 200 were included in the medium category and those above 200 were included in the top category of exporters.

10 per cent of the exporters surveyed were casual exporters with export share of less than 25 per cent of their production. 27.5 per cent occasional exporters with 26 to 50 per cent of their production being exported, 17.5 per cent

were regular exporters with 51 to 75 per cent of their production being exported while the rest 45 per cent were totally export oriented who exported more than 75 per cent of their production.

9.3.2 Strategies of Indian Exporters

The Indian exporters were mostly adopting a mixed strategy of selling their products abroad using direct contacts and also by involving the service of an agent. Wherever they had good rapport with the buyers, they had involved in direct sales. Further, it was observed that there was no difference between the sales methods adopted by small, medium or top exporters.

Majority of the Indian exporters (92.5%) surveyed were sourcing the raw materials for processing from imports in addition to domestic production. But there existed no association between the export share of cashew kernels to the import share of raw nuts used in processing. The Indian exporters adopted imports of raw nuts mainly to ensure uninterrupted processing in their units. They were of the opinion that increased domestic production of raw nuts cannot completely substitute imports. This was because they would be made to store bulk quantities of raw nuts to cater for the full year processing if they were to depend on domestic products only. In such a situation, they would be exposed to high risk of market fluctuation. A balanced domestic production with the support of imports would be an ideal sourcing solution.

Further, exporters were not much into exports of value added produce. This was analysed using Multi Dimensional Scaling technique based on Trade related (Objective) and Product related (Subjective) factors. Low demand was the major objective factor while lack of technique was the major subjective factor. Also there was no significant difference between

small, medium and top exporters in their attitude towards export of value added products.

9.3.3 Stimuli for Exports

The trade and export incentive based stimuli for exports were analysed on the basis of the responses collected from Indian Exporters. Among the trade related stimuli, the net price realised was the most significant stimuli to switch between exports and domestic sales. Grade of cashew was also significant in the sense that exportable graded were exported and others sold in the domestic market. The quantity of cashew kernel to offer, bank commitment and the export orientation of the firm were the other significant factors. Here also, there was no association between small, medium and top exporters in their trade related stimuli for exports.

Regarding incentive based stimuli, direct incentives like VKUGY and DEPB were the major stimuli for exports followed by lower rate of interest for export finance. Again, top exporters attributed more significance to export incentives like DEPB and VKUGY where as small exporters attributed more importance to 'lower rate of interest' among various stimuli for exports. In other cases like Vat refund, Advance License and MDA assistance, there was no significant difference in their stimuli.

Various approaches were available for exporters to manage currency risk in the international transactions. Most of the exporters were also into import of raw nuts also and both imports and exports were invoiced in foreign currency (mainly US Dollars). The Indian exporters in general preferred to effect imports and exports at the then prevailing exchange rates adopting the risk retention strategy. Risk avoidance using PCFC was the next

preferred strategy where as going for EEFC (maintaining current accounts in foreign currency) was the least preferred strategy.

A further analysis revealed that highly experienced exporters preferred PCFC strategy while there was no significant difference in the preference pattern for other strategies.

9.3.4 Export of Value Added Products

Only 12.5 per cent of the Indian exporters surveyed were into export of value added products. Even those exporters who were exporting value added products were doing in very small volumes of less than 10 per cent of their total exports. Low demand for value added products (due to strong brand image of native brands in the importing countries) was the major perceived factor where as lack of technology was the major objective factor. High cost of marketing was also a major subjective factor for the low level of exports of value added products from India. Further, it was concluded that there existed no significant difference between small, medium and top classes of exporters in their perception for export of value added products.

9.4 Views and Patterns of Overseas Buyers

The views and preference pattern of overseas buyers on the cashew kernels they import, the quality, trade terms and the relative position of India among other competitors were all analysed with the help of responses collected from them. The exporters surveyed were from the major consuming countries / regions in the world, which had direct imports from India.

9.4.1 Classification of Overseas Buyers

Overseas buyers were classified on the basis of their experience in the cashew trade and also on the basis of their volume of imports.

Based on the experience, they were classified into three groups. Those with upto 10 years of experience were included in the new entrants group, with 11 to 25 years experience in the 'medium' group and those with more than 25 years of experience in the 'highly experience' group.

Based on the volume of imports, those with import volume of up to 100 containers a year were grouped as 'small' importers, with import volumes of 101 to 200 containers a year as 'medium' importers and with more than 200 containers a year as 'Top' importers.

9.4.2 Strategies of Overseas Buyers.

All the overseas buyers of Indian cashew surveyed were engaged into trade of other dry fruits and almost all of them were into Almonds also. Here also, majority of the overseas buyers adopted the strategy of buying directly from trusted suppliers and engaging the service of an agent for sourcing their cashew kernels from India.

Only 9.4 per cent of the overseas buyers surveyed were into import of value added products. The share of their exposure to value added products was less than 10 per cent. The attitude of the overseas buyers towards import of value added product could not be included in the survey, as the same was opposed by overseas buyers in the focus group. They perceived it as a measure of tapping their internal strategy.

As for the overseas buyers, India was the supplier of choice once all other trade criteria remained the same with other suppliers. Though the 'Vision 2020' statement of the CEPCI (Cashew Export Promotion Council of India) recommended to market cashew kernels under a generic brand 'Indian Cashew', the overseas buyers considered the quality of Indian cashew standing out to be considered for a special preference.

Different criteria affecting the purchase process of cashew kernels were short listed during the expert interviews. Altogether ten criteria were listed and the respondents marked the same in their order of significance. The responses were analysed using Friedman's test. As per the analysis, the quality of the product was the most important buying criteria followed by the pricing of the product. Contractual obligations stood next to that. Promptness in shipment, packing of the product, rapport with suppliers, After sales support, Payment terms, Other trade norms and service of an agent were the other criteria preferred in that order.

Further, an analysis with Kurskal walls test revealed that there existed no difference in buying criteria among small, medium and top overseas buyers.

9.4.3 Performance of Competing Countries in International Cashew Market

On the basis of preference pattern of overseas buyers in their buying criteria, the performance of three competing countries in the international cashew market was analysed. Responses were collected from the respondents on a ten point scale against the performance of each country against each criteria considered. The responses were coded in an ordinal scale and from the summated value, the mean score was calculated for each country for each

criteria considered. The score of each country against each criteria was converted into weighed score on the basis of the mean rank obtained to each criteria (while analysing the buying pattern). This weighted score were summed up for each country and the mean score was calculated. India's mean score was 351.909 against the mean score of 385.871 for Brazil and 332.509 for Vietnam. On the basis of the one-sample t test, it was observed that the difference in the mean score was significant. This rejected the hypothesis that India was performing closer to the expectation of overseas buyers than her competitors.

9.5 Challenges to India in the World Cashew Market

The challenges that await India in the world cashew market in the years to come was analysed using exploratory factor analysis on the basis of the response collected from both Indian Exporters and overseas buyers. *Effective utilisation of Strength and opportunity with minimising the effects of weakness and threats was the core meaning of 'challenge' in the context of the study.* On the basis of expert interviews, the core areas of challenges were first identified. The areas identified were:

- 1) The growing domestic market
- 2) Competition from other exporting countries
- 3) The mechanisation of processing
- 4) India's supply chain of raw nuts
- 5) The changing international trends

Fourteen (14) variables were identified in the above core areas of challenges. These variables were presented to the respondents in the form of

arguments/ statements and their responses collected on a five point scale. This was included as a common item in the questionnaires for both Indian exporters and overseas buyers.

The EFA (exploratory factor analysis) identified six factors with a cumulative variance of 79.21 per cent, which in other words meant that the six factors identified could explain 79.21 per cent of the challenges under the study.

Of the six factors identified, the major challenge for India in the years to come is to effectively utilise and take advantage of her internal opportunities. The high demand for cashew kernels in India would push the prices up beyond international levels. The exporters would be attracted to domestic market. Further, the high demand here may cause scarcity in the domestic market which may attract some governmental control on exports and /or lifting of controls for imports of cashew kernels. Indian products would be scarce in the international market and those who prefer Indian cashew alone for certain type of value added products may have to pay a premium price. India may be able to multiply her processing capacities with mechanisation and automation in processing, but may have to increase her raw nut production to keep the factories run at break even levels.

Foreign entrants to Indian market would be the next concern. Due to the high demand and resulting high prices, other processing countries would somehow try to enter the domestic market of India. Further India would be dependent on new raw nut producing countries and would be forced to increase processing with automation due to scarcity of labour.

Threats from foreign players in the international market would be another challenge to address with. India may face stiff competition from raw nut producing countries once they are fully into processing. These countries will naturally be penetrating into the traditional markets and India would be partly or fully withdrawing from the traditional markets.

Reduction in the market share of India in the international market would be the next concern to address with. Due to high competition from existing and new competitors, India's share in the international market may still come down. She is likely to lose certain markets even.

Another challenge that India may face would be the centralisation of processing activities with the processing evolving around big and corporate entities. This would have social effects when small entrepreneurs stand to lose in the game. Indian corporate would be shifting to other raw nut processing countries, which may result India losing her processing hub.

As a result of these, India will be forced to explore new markets to maintain her exports in cashew kernels. Since international prices would be less than domestic prices, it would be difficult to market Indian cashew in the existing traditional market that could produce low returns compared to domestic market. May be taking advantages of export incentives and to manage a balance on domestic sale and exports, some exports will still continue to the traditional overseas market. However, in view of the increasing growth rate of consumption in the non-traditional overseas markets, Indian exports may have to increase their exports to such market and also should explore new markets to sell their products.

The variance of these six factors on the challenges as analysed using exploratory Factor Analysis is summarised as:

Table 9.1 Factors and Variance

| Sl. No | Factors | Variance |
|---------------------------------|-----------------------------------|-----------------|
| 1 | Internal Opportunities | 17.324 |
| 2 | Foreign Entrants to Indian market | 14.834 |
| 3 | Threats from Foreign Players | 13.886 |
| 4 | Reduction in market share | 13.008 |
| 5 | Centralisation of processing | 10.289 |
| 6 | Exploring new markets | 9.871 |
| TOTAL VARIANCE EXPLAINED | | 79.210 |

9.6 The Summary

The findings of the study based on the specific objectives of the study is summarised as follows:

9.6.1 The World Scenario

- 1) The raw nuts production worldwide had grown up by 7.2 per cent exponentially where as the world processing and consumption had grown up by 8.7 per cent during the last 25 years.
- 2) Over the last 10 years, the raw nut growth was at 2.7 per cent worldwide against the growth rate of 5.1 per cent in both processing and consumption.
- 3) The low rate of growth in production of raw nuts to consumption worldwide is likely to result in shortage of raw nuts in a near future.
- 4) Processing and consumption had grown at the same rate which implied that had there been more processing, consumption would have been more.

- 5) West Africa had registered a steep growth in production of raw nuts by increasing the area of production while Vietnamese growth in raw nuts production was mainly due to increase in productivity.
- 6) The processing of cashew had witnessed an evolution in the processing technology ever since its inception as an industry.
- 7) The consumption of cashew kernels had shifted more to Asian countries from US and Europe especially over the last ten years.
- 8) India had emerged out as the largest consumer of cashew kernel in world- a position enjoyed by the U.S. for decades together.
- 9) Vietnam had emerged out as the largest exporter of cashew kernels in the world- a position enjoyed by India till 2005.

9.6.2 The Indian Scenario

- 1) The domestic consumption in India had registered a growth rate of 14.4 per cent exponentially over the last 25 years.
- 2) The increased income level had boosted the domestic consumption of India.
- 3) The increase in processing and domestic consumption was more at the cost of imports of raw nuts than the increase in domestic production of raw nuts.
- 4) The increased domestic consumption had boosted the export prices also.
- 5) The increased domestic consumption had resulted in the reduction of market share of India in the international market.

- 6) The market share of India was mostly affected by the competition from Vietnam than from any other countries.
- 7) Change in global share of supply of raw nuts had no effect on the market share of India in the international market.
- 8) Indian cashew did not enjoy a premium price in the international market.
- 9) Government policies involving direct export incentives like VKUGY had a positive impact on the export growth in India while indirect incentives like interest subvention and income tax benefits could not produce an impact.
- 10) The change in exchange rates had not influenced the export of cashew kernels from India.

9.6.3 Analysis of Views and Patterns of Indian Exporters

- 1) Indian exporters adopted a mixed strategy of exporting their produce directly to overseas buyers and also through agents.
- 2) Majority of Indian Exporters depended on imports of raw nuts in addition to locally sourced raw nuts.
- 3) Indian exporters resorted to imports of raw nuts mainly to ensure un-interrupted production.
- 4) Indian Exporters were of the opinion that import of raw nuts cannot be fully substituted with increase in domestic production mainly because of the risk exposure to unforeseen fluctuations in raw nut prices.

- 5) Low demand in foreign markets was the main reason for not adopting to export of value added products.
- 6) Among the trade related stimuli for export, net price realised was the prime consideration for switching between exports and domestic sales.
- 7) Regarding various export incentives, direct incentives were more significant to top exporters where as small exporters attributed more importance to interest subversion.
- 8) Indian exporters generally prefer buying and selling foreign currencies at the then prevailing rate adopting risk retention strategy. But highly experienced exporters preferred PCFC (transacting in foreign currency) adopting risk avoidance strategy.

9.6.4 Analysis of Views and Patterns of Overseas Buyers

- 1) Overseas buyers, like their Indian counterpart adopted the mixed strategy of buying direct and also through middlemen.
- 2) Overseas buyers were more loyal to Indian cashew and preferred to buy from India, had other buying criteria remained the same.
- 3) The overseas buyers did not perceive the quality of Indian cashew as superior to others.
- 4) Among the various purchase criteria of cashew kernels, the overseas buyers considered the quality of cashew as the most important one followed by the pricing of the product.
- 5) The performance of Brazil was more close to the expectation of the overseas buyers among the suppliers of cashew kernels to the world.

9.6.5 Challenges to India

- 1) The major challenge to India in the years to come is to effectively utilise her internal opportunities by addressing the growing domestic market and increasing the production of raw nuts.
- 2) The next challenge to India is the foreign entrants to Indian market to penetrate into the Indian market. Dependence on new countries for raw nuts would attract foreign entrants in that field also. India may have to increase processing by adopting mechanisation and process automation.
- 3) Threats from raw nut producing countries as they fully start processing and entering the traditional international market would be another threat for India.
- 4) India would be exposed to further reduction in international market share and may even lose certain markets in the race.
- 5) Indian processing would evolve around big corporate wiping off small and tiny entrepreneurs causing social problems in the future.
- 6) Indian big players may shift to raw nut producing countries and Indian processing is likely to be reduced.
- 7) India would have to look for new market to overcome the competitions in future.

9.7 Suggestions

Based on and the inference drawn on the study, certain suggestion are put forwarded to overcome the crisis of the cashew sector in general and that of Indian cashew industry in particular.

- 1) To match the growth in consumption of cashew kernels, the raw nut production has to be increased worldwide, lest the world is likely to face a shortage of raw nuts in future. This can be achieved by (1) increasing the area of production by utilising bulk area of land in states like Maharashtra, Andhra Pradesh, Orissa, West Bengal etc., (2) increasing productivity by replacing senile trees and also by (3) proper harvest management of productive trees.
- 2) The health benefits of consuming cashew kernels are not properly marketed. Still there are mis-concepts that cashew consumption is not good for health. Effective awareness programmes should be conducted to spread the health benefits of consuming cashew kernels worldwide.
- 3) New markets should be explored to market cashew kernels and spread its usage. The market potentials of the re-export markets (from US and UAE) should be explored directly. Other prospective markets in the northern African continents (Egypt, Morocco etc) which are rich and exposed to similar climatic conditions of Europe should be explored.
- 4) Effective marketing strategies should be implemented to increase the consumption of cashew kernels in the existing markets, in line with Almonds marketing.
- 5) Indian dependence on imports should be reduced in a phased manner by increasing the domestic production of raw nuts.
- 6) India should adopt a strategy to gear up production and processing so that she can cater to the needs of the domestic market still holding her premium positions as before.

- 7) India should tap the loyalty of overseas buyers by performing more close to their expectations.
- 8) Indian cashew kernel quality should be still improved to stand out in the race to promote the generic brand of 'Indian cashew' (like California Almonds, Egyptian cotton etc.).
- 9) Effective Government policies should be implemented to boost exports of cashew kernels and to make Indian cashew competitive in the international market.
- 10) India should switch over gradually to export of value added cashew kernels by exploring the non-traditional market where the strong presence of other international brands is not felt.
- 11) India should frame apt strategy and properly address the challenges identified in the study to ensure better prospects of Indian cashew industry in the future.

9.8 For Further Study and Research

This study conducted covering the production, processing, trade and consumption of cashew world over may be the first attempt of that nature. As such there were too many limitations to this study and based on the inference drawn from this study, it is proposed that more research study should be conducted in this field, which among others may include:

- 1) The transition of World cashew industry in comparison with other edible dry fruits.
- 2) The effect of health benefits as a tool in cashew marketing.
- 3) Competitive advantage of processing standards and cost of processing in different regions of the world.

- 4) Study on the domestic consumption and domestic trade of cashew kernels in India.
- 5) Confirmatory factor analysis on the challenges arrived at during this study.
- 6) Comparison of competitive advantage of India, Vietnam and Brazil in the cashew production, processing and marketing.

9.9 Conclusion

This study on the ‘Transition of World Cashew Industry and The Challenges to India’ was carried out with the specific objectives of analysing the transition worldwide in the field of raw nut production, processing the raw nuts to cashew kernels and the consumption of cashew kernels and the challenges to Indian cashew industry in the light of reduced market share in the international market, the growing domestic market and the large level of mechanisation and process automation worldwide. Secondary data over the last 25 years in the field of raw nut production, processing and consumption of cashew kernels were analysed. The cause and effect of changing domestic consumption in India was also analysed. The probable reasons- both domestic and global - for the decline in market share of India were also analysed with the help of certain hypothesis formulated.

The study revealed that the world cashew consumption is growing up at a higher rate than the production of raw nuts. This is likely to cause shortage of raw nuts in future. As of now itself, the exporters report that the raw cashew prices are high compared to the kernel market. This is an indication of the shortage of raw nuts in the international market and the resulting increased demand. There is enough scope for increasing the production of

raw cashew nuts as land is available in many a part of the world suitable for cashew cultivation. But what is more important is to increase the productivity of cashew trees, as with the increased productivity the farmers will be better benefited that will encourage them to plant more trees. This would protect cashew from the competition currently faced from other plantations like rubber, mango etc. Replacing senile trees with high yielding new breeds of cashew trees in a phased manner and better harvest management would help in increasing the productivity of the cashew plantation. Though the processing capacity world over is underutilised, growth rates in processing and consumption are perfectly matching, which in other words mean that there is scope for better utilisation of processing if the consumption can be increased by better marketing of the product. Of course the same should be supported by increased supply of raw nuts world over.

Since the net price realised was the main concern of the Indian Exporters, more attractive incentives should be provided to boost exports as the domestic prices in India are always more lucrative. At the same time the demand for broken grades in India should be made use of in such a way that India should promote marketing of broken grades in her domestic market and the wholes grade in the international market. Further export of value added products should be explored to non traditional markets as penetration into the traditional market may be difficult.

Though the overseas buyers are more loyal to Indian cashew, neither the quality of Indian cashew nor the performance of India in the international trade is superior to go for a brand promotion of 'Indian Cashew' in the international market. The above aspects should be improved and the loyalty of overseas buyers tapped to promote 'Indian Cashew' as a brand.

Effective utilisation of the growing domestic market is the major challenge to India in the years to come. Indian Cashew (Whole grades) should be promoted in the international market and the corresponding broken grades promoted in the domestic market. When the cashew processing in India is to be increased to cater the demand for broken cashew grades, more markets should be explored overseas to market the corresponding whole grades produced. The Indian market should be protected against foreign invasion by imposing suitable duties and taxes. Mechanisation should be encouraged in India in view of the shortage in labour (especially in Kerala) and the increased demand in consumption. The processing in India should be more competitive in terms of cost of processing and quality of processing to enable her to maintain her position as the hub of world cashew processing. This would certainly help her regain her premier position in the world cashew Industry.

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ANNEXURE

Annexure I

Dear ,

I am forwarding herewith a questionnaire to collect the views and preference of Indian Exporters of Cashew kernels regarding international cashew scenario in general and that of India in Particular.

This is in connection with my Ph.D research on the topic '**The Transition of World Cashew Industry and the Challenges to India**' that I am pursuing in the School of Management Studies, Cochin University of Science and Technology, Cochin, India. The outcome of the research programme will be of much relevance to the cashew Industry.

Your responses to the questionnaire will be confidential and will not be used for any analysis other than the research study. Your views and preferences sought for is limited to the purpose of the study only.

These responses and views in this regard will be of immense help and support for me to complete the research and to come out with findings, which I hope can benefit the cashew industry in General, which I will be forwarding to you upon completion of the programme.

I would be highly obliged, if you could spare a bit of your valuable time to respond to this questionnaire by clicking the link.

Thanking you very much,

Bhodes R.K,
Research Scholar,
School of Management Studies
Cochin / India

QUESTIONNAIRE FOR INDIAN EXPORTERS

1. **Name of the Organisation :**
2. **Contact Person :**
3. **How long is your firm engaged in cashew exports:** Years
4. **Volume of Cashew Kernels Exported during a year** (In 20ft. containers)
Please click to select appropriate box
Less than 100 101-200 Above 200
5. **How do you effect your export of Cashew Kernels**
Please click to select appropriate box
Direct Sales Through Agent Both
6. **What is the percentage of your exports to over all sales ?**
Less than 25 % 25-50 % 50-75 % Above 75 %
7. **Do you import raw cashew nuts for your processing ?**
- b. **If your answer is "Yes" Please fill items (b) to (e),else proceed to item 8**
Yes No
- b. **What is the percentage of your imports of raw cashew nuts to over all purchase?**
Less than 10 % 10-25 % 25-50 %
50-75 % Above 75 %
- c. **How do you rate the significance of the following factors in the import of cashew nuts for your production.**
(kindly indicate your opinion against each factor)

| | Factors | Significance | | | | |
|----|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | | Less | > | >> | >> | More |
| a. | Imports ensure uninterrupted production | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. | Imported nuts are less costly compared to domestic nuts | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. | Imported Nuts are Free from tax burden | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. | Imported nuts are available round the year | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e. | Imported nuts are availability in Bulk Quantity | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- d. Can you avoid imports by storing the raw nuts for the whole year if local nuts are available in required quantity and at par with imported raw nuts prices during the local crop season ?

Yes No

- e. If your answer to the above is 'NO', kindly rank your reasons in the order of preference. (kindly indicate your opinion against each factor)

| | Factors | Significance | | | | |
|----|------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | | Less | > | >> | >> | More |
| a. | High cost of storage | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. | Risk of Market Fluctuation | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. | Quality Deterioration (In Storage) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. | Weight Shortage (In Storage) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e. | Lack of storage facility | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- 8a. Are you exporting any value added products ?

Yes No

- b. Kindly rank the reasons shown below in order of your preferences (Rank 1 to 5)

| Factors | RANK | |
|---|--------------------------|-------|
| Low demand | <input type="checkbox"/> | Clear |
| Lack of production techniques | <input type="checkbox"/> | |
| Can badly affect existing business (as present overseas buyers turns out to be your competitors) | <input type="checkbox"/> | |
| High cost of Marketing abroad | <input type="checkbox"/> | |
| Impact of duties & tax abroad | <input type="checkbox"/> | |
| Others (Pl.specify.....) | <input type="checkbox"/> | |

9. When you have to choose between Exports and Domestic sales, what are the factors affecting your decision?

(kindly indicate your opinion against each factor)

| | Factors | Significance | | | | |
|----|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | | Less | > | >> | >> | More |
| a. | Grade of the cashew kernel (Top grades are exported) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. | Quantity of cashew kernels (Bulk quantities are exported) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. | Nett price realizable (exports preferred only if Prices are more than domestic price) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. | Bank commitment (Exported to honor packing credit period limitation) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e. | Export Oriented (Always exported, only non-exportable grades are sold domestically) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f. | Others(pl.specify.....) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

10. How do you rate the following incentives available to exporters.

(Please click the 'Rank' boxes in order of your preferences to rank the criteria 1 to 5)

| No | Criteria | RANK | |
|----|--|--------------------------|--------------|
| 1 | Lower rate of Interest | <input type="checkbox"/> | Clear |
| 2 | VAT refund on exports | <input type="checkbox"/> | |
| 3 | Export incentives (<i>VKUGY,DEPB etc</i>) | <input type="checkbox"/> | |
| 4 | Advance License (<i>duty free imports of raw nuts</i>) | <input type="checkbox"/> | |
| 5 | MDA schemes (<i>Market Development Assistance</i>) | <input type="checkbox"/> | |
| 6 | Others (Pl.specify.....) | <input type="checkbox"/> | |

11. How do you tackle the effect of exchange rate fluctuations in your exports/imports?

(Please click the 'Rank' boxes in order of your preferences to rank the criteria 1 to 5)

| No | Criteria | RANK | |
|----|---|--------------------------|--------------|
| 1 | Importing when the exchange rate is less (<i>Rupee stronger</i>) and exporting when exchange rate is more (<i>Rupee weaker</i>) | <input type="checkbox"/> | Clear |
| 2 | Importing and exporting at current exchange rates (<i>Fluctuations are balanced in long run</i>) | <input type="checkbox"/> | |
| 3 | By opting forward booking / options | <input type="checkbox"/> | |
| 4 | Availing PCFC (<i>loans in foreign currency</i>) | <input type="checkbox"/> | |
| 5 | Maintaining EEFC accounts / transacting at matching rates (<i>imports are paid by export bills at matching rates</i>) | <input type="checkbox"/> | |

**12. In your opinion, what are the challenges to India in the years to come ?
Kindly indicate your views on the following**

| | | Your Views | | | | |
|-----------|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | | Strongly Agree | Agree | No views | Disagree | Strongly Disagree |
| 1 | <u>The effect of growing domestic market</u> | | | | | |
| | (a) India will concentrate more on domestic market as international market can not offer the same price offered by domestic market | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (b) The domestic consumption will be huge in India that India has to reduce its share in the export market | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 | <u>Competition from other exporting countries</u> | | | | | |
| | (a) India loses her share in the existing traditional cashew markets like USA,UK, Europe ..etc. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (b) India explores new market to overcome competition by other countries. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (c) India almost withdraws from lost markets like Japan , Australia ..etc | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 | <u>Effect of mechanization in processing</u> | | | | | |
| | (a) India faces big competition from producing countries as they start direct processing and export of finished goods. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (b) India's processing is increased and India stands benefited. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (c) Indian units has to establish processing activities in African countries. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (d) Cashew processing in India will evolve around big corporate and small entrepreneurs stands to loose. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. | <u>India's supply chain of Raw Nuts</u> | | | | | |
| | (a) India increases its production of raw nuts to overcome the shortage of supply from African countries. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (b) India's supply of raw nuts is compensated by imports from new growing countries. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. | <u>General</u> | | | | | |
| | (a) Indian cashew will be the best preferred among products from other countries. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (b) India's share in the International market still reduces. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (c) India faces competition from exporting countries in her own domestic market. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Annexure II

Dear,

I am forwarding herewith a questionnaire to collect the views and preference of overseas buyers of Indian Cashew regarding international cashew scenario in general and that of India in Particular.

This is in connection with my Ph.D research on the topic ‘**The Transition of World Cashew Industry and the Challenges To India**’ that I am pursuing in the School of Management Studies, Cochin University of Science and Technology, Cochin, India. The outcome of the research programme will be of much relevance to the cashew Industry.

Your responses to the questionnaire will be confidential and will not be used for any analysis other than the research study. Your views and preferences sought for is limited to the purpose of the study only.

These responses and views in this regard will be of immense help and support for me to complete the research and to come out with findings, which I hope can benefit the cashew industry in General, which I will be forwarding to you upon completion of the programme.

I would be highly obliged, if you could spare a bit of your valuable time to respond to this questionnaire by clicking the link.

Thanking you very much,

Bhoodes R.K,
Research scholar,
School of Management studies
Cochin / India

QUESTIONNAIRE FOR OVERSEAS BUYERS

1. **Name of the Organisation :**
 2. **Contact Person:**
 3. **Country of Establishment:** Select
 4. **How long is your firm engaged in cashew exports:** Years
 5. **Commodities Dealt with**
Please click to select appropriate box (s)
 Almonds Brazil Nuts Wal Nuts Cashew Nuts
 Hazel Nuts Pistachio
 6. **Volume of Cashew Kernels Exported during a year** (In 20ft. containers)
Please click to select appropriate box
 Less than 100 101-200 Above 200
 7. **How do you effect your Purchase of Cashew Kernels**
Please click to select appropriate box
 Direct from seller Through Agent Both
 8. **When all other buying criteria remains the same, what is your order of preferences for purchase based on the country of origin?**
(Please click the 'Rank' boxes in order of your preferences to rank the criteria 1 to 4)
- | | RANK | |
|---|--------------------------|--------------|
| INDIA | <input type="checkbox"/> | Clear |
| BRAZIL | <input type="checkbox"/> | |
| VIETNAM | <input type="checkbox"/> | |
| OTHERS (Indonesia, Tanzania, Ivory Coast etc..) | <input type="checkbox"/> | |
| No Preference | <input type="checkbox"/> | |
9. **Do you import value added products**
(like roasted /salted , spice coated, honey coated etc).If your answer is "Yes"
Please fill items (a) to (d),else proceed to item 10
 Yes No
 - a. **What percentage of your imports of cashew is value added products ?**
 Less than 10 % 10-25 % 25-50 %
 50-75 % Above 75 %

b. What type of value added cashew products you import normally ?

- Oil Roasted & Salted Dry Roasted & Salted
 Spice coated Honey Coated
 Others (Pl. specify)

c. Are you importing value added products in consumer packs or bulk ?

- Consumer Packs Bulk Both

d. If importing in consumer packs, is the product marketed in producers brand/ importers brand or third party brand

(as in the case of contract manufacturing)

- Producer's Brand Importer's Brand Third Party's Brand

10. The following statements regarding Indian Cashew. Please give your views / opinion by clicking appropriate boxes against each statement.

| | Statements | Your Views | | | |
|---|---|--------------------------|--------------------------|--------------------------|--------------------------|
| | | Strongly Agree | Agree | No views | Disagree |
| a | The taste of Indian Cashew is superior to other origins. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b | The colour of Indian Cashew is Superior compared to others. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c | Indian cashew is more crispy than others. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d | Indian Cashew is uniform in size compared to Vietnam & Brazil | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e | Foreign matter in Indian Cashew is more compared to Vietnam& Brazil | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f | The infestation level in Indian cashew is more compared to Vietnam& Brazil | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| g | The odour of Indian Cashew is more acceptable. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| h | The Broken percentage of Cashew in Indian Cashew is more compared to that of Vietnam & Brazil | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

11(a). Kindly rank the following criteria in order of your preference with regards to your decision for purchasing of cashew kernels

(Please click the 'Rank' boxes in order of your preferences to rank the criteria 1 to 10)

| No | Criteria | Rank | Clear |
|----|---|--------------------------|-------|
| 1 | Pricing of the product | <input type="checkbox"/> | |
| 2 | Promptness in Shipment | <input type="checkbox"/> | |
| 3 | Packing of the product | <input type="checkbox"/> | |
| 4 | Quality of the product | <input type="checkbox"/> | |
| 5 | Supplier(Rapport and Flexibility) | <input type="checkbox"/> | |
| 6 | Trade Norms (Terms and Conditions of sale) | <input type="checkbox"/> | |
| 7 | Service of Agent | <input type="checkbox"/> | |
| 8 | After sales support (<i>in case of settling of quality claim etc.</i>) | <input type="checkbox"/> | |
| 9 | Payment Terms (<i>L/C, CAD, Credit Facility etc.</i>) | <input type="checkbox"/> | |
| 10 | Honouring of contractual obligations (<i>in case of price fluctuations etc..</i>) | <input type="checkbox"/> | |

11(b). How do you rate the above criteria as supplied to the competing countries viz India, Vietnam & Brazil.

(1 being the lowest and 10 the highest)

| Pricing of Product | | <i>Low (1)</i> | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | <i>High (10)</i> | |
|--------------------|---------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | INDIA | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | BRAZIL | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | VIETNAM | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Promptness in shipment | | <i>Less prompt (1)</i> | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | <i>More (10)</i> |
|------------------------|---------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | INDIA | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | BRAZIL | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | VIETNAM | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Packing of product | | <i>Poor (1)</i> | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | <i>Good (10)</i> |
|--------------------|---------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | INDIA | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | BRAZIL | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | VIETNAM | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Quality of the product | | <i>Poor (1)</i> | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | <i>Good (10)</i> | |
|------------------------|---------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | INDIA | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | BRAZIL | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | VIETNAM | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Supplier (Rapport & Flexibility of the supplier) | | <i>Poor (1)</i> | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | <i>Good (10)</i> | |
|--|---------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | INDIA | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | BRAZIL | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | VIETNAM | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Trade Norms (Terms and Conditions of sale) | | <i>Less favorable (1)</i> | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | <i>More (10)</i> | |
|--|---------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | INDIA | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | BRAZIL | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | VIETNAM | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Service Of Agent | | <i>Poor (1)</i> | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | <i>Good (10)</i> | |
|------------------|---------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | INDIA | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | BRAZIL | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | VIETNAM | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| After Sale Support (in case of settling quality claims etc) | | <i>Poor (1)</i> | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | <i>Good (10)</i> | |
|---|---------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | INDIA | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | BRAZIL | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | VIETNAM | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Payment terms (Like L/c, CAD, Credit facility etc..) | | <i>Less favorable (1)</i> | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | <i>More (10)</i> | |
|---|---------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | INDIA | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | BRAZIL | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | VIETNAM | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Contractual Obligations | | <i>Low (1)</i> | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | <i>High (10)</i> | |
|-------------------------|---------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | INDIA | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | BRAZIL | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | VIETNAM | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**12. In your opinion, what are the challenges to India in the years to come ?
Kindly indicate your views on the following**

| | | Your Views | | | | |
|-----------|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | | Strongly Agree | Agree | No views | Disagree | Strongly Disagree |
| 1 | <u>The effect of growing market</u> | | | | | |
| | (a) India will concentrate more on domestic market as international market can not offer the same price offered by domestic market | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (b) The domestic consumption will be huge in India that India has to reduce its share in the export market | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 | <u>Competition from other exporting companies</u> | | | | | |
| | (a) India loses her share in the existing traditional cashew markets like USA,UK, Europe ..etc. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (b) India explores new market to overcome competition by other countries. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (c) India almost withdraws from lost markets like Japan, Australia ..etc | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 | <u>Effect of mechanization in processing</u> | | | | | |
| | (a) India faces big competition from producing countries as they start direct processing and export of finished goods. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (b) India's processing is increased and India stands benefited. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (c) Indian units has to establish processing activities in African countries. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (d) Cashew processing in India will evolve around big corporate and small entrepreneurs stands to loose. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. | <u>India's supply chain of Raw Nuts</u> | | | | | |
| | (a) India increases its production of raw nuts to overcome the shortage of supply from African countries. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (b) India's supply of raw nuts is compensated by imports from new growing countries. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. | <u>General</u> | | | | | |
| | (a) Indian cashew will be the best preferred among products from other countries. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (b) India's share in the International market still reduces. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | (c) India faces competition from exporting countries in her own domestic market. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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