

**Direction and Patterns of India's Agricultural Trade with  
ASEAN, 2000-2015**

A Thesis Submitted

To

**Sikkim University**



In Partial Fulfilment of the Requirement for the  
**Degree of Doctor of Philosophy**

By

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December 2020

Date: 22<sup>nd</sup> December 2020

### DECLARATION

I, **Pranesh Pandey**, hereby declare that the research work embodied in the thesis titled "**Direction and Patterns of India's Agricultural Trade with ASEAN, 2000-2015**" submitted to Sikkim University for the award degree of Doctor of Philosophy is my original work. The thesis has not been submitted for any other degree of this University or any other University.



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### CERTIFICATE

This is to certify that Thesis titled “**Direction and Patterns of India's Agricultural Trade with ASEAN, 2000-2015**” submitted to the Sikkim University for partial fulfillment of the degree of Doctor of Philosophy in the **Department of Economics**, embodies the result of bonafide research work carried out by **Pranesh Pandey** under my guidance and supervision. No part of the dissertation has been submitted for any other Degree, Diploma, Association and fellowship.

All the assistance and help received during the course of investigation have been duly acknowledge by him.

I recommend this dissertation to be placed before the examiners for evaluation.

  
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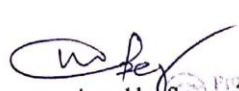
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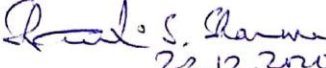
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## Abbreviations

AFTA	ASEAN Free Trade Area
AIFTA	ASEAN-India Free Trade Agreement
APEDA	Agricultural and Processed Food Products Export Development Authority
ASEAN	Association of South East Asian Nations
CAGR	Compound Annual Growth Rate
CDVI	Cuddy- Della Valle Instability Index
CECA	Comprehensive Economic Cooperation Agreement
CEP	Comparative Export Performance
CEPII	Centre for Prospective Studies and International Information
CGR	Compound Growth Rate
CV	Coefficient of Variation
DGCIS	Directorate General of Commercial Intelligence and Statistics
EEPC	Engineering Export Promotion Council
EHP	Early Harvest Program
EII	Export Intensity Index
EU	European Union
FAO	Food and Agriculture Organization
FEM	Fixed Effect Model
FGLS	Feasible Generalized Least Squares
FTA	Free Trade Agreements
GDP	Gross Domestic Product
GOI	Government of India
GTAP	The Global Trade Analysis Project
HS	Harmonized System
III	Import Intensity Index
IT	Information Technology
ITC	International Trade Centre
k.m.	Kilometer

Lao PDR	Lao People's Democratic Republic
MEA	Ministry of External Affairs
MICECA	Malaysia-India Comprehensive Economic Cooperation Agreement
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
OPEC	Organization of the Petroleum Exporting Countries
PCI	Per Capita Income
RCA	Revealed Comparative Advantage
REER	Real effective exchange rate
REM	Random Effect Model
RSCA	Revealed Symmetric Comparative Advantage
SAARC	South Asian Association of Regional Cooperation
SAFTA	South Asia Free Trade Agreement
SID	Simpsons Index of Diversity
SITC	Standard International Trade Classification
SMART	Single Market Partial Equilibrium Simulation Tool
sq. km	Square Kilometer
SSA	Sub-Saharan Africa
TCI	Trade Complementarity Index
TII	Trade Intensity Index
TPCI	Trade Promotion Council of India
UN-COMTRADE	United Nations International Trade Statistics Database
US	United States
USA	United States of America
USD	United States Dollar
WCO	World Customs Organization
WITS	World Integrated Trade Solution
WTO	World Trade Organization

# Chapter 1

## Introduction

### 1.1 Background

Foreign trade is an exchange of goods and services beyond national territories. Foreign trade is a significant engine for economic growth and facilitates economic development. In the famous work of Adam Smith, 'Wealth of Nation,' there is a greater prominence given to the foreign trade. He was in favor of giving freedom to everyone to produce and exchange within and beyond borders. This activity must follow without any intervention by the government for the prosperity of human beings. Fundamentally, Smith was a strong supporter of free trade. Following Smith's footsteps, numerous well-known thinkers like David Ricardo, Heckscher-Ohlin, Paul Krugman, etc., to name a few, ardently supported free trade and developed their respective theories in the arena of international trade. There are different broad sectors within an economy wherein exchanging goods and services from one trading bloc to another occurs. Agriculture is one of the crucial sectors of an economy for international trade. Agriculture trade is every time considered as the economic driving force for developing nations. According to FAO, the agriculture sector accounts for over one-third of export earnings for almost 50 developing countries. Out of them, for about 40 countries, this sector accounts for over half of export earnings. Agriculture remains the largest employment source, contributing to GDP, exports, and foreign exchange earnings in many developing countries (Moisé et al., 2013). Over the past decade, international agricultural and food markets have witnessed several changes. Agriculture trade has brought domestic and international markets closer together. Since 2000, trade-in agro-food products has grown more strongly than in the

preceding decade at close to 8 percent in real terms annually between 2001 and 2014 compared to 2 percent between 1990 and 2000 (OECD, 2015).

Agricultural trade is widely considered an essential contributor to developing countries' economic growth, poverty alleviation, and food security. Agriculture is the primary support for the Indian economy too. Agriculture continues to occupy a place of pride in India's economy. Indian agricultural commodities have come to lodge a leading position in the global market over the years. In India, over 70 percent of the rural households depend on agriculture as their principal means of livelihood. Economic Survey 2013 revealed that India's global ranking for agricultural-exports is tenth. The share of India's agricultural exports and imports in the world agriculture trade in 2013-14 was 2.69 percent and 1.31 percent, respectively (Annual report 2015, Department of Agriculture and Cooperation, GOI).

Agriculture, including fisheries and forestry, books for one-third of India's GDP, and it has a considerable contribution. The total share of agriculture & allied activities (including agriculture, livestock, and forestry and fishery sub-sectors) in terms of percentage share to GDP is 13.9 percent during 2013-14 (as per the estimates released by Central Statistics Office, 2015). The percentage share in exports and imports of India's agricultural in the world agriculture trade in 2013-14 was 2.69 percent and 1.31 percent, respectively (Annual report 2015, Ministry of Agriculture, GOI).

India is a developing country, and it commenced its economic reform in 1991 and integrated its economy with the rest of the world. India followed a restrictive economic policy pattern where public ownership existed in many vital industries until its economic reform. This restrictive economic policy resulted in India's liquidity crisis, the balance of payment deteriorated, a fall in the foreign exchange reserves, and



a fiscal deficit increased. This situation forced the country to make unavoidable changes in its economic policy. It adopted economic liberalization in 1991, which changed the scenario to a large extent and helped India grow its economy. There have been substantial successes during this phase, as the rate of economic growth has picked up, and incomes have increased (Rajadhyaksha, 2012).

A similar trend was in the Agriculture sector, where India followed an inward-looking and protectionist trade policy until the early 1990s. Except for a few commercial commodities, these led Indian agriculture trade with quantitative restrictions, canalizations, licenses, quotas, and high tariff rates. These measures strictly regulated imports and export to safeguard domestic producers' and consumers' interests (Banga and Das, 2012). Domestic requirements and self-sufficiency precisely guided the production pattern in almost all major commodities. The inward-looking approach of India did not highlight the allocation of resources based on comparative advantage. The scenario started changing with the introduction of a new economic policy in 1991. And further, with the introduction of WTO, the liberalization in external trade in agriculture took place. "Agriculture liberalization in India came especially under multilateral organizations, i.e., WTO."<sup>1</sup>

India is a crucial supplier of many agricultural commodities, including rice, spices, cashew, oil meals, fresh fruits, tea, coffee, fresh vegetables, meat, and its preparations and marine products to the international market (Kanaka and Chinadurai, 2012). Globally, India is the second-largest producer of agricultural products. In contrast to this, India's share of agricultural exports in the world is only 2 percent and ranks tenth in the global agriculture ranking (TPCI, 2018). Due to globalization and liberalization,

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<sup>1</sup> Deepika M.G. (2004) Changing Trade Scenario in Agriculture and its Implications for the Indian Economy, Doctoral Thesis, Bangalore University, Bangalore p. 21.

there is tough competition concerning agriculture trade in general and particularly export earnings.

Therefore, the country faces severe competition from other major players in the field, both the existing and new entrants in the battle. India faces intense competition from other major players. The major challenge is from within Asia. China, Malaysia, Philippines, Thailand, Singapore, and Indonesia pose a significant threat to Indian agricultural products (Shinoj and Mathur, 2008). The majority of them posing challenges towards India in terms of agriculture is from ASEAN nations. It will be therefore fruitful to study the trade in agriculture of India with ten ASEAN countries.

## **1.2 ASEAN: A Brief Profile**

The ASEAN (The Association of Southeast Asian Nations) came into existence on 8 August 1967 in Bangkok, Thailand. It was established with the signing of the ASEAN Declaration (Bangkok Declaration) by ASEAN's founding members, including Singapore, Indonesia, Malaysia, Philippines, and Thailand. On 7 January 1984, Brunei Darussalam joined ASEAN. Vietnam joined on 28 July 1995, Lao PDR and Myanmar registered themselves as members on 23 July 1997. Finally, Cambodia was the last and the latest country to join ASEAN on 30 April 1999, making up the active ten member nations of ASEAN to foster intra-regional cooperation in Southeast Asia. The headquarter of ASEAN is in Jakarta, Indonesia.



*Source: Photo from International Pharmaceutical Quality, 2013*

### **Aims and Purposes of ASEAN**

As established in the ASEAN Declaration, the main aims and purposes of ASEAN are as under:

1. To fast-track the economic growth, social progress, and cultural development in the region through joint endeavors in the essence of equality and corporation to support a wealthy and peaceful community.
2. To endorse regional harmony and solidity through enduring respect for justice and the rule of law in the relationship among nations of the region and devotion to the United Nations Charter's principles.

3. To encourage active association and mutual support on common interest matters in the social, economic, cultural, scientific, technical, and administrative arenas.
4. To deliver assistance with each other in training and research facilities in the professional, technical, educational, and administrative fields.
5. To collaborate effectively for the greater utilization of their agriculture and industries, the expansion of their trade, including studying the problems of international commodity trade, improving their transportation and communications facilities, and raising their peoples' living standards.
6. To promote Southeast Asian studies for future welfare.
7. To sustain closer and beneficial cooperation with present global and regional organizations with identical aims and purposes, and explore all paths for even closer collaboration.

Few selected macroeconomic indicators related to ASEAN member countries corresponding to the year 2018 is in Table 1.1.

**Table 1.1: Selected Indicators of ASEAN Members, 2018**

Country	Total Land Area (sq. km)	Total Population (in thousand)	GDP (US\$ million)	PCI (US\$)	Export (US\$ million)	Import (US\$ million)	Total Trade (US\$ million)
Brunei Darussalam	5765	442.4	13557.19	30644.65	6571.37	4157.39	10728.76
Cambodia	181035	15981.8	24633.57	1541.352	5897.42	8372.69	14270.11
Indonesia	1916862	265015.3	1041562	3930.196	180012.7	205521.9	385534.6
Lao PDR	236800	6887.12	18095.74	2627.475	5540.84	5848.14	11388.98
Malaysia	331388	32385	358411.7	11067.21	247354	217467.1	464821
Myanmar	676576	53625	77263.63	1440.814	16654.24	19337.05	35991.29
Philippines	300000	106598.6	342693.1	3214.8	67487.92	115119.2	182607.1
Singapore	719.9	5638.7	364075.7	64567.31	411973.3	370683.6	782656.9
Thailand	513139.5	67831.58	505059.7	7445.79	241010.5	191967.4	432977.9
Viet Nam	331230	94665.97	241038.8	2546.203	242969.2	236837.4	479806.7
ASEAN	4493516	649071.5	2986391	4601.02	1425471	1375312	2800783

*Source: ASEAN Macro-economic Database, ASEAN Merchandise Trade Statistics Database, 2018*

### **1.3 India-ASEAN Partnership**

India and ASEAN members are natural trade partners, and their ties date back hundreds of years. India's partnership and association with the ASEAN members began with India becoming a sectoral dialogue partner at the ASEAN meeting in 1992 as an initial step towards India's 'Look East' policy. In 1996 India became a full dialogue partner of ASEAN. In 2009, the Free Trade Area between India-ASEAN was established, and FTA in goods became effective from 2010. The latest is the FTA in services and investment signed- by all ASEAN nations with India.

There is cooperation in the agriculture and forestry sector as ASEAN and India have successfully held the first and second ASEAN-India Ministerial Meeting on Agriculture and Forestry on 8 October 2011 in Jakarta, Indonesia. Similarly, on 17 October 2012 in New Delhi, India, respectively. The Ministers adopted the Medium-Term Plan of Action for ASEAN-India Cooperation in Agriculture (2011-2015). It was assumed to promote and intensify cooperation in the agriculture and forestry sector between ASEAN and India. Further, to meet the challenges of food security, exchange information and technology, cooperate on research and development projects, encourage agriculture and forestry-related industries, and strengthen human resources development.

After the inception of the Look East Policy, there are numerous strategic relationships between India and ASEAN. Table 1.2 has highlighted different policies and agreements from 1990 to 2014 between the two neighboring blocs to strengthen their relationship, primarily focusing on the economy.

**Table 1.2: The relation between India and ASEAN**

<b>Year</b>	<b>Relationship</b>
1990	India starts engaging with ASEAN, part of Look East Policy.
1992	India becomes a sectoral dialogue partner of ASEAN.
1996	India becomes the full dialogue partner of ASEAN.
2002	India started having annual summits with ASEAN.
2003	The initial framework agreement for the ASEAN–India Free Trade Area (AIFTA) was signed in Bali, Indonesia.
2009	FTA in goods signed. This established Free Trade Area established between India-ASEAN.
2010	FTA in goods becomes effective.
2012	20th Anniversary of ASEAN-India Dialogue. ASEAN–India Commemorative Summit was held. Now India becomes a strategic partner of ASEAN. FTA in services and investment- talks concluded.
2014	FTA in services and investment signed- by all ASEAN nations with India. Except for the Philippines.

*Source: Overview of ASEAN-India Dialogue Relations, ASEAN. Retrieved from [https://asean.org/?static\\_post=overview-of-asean-india-dialogue-relations](https://asean.org/?static_post=overview-of-asean-india-dialogue-relations)*

Therefore, the present study examines India's trade in agricultural products with ASEAN from 2000-2015. The present study will examine the composition and trend in agriculture trade between India and ASEAN. The research will also focus on the changing scenario of direction and pattern of agriculture trade between India and ASEAN. It will also ascertain the comparative advantage dynamics in agricultural products and trade complementarities concerning ASEAN and determine the possible factors influencing agricultural trade between India ASEAN. The study will help to

identify future trade opportunities with ASEAN via agriculture, which may boost the economy in the long run.

#### **1.4 Statement of the Problem**

The establishment of regional trading blocs like the ASEAN Free Trade Area (AFTA), Bangkok, has paved the way to powerful associations with strong bargaining power. These can significantly impact the demand and supply factors in the global markets. ASEAN has emerged as an essential trading partner for India in agricultural products. India-ASEAN trade and investment relationships have been growing gradually, with ASEAN being India's fourth-largest trading partner. India's trade with ASEAN stands at US\$ 81.33 billion, which is approx. 10.6 percent of India's overall trade (MEA, 2018). But from ASEAN's perspective, India is not an important export market. India's share in ASEAN's agricultural exports and imports was about 5 percent in 2008. India stands as ASEAN's 10th largest trading partner in the year 2015. During the past five years, India's total trade with the ASEAN has witnessed a moderation from US\$ 75 billion in 2012 to US\$ 64.6 billion in 2016. India's trade deficit had increased ever since the country entered into FTAs with ASEAN. The agriculture trade between the India-ASEAN is rising compared to global trade, where ASEAN stands as a major supplier of agricultural commodities to India in Asia. The present study is significant. It will try to determine India's prospects and opportunity to export agricultural products to ASEAN and strengthen trade relations between them by identifying the influential factors for agricultural trade.

## **1.5 Objectives**

The following are the main objectives of the present study:

1. To study the composition, direction, and diversity of agriculture trade of India with ASEAN.
2. To analyze the intensity and complementarity of trade in agriculture products between India and ASEAN.
3. To ascertain the dynamics in comparative advantage in agricultural products between India and ASEAN.
4. To determine the possible factors influencing agricultural trade between India and ASEAN.

## **1.6 Research Questions**

The questions raised in the present study are as follows:

1. Whether the direction and composition of India's agriculture trade with ASEAN are changing over the period?
2. Whether there exist any opportunities and prospects for India to export agricultural products to ASEAN nations?
3. Whether Indian agricultural products are competitive as compared to ASEAN countries?
4. What are the possible factors influencing agricultural trade with ASEAN?

## **1.7 Research Methodology**

The details regarding the data sources, collection, and classification of data and analytical frameworks are discussed in detail in the present section. Suitable



methodologies are used after going through various earlier literature and empirical findings to fulfill the research objectives.

### **1.7.1 Data Source**

The present research is based on secondary data set. Time series data of agriculture trade pertaining from period 2000 to 2015, comprising both export and import of India with individual ASEAN nations and the world as a whole (in thousand US dollar), has been used in the present study. The source of data for agriculture trade is from the ITC database (compiled from ITC Trade Map and UN-COMTRADE) and DGCIS, Kolkata. Besides, for computing determinants of trade via the gravity model, the GDP data source is from World Development Indicators, World Bank. Data on distance, border, language, and common colonies are from the Centre for Prospective Studies and International Information (CEPII, France). The GDP and trade values were converted into real values at the 2010 price using the GDP deflator.

### **1.7.2 Classification of Agricultural Products**

HS-2 digit (Harmonized System- 2-digit codes) have been used in the present study to classify agricultural products. The Harmonized System (HS) is an international nomenclature defined by the World Customs Organization (WCO) to classify agriculture products. This study has incorporated HS-2-digit codes from 01 to 24 chapters, which constitutes 85 percent of the total chapter falling under agricultural products. The product details, divided into four sections, are shown in Table 1.3:

**Table 1.3: Classification of Agricultural Products**

Sections	HS-2-digit codes	Agricultural products
1. Live animals; animal products	01	Live animals
	02	Meat and edible meat offal
	03	Fish and crustaceans, molluscs, and other aquatic invertebrates
	04	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included
	05	Products of animal origin, not elsewhere specified or included
2. Vegetable Products	06	Live trees and other plants; bulbs, roots, and the like; cut flowers and ornamental foliage
	07	Edible vegetables and certain roots and tubers
	08	Edible fruit and nuts; peel of citrus fruit or melons
	09	Coffee, tea, mate, and spices
	10	Cereals
	11	Products of the milling industry; malt; starches; inulin; wheat gluten
	12	Oilseeds and oleaginous fruits; miscellaneous grains, seeds, and fruit; industrial or medicinal plants; straw and fodder
	13	Lac; gums, resins, and other vegetable saps and extracts
14	Vegetable plaiting materials; vegetable products not elsewhere specified or included	
3. Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	15	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes
4. Prepared foodstuffs; beverages, spirits, and vinegar; tobacco and manufactured tobacco substitutes	16	Preparations of meat, of fish or crustaceans, molluscs or other aquatic invertebrates
	17	Sugars and sugar confectionery
	18	Cocoa and cocoa preparations
	19	Preparations of cereals, flour, starch, or milk; pastry cooks' products
	20	Preparations of vegetables, fruit, nuts, or other parts of plants
	21	Miscellaneous edible preparations
	22	Beverages, spirits, and vinegar
	23	Residues and waste from the food industries; prepared animal fodder
24	Tobacco and manufactured tobacco substitutes	

Source: WCO, 2015

### **1.7.3 Analytical Framework**

The present study has applied the percent share formulation for analyzing the composition and direction of agriculture export and import of India with ASEAN nations. The Compound Annual Growth Rate (CAGR) is assessed to study India and ASEAN's growth performances. To address whether there exists variability in export and import of agricultural products between India and ASEAN, an instability index, i.e., Cuddy- Della Valle Instability Index, has been calculated. Simpsons Index of Diversity has been considered in the current study for evaluating the extent of export diversification in India's agriculture products. Trade Intensity Index (TII), including both Export Intensity Index (EII) as well as Import Intensity Index (III), is calculated to capture the extent of trade concentration between the two trading blocs. Furthermore, to identify to what degree the export profile of the reporter matches or complements, the import profile of the partner, Trade Complementarity Index (TCI), is estimated. To ascertain the dynamics in comparative advantage status of India's agricultural exports in relation with ASEAN, Revealed Comparative Advantage (RCA), as well as Revealed Symmetric Comparative Advantage (RSCA), had been applied. RCA and RSCA are measures of international trade specialization and competitiveness. Finally, for identifying the determining factors responsible for agricultural trade between India and ASEAN, the gravity model has been carried out and estimated.

#### **1.7.3.1 Composition of Agricultural Trade**

For the composition of agricultural trade of India with ASEAN, the percent share of export and import of India's various agricultural products out of its total agriculture product that is traded with ASEAN is calculated by the following formula:

$$s_i^y = \frac{x_i^y}{t^y}$$

Where,

$s_i^y$  = share of export/import of the  $i^{\text{th}}$  agricultural products for the  $y^{\text{th}}$  year,

$x_i^y$  = value of export/import of  $i^{\text{th}}$  agricultural products for the  $y^{\text{th}}$  year,

$t^y$  = value of total agricultural export/import for the  $y^{\text{th}}$  year.

To see the importance of ASEAN as a major trading partner, shares of India's trade with ASEAN relative to that of India's trade with the world has been computed by the formula:

$$s_i^y = \frac{x_{ia}^y}{T_{iw}^y}$$

Where,

$s_i^y$  = share of export/import of the  $i^{\text{th}}$  agricultural products to/from ASEAN concerning that of the world for the  $y^{\text{th}}$  year,

$x_{ia}^y$  = value of export/import of  $i^{\text{th}}$  agricultural products to/from ASEAN for the  $y^{\text{th}}$  year,

$T_{iw}^y$  = value of export/import of  $i^{\text{th}}$  agricultural products to/from the total world for the  $y^{\text{th}}$  year.

### 1.7.3.2 Compound Annual Growth Rate (CAGR)

For analyzing the trends in agriculture export and import of India with ASEAN, CAGR was estimated from the period 2000 to 2015 using the following formula:

$$\log Y_t = \beta_1 + \beta_2 t + u_t$$

where,

$Y_t$  = value of export of each product group for year 't.'

$\beta_1 = \text{constant}$

$\beta_2 = \text{slope coefficient}$

$u = \text{error term}$

$t = \text{time variable}$

In terms of percentage, the formula for CAGR becomes:

$$\text{CAGR} = [\text{antilog}(\beta_2) - 1] \times 100$$

### **1.7.3.3 Cuddy- Della Valle Instability Index**

To account for and check the existence of variability in export and import of India's agricultural products with ASEAN, a well-known instability index, i.e., Cuddy- Della Valle Instability Index, has been calculated in the present study. Cuddy- Della Valle Instability Index measures the magnitude of volatility or instability in exports and imports. John Cuddy and Della Valle developed this index in 1978 to measure the instability in time series data. The formula for this index is:

$$\text{CDVI} = \text{C.V.} \cdot \sqrt{1 - \bar{R}^2}$$

Where,

CDVI = Cuddy- Della Valle Instability Index,

C.V. = Coefficient of Variation,  $[\text{C.V.} = \frac{\text{Standard Deviation}}{\text{Mean}} * 100]$

$\bar{R}^2 = \text{Adjusted coefficient of determination from time-trend regression,}$

Cuddy- Della Valle Instability Index is a better measure to evaluate instability or consistency than the Coefficient of Variation(C.V.) in time series data as it intrinsically adjusts the trend (Deb and Pramanik, 2015). There is ample literature where the same technique is employed to study the instability in trade and instability in agricultural trade. Few studies that included this technique are Cuddy-Della Valle (1978), Shinoj (2007), Maity (2013), Sihmar (2014), Ali and Jabbar (2015), Suseela and Chandrasekaran (2016), Dudhat et al. (2017), etc.

#### **1.7.3.4 Simpsons Index of Diversity**

Trade diversification is the changing of a country's export and import structure and composition. This export diversity is achieved by changing the patterns of the export or through innovation and technology. Export diversification is to widen the range of products that a country exports (Dennis and Shepherd, 2007). The study which argued that countries with more diversified exports generally experience faster economic growth includes Herzer and Lehnmann (2006), Agosin (2007), Samen (2010), Anwasha and Rajat (2013), and Lugeiyamu (2016). Simpsons Index of Diversity (SID) has been used in the present study to see the extent of diversity in India's agricultural trade with ASEAN.

$$SID = 1 - \sum_{i=1}^n w_i^2 \text{ and, } w_i = \frac{x_i}{\sum x_i}$$

Where,

$x_i$  = value of export/import of  $i$ th agricultural products and

$w_i$  = proportionate value of export/import of  $i$ th agricultural products out of total agricultural export/import.

The value of Simpson's Index of Diversity lies between 0 and 1. If there is complete specialization, the index tends towards 0, and in cases of full diversification, it tends towards 1. Joshi et al. (2004), Singh et al. (2006), Shinoj (2007), Bardhan (2007) have used Simpsons Index of Diversity in their study to see the export/import diversity in agricultural products.

### **1.7.3.5 Trade Intensity Index (TII)**

K. Kojima first developed the trade intensity index in 1964 to study the bilateral trade flow. Trade Intensity Index is used to verify whether the value of trade between two partners is greater or smaller compared to its position in the world trade. In other words, the TII tells whether or not a region exports more (as a percentage) to a given destination than the world does on average. Therefore, the present study has used this index to witness the strength of trade between India and ASEAN and to capture how intense their trading patterns are. TII is calculated as:

$$T_{ij} = \frac{x_{ij}/x_{it}}{x_{wj}/x_{wt}}$$

Where,

$T_{ij}$  is the trade intensity of India and ASEAN

$x_{ij}$  and  $x_{wj}$  are the values of India's export and world's export to ASEAN,

$x_{it}$  and  $x_{wt}$  are the values of India's total export and total world's export, respectively.

The trade intensity index is divided into Export Intensity Index (EII) and Import Intensity Index (III) as suggested by Kojima (1964).

Export Intensity Index (EII) between India and ASEAN is denoted by:

$$EII = \frac{x_{ia}/x_i}{m_a/m_w - m_i}$$

Where,

$x_{ia}$  = India's export to ASEAN;

$x_i$  = India's total export;

$m_a$  = Total import of ASEAN;

$m_w$  = Total World imports

$m_i$  = Total imports of India.

Import Intensity Index (III) between India and ASEAN is denoted by:

$$III = \frac{m_{ia}/m_i}{x_a/x_w - x_i}$$

Where,

$m_{ia}$  = Import of India from ASEAN;

$m_i$  = Total Import of India;

$x_a$  = Total Export of ASEAN;

$x_w$  = Total World Export;

$x_i$  = Total Export of India.

#### **1.7.3.6 Trade Complementarity Index (TCI)**

TCI specifies the degree to which the reporter's export profile matches or mismatches its respective partner's import profile. If the reporting country's export items match with the partner country's import item, then the trade complementarity exists. If so, then there is a high prospect for a reporter country to export to its partner. A high



index value may show that trading partners would benefit from an increase in trade and may be predominantly advantageous in assessing potential bilateral or regional trade agreements. According to WITS, World Bank, the formula for TCI is:

$$TCI = 100 * 1 - \left[ \sum_k \left| \frac{m_{jk}}{M_j} - \frac{x_{ik}}{X_i} \right| \right]$$

Where,

"x is the exports of product k from reporter country I value, and X is country i's total exports. Partner country j's value of imports of product k is denoted by m, and the value of its total imports is denoted by M"<sup>2</sup>. In our analysis, the reporting country is India and the partner countries are ASEAN nations.

The values of TCI ranges between 0 to 100. A score of 100 indicates perfect trading partners, and a score of 0 reveals that the two countries are perfect competitors. A high index may suggest that the two countries would gain from increased trade and may be particularly useful in evaluating prospective bilateral or regional trade agreements. Therefore, to assess whether there exist any opportunities and prospects for India to export agricultural products to ASEAN nations, TCI has been calculated in the present study.

### **1.7.3.7 Revealed Comparative Advantage (RCA)**

To ascertain the dynamics in the comparative advantage status of India's agricultural exports concerning ASEAN, initially, the Revealed comparative advantage (RCA) was considered in the study from 2000 to 2015. It is an index that

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<sup>2</sup> Online Trade Outcomes Indicators - User's Manual, The World Bank Version 1.0, September 2013. <http://wits.worldbank.org/WITS/docs/TradeOutcomes-UserManual.pdf>

measures international trade specialization and competitiveness. It measures the degree of a country's comparative advantage or disadvantage regarding their products, which are exported concerning their partner country or a trading bloc. Balassa's RCA formula is:

$$RCA = \frac{X_{ij}/X_{ik}}{X_{nj}/X_{nk}}$$

Where,

$X_{ij}$  = Exports of country 'i' of commodity 'j'

$X_{ik}$  = Exports of the country 'i' of a set of commodities 'k.'

$X_{nj}$  = Exports of a set of countries 'n' of commodity 'j,' and

$X_{nk}$  = Exports of a set of countries 'n' of a set of commodities 'k.'

The RCA index indicates that if the value exceeds unity, the particular product is said to have a comparative advantage. It is then said to be competitive in the global market. But if the index value is less than the unity, the particular product is said to have a comparative disadvantage. The consideration of an assumption that "the commodity pattern of trade reflects the inter-country differences in relative costs as well as non-price factors, the index is assumed to 'reveal' the comparative advantage of the trading countries" (Shinoj, 2008). Applying the RCA index will reflect the intrinsic benefit of a specific export product and is steady with the variations in an economy's relative factor endowments and productivity. The drawback is it cannot differentiate between improvements in factor endowments and the search for suitable trade policies by a country (Batra and Khan, 2005).

But RCA suffers from asymmetry as pure RCA is not comparable on both sides of unity, as the index ranges from one to infinity.

Following the Dalum et al. (1998) methodology, Revealed Symmetric Comparative Advantage (RSCA) has been computed and presented in this study, making the index symmetric.

Mathematically, it is expressed as:

$$RSCA = (RCA-1) / (RCA+1)$$

The RCA ranges between -1 and +1 and is free from the problem of skewness. A commodity will be having a comparative advantage in its exports if the corresponding RSCA value is positive and vice versa.

Researchers who have used similar techniques include Chauhan (1999), Shinoj et al. (2008), Chaddha et al. (2008), Chandran (2011), Singh et al. (2012), Kanaka et al. (2012), Mahajan et al. (2012), etc.

### **1.7.3.8 Gravity model**

Tinbergen (1962) was the initial person to use the gravity model. It was used to explain international trade flows between nations. The gravity model is widely used in determining trade flows between nations due to its inherent simplicity and high explanatory power. Frankel (1997) identified three important reasons: empirical success, improved theoretical foundations, and new interest among economists in geography and trade for its popularity in trade analysis. Gravity models are intensively used to study the impact of Regional Trade Agreements as it provides a strong theoretical basis and empirical results. The basic form of the gravity model is as under:

$$T_{ij} = Y_i * Y_j / D_{ij} \dots \dots \dots 1$$

where,

$T_{ij}$  = Bilateral trade flows between country 'i' and 'j,'

$Y_i$  and  $Y_j$  = National income of country 'i' and 'j,' respectively measured in terms of GDP, and

$D_{ij}$  = Distance between the capital cities of the country 'i' and country j (in km).

The countries are likely to trade more with the increase in economic size. The GDP of a respective country represents this. The distance variable indicates as the trading partners are nearby, the trade increases and vice versa. Therefore, the distance variable is correlated negatively with bilateral trade (Chaney, 2018). Also, dummy variables like sharing a common border, common language, common colony, and landlocked have become common to capture the trade's qualitative aspects. Two countries sharing a common boundary will have more business due to more substantial social and economic relations at the general level (Renjini et al. 2016). Due to the ease of doing trade and suitable policies, regional trade agreements such as Free Trade Agreement (FTA) have increased bilateral trade. Given the multiplicative nature of the model, the natural logarithms can be taken to obtain the linear relationship, and equation 1 can be converted as follows:

$$\ln T_{ijt} = \beta_1 + \beta_2 \ln GDP_{it} + \beta_3 \ln GDP_{jt} + \beta_4 \ln Dist_{ij} + \beta_5 Combord + \beta_6 landlock + \beta_7 Coml + \beta_8 Comcol + \beta_9 FTA + u_{it}$$

Where,

$\ln T_{ijt}$  = Natural logarithm of bilateral trade flows of agriculture between countries 'i' and 'j' in time 't,'

$\ln GDP_{it}$  and  $\ln GDP_{jt}$  = Natural logarithm of GDP of countries 'i' and 'j' in time 't'

$\ln Dist_{ij}$  = Natural logarithm of bilateral distance between countries 'i' and 'j',

Combord = Binary variables that take the value 1 if both countries share a border, and 0 otherwise,

landlock = Binary variables that take the value 1 if the country is landlocked, and 0 otherwise,

Coml = Binary variables that take the value 1 if countries have a common official language, and 0 otherwise,

Comcol = Binary variables that take the value 1 if both countries were under the same colonizer, and 0 otherwise,

FTA = Binary variables that take the value 1 if countries have common membership in Free Trade Agreements, and 0 otherwise,

$u_{it}$  = Error-term, which is assumed to be normally distributed with zero mean and constant variance for all observations and uncorrelated.

The gravity model deals with panel data, and there are three types of panel models for the estimation: the Pooled Model, Fixed Effect Model (FEM), and Random Effect Model (REM). Autocorrelation and heteroscedasticity are the two common problems that occur in the panel data. The pooled model disregards these significant issues. Therefore, FEM and REM are alternatives for estimating the panel data, and the two techniques are applied in the study.

## **1.8 Organization of the study**

The present study is organized into six chapters. Chapter 1 comprises the study's introduction, which includes the study's background, a brief profile of ASEAN, a statement of the problem with the study's objectives, and research questions. This chapter further includes research methodology comprising data sources, classification

of agriculture products, and analytical framework. Chapter 2 contains the study's theoretical foundation and a review of various empirical works of literature related to the study. Similarly, chapter 3 incorporates the analysis of India's composition and patterns of agriculture trade with ASEAN. Here, earnings from individual products as a share of total agricultural products trade with ASEAN and India's agricultural trade to ASEAN as a share of agricultural trade with the world is discussed. The growth and instability in India and ASEAN's agriculture trade have been estimated in this chapter. Chapter 4 is all about direction, diversity, and complementarities in India's agriculture trade with ASEAN. This chapter will identify which ASEAN nation is significant for India to export agricultural produce and its dynamics over the period. This chapter will further explore the extent and the degree of trade combined with recognizing how potential partner India is with the various ASEAN nations. Chapter 4 deals with the comparative advantage and determinants of agricultural trade between India and ASEAN. This chapter deals with the study to learn the changing level of competitiveness of Indian agricultural products with ASEAN countries over the period. Further, this chapter will identify various possible or influential factors determining agricultural trade between India and ASEAN. The final chapter, i.e., chapter 6, is the conclusion and policy implications. This chapter summarizes the entire study and recommends measures for the policymakers in agriculture and agriculture trade.

## **Chapter 2**

### **Theoretical Framework and Review of Literatures**

Fundamental theories and concepts that are prerequisites before the initiation of the study have been undergone in detail. These theories and concepts include mercantilist's theory of trade, free trade, protection trade policy, Revealed Comparative Advantage (RCA), export diversity, and the gravity model of trade.

#### **2.1 Mercantilist's theory of trade**

The mercantilist's theory of trade is a group of ideas and policies in an economy, popularized by a group of merchants through their writings. This idea was widespread in different Western European countries until the 18<sup>th</sup> century. Mercantilists' main aim and objective were to accumulate 'bullions' in the form of precious gold and silver to make their state wealthier. Mercantilists believed that the more affluent the nation is, the more influential the country will become through strong armed forces. Mercantilism believed in the enrichment of state power through economic means (Herlitz, 1964).

Mercantilism trade theory suggested and promoted the export of goods but was firmly against the import. They wanted an inflow of money from foreign nationals, which will further finance their nation to accumulate precious gold and silver to make them wealthy and powerful. They were the believer of the zero-sum game. It means that a country could gain at the expense of another nation due to the fixity in the amount of gold and silver at a given point of time, and also no nation could simultaneously achieve a trade surplus at one end of time. Mercantilism is also known as economic nationalism. They were a believer in strict government regulation to reach their target.

## **2.2 Free Trade**

A free trade policy does not impose any restriction on exchanging goods and services between different countries. According to Adam Smith, a free trade policy refers to a commercial policy system that does not distinguish domestic and foreign commodities, which neither imposes an additional burden on the latter nor grants any special favor to the former. There are different theories and views on free trade, more specifically, theories of international trade. Those theories and ideas include: (i) Absolute Advantage theory of Adam Smith, (ii) Comparative Cost Advantage theory of David Ricardo, (iii) International Trade Theory of Heckscher-Ohlin, and (iv) New Trade Theory of Paul Krugman.

### **(i) Absolute Advantage Theory of Adam Smith**

In 1776, Adam Smith published his writings, namely "An Inquiry into Nature and the Causes of Wealth of Nations," where he criticized mercantilist's thoughts regarding international trade. Mercantilists believed in the gain of one nation at the expense of another nation. Mercantilist's main intention was to accumulate wealth and become a strong nation, thereby imposing restrictions on imports through the government's strict regulations. In contrast to their idea, Smith advocated free trade and laissez-faire policy, which every nation would gain (Salvatore, 1998).

While explaining the international trade theory, Adam Smith mentioned that two countries (say country A and country B) engaged in free trade with each other would gain from international trade. The trade between the two countries depends upon absolute cost advantage. If country A is efficient or has an absolute cost advantage in producing one commodity and if country B is efficient or has an absolute cost



advantage in making another commodity, both countries may concentrate on producing that commodity with an absolute cost advantage. In this way, both countries will gain from the specialization in the production of those commodities where they have an absolute advantage and curtail the production of an absolute cost disadvantage commodity (Salvatore, 1998).

**(ii) Comparative Cost Advantage Theory of David Ricardo**

In his famous book, "Principles of Political Economy and Taxation, " published in 1817, David Ricardo, has talked about Comparative Cost Advantage in international trade. Ricardo went one step further than Adam Smith. He mentioned that even if a nation has an absolute disadvantage in producing both commodities, and even if a country is less efficient than its partner in producing both items, it can still trade with its partner. Both nations will gain from trade. In the case of two commodities in consideration, beneficial trade will occur for a country if it concentrates and produces that commodity where its absolute disadvantage is smaller than the other commodity that has the greater absolute disadvantage. After specialization and production, the nation must export the first commodity with a smaller absolute disadvantage than the second commodity. Likewise, the country should curtail the production and import the second commodity with greater absolute disadvantage. In other words, the Ricardian model finds that international trade takes place from differences in labor productivity between countries. And he explained why Portugal exported wine and Britain cloth. Subsequently, the comparative advantage principle has occupied an almost universal law of economics (Salvatore, 1998).

While Ricardo emphasized physical and natural influences over competitiveness, later economists gave technological and human factors weight. A reading of the

comparative advantage literature reveals Ricardo's theoretical development's continuity via Mill and Marshall to Heckscher, Ohlin, Samuelson (Goldin, 1990), and Krugman in recent time. Despite the influential weight and usefulness of comparative advantage, the major problems arise when applying this theoretical concept in empirical analyses, especially when measuring the comparative advantage in analyzing trade performance.

### **(iii) International Trade Theory of Heckscher-Ohlin**

Swedish economists Eli Heckscher and Bertil Ohlin developed this theory of international trade. This theory is also known as the factor endowment theory, and it is the alternative to the comparative advantage theory (Subasat, 2003). Heckscher-Ohlin has mentioned that a nation will produce and export the good which requires the intensive use of the factor that their country has been endowed in abundance and import those goods that require scarce factor available in the nation. If a country is endowed abundantly with labor, it will produce and export labor-intensive goods. If a country is endowed abundantly with the capital, it will produce and export capital intensive goods. In this theory, the comparative advantage source is in terms of factor endowments (Salvatore, 1998).

### **(iv) New Trade Theory of International Trade**

New Trade Theory of International Trade is an economic theory developed by Paul Krugman in the 1970s to understand international trade patterns. New Trade Theory originated to support our understanding of why developed and big countries are trading with similar goods and services. These countries constitute more than 50 percent of world trade. By selling similar goods and services by these countries there

exists variety as well as the competition. It will pave the way for monopolistic competition (Ahmed, 2012). New Trade Theory of International Trade claims that considerable economies of scale lead to exporting goods and services to another country. Those countries with the advantages will dominate the market, and the market takes the form of monopolistic competition. It is a known fact that in monopolistic competition, firms produce a similar product that isn't the same but somewhat close. It is particularly true in today's scenario, especially in crucial economic sectors like electronics, IT, food, automotive, etc. There are many cars made in India, yet Indians purchase cars made in other countries. According to this theory, economies of scale and network effect will benefit both exporting and importing countries.

### **2.3 Revealed Comparative Advantage**

It was somewhat challenging to empirically study the comparative advantage through earlier theories from Adam Smith, David Ricardo, to Heckscher-Ohlin. Later, there were numerous techniques suggested by different economists to measure the comparative advantage. One such is the Revealed Comparative Advantage (RCA) developed by Bela Balassa in 1965. Balassa extended the Liesner (1958) measure of comparative advantage. Balassa's RCA index is an index used in international trade for estimating the relative advantage or disadvantage of a particular country in a specific group of goods or services as evidenced by trade flows. It identifies the comparative advantage or disadvantages a country has for a commodity concerning another country or group of countries. "It provides a ranking of commodities by the degree of comparative advantage and identifies a binary type demarcation of commodities based on the comparative advantage" (Balance et al., 1987). With the

assumption that the commodity pattern of trade reflects the inter-country differences in relative costs and non-price factors, the index is assumed to "reveal" the trading countries' comparative advantage. There are several factors, measurable as well as non-measurable. The factors contributing to RCA movements are economical, structural, world demand, and trade specialization. The Balassa's RCA is expressed as:

$$RCA = \frac{X_{ij}/X_{ik}}{X_{nj}/X_{nk}}$$

Where,

$X_{ij}$  = Exports of the country 'i' of commodity 'j'

$X_{ik}$  = Exports of the country 'i' of a set of commodities 'k.'

$X_{nj}$  = Exports of a set of countries 'n' of commodity 'j,' and

$X_{nk}$  = Exports of a set of countries 'n' of a set of commodities 'k.'

The RCA index indicates that if the value exceeds unity, the particular product is said to have a comparative advantage. It is competitive in the global market and vice versa.

The benefit of using the comparative advantage index is it considers the inherent advantage of a specific export commodity and is consistent with the changes in an economy's relative factor endowment and productivity. However, the disadvantage is that it cannot distinguish improvements in factor endowments and pursue appropriate trade policies by a country (Batra et al., 2005). However, RCA suffers from asymmetry as 'pure' RCA is not comparable on both sides of unity, as the values range from zero to one if a country is said not to be specialized in a given sector. In contrast, the index's value ranges from one to infinity if a country is said to be specialized. There will be bias in the econometric analysis as this index's mean would be higher

than the median. As a result, there will be skewed distribution towards the right. The index is made symmetric, with the methodology recommended by Dalum et al. (1998), and the new index is called Revealed Symmetric Comparative Advantage.

Mathematically, it can be stated by the following equation:

$$RSCA = (RCA-1) / (RCA+1)$$

RSCA ranges between -1 and +1 and is free from the problem of skewness. A particular commodity is said to have a comparative advantage in its exports if the corresponding RSCA value is positive and vice versa.

## **2.4 Protection Trade Policy**

Free trade will help nations to exchange commodities, and they will gain from it. But in today's world, most governments do not follow a firm free trade policy considering their national interest. Countries generally follow protection policy in international trade for their self-welfare. In common usage, the term 'protection' means a commercial policy adopted by a government to encourage domestic industry by shielding its high-priced products against the competition from cheap imports. It is done either by subjecting the import duties to bring their prices at par with the domestic prices of import-competing goods or by restricting imports either by banning them altogether or by subjecting them to import quota<sup>3</sup>. According to Harry G. Johnson, the term 'protection' refers to those "policies" that create a divergence between commodities' relative prices to domestic consumers and producers and their relative prices in the world markets. Corden (1971) has defined protection as the

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<sup>3</sup> Vaish, M.C., Singh, S. (2006). *International Economics*, Eight Edition, Oxford and IBH Publishing, p. 263.

difference in the domestic and border prices and said it is equivalent to the tariffs. Countries usually levy trade restrictions like trade barriers in tariff and non-tariff barriers to restrict the inflow of goods and services from other nations.

There are theoretical arguments of protectionist measures that justify why a country should adopt a protection trade policy for national welfare. These theories include the terms of trade argument, the market failure argument, the infant industry argument, and protection against dumping.

## **2.5 Export Diversity**

There is a vast theory of classical economists from Adam Smith, David Ricardo, Heckscher-Ohlin to Krugman, who primarily focused on the product specialization and exports of specialized products to gain via foreign trade. They were the believer of economies of scale and comparative advantage. However, there are numerous literature and theories in the present scenario where thinkers have shifted their opinion from product concentration and specialization to diversification in terms of production and exports of goods and services. Most of them believed that instability in export earning is due to specialization in production and market concentration. There are volatilities in the market price of the wide range of products, specifically agricultural products. If production is diversified and the export base is broadened up, then stability in export earnings is achieved.

Export diversification is defined as the changing of a country's export structure and composition. This diversity is achieved by changing the patterns of the export or through innovation and technology. Export diversification is to widen the range of products that a country exports, as Dennis and Shepherd (2007) stated. Diversification

in export usually occurs in two dimensions, i.e., horizontal and vertical diversification. (Ali et al., 1991 and Herzer and Lehnmann, 2006).

**(i) Horizontal diversification of Exports**

It is an increment of products available for exports which are from the same sector. Horizontal diversification usually prevents price fluctuation and prevent economic risk. It brings stability in export earnings, as some sector experiences volatility in prices. (Herzer and Lehnmann, 2006 and Samen, 2010). To attain trade gain through export earnings and subsequently achieve economic growth through horizontal diversification, a nation must increase production or introduce new products from the same sector to earn a handsome amount in the world market (Ali et al., 1991).

**(ii) Vertical Diversification of Exports**

It is a shift of products available for export from primary sector production to secondary and tertiary sectors. According to Matthee and Naudé (2007), vertical diversification occurs when new technologies are introduced and used as value addition in processing and marketing. Moreover, it brings stability in export earning as in the international market, and manufactured exports are less fluctuating than those of primary exports (Ali et al., 1991).

The idea is generated that two dimensions of export diversity, i.e., horizontal and vertical diversification, lead to constructive effect with stability in the export earnings and subsequently help achieve economic growth. Although they work differently depending on marketing, skill, and technology. Mostly vertical diversification creates dynamic externalities, and it depends upon high-class skills, advanced technologies, and favorable policies.

## 2.6 The Gravity Model of Trade

The gravity models' basic idea was taken from Newton's law of universal gravitation (1687). The gravity model was developed by Tinbergen in his seminal work, "Shaping the World Economy," in 1962. This model has emerged as a popular model due to its success in explaining the bilateral trade patterns between a particular country with its any other trading partner. The gravity model had played an essential role in defining trade flow, where distance had been a significant element in theory (Nijkamp and Reggiani, 1992). Linder (1961) hypothesis and Gruber and Vernon (1970) explained trade dependence on the trading countries' per capita GDP.

The basic form of the gravity model is as under:

$$T_{ij} = Y_i * Y_j / D_{ij}$$

where,

$T_{ij}$  = Bilateral trade flows between country 'i' and 'j',

$Y_i$  and  $Y_j$  = National income of country 'i' and 'j,' respectively measured in terms of GDP, and

$D_{ij}$  = Distance between the capital cities of the country 'i' and country j (in km).

By taking the log in the basic form of the gravity model, the estimable equation becomes:

$$\ln T_{ijt} = \beta_1 + \beta_2 \ln GDP_{it} + \beta_3 \ln GDP_{jt} + \beta_4 \ln Dist_{ij} + u_{it}$$

where,



$\ln T_{ijt}$  = Natural logarithm of bilateral trade flows between countries 'i' and 'j' in time 't,'

$\ln GDP_{it}$  and  $\ln GDP_{jt}$  = Natural logarithm of GDP of countries 'i' and 'j' in time 't,'

$\ln Dist_{ij}$  = Natural logarithm of bilateral distance between countries 'i' and 'j',

$u_{it}$  = Error-term, which is assumed to be normally distributed with zero mean and constant variance for all observations and uncorrelated.

This gravity model's theoretical basis was first proposed and popularized by Anderson in 1979 under the constant elasticity of substitution and product differentiation's assumption. The gravity equation empirically explains bilateral trade patterns between any two trading countries, as stated by Deardorff (1998). They are also consistent with the other major trade models, including the Ricardian model, Heckscher-Ohlin model, increasing return to the sale, etc. The gravity equation states that trade between the two countries is positively related to their income and negatively to their distance. Deardorff (1998) mentioned no or zero barriers to trade for all types of goods and services, as frictionless trade. The GDP represents the trading partners' market size and purchasing power, which postulates that they trade more with their economic size. The distance variable indicates higher transportation costs; therefore, the distance variable correlates negatively with the bilateral trade. Taking the geographical distance alone to approximate economic barriers to international trade is not well accepted. According to Renjini et al. (2017), the inclusion of dummy variables like sharing a common border, common language, common colony, and landlocked has become common in capturing the trade's qualitative aspects.

## **2.7 Review of Literature**

The relevant literature reviewed is classified under four sections. Section 2.7.1 deals with the patterns of agricultural trade of India, 2.7.2 is related with the comparative advantage and complementarities in agricultural trade, section 2.7.3 is concentrated in the determinants of agricultural trade, and finally section 2.7.4 is dedicated towards India-ASEAN Trade.

### **2.7.1 Patterns of Agricultural Trade of India**

Kaur (2012) studied the pattern of India's foreign trade and share of India's export and import in the world's trade during the period 1960-2010. Accordingly, India's share in the world's exports has shown a rising trend. The percentage was only 0.5 percent in 1991. From 1991 to 1997, its share continuously rose from 0.50 percent to 0.62 percent, and from 2009 to 2010, it rose to 1.25 percent.

Sahni (2014) analyzed India's export trends using the time series data from 1980-81 to 2010-11. The entire period was divided into two sub-periods, 1980-81 to 1991-92 (pre-reform period) and 1992-93 to 2010-11 (post-reform period), to see the impact of economic reforms on India's export behavior. The study shows that India's export performance improved significantly during the post-reform period, and there has been a noticeable change in the value, composition, and direction of India's exports. Though exports' volume and value have increased manifold, India's share in the world exports is still not up -to expectation.

Concerning agriculture trade, trend analysis was carried out by Patil et al. (2006) from 1990-1991 to 2000-2001 to get insight into India's long-term trends in exports and imports of agricultural commodities after liberalization. The imports increased at a

rate of 26 percent, whereas the exports of agricultural commodities showed an increasing trend, but this increase in export is slower than imports. These results also revealed that India's liberalization policy in 1991 and WTO positively impacted agricultural commodities' export and import. However, the gap between imports and exports has been widening; therefore, they suggested that the government should work out policies to increase its exports and decrease the gap.

Nabi et al. (2013) analyzed India's agriculture Export Performance in Pre and Post WTO Regime (time series analysis from 1980-81 to 2009-10). The annual growth of exports increased to 9.5 percent during the post-WTO period compared to -2.8 percent during the pre-WTO period. Moreover, the exports index at base 1994-95 also increased to 98 percent during the post-WTO period on an average. On average, India's exports went up from USD 27242 million during the pre-WTO era to USD 50163 million during the post-WTO era. The influence of WTO on India's primary product export performance was constructive. This result is consistent with Kaur (2012), where the study found that out of total exports, agriculture export has grown after economic reform and the introduction of WTO.

Furthermore, Thomas et al. (2011) stated that the emerging world demand for Indian agricultural commodities offers a great opportunity. Indian agricultural exports have increased manifold. However, the contribution of agricultural export to the total export of the country has declined. This study has explored India's agricultural exports' growth performance from 1991-92 to 2009-10, using compound annual growth rate and percentage share in total export of India and Gross Domestic Product.

Mahajan et al. (2012) examined the impact of the agricultural sector's opening up on the commodities composition and structural changes in agricultural and allied

products' exports and direction of India's agricultural exports during the post- WTO period (i.e., 1995-96 to 2005-06). The study reveals that though India's agricultural exports share in the world's agricultural exports witnessed a fluctuating and declining trend after 1996, India's agricultural exports in world total agricultural exports are more significant than India's total exports in the world's total exports. If we consider the percentage of India's agricultural exports to world exports within agricultural and allied products, there has been a sharp turnaround, contributed mainly by the enhanced share of exports of rice, tea and mate, and spices.

Sahni (2014) estimated India's exports of agriculture and allied products pre and post-economic reforms period. Agricultural products like tea, coffee, rice, tobacco, and spices were essential items of India's exports and foreign exchange earnings. The compound growth rate of India's exports of agriculture and allied products was found to be only 1.9 percent during the pre-reform period. Still, it is found to be higher, i.e., 9.7 percent during the post-reform period. The compound growth rate of India's exports of tea was found to be only 0.8 percent during the pre-reform period, but the C.G.R was found to be 3.0 percent during the post-reform period.

Similarly, C.G.R of exports of coffee, rice, tobacco, and marine products were calculated by Sahni (2014), where coffee, rice was negative during the pre-reform period and positive during the post-reform period. The C.G.R of exports of marine products was 5.76 percent during the pre-reform period and 5.44 percent during the post-reform period. The period of the study was 1980-81 to 2010-11.

Thomas et al. (2011) analyzed the composition of agricultural exports from 1991 to 1999 and 2000 to 2009. The commodities selected were Cereals and cereal preparation, Fresh and processed vegetables, Fresh and processed Fruits, Pulses,

Floriculture products, Tea and coffee, Spices, Tobacco, Cotton, Marine products, Meat and meat preparations, Poultry & dairy products, Oil cakes, oil and oilseeds, and Sugar and molasses. In this study, appropriate statistical tools like percentage share, average values, and Compound Annual Growth Rate (CAGR) were used. They found tea and coffee, cereals and cereals preparations, marine products, oilcake, oil, and oilseeds, and earned a large chunk of the total agricultural export until 1999. However, it can be observed that the relative importance of tea and coffee has marginally declined. From the year 1991 to 2009, the share of cereals export has increased from 12.4 percent to 17.2 percent. Tea and coffee, the primary export earners in the earlier decade, declined to 6.3 percent of the total agricultural export value in 2009 from 21.8 percent in 1991.

The study for the composition of various agricultural exporting commodities has also been studied by Banga et al. (2012) by taking time from 1991-92 to 2009-10. Their study is consistent with Thomas et al. (2011), who declared a declining tea and coffee trend. Their research confirms that due to tough competition in the global market, the same result has been encountered concerning tea and coffee.

Datta et al. (2001) examine the changes in India's agricultural trade composition and direction in the reforms period classifying the period 1986 to 1991 as pre-reform and 1992-97 as post-reform years. It was seen that India had achieved a sharp change in the composition of its exports. Still, India has achieved only a marginal increase in exportable share, whose relative unit value is increasing or remaining constant during the post-reform period.

Adhikary (2013) studied India's trade direction for agricultural commodities from 1990-91 till 2007-08. His analysis shows that during 2008-09 developing countries

and OECD countries were the major markets for India's export accounting for 37.6 percent, 37.4 percent share, respectively. Another major contributor was OPEC, with 21.2 percent shares. Country-wise, the UAE become the single largest destination for India in 2008-09 with a share of 13.1 percent in India's total exports by replacing the U.S, which remained India's largest export market for several years. UAE was followed by the US (11.4 percent), China (5.1 percent), Singapore (4.5 percent), Hongkong (3.6 percent), and UK (3.6 percent).

Tejaswi et al. (2005) used the Markov chain model to analyze the direction of trade and the changing pattern of Indian coffee export. It was apparent from the study's outcomes that the USA was the most reliable and loyal importing country (loyalty index with the probability of 80 percent retention of than any other importing countries, followed by other countries, Russian Federation, etc.). The data used was for the nine years starting from 1994 -1995 to 2002-2003.

After reviewing various literature, many studies revealed a significant decline in the growth of production and productivity of agricultural output. Especially total food grain production in post-reform and posts WTO period declined. Again, while going through the literature concerning the trends in agriculture trade, most studies revealed an increasing export trend. However, the import exceeds export mainly after the introduction of reform and WTO compared to the early phase before reform.

### **2.7.2 Comparative Advantage and Complementarities in Agricultural Trade**

In her topic, Chauhan (1999), "India's Trade and Investment Relationship with ASEAN Countries: With Special Reference to Singapore and Malaysia," found the comparative advantage status of India in relation with Malaysia and Singapore. The

study has revealed that Singapore gains a high comparative advantage in exporting high-tech products, while Malaysia enjoys high comparative advantage in exporting semi-manufactured products. For all these products, India shows its potential to import. India enjoys a high comparative advantage in exporting food products and semi-manufactured goods and comparatively low comparative advantage in exporting manufactured products. Similarly, Singapore experiences more potential for the import of food products and semi-manufactured products from India. On the other hand, Malaysia shows potential for importing food products, garments, and semi-manufactured products from India.

Similarly, Shinoj et al. (2008) argued that the Indian economy in itself had experienced a rapid change after the inception of economic reforms in 1991. The formation of regional trading blocs like the ASEAN Free Trade Area (AFTA), South Asia Free Trade Agreement (SAFTA), etc., has given an upsurge to strong associations with substantial bargaining power. These can meaningfully influence the demand and supply factors in the global markets. He examined the comparative advantage of India in agricultural export vis-a-vis Asia in the post-reform era. From 1991 till 2004, ten major agricultural commodities groups were studied. India has been able to maintain a comparative advantage in commodities like cashew and oil meals. But tea, coffee, spices, marine products have been negatively affected.

Chandran (2011) looked into India and ASEAN countries' trade structure to identify complementary sectors and product groups for enhanced trade cooperation. The study constructed Trade Intensity Index (TII) and Revealed Comparative Index (RCA) for 16 product groups to get trade complementarity and similarity between 1990 to 2007. His analysis reveals that there are complementary sectors and products available

between India and ASEAN for greater cooperation. While India has a comparative advantage in food grains, minerals, chemicals, gems and jewelry, and manufactured products, ASEAN countries are advantageous in electrical goods, electronic products, vegetable oils, rubber products, and agricultural products.

Similarly, about trade complementarity, Paswan (2000) studied for South Asian countries titled "India's Trade-in Agricultural Food Products with South Asia: 1990-95." He concluded that the fundamental cause for the current low level of intra-regional and India-SAARC trade in agricultural food products is the presence of a low degree of complementarity in the countries' products and trade structure in the region.

Bhattacharyya (2011) tried to quantify the extent to which India has a comparative advantage in vegetable, fruits and flower trade in the Asian, EU and North American (USA & Canada) markets as compared to selected other South East Asian countries for the years 2005-06 to 2008-09. To identify India's competitiveness with its partner, two widely used indexes were calculated: The Revealed Comparative Advantage (RCA) and the Comparative Export Performance (CEP) index. His results indicated that India has a strikingly high comparative advantage in the vegetable and fruit markets in the EU, but this is not the same for the flower market.

Chaddha et al. (2008) evaluated India's comparative advantage structure and the change in the scene over ten years from 1996 to 2005. Data was as per the HS classification. The index constructed was for various levels of aggregation for exports as well as for imports. India gains a comparative advantage in the exports of goods for which standard technology is required. India enjoys a comparative advantage in the exports of labor-intensive items like textiles and scale-intensive items such as chemicals and iron and steel.



Even Singh et al. (2012) analyzed that India has a competitive advantage in a broader range of export commodities by using relative prices and global market share, and Revealed Comparative Advantage (RCA) and Revealed Systematic Comparative Advantage (RSCA) indices. The study selected a bundle of Thirty commodities at SITC digit-3 by taking into account their continuous presence in India's exports basket, which constitutes more than 75 percent of India's exports during 1991-2006. Their analysis reveals that India enjoyed a competitive advantage in a wider variety of export items. The rapid increment in the world demand for India's exports has played a significant role in reasonable export performance. Apart from growing world demand, India's export performance benefited from the competitiveness and market-wise distribution during the study period. The gap between potential growth and actual growth of India's exports was attributed to their competitive strengths. Export promotion measures adopted by Indian policy makers significantly affect its export competitiveness. It would be tough for exports to withstand competitiveness in this global competition era and a flexible exchange rate. Both the prior studies have used the RCA index to measure comparative advantage.

Similarly, Kanaka et al. (2012) ascertained the changes in India's major agricultural exports' comparative advantage status during the post-WTO era, i.e., from 1994-1995 to 2008-2009. India enjoyed a comparative advantage in tea exports, which contradicts Shinoj et al. (2008) study.

Mahajan et al. (2012) studied a commodity-wise comparative advantage, which showed that India had lost its comparative advantage in all agricultural commodities, except vegetables and fruits, sugar, and sugar preparations over the period.

Various literature on comparative advantage revealed that while estimating comparative advantage, they used the Revealed Comparative Advantage technique, developed by Ballasa, 1965. The study conducted by Paswan et al. (2010) has used tools like; trade intensities, revealed comparative advantage, intra-industry trade, and potential trade indices to analyze trade complementarities and trade potentiality. At the same time, Chand (2014) have used RCA and trade complementarity indices. Studies like Chauhan (1999) concentrated on Singapore and Malaysia, which is only a part of ASEAN, while Shinoj et al. (2008) dealt with Asia as a whole. There are limited studies conducted to analyze comparative advantage and trade complementarity between India and ASEAN concerning agricultural trade. The recent research will help us understand the changing comparative advantage scenario and trade complementarities between these trading partners.

### **2.7.3 Determinant of Agricultural Trade**

Amoro (2012) examined the factors influencing agricultural exports with specific reference to Cocoa and rubber between 1970 and 2005. The OLS findings revealed that rubber export is influenced significantly ( $p < 0.05$ ) by domestic rubber production ( $\beta = 68124.857$ ), producer price ( $\beta = 10741.503$ ), exchange rate ( $\beta = -17078.957$ ), domestic consumption ( $\beta = -27094.147$ ) and interest rate ( $\beta = 14991.565$ ). For cocoa, the OLS shows that cocoa output ( $\beta = 0.847$ ), domestic consumption ( $\beta = -0.850$ ), and rainfall ( $\beta = 44.074$ ) significantly ( $p < 0.05$ ) influenced cocoa export. Similarly, Kanan (2013) examined the factors influencing agricultural production and exports with specific reference to India's natural rubber from 1991-92 to 2010-11. The OLS findings revealed that natural rubber production is significantly ( $p < 0.05$ ) by the export of natural rubber ( $\beta = 0.05$ ), stock ( $\beta = 0.21$ ), and domestic price ( $\beta = 0.21$ ). For export of

natural rubber, the OLS shows that stock of natural rubber ( $\beta=0.29$ ), world market price ( $\beta=15.96$ ), domestic price ( $\beta=-18.47$ ), and world population ( $\beta=88.37$ ) significantly ( $p<0.05$ ) influence the export of natural rubber. His study also recommended that there be value addition regarding natural rubber for export.

Chowdhury et al. (2014) examined the determinants of India's export to small and large economies from 1996-97 to 2010-11. They have also used a simple linear regression model. Bangladesh, Bhutan, Nepal, Srilanka, and Thailand were considered small countries, and U.S.A, U.K, France, Germany, and China were considered large countries. The selected export determining variables used in their analysis, including GDP, Exchange rate, and Distance from India to export destinations. The exchange rate too plays an essential role in influencing export between the countries. Their study has found that India's exports to small countries increase when the exchange rate falls and that large countries decrease. India's export to Bhutan, Nepal, Bangladesh, Srilanka, and Thailand does not depend heavily on distance. These countries neighbor India, and the goods can be exported by roads. On the other hand, for those selected large countries, located at far off places, exports depend on the distance as exporting goods involve colossal cost.

Even Boansi et al. (2014) made an effort to identify and assess the magnitude and effect of crucial determinants of fresh pineapple exports from Ghana for 1984-2009 using OLS. The results showed that Ghana's fresh pineapple export industry has a competitive advantage and is more price-driven than volume-driven. The volume and value of exports have a positive association with production, openness to trade, and competitiveness index. However, both have an inverse association with domestic demand and the net inflow of foreign direct investment.

Kingu (2014) examined agricultural export determinants (cotton lint) in Tanzania from 1970 to 2010. In his study, the cointegration and error correction model techniques were utilized to investigate the determinants of cotton lint export earnings in Tanzania. The findings revealed that cotton lint export earnings were mostly determined by internal factors like real exchange rate and agricultural productivity. The results also show that the real exchange rate and agricultural earnings' estimated coefficients are statistically significant. It means that the real exchange rate and agricultural productivity positively contribute to cotton lint export earnings in Tanzania. Similarly, Alkhteb (2015) also found a long-run cointegration relationship between India's agricultural exports and Real effective exchange rate (REER), demand for agricultural products, agricultural production, and India's per capita income.

Hatab et al. (2010) used a gravity model approach to examine the key factors inducing Egypt's agricultural exports to its main trading partners from 1994 to 2008. Their conclusions were a one percent increase in Egypt's GDP results in roughly a 5.42 percent increase in Egypt's agricultural export flows. In contrast, the rise in Egypt's GDP per capita causes exports to decrease. The increase in economic growth, besides the increasing population, raises the demand per capita for all normal goods. Hence, domestic growth *per se* leads to reduced exports. The exchange volatility has a significant positive coefficient, indicating that the Egyptian Pound's depreciation against its partners' currencies stimulates agricultural exports. Transportation costs, proxy by distance, are found to have a negative influence on agricultural exports.

Kumar (2010) analyzed the factors affecting the growth of livestock export. His study is based on the data on the period 1979-80 to 2007-08. Like Hatab et al. (2010), he

used the gravity model of India's export of livestock products. The dependent variable was export of livestock sector, dairy products, meat and eggs, and independent variables included the GDP of the importing country; the GDP per capita of the importing country; the livestock GDP or production of the respective livestock commodities; the per capita GDP of India; price of livestock commodities; the trade policy rank of the importing country; and the distance between India and importing country.

His study found the domestic production had a significant positive influence on exports of dairy products and meat products, while its effect on exports of eggs was not substantial. The importing countries' GDP had a significant and positive influence on India's overall exports of livestock products. It implies that India tends to export more livestock products with larger economies. However, its effect on exports of meat products was negative, indicating the importing countries tend to import fewer meat products with the increase in the size of the economy. The GDP per capita of the destination countries, which characterizes the level of development and consumption level, is also positive and significant for India's livestock exports, including meat and eggs exports. The per capita GDP of the destination country negatively influences India's export of dairy products. The distance variable is significant. The distance variable had the expected negative sign in all the cases, indicating that India must be motivated to export livestock products more with its neighboring countries. The ratio of international and domestic prices did not influence the export of livestock products, implying that other factors were more significant in influencing India's export of livestock commodities. The trade policy index, which represents the openness of a country or the foreign market access by considering tariff, non-tariff, and other

nations' administrative policies, was significant only for the aggregate exports of livestock products.

Tesfaye (2014) assessed the demand and supply-side factors affecting agricultural export of Sub-Saharan Africa countries empirically. Specifically, the study analyzes the relative importance of the two significant factors in determining its agricultural export performance. The study used panel data with the fixed-effects model to fulfill the objective. The data set covers forty-seven Sub-Saharan Africa countries for the periods 2000-2008. The estimation result confirmed that on the supply side, factors like real GDP lagged, real GDP of exporting nation, and lagged agricultural input use were positive and significantly affected the SSA countries' agricultural export. The study also indicated that the influence of the US's per capita GDP, which is the major trading partner of SSA countries, was positive and significant on the demand side.

Various literature on the determinant of agricultural export has been gone through in detail. Most standard techniques included the use of the Ordinary Least Squares regression (OLS). Amoro (2012), Kanan (2013), Boansi et al. (2014), and Chowdhury et al. (2014) have used this technique. Kumar (2010), Hatab et al. (2010) have analyzed agricultural export determinants via the gravity model. There are studies conducted that are commodity-specific about the factors determining trade like Veeramani and Saini (2010), Amoro (2012), Kanan (2013), Boansi et al. (2014), Kingu (2014), etc. Few studies are sector-specific, which includes Kimura and Lee (2006), Kumar (2010), Hatab et al. (2010), Sahoo et al. (2013), Tesfaye (2014), Alkhteb (2015), etc. Some studies have considered trade as a whole while addressing the determinants of trade, which include Sasatra et al. (2007), Chowdhury et al. (2014), Chakravarthy and Chakrabarty (2014), Wani et al. (2016), Gururaj et al.

(2016), etc. There are very negligible, or no studies conducted that took into account the influencing factors determining India's agriculture trade with ASEAN countries as a whole. Thus, the present study tries to fill this gap and open up avenues for other researchers in a particular area.

#### **2.7.4 India- ASEAN Trade**

Chauhan (1999) studied that India's trade policy's liberalization enhanced its trade relationship with the ASEAN region, especially Singapore and Malaysia. India's export to and import from these selected countries of the ASEAN region reflected an increasing trend over the decade, i.e., from 1988-89 to 1997-98. India's balance of trade with the ASEAN region and its selected countries remained negative for most of the years because the immediate impact resulted in increases in India's imports from these countries. Therefore, India's export growth rate was higher than its import rate during the pre-liberalization period, and it showed a declining trend during the post-liberalization period.

Shinoj (2009) has looked into the status, composition, distribution, and intensity of India's agricultural trade with the ASEAN members during 1995-96 to 2005-06. His analysis has revealed that despite pursuing favorable economic policies by both parties, trade-in agriculture has lagged behind other sectors, as is evident from the low rates of growth and plummeting share of agricultural exports and imports in the total. Therefore, it is essential to note that agricultural trade is one of the key drivers of rural prosperity and economic well-being. The study pointed out that agriculture should not be overlooked while deciding priorities in international economic relations. Presently, the applied tariff rates on agricultural commodities prevailing in all ASEAN member

countries are much lower than those prevailing in India. In this context, India must identify the commodities which have maximum takers in the export market.

Raju (2010) stated that bilateral trade flows between India & ASEAN have expanded by fivefold between 2000 and 2008. Concerning agricultural trade balance, ASEAN has maintained a trade surplus (i.e., exports > imports), which has increased until 2006 and then declined over the last few years. In this regard, India's concern would be to examine if this trend entails a severe import threat under a lower tariff regime.

In her study, Francis (2011) stated that Singapore, followed by Indonesia, were the most important markets for India within ASEAN in 1995; Malaysia and Thailand also became more important later. In 2004, Singapore shares in India's exports increased considerably, and the signing of the Comprehensive Economic Cooperation Agreement (CECA) in 2005 led export to improve further. Then again, the share of India's exports going to Thailand declined after 2002 and has hovered around 1.1 percent despite the coming into force of the Early Harvest Program (EHP) of the India-Thai FTA in 2004. In 2008, 10 percent of India's exports were absorbed by the ASEAN-5 countries (Singapore, Indonesia, Malaysia, Thailand, and Vietnam).

Pal et al. (2009) studied India's tariff schedule and made a preliminary evaluation of the India-ASEAN FTA. By analyzing India's commitment schedule and studying the ASEAN members' production structure, the present study concluded that sectors such as tea, spices, coffee, and rubber would be negatively affected. The marine products, textiles and garments, and auto components industries are also likely to face increased competition. The study points out that the trade agreement's net effect crucially depends on the Government of India's ability to redistribute some of the increased



wealth gained from this trade agreement to those industries negatively affected by the agreement.

Veeramani et al. (2010) carried out a quantitative analysis of the ASEAN-India Free Trade Agreement's impact on certain plantation commodities, i.e., coffee, tea, and pepper, in India. They have used a partial equilibrium modeling approach (SMART and gravity models) to simulate the likely increase in India's plantation commodities' imports under the proposed tariff reduction schedules of the India-ASEAN FTA. The results suggested that India-ASEAN FTA would significantly increase India's imports, which will drive mostly by trade creation instead of diversion in trade. Their assessment displayed that the anticipated tariff reductions under the India-ASEAN trade agreement might lead to a significant loss of tariff revenue for India's government. However, the gain in consumer surplus (due to falls in domestic prices and the consequent reduction in dead-weight loss) would outweigh the tariff revenue loss, leading to a net welfare gain.

Ahmed (2010) investigated the India-ASEAN FTA's sectoral dimensions as a result of tariff liberalization by using GTAP (The Global Trade Analysis Project) and SMART models. The study revealed that both India and ASEAN would gain welfare while India's terms of trade would deteriorate. In India's case, the study showed that the processed food products, grain crops, textiles and wearing apparel, light manufacturing goods, and heavy manufacturing sectors were likely to be significantly affected. ASEAN's exports of processed food items and agricultural and fisheries products were likely to increase, which could hurt employment and wages among the Indian working class. The study also found that the present FTA would adversely affect India's trade balance and cause revenue losses for the Government. The study

analyzed the FTA's impact with complete tariff elimination concerning bilateral trade between India and ASEAN.

After reviewing various literature on India-ASEAN trade, it is concluded that most of the studies are concentrated on trade as a whole rather than agriculture in a specific manner between India and ASEAN. Those studies include Ahmed (2010), Pal et al. (2009), Francis (2011), etc. Veeramani et al. (2010) concentrated only on tea, pepper, and coffee in terms of agricultural commodities. No studies that are reviewed have touched on agricultural trade between India and ASEAN as a whole from 2000-2015 after Cambodia becoming the tenth nation of ASEAN (in 1999).

## **2.8 Research Gap**

There is a need to analyze the agricultural trade between India and ASEAN after introducing the ASEAN-India Free Trade Agreement. No serious efforts were made to study the impact of this agreement on trade in the agricultural sector. Most of the investigations have been focused on total trade, or they are commodity-specific or sector-specific. The product group-wise analysis of India-ASEAN's agriculture trade has not been done in earlier studies, at least for a more extended period frame considering entire ASEAN nations. Moreover, the number of ASEAN member countries was changed in 1999 as Cambodia was the latest country to join ASEAN in the same year. The present research attempt also demonstrates a broad picture of Indian agriculture trade with ASEAN ten countries from 2000-2015. The gap unwraps the avenues for researchers to understand the overall changing Indian agricultural trade scenario concerning ASEAN. This study will identify the prospect and potential of India's export with ASEAN, product-wise, and the direction of trade.

## **Chapter 3**

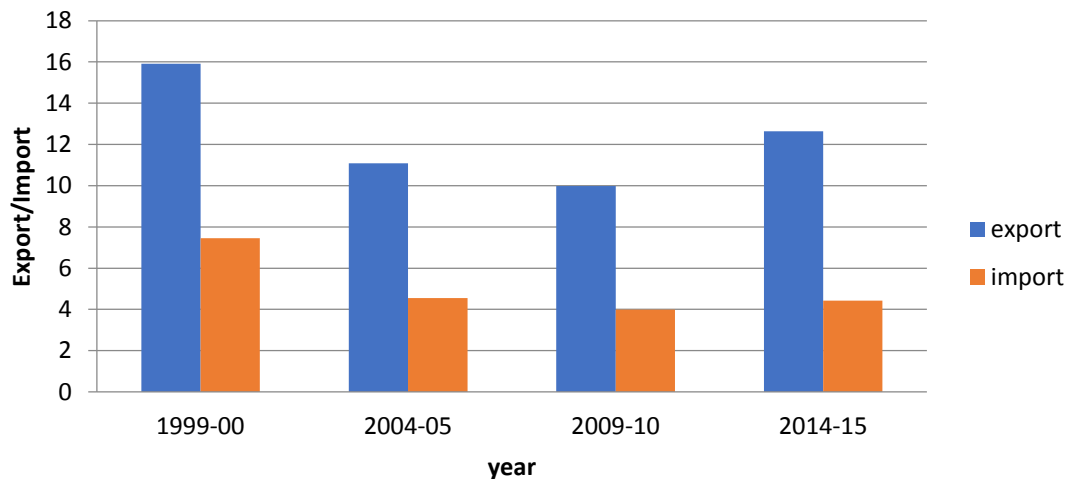
### **Composition and Patterns of Agriculture Trade of India with ASEAN**

The present chapter is dedicated to studying India's composition and patterns of agricultural trade with ASEAN nations. Section 3.1 is devoted to analyzing India's global scenario of India's share in the agricultural exports and imports in total trade with the world from the period 2000 till 2015. Section 3.2 deals with the composition of India's agricultural trade with ASEAN, concerning various agricultural products.

This chapter will further examine the growth and instability in India's agricultural trade.

#### **3.1 Global Scenario of India's Agricultural Trade**

India's current global scenario reveals that India's share in the agricultural exports in India's total trade with the world is declining from the period 2000 till 2015, and the trend is fluctuating. There is not much difference, but a fluctuating trend is occurring in the import sector too. Figure 3.1 shows the percent share of agricultural trade in the total trade of India. In 1999-00, the share of agricultural exports to total export was 15.91 percent, which drastically declined to 11.08 percent in 2004-05, further decreased to 9.99 in 2009-10. But by 2014-15, it somehow managed to reach 12.64 percent. The decline in the export can be attributed to the low price and competition of agriculture produces at the global market. It has been observed about the import that in 1999-00, the share was 7.45 percent, and by 2014-15, it accounted for 4.43 percent. There is a slight changeability in the import and export sector but the interesting point to consider is that export is approximately three times the import.



Source: *Agriculture Statistics at a Glance, 2016*

**Figure 3.1: Percent Share of Agricultural Trade in Total Trade of India**

### 3.2 Composition of India's Agricultural Trade with ASEAN

Earnings from the individual products as a share of total agricultural products exports have been shown in Table 3.1. The result discloses that India's maximum export earnings were observed from HS-23 product (i.e., Residues and waste from the food industries; prepared animal fodder) from 2000 till 2010; their share ranged between 23.80 to 35.34 percent though the trend is declining. By 2015, its share decreased drastically to 4.30 percent. Even India's export earnings from the world in this period for this product have declined.

In 2015, HS-02 products, i.e., Meat and edible meat offal, dominated the scene with a 42.20 percent share in total agricultural products exports. A significant share in export earnings is throughout the period under consideration for products HS-03 (Fish and crustaceans, molluscs and other aquatic invertebrates), HS-12 (Oil seeds and oleaginous fruits; miscellaneous grains, seeds, and fruit; industrial or medicinal plants; straw and fodder) HS-09 (Coffee, tea, mate, and spices). In contrast, there is a

massive decline in the product group, including HS-10 (Cereals) and HS-17 (Sugars and sugar confectionery).

**Table 3.1: Composition of Agricultural Export to ASEAN: Earnings from Individual Products as a Share of Total Agricultural Products Exports**

HS code	2000	2005	2010	2015
01	0.04	0.00	0.00	0.00
02	14.14	16.47	20.50	42.20
03	8.50	8.84	8.30	17.61
04	0.40	1.29	0.73	0.35
05	0.39	0.06	0.16	0.25
06	0.07	0.08	0.04	0.06
07	3.95	4.44	5.00	2.56
08	0.86	1.68	1.03	0.71
09	2.69	4.26	6.26	7.61
10	9.75	3.96	10.94	3.42
11	0.69	0.68	0.31	1.07
12	7.47	9.99	13.19	9.94
13	1.56	1.40	0.58	0.35
14	0.08	0.09	0.02	0.01
15	2.11	2.40	1.55	1.65
16	0.01	0.50	0.74	0.05
17	14.19	1.32	1.50	3.69
18	0.01	0.02	0.11	0.52
19	0.46	0.76	0.52	0.25
20	2.16	0.84	0.21	0.24
21	1.08	0.90	0.82	0.92
22	0.11	0.91	0.50	0.68
23	28.11	35.34	23.80	4.30
24	1.19	3.77	3.16	1.58
Total	100	100	100	100

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

*Note: Figures are presented in percentage.*

The value of the individual product as a share of total agricultural products imports is presented in Table 3.2. India's import from ASEAN is dominated by HS-15 products

(Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes) for the entire period. It accounted for 73.18 percent in 2000 to 78.49 percent in 2015. No imports were registered throughout the study period for products, i.e., HS-01 (Live animals), HS-02 (Meat and edible meat offal), and HS-04 (Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included).

**Table 3.2: Composition of Agricultural Import from ASEAN: values of individual products as a share of total agricultural products imports**

HS code	2000	2005	2010	2015
01	0	0	0	0
02	0	0	0	0
03	0.08	0.13	0.10	0.29
04	0	0	0	0
05	0.08	0.06	0.24	0.05
06	0.03	0.03	0.03	0.10
07	20.47	11.21	11.57	11.20
08	0.69	4.90	0.94	1.35
09	2.29	4.54	1.95	3.62
10	0	0	0	0
11	0.01	0.02	0.12	0.04
12	0.16	0.40	0.28	0.56
13	0.69	0.84	0.43	0.25
14	0.04	0.07	0.04	0.19
15	73.18	74.80	79.90	78.49
16	0.01	0.01	0.01	0.00
17	0.17	0.34	2.13	0.05
18	0.39	0.35	0.76	1.03
19	0.07	0.10	0.14	0.30
20	0.10	0.13	0.16	0.15
21	0.50	0.15	0.30	0.30
22	0.07	0.16	0.11	0.21
23	0.89	1.60	0.57	1.65
24	0.06	0.17	0.19	0.17
Total	100	100	100	100

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

*Note: Figures are presented in percentage*

It is clear from the result depicted in Tables 3.1 and 3.2 that India is an exporter of primary agricultural produce as its share is very high. In contrast, ASEAN is exporting processed and manufactured agricultural products to India. The idea that ASEAN is entirely developed in terms of value-added and manufactured services as compared to India can be generated from the study. The result contradicts earlier studies on the declining trend in tea and coffee due to tough competition in the global market by Shinoj and Mathur (2008) Shinoj (2009), Banga et al. (2012). The high share of HS-02 (meat and edible meat offal) is because India is the world-leading producer of total livestock population, second in goat population, fourth in chicken production, and fifth in poultry meat production. HS-03 (Fish and crustaceans, molluscs, and other aquatic invertebrates) also have a significant share as India is the second leading producer of fish globally. India imports HS-23 (Residues and waste from the food industries; prepared animal fodder) is high, especially from Malaysia as MICECA (2011) granted better concessions for palm and palm oil products for Malaysia.

### **3.3 Agricultural Trade of India with ASEAN: Product Wise**

India's agricultural exports to ASEAN as a share of agricultural exports to the world concerning individual product groups have been presented in Table 3.3. India's total agricultural export to ASEAN was 13.53 percent in the year 2000, which increased to 20.48 percent in 2015. HS-02 (Meat and edible meat offal) ranked top in terms of export as compared to other products throughout the period except in the year 2010 where HS-12 (Oil seeds and oleaginous fruits; miscellaneous grains, seeds, and fruit; industrial or medicinal plants; straw and fodder) dominated the scene. HS-03 (Fish and crustaceans, molluscs and other aquatic invertebrates), HS-05 (Products of animal

origin, not elsewhere specified or included), HS-09 (Coffee, tea, mate, and spices), HS-11 (Products of the milling industry; malt; starches; inulin; wheat gluten), HS-18 (Cocoa and cocoa preparations), HS-21 (Miscellaneous edible preparations), HS-22 (Beverages, spirits, and vinegar), and HS-24 (Tobacco and manufactured tobacco substitutes) also showed the tremendous amount of increment in exports over the period under consideration.

**Table 3.3: India's Agricultural Exports to ASEAN as a share of Agricultural Exports to the World: Product Wise**

HS code	2000	2005	2010	2015
01	13.18	0.20	0.19	0.03
02	43.47	32.04	36.48	62.97
03	5.82	6.81	12.12	24.93
04	4.66	6.12	9.74	6.42
05	8.07	1.77	6.93	20.28
06	2.14	1.34	2.02	5.04
07	14.25	9.34	16.40	14.44
08	1.34	2.18	2.98	3.08
09	2.75	5.36	9.87	16.83
10	9.16	2.34	11.81	3.23
11	12.39	23.54	12.91	23.45
12	20.02	27.77	38.43	37.38
13	5.64	3.94	2.81	2.06
14	3.42	3.98	1.10	0.93
15	9.20	8.55	6.86	11.50
16	2.34	3.63	8.14	1.63
17	33.53	19.16	4.57	17.24
18	1.25	4.18	12.18	18.66
19	8.38	7.35	6.64	3.21
20	25.30	6.95	2.43	3.18
21	6.47	5.95	8.25	10.69
22	3.04	20.59	9.42	12.77
23	52.79	49.50	36.38	26.02
24	5.80	14.29	11.35	10.91
Total	13.53	11.75	16.44	20.48

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

*Note: Figures are presented in percentage*



HS-23 (Residues and waste from the food industries; prepared animal fodder) also significantly contribute to India's export basket to ASEAN throughout the study period, but its trend is declining approximately 50 percent from 2000 to 2015. While the result of products like HS-01 (Live animals), HS 10 (Cereals), HS-13 (Lac; gums, resins, and other vegetable saps and extracts), HS-14 (Vegetable plaiting materials; vegetable products not elsewhere specified or included), HS-16 (Preparations of meat, of fish or crustaceans, molluscs or other aquatic invertebrates), HS-17 (Sugars and sugar confectionery), HS-19 (Preparations of cereals, flour, starch or milk; pastry cooks' products), HS-20 (Preparations of vegetables, fruit, nuts or other parts of plants) and HS-24 (Tobacco and manufactured tobacco substitutes) showed declining trend under the focused timeline.

It is evident from the analysis that India's import from ASEAN is more than its export to ASEAN for the entire period, which ranged between 37.46 to 47.03 percent, which has been shown in Table 3.4. For the whole of the period of consideration, HS-15 product (Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes) dominated the scene with maximum import share ranged between 54.10 in 2000 to 72.70 percent in 2010 to further 58.65 percent in 2015.

Other products including HS-06 (Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage), HS-09 (Coffee, tea, mate, and spices), HS-14 (Vegetable plaiting materials; vegetable products not elsewhere specified or included), and HS-18 (Cocoa and cocoa preparations), were significantly imported by India. Further HS-19 (Preparations of cereals, flour, starch or milk; pastry cooks' products), HS-20 (Preparations of vegetables, fruit, nuts or other parts of plants), HS-

21 (Miscellaneous edible preparations), HS-23 (Residues and waste from the food industries; prepared animal fodder) and HS-24 (Tobacco and manufactured tobacco substitutes) were essential contributors in the import basket of India from ASEAN.

**Table 3.4: India's Agricultural Imports from ASEAN as a share of Agricultural Imports from the World: Product Wise**

HS code	2000	2005	2010	2015
01	0	0.05	0.01	0
02	14.63	7.77	0.88	6.70
03	9.96	12.13	10.67	35.36
04	0.71	0.38	0.04	0.05
05	6.66	9.68	48.32	10.66
06	29.91	14.45	15.68	42.33
07	39.30	34.99	36.18	23.97
08	3.04	11.53	4.16	3.47
09	34.25	42.08	36.10	38.01
10	0.14	0.70	0.08	0.20
11	2.64	5.01	24.33	5.13
12	6.89	10.82	10.33	12.97
13	27.79	28.40	21.59	10.01
14	33.04	40.46	29.46	52.62
15	54.10	57.08	72.70	58.65
16	19.48	6.70	19.84	6.46
17	9.17	2.32	12.06	0.66
18	40.83	28.48	38.81	39.46
19	5.02	6.69	21.70	36.86
20	10.90	12.05	15.24	16.15
21	9.10	12.49	21.62	18.33
22	4.96	1.30	2.83	2.92
23	23.96	28.63	17.71	35.95
24	16.81	17.77	43.21	29.24
Total	41.44	37.77	47.03	37.46

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

*Note: Figures are presented in percentage*

It is in comparison to India's total share of Imports around the globe. Their share grew over the period under study. In the meantime, HS-02 (Meat and edible meat offal), HS-07 (Edible vegetables and certain roots and tubers), HS-13 (Lac; gums, resins, and

other vegetable saps and extracts), HS-16 (Preparations of meat, of fish or crustaceans, molluscs or other aquatic invertebrates) and HS-17 (Sugars and sugar confectionery) had a significant contribution in the early phase. Still, their share decreased significantly over the period. The very fact that India is a significant producer and an exporter of live animals and dairy products is reflected in the result. Therefore HS-01 (Live animals) and HS-04 (Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included) showed negligible or no share in the import basket from ASEAN as compared to a world.

### **3.4 Growth and Instability in Agricultural Trade of India and ASEAN**

India's exponential growth rate and instability in agricultural export have been computed via Compound Annual Growth Rate (CAGR) and Cuddy-Della Valle Instability Index (CDVI) for 2000-2015. India's export CAGR at the global level revealed that the highest growth rate was registered by the product HS-18 (Cocoa and cocoa preparations) with 34.85 percent, followed by HS-02 (Meat and edible meat offal) and HS-22 (Beverages, spirits, and vinegar) with 26.11 percent and 25.83 percent respectively. The lowest figure was registered by HS-06 (Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage) and HS-08 (Edible fruit and nuts; peel of citrus fruit or melons) with 5.23 percent and 8.98 percent respectively as depicted in Table 3.5. There were only two HS digit products that registered a single-digit growth rate in exports.

**Table 3.5: Growth and Instability in Agricultural Export of India with World  
(2000-2015)**

<b>HS code</b>	<b>CAGR</b>	<b>CDVI</b>
01	13.31	38.98
02	26.11	38.59
03	11.96	33.25
04	14.11	46.40
05	10.52	47.80
06	5.23	34.69
07	13.09	15.09
08	8.98	10.52
09	12.98	16.92
10	18.06	43.32
11	14.80	52.58
12	17.59	25.58
13	22.14	113.76
14	11.85	20.49
15	15.37	19.58
16	15.95	49.09
17	17.47	55.93
18	34.85	81.80
19	20.08	18.20
20	15.95	54.82
21	13.66	17.54
22	25.86	36.25
23	13.31	44.57
24	15.03	18.02

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

*Note: Figures are presented in percentage, CAGR= Compound Annual Growth Rate, CDVI= Cuddy-Della Valle Index.*

India's most instable products at the global level were HS-13 (Lac; gums, resins, and other vegetable saps and extracts) with a value of 113.76 percent and HS-18 (Cocoa and cocoa preparations) with 81.80 percent. More than an index value of 50 percent also includes HS-11 (Products of the milling industry; malt; starches; inulin; wheat gluten), HS-17 (Sugars and sugar confectionery), and HS-20 (Preparations of vegetables, fruit, nuts, or other parts of plants). A low rate of instability was accounted for HS-7 (Edible vegetables and certain roots and tubers) and HS-8 (Edible fruit and nuts; peel of citrus fruit or melons) with 10.52 and 15.09 percent, respectively. On average, the agriculture sector registered 38.91 percent of instability in export while the average growth rate was accounted at 16.18 percent with the world.

For the growth rate in agriculture exports of ASEAN nation with the World, HS-22 (Beverages, spirits, and vinegar) have been found to have maximum value with 18.18 percent. It was followed by HS-21 (Miscellaneous edible preparations) and HS-19 (Preparations of cereals, flour, starch or milk; pastry cooks' products) with 17 percent and 16.77 percent, respectively, as shown in Table 3.6.

The low growth rate was encountered for HS-05 (Products of animal origin, not elsewhere specified or included) and HS-02 (Meat and edible meat offal) with the values 4.29 percent and 5.44 percent, respectively. There were altogether eight product grouping which registered single-digit growth rate. ASEAN's export growth rate with the world was comparatively lower than that of India, which reported a figure of 11.81 percent.

**Table 3.6: Growth and Instability in Agricultural Export of ASEAN with World  
(2000-2015)**

<b>HS code</b>	<b>CAGR</b>	<b>CDVI</b>
01	10.63	15.16
02	5.44	64.94
03	6.08	10.73
04	7.68	14.04
05	4.29	21.64
06	8.87	10.16
07	17.12	22.39
08	13.43	19.25
09	14.80	15.76
10	11.29	26.32
11	17.94	22.08
12	10.30	18.10
13	10.74	12.64
14	9.42	20.51
15	15.49	25.53
16	11.18	12.47
17	12.86	30.36
18	11.29	15.92
19	16.77	12.23
20	8.76	10.03
21	17.00	21.00
22	18.18	15.36
23	15.26	16.57
24	8.55	13.04

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

*Note: Figures are presented in percentage. CAGR= Compound Annual Growth Rate, CDVI= Cuddy-Della Valle Index.*

In contrast, the low growth rate of export was accompanied by low export instability for ASEAN nations, which accounted for 19.43 percent within the study time frame.

Growth and instability in agricultural export of India with ASEAN have been shown in Table 3.7. At the ASEAN level, India registered the highest CAGR in HS-18 (Cocoa and cocoa preparations) with 60.16 percent. HS-22 (Beverages, spirits, and vinegar) with 31.39 percent and HS-3 (Fish and crustaceans, molluscs and other aquatic invertebrates) with 30.73 percent growth rate. However, India is the leading producer of livestock globally but accounted for negative growth in HS-01 (Live animals) and followed by HS-14 (Vegetable plaiting materials; vegetable products not elsewhere specified or included). The product grouping HS-01 registered -16.41 percent while HS-14 accounted for -3.15 percent growth rate.

India's negative growth, coupled with instability in exports with ASEAN, was estimated for HS-01 (Live animals). The instability index for HS-01 was accounted to be 112.86 percent. The most unstable product was HS-18 (Cocoa and cocoa preparations), with instability of 152.46 percent. There were ten more product groups which were having more than 50 percent instability value. Those included HS-02 (Meat and edible meat offal), HS-03 (Fish and crustaceans, molluscs and other aquatic invertebrates), HS-4 (Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included), HS-5 (Products of animal origin, not elsewhere specified or included), HS-10 (Cereals), HS-11 (Products of the milling industry; malt; starches; inulin; wheat gluten), HS-13 (Lac; gums, resins, and other vegetable saps and extracts), HS-16 (Preparations of meat, of fish or crustaceans, molluscs or other aquatic invertebrates), HS-17 (Sugars and sugar confectionery) and HS-20 (Preparations of vegetables, fruit, nuts or other parts of plants).

**Table 3.7: Growth and Instability in Agricultural Export of India with ASEAN  
(2000-2015)**

<b>HS code</b>	<b>CAGR</b>	<b>CDVI</b>
01	-16.14	112.86
02	30.73	59.6
03	26.11	62.57
04	20.32	71.01
05	17	57.65
06	12.08	30.06
07	14.68	34.6
08	18.53	38.73
09	28.02	26.43
10	16.18	79.03
11	11.4	79.34
12	23.61	43.05
13	10.85	58.97
14	-3.15	31.33
15	16.3	26.39
16	3.25	62.63
17	4.39	81.51
18	60.16	152.46
19	13.77	25.42
20	3.25	60.41
21	20.56	31.97
22	31.39	49.69
23	7.14	49.98
24	21.29	24.23

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

*Note: Figures are presented in percentage, CAGR= Compound Annual Growth Rate, CDVI= Cuddy-Della Valle Index.*



Low instability in export compared to other products was registered by HS-24 (Tobacco and manufactured tobacco substitutes), HS-19 (Preparations of cereals, flour, starch or milk; pastry cooks' products), and HS-09 (Coffee, tea, mate, and spices) with 24.23 percent, 25.42 percent, and 26.43 percent respectively. The argument that due to price volatility in the international market, livestock and related sectors face export instability (Shinoj, 2008) have been confirmed by the present study, as HS-01, HS-02, HS-04, and HS-05 unstable at the ASEAN market. On average, India's growth rate in exports of agricultural products was registered to be 16.32 percent with ASEAN. It is slightly above India's export to the world. On the other side, there is higher instability in exports to ASEAN than the world, which accounted for 56.25 percent.

Growth and Instability of India's agricultural imports have been observed in Table 3.8. The result shows that the growth rate in agriculture import from 2000 to 2015 was highest for HS-10 (Cereals) with 34.31 percent, accompanied by its high instability index value of 222.43 percent during the study period. Products like HS-02 (Meat and edible meat offal) and HS-17 (Cocoa and cocoa preparations) had a growth rate of more than 30 percent. India registered the lowest growth rate for the product grouping HS 19 (Preparations of cereals, flour, starch or milk; pastry cooks' products) with single-digit around 8 percent only.

The most unstable agriculture product concerning import from the world was registered by HS-10. It was followed by HS-04 (Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included) and HS-17 (Sugars and sugar confectionery) with the index value of 98.90 percent and 81.32 percent, respectively.

**Table 3.8: Growth and Instability in Agricultural Import of India from World (2000-2015)**

HS code	CAGR	CDVI
01	29.82	23.45
02	32.05	29.92
03	18.18	45.81
04	16.88	98.90
05	11.52	28.28
06	22.14	14.22
07	15.26	20.67
08	17.70	19.24
09	16.42	21.53
10	34.31	222.43
11	21.65	22.16
12	20.44	23.70
13	16.07	13.86
14	23.49	46.26
15	17.12	26.70
16	19.12	33.45
17	30.21	81.32
18	28.79	38.31
19	8.11	16.95
20	19.12	31.85
21	14.45	34.15
22	26.49	25.05
23	16.65	17.88
24	16.18	24.10

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

*Note: Figures are presented in percentage, CAGR= Compound Annual Growth Rate, CDVI= Cuddy-Della Valle Index.*

India is a significant producer of dairy and sugar globally and has witnessed instability in the import. The lowest import instability was registered by HS-13 (Lac; gums, resins, and other vegetable saps and extracts) and HS-06 (Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage) the value 13.86 and 14.22 respectively. On average, both growth rate and instability index in the

import were higher (i.e., 20.51 and 40.01 percent respectively) for India for the world compared to its export from the world in agricultural products.

In the ASEAN context, its import growth rate with the world was registered higher for HS-15 (Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes) 17.23 percent as shown in Table 3.9.

**Table 3.9: Growth and Instability in Agricultural Import of ASEAN from World (2000-2015)**

HS code	CAGR	CDVI
01	11.85	23.33
02	16.65	46.80
03	11.18	16.44
04	10.08	17.21
05	16.18	39.81
06	13.09	27.85
07	14.34	22.27
08	16.30	22.26
09	14.68	24.69
10	12.52	15.44
11	12.30	16.62
12	13.09	18.08
13	11.07	11.41
14	10.74	32.71
15	17.23	37.15
16	12.41	15.94
17	14.34	21.42
18	14.34	14.73
19	14.34	13.73
20	12.41	15.70
21	16.18	17.32
22	16.77	18.22
23	15.26	15.53
24	7.57	15.08

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

*Note: Figures are presented in percentage CAGR= Compound Annual Growth Rate, CDVI= Cuddy-Della Valle Index.*

The single-digit value and the lowest growth rate were registered by HS-24 (Tobacco and manufactured tobacco substitutes) with 7.57 percent. About the instability in import, HS-02 (Meat and edible meat offal) registered a high value with 46.80 percent, followed by HS-05 (Products of animal origin, not elsewhere specified or included) with 39.81 percent. On average, with 13.54 percent and 21.66 percent value for both growth rate and instability index, respectively, ASEAN recorded a lower value than that of India.

The growth rate of India's import from the ASEAN nations was highest for HS-10 (Cereals) with the value 37.30 percent accompanied by a high instability value of 85.16 percent, as shown in Table 3.10. It is a similar result which has been encountered concerning India's import from the world. According to APEDA, India is the second-largest producer of cereals. Still, in 2008 India had imposed a ban on the export of essential cereals, including rice and wheat, to meet the domestic demands. It resulted in a high growth rate of import in this product.

This result is consistent with Dastagiri et al. (2018), where they have also found that cereals are an unstable product concerning import and export due to elasticity in price. The lowest growth rate with a single-digit value was registered by HS-04 (Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included). It was followed by HS-13 (Lac; gums, resins, and other vegetable saps and extracts) and HS-08 (Edible fruit and nuts; peel of citrus fruit or melons) with 2.33 percent, 8.65 percent, and 9.75 percent, respectively. Instability in import from ASEAN was highest for maximum products during the study time frame.

**Table 3.10: Growth and Instability in Agricultural Import of India from ASEAN  
(2000-2015)**

<b>HS code</b>	<b>CAGR</b>	<b>CDVI</b>
01	20.44	169.15
02	17.23	113.12
03	27.51	52.49
04	2.33	215.96
05	21.17	82.91
06	29.18	54.23
07	11.52	22.99
08	9.75	33.23
09	18.41	27.98
10	37.30	85.16
11	24.86	67.35
12	21.17	29.56
13	8.65	28.35
14	27.12	65.90
15	18.06	31.11
16	11.40	68.86
17	15.60	207.26
18	26.11	38.85
19	29.43	40.00
20	11.40	24.91
21	27.25	44.84
22	31.65	44.42
23	18.06	39.28
24	23.61	35.86

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

*Note: Figures are presented in percentage, CAGR= Compound Annual Growth Rate, CDVI= Cuddy-Della Valle Index.*

Products like HS-04, HS-17, HS-01, and HS-02 touched triple-digit values of instability, as shown in Table 3.10. There is more or less a similar scenario of India's import growth rate (around 20 percent on an average) if we compare imports from the world and ASEAN. But on average, there is massive instability in imports from ASEAN, which registered 67.66 percent.

It can be depicted from the ongoing discussion and result that although India has witnessed a higher export growth rate than ASEAN, there is a considerable amount of volatility. Comparatively, ASEAN's agriculture trade is stable.

### **3.5 Conclusion**

It is observed that from the period 2000 till 2015, the percent share of agricultural exports in India's total trade with the world is declining from the value of 15.91 percent to 12.64 percent. But the percent share of export in 2015 is approximately three times the import. The composition of agricultural trade over a period revealed that, India is mostly exporting primary agricultural produce. The share of primary agricultural produce is very high. In contrast, ASEAN is exporting processed and manufactured agricultural products to India. The ASEAN is entirely developed in terms of value-added and manufactured services compared to India can be generated from the study. Those agricultural products having a handsome amount of share in exports are those products where India is a leader or have a significant production value in the world. The study noted that India's import from ASEAN is more than its export to ASEAN for the entire period. It has been observed from the result that India is coupled with a higher export growth rate and a significant amount of volatility than ASEAN concerning agricultural trade. Comparatively, ASEAN's agriculture trade is stable. It will be interesting to witness the changing scenario of the direction of

India's agricultural trade with ASEAN nations, the extent of trade diversity, and the prospect of trade via trade complementarities in the next chapter.

## **Chapter 4**

### **Direction, Diversity and Complementarity in Agricultural Trade of India with ASEAN**

It is constructive to verify the export basket of agricultural commodities, identify significant trading partners, and investigate the extent of diversity in agriculture trade, primarily export. The present chapter will thus open prospects for the policy makers to improve and take necessary measures to strengthen the export basket and identify a prospective market.

#### **4.1 The Direction in Agricultural Trade of India with ASEAN**

It is evident from history before independence; Britain was the single most significant destination of India's export and import. Post-independence and most importantly, after opening an economy after the early 1990s, the scenario changed. New trade partners appeared and contributed to the economic structure of India. Countries like the USA, Germany, Japan, Gulf countries, and ASEAN are the main participants in India's export and import.

The direction and dynamics of India's agricultural trade with ten ASEAN countries have been shown in Table 4.1. In the year 2000, the ASEAN's major trading partners were Indonesia and Malaysia, which accounted for approximately 63 percent of agricultural trade with 50.22 percent of export share and 75.01 percent of import share. Other significant export destinations were Singapore, the Philippines, and Thailand. Myanmar also recorded the right amount of import share of India in the same period.



**Table 4.1: The Direction of Agricultural Trade of India with ASEAN (Percent Share)**

Year	2000		2005		2010		2015	
	Export	Import	Export	Import	Export	Import	Export	Import
Brunei	0.07	0	0.19	0.00	0.27	0.00	0.27	0.00
Cambodia	0.03	0	0.06	0.01	0.41	0.11	0.36	0.01
Indonesia	25.76	36.41	18.07	66.71	14.17	68.38	6.21	50.71
Laos	0.07	0.00	0.00	0.00	0.00	0.00	0.35	0.00
Malaysia	24.46	38.60	28.11	17.11	25.77	13.79	16.05	31.14
Myanmar	0.36	20.26	0.62	11.32	2.92	11.66	4.39	11.47
Philippines	13.23	0.28	11.19	0.12	7.63	0.18	4.06	0.47
Singapore	16.72	1.56	13.38	0.66	5.76	0.79	5.00	0.84
Thailand	12.78	1.82	9.63	1.17	9.97	3.45	10.25	1.65
Vietnam	6.52	1.07	18.75	2.90	33.10	1.64	53.06	3.71

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

In the year 2005, Indonesia alone accounted for 42 percent of total agriculture trade with India. It is attention-grabbing to view that 66.71 percent of India's agriculture imports were from Indonesia only, with 18 percent of export share to the respective destination. In this period, India's top export partner was Malaysia, with 28.11 percent, followed by Vietnam, Indonesia, Singapore, Philippines, and Thailand.

Indonesia continuously ranked top to become an important trading partner with India in the year 2010 also. It constituted a handsome share of 41 percent of the total agricultural trade of India within ASEAN nation. It is to note that India's export to Indonesia was mere 14.17 percent compared to 68.38 percent of import share in total agricultural trade with ASEAN. Malaysia and Vietnam also had a significant stake in India's total trade within ASEAN with 20 and 17 percent. It has been examined in this period that Vietnam was the favorite export destination of agriculture with a share of

33.1 percent, followed by Malaysia and Indonesia with 25.77 and 14.17 percent shares. At the same time, Malaysia and Myanmar stood second and third in importing agricultural items for India.

By 2015, Vietnam stood at the top at par with Indonesia, accounting for 28 percent share of India's total agricultural trade within ASEAN, followed by Malaysia with 24 percent share. In continuation with the earlier trend, it is seen from Table 4.1 that India's export of agriculture is highest with Vietnam amounting to 53 percent share alone in the entire ASEAN countries. Other important export destinations were Malaysia and Thailand, with 13.79 and 10.25 percent share. Again, Indonesia tops the chart with a 51 percent share concerning the import sector, followed by Malaysia with a 31 percent share. Even Myanmar showed its presence with double digits in the import share of India from ASEAN.

According to FAO, Indonesia has a flexible trade policy concerning agriculture, and it has eliminated all Non-Tariff Barriers for commodities bound in the WTO. Moreover, after the Asian crisis, it devalued its currency 'Rupiah' up to 80 percent, resulting in a higher trade share with India. The Department (Ministry) of Commerce and Industry, GOI, in 2015, highlighted that the primary commodities which India exported to Indonesia were groundnut, capsicum, maize starch, etc., while India's main imports from Indonesia were crude and refined palm oil, cashew nuts, pepper, etc. Another significant trade partner of India is Malaysia. Both the nations signed the Malaysia-India Comprehensive Economic Cooperation Agreement (MICECA) in 2011, strengthening their trade relationship. India was in a surplus with Malaysia in agricultural trade until 2010, but by 2015 Malaysia surpassed India. MICECA granted better concessions for palm and palm oil products in favor of Malaysia.

From 2010 to 2015, Vietnam recorded the highest agriculture trade share with India within ASEAN. According to the Ministry of Commerce and Industry, for Vietnam, India is the seventh-largest trade partner and seventh-largest import source. Small economies like Brunei, Cambodia, and Laos have shown negligible agricultural trade relations with India. However, there are future possibilities to strengthen agrarian trade relations between India and these economies.

#### **4.2 Export Diversity of India with ASEAN in Agriculture**

By applying the Simpsons Index of Diversity (SID), the result of India's export diversity with ASEAN concerning agricultural products has been shown in Table 4.2.

It is observed from the year 2000 till 2015, at every interval, the value of SID is approaching one concerning the overall ASEAN nation. It indicates India's exports of agricultural products are reasonably diversified with ASEAN as a whole. Though, there is a fluctuation and declining trend, as shown in Table 4.2. Regarding the individual ASEAN nation, the country with whom India is exporting diversified agricultural produce was Malaysia with a value of 0.81, followed by Myanmar and Singapore in 2001. But by 2015, with Singapore, India has exported diversified agricultural produce with the value of 0.89, followed by Thailand and Malaysia.

**Table 4.2: Export Diversity of India with ASEAN in Agricultural Products**

<b>Countries</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>
Brunei Darussalam	0.70	0.76	0.76	0.68
Cambodia	0.62	0.60	0.42	0.69
Indonesia	0.77	0.62	0.71	0.69
Lao PDR	0.21	---	0.00	0.36
Malaysia	0.81	0.82	0.84	0.79
Myanmar	0.78	0.78	0.47	0.45
Philippines	0.73	0.73	0.72	0.73
Singapore	0.78	0.81	0.92	0.89
Thailand	0.58	0.76	0.77	0.80
Vietnam	0.73	0.48	0.75	0.60
ASEAN	0.85	0.82	0.86	0.77

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata*

### **4.3 Import Diversity of India with ASEAN in Agriculture**

The result of import diversity of India from ASEAN about agricultural products has been shown in Table 4.3. It is evident from the result that SID's value is less than 0.50 concerning the overall ASEAN nation at every interval. It indicates India's imports of agricultural products are not diversified. There is also a declining trend from 0.42 in 2001 to 0.37 by 2015, as shown in Table 4.3.

**Table 4.3: Import Diversity of India in Agricultural Products with ASEAN**

<b>Countries</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>
Brunei Darussalam	---	---	---	---
Cambodia	---	0.47	0.07	0.56
Indonesia	0.15	0.23	0.06	0.13
Lao PDR	---	0.00	0.40	0.48
Malaysia	0.04	0.10	0.11	0.03
Myanmar	0.02	0.03	0.06	0.08
Philippines	0.61	0.76	0.77	0.69
Singapore	0.85	0.84	0.82	0.77
Thailand	0.57	0.87	0.68	0.79
Vietnam	0.47	0.17	0.36	0.59
ASEAN	0.42	0.42	0.35	0.37

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

Regarding the individual ASEAN nation, it has been observed that Myanmar and Malaysia are those nations from ASEAN whose values are approaching 0 throughout the study period. It shows there is a fair amount of specialization in imports from these nations. This result is consistent with Shinoj (2009) and EEPIC India (2018). Many imports from Myanmar and Malaysia were mainly from edible vegetables, pulses, wood products, and palm oil.

India's exports of agricultural products are reasonably diversified with ASEAN as a whole as compared to imports. The result designates India to be better positioned, as diversification in exports leads to export earnings stability. It can produce positive results for a country's economic growth, as suggested by Herzer et al. (2006), Samen (2010), and Lugeiyamu (2016). It is worth mentioning here that the international

market's agriculture price is volatile, so export diversification will help India's export earnings stability.

#### **4.4 India's Agriculture Trade Intensity with ASEAN**

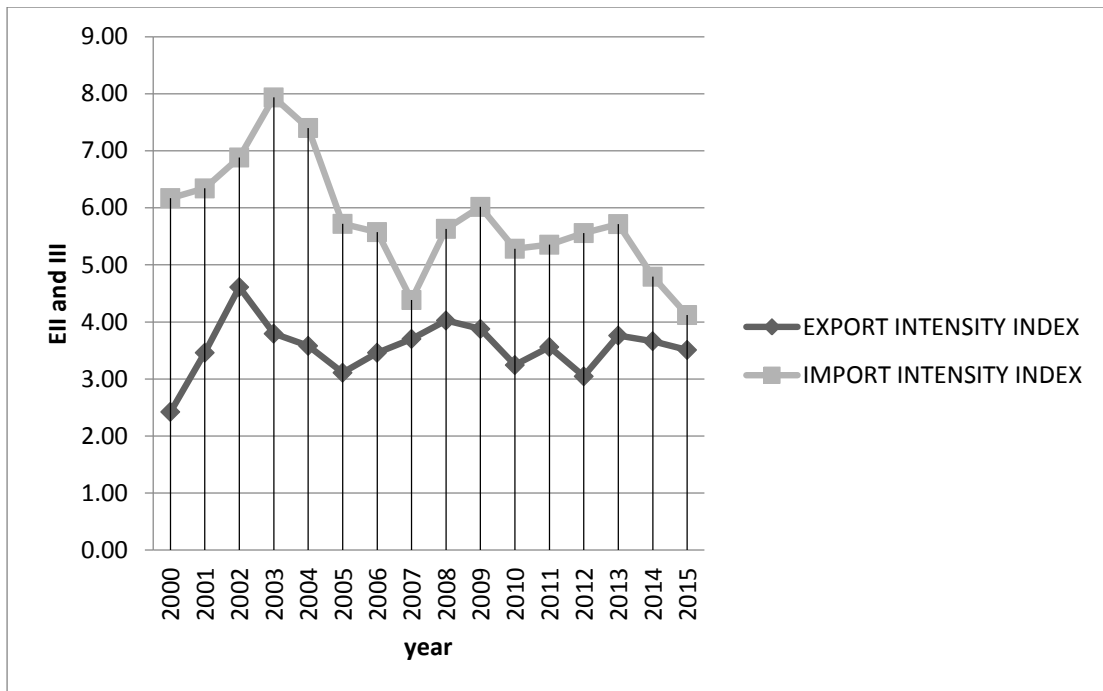
The result depicted in Table 4.4 confirms that India's agricultural trade with ASEAN is robust throughout the period under consideration. The value of India's agricultural export intensity and import intensity is above one throughout the period from 2000 till 2015. If it is to be compared to the rest of the world, India's agricultural trade is intense with ASEAN nations as suggested by the two indexes, namely Export Intensity Index (EII) and Import Intensity Index (III). This result is related to the statement, "The neighbors for each country are the primary force determining national exports, explaining about 85 percent of these exports all over the world" (Sanidas, 2018). Further, the natural trading partner theory suggests that the intensity of trade with its neighboring countries is always high compared with the rest of the world (Jagdambe, 2016). In this context, ASEAN countries are India's immediate neighboring countries with very little distance. It is an apparent reason to have a healthy and intense trading bond between the two. India's agricultural export intensity index with ASEAN has slightly increased, and import intensity index turned down from 2000 to 2015. If we compare India's agricultural EII and III, we witness that through the period, III is higher as compared to EII.

**Table 4.4: India's Agricultural Trade Intensity index with ASEAN**

<b>Year</b>	<b>Export Intensity Index (EII)</b>	<b>Import Intensity Index (III)</b>
2000	2.42	6.17
2001	3.46	6.34
2002	4.61	6.88
2003	3.79	7.94
2004	3.58	7.40
2005	3.11	5.72
2006	3.46	5.58
2007	3.70	4.39
2008	4.03	5.63
2009	3.88	6.02
2010	3.24	5.28
2011	3.56	5.35
2012	3.05	5.56
2013	3.76	5.72
2014	3.66	4.79
2015	3.51	4.12

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and*

*DGCIS, Kolkata.*



Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata

**Figure 4.1: India's Agricultural Trade Intensity index with ASEAN (2000-2015)**

India's agricultural export intensity and import intensity index with individual ASEAN countries is presented in Table 4.5 and Table 4.6. In the year 2000, India's EII with six ASEAN nations, namely Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam, are above unity. Interestingly, after signing FTA in 2010, EII has improved, and altogether there were nine ASEAN countries in 2015 whose value was above unity. As India is among Vietnam's top ten trading partners, it consistently stood as India's major agricultural export destination, followed by Malaysia and Indonesia throughout the period under consideration.



**Table 4.5: India's Agricultural Export Intensity Index (EII) with ASEAN Countries**

Year	BRU	CAM	IND	LAO	MLY	MYN	PHP	SIN	THL	VTM
2000	0.27	0.41	2.60	0.01	3.26	0.37	1.47	2.14	2.05	3.99
2001	0.24	0.14	5.38	0.40	4.01	0.89	3.15	2.49	2.60	3.99
2002	0.33	0.06	6.37	0.61	4.50	1.86	8.31	2.56	1.95	6.36
2003	0.47	0.08	5.48	0.06	6.05	2.10	3.12	2.03	1.66	5.84
2004	0.51	0.12	4.43	0.01	4.89	3.21	2.42	2.02	2.02	7.37
2005	0.61	0.29	3.30	0.00	4.05	1.18	2.75	1.98	1.72	6.80
2006	0.96	6.13	4.19	0.01	3.62	0.51	3.03	1.89	1.99	8.40
2007	1.17	3.99	3.37	0.02	4.54	0.73	3.06	1.43	2.06	10.13
2008	1.53	1.21	3.37	0.00	5.06	1.60	2.36	1.46	2.47	11.90
2009	1.26	1.11	2.38	0.00	4.22	0.75	2.39	1.55	2.73	12.14
2010	1.22	2.25	2.31	0.01	3.80	16.21	2.18	1.10	2.18	8.52
2011	1.09	1.72	2.99	0.00	3.21	2.26	1.94	1.03	2.29	11.60
2012	1.07	1.17	2.60	0.59	2.77	1.23	1.90	0.99	2.67	9.73
2013	1.06	1.43	2.44	0.87	2.95	2.13	1.91	0.98	2.95	12.36
2014	1.37	0.58	1.94	1.48	2.55	1.50	1.53	0.95	2.44	13.04
2015	1.50	0.60	1.21	1.19	2.98	4.41	1.36	1.17	2.27	5.97

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

*Note: BRU= Brunei, CAM= Cambodia, IND= Indonesia, LAO= Lao PDR, MLY= Malaysia, MYN= Myanmar, PHP= Philippines, SIN= Singapore, THL= Thailand, VTM= Vietnam.*

India's agricultural import intensity index is less than unity throughout Brunei, Lao PDR, Philippines, Thailand. Vietnam and Singapore also stand weak in this segment, while Cambodia showed a fluctuating trend. This result indicates lesser or negligible preferences of agriculture imports from these countries. Myanmar shares a common border with India, stood first, while Indonesia, and Malaysia stationed second and third-largest trading partner with India from entire ASEAN countries. India prefers Indonesia, Malaysia, and Myanmar to be the best agriculture importing partners from the ASEAN region.

**Table 4.6: India's Agricultural Import Intensity Index (III) with ASEAN****Countries**

Year	BRU	CAM	IND	LAO	MLY	MYN	PHP	SIN	THL	VTM
2000	0	0	14.14	0	18.61	14.78	0.08	1.14	0.40	0.29
2001	0	0	13.51	0	14.13	62.97	0.28	1.01	0.33	0.47
2002	0	1.04	14.45	0.36	12.49	58.81	0.10	0.52	0.18	0.67
2003	0	0	23.77	0.65	10.58	51.58	0.15	0.68	0.43	0.49
2004	0	0	24.36	0.19	6.83	37.68	0.25	0.45	0.24	0.89
2005	0	1.14	17.55	0.06	4.81	42.67	0.12	0.44	0.23	1.14
2006	0	7.49	14.85	0.84	3.31	69.64	0.29	0.47	0.42	0.89
2007	0	5.28	11.74	0.14	1.64	61.13	0.06	0.60	0.46	0.39
2008	0	10.14	15.02	0.01	2.81	53.79	0.56	0.65	0.51	0.46
2009	0	5.37	15.07	0.06	4.42	49.48	0.13	0.49	0.71	0.62
2010	0	6.70	14.47	0.08	3.25	6.84	0.24	0.60	0.71	0.61
2011	0	2.79	14.74	0.06	4.60	5.27	0.17	0.72	0.38	0.71
2012	0.32	0.31	13.45	0.00	7.53	4.62	0.16	0.58	0.32	0.71
2013	0	0.02	14.55	0.02	6.87	4.22	0.31	0.58	0.80	0.88
2014	0	0.07	9.80	0.01	8.22	2.44	0.52	0.60	0.47	0.98
2015	0	0.12	8.29	0.01	7.65	3.90	0.51	0.42	0.28	1.08

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

*Note: BRU= Brunei, CAM= Cambodia, IND= Indonesia, LAO= Lao PDR, MLY= Malaysia, MYN= Myanmar, PHP=Philippines, SIN- Singapore, THL= Thailand, VTM= Vietnam.*

The study observed India's trade in agricultural products with ASEAN from 2000-2015. The study recognized the significance of ASEAN as a major trading partner; trade intensity approach confirmed that India's agricultural trade is found to be

intense and robust with ASEAN nations as suggested by the two indexes of trade intensity namely Export Intensity Index (EII) and Import Intensity Index (III).

#### **4.5 Complementarities of Trade in Agriculture of India with ASEAN**

Through the analysis of the trade intensity approach and recognizing the significance of ASEAN as a major trading partner with India, the following section will center on the trade complementarity in agriculture between India and ASEAN.

The international trade literature has widely discussed that complementarities in production and trade must exist between the partner countries for the prospect and deepening of the trade relationship. Trade complementarities measure the degree of similarities or dissimilarities in the export and import structure. Complementarities of trade between two countries declare that there will be potential for trade between the two countries. Suppose one country's export structure has a high degree of similarity with another country's import structure. Similarly, suppose the country's export structure has a high degree of similarity with the former country's import structure. In that case, the trade will be favorable for both countries.

In this section, an attempt has been made to estimate the Trade Complementarity Index (TCI) put forward by Peter Drysdale in 1967 to capture the structure of export and import between India and ASEAN nations concerning the world trade. This analysis will help identify the degree of export specialization and import specialization regarding India's agriculture with ASEAN countries. The result of TCI has been shown in Table 4.7 for the four periods of time, from 2000 till 2015.

**Table 4.7: Trade Complementarity Index (TCI) in Agricultural Products of India with ASEAN (2000-2015)**

<b>Countries</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>
Brunei	50.32	53.99	60.23	46.40
Cambodia	24.94	33.92	34.91	27.04
Indonesia	54.51	54.88	64.63	59.20
Lao PDR	32.85	29.39	44.95	37.87
Malaysia	66.16	64.17	62.19	59.60
Myanmar	46.80	37.53	14.59	32.01
Philippines	50.33	56.49	56.69	60.67
Singapore	71.00	51.12	51.44	48.38
Thailand	54.15	54.15	56.82	59.70
Vietnam	49.29	54.03	61.75	56.25

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

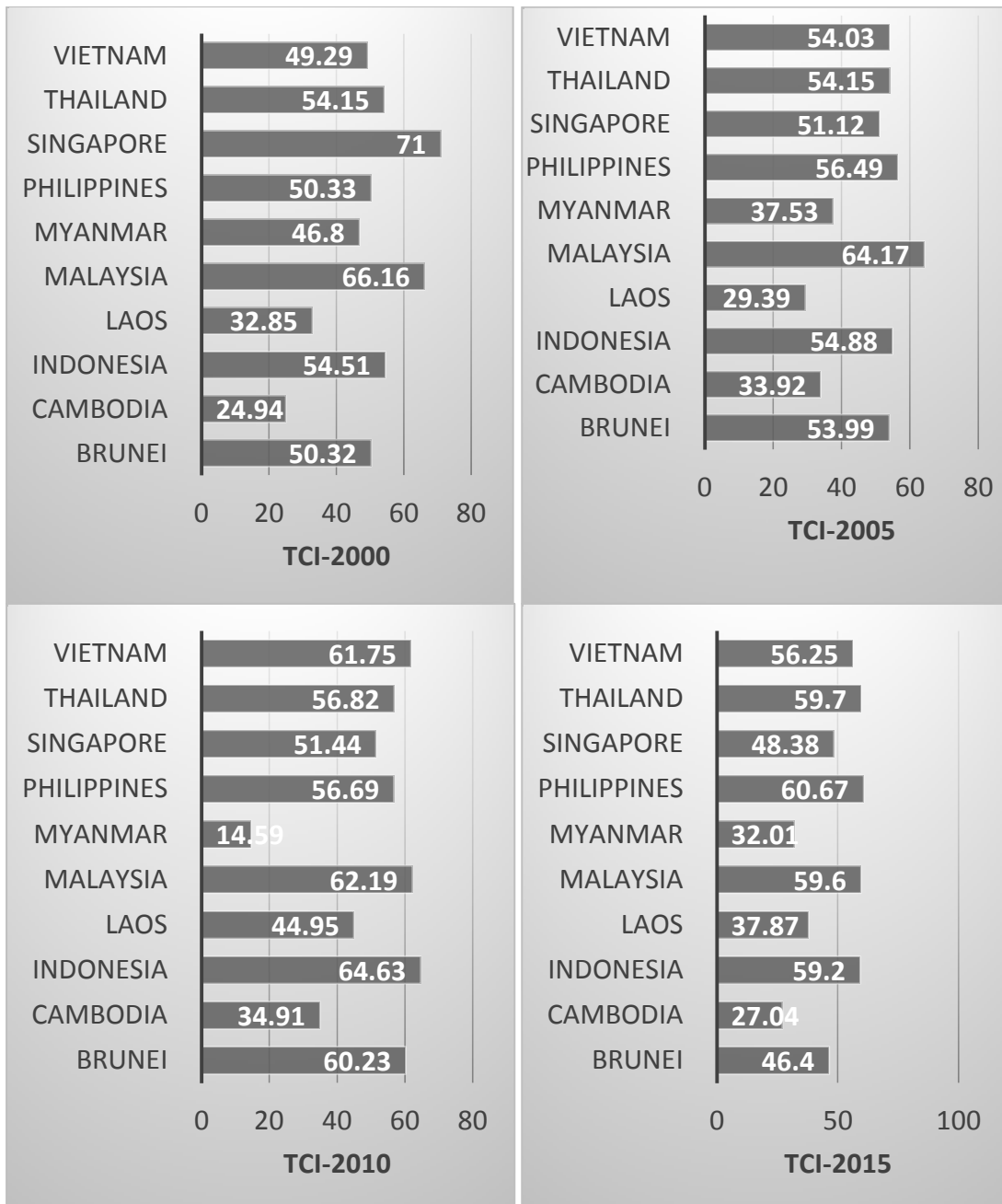
It has been confirmed from the result that in the year 2000, among ASEAN nations, Singapore complemented well for agricultural products and accounted for a higher TCI value of 71 percent, followed by Malaysia with 66 percent. It is to note here that these two countries are developed countries from the ASEAN region, which imports primary products and exports processed and manufactured products. Even countries like Indonesia with 55 percent, Thailand with 54 percent, Brunei and Philippines with 50 percent each registered moderate complementarities in agriculture products with India.

In the year 2005, Malaysia, with 64 percent, topped the chart among other ASEAN countries. The Philippines recorded the second position with 56 percent and showed

an upward trend in agriculture trade complementarity. Indonesia and Thailand, again with 55 and 54 percent index value respectively, maintained their consistency. Brunei, with 54 percent, showed a rising figure. Other nations with moderate index values are Vietnam and Singapore, although the trade complementarity index for Singapore showed a declining trend. Myanmar, Cambodia, and Laos are at the bottom for complementing agriculture trade with India.

Four countries from ASEAN registered more than 60 percent of TCI value in the year 2010. Indonesia, Malaysia, and Vietnam, significant trade partners of India, complemented well the export items of Indian agriculture. Brunei, too, showed a rising trend in the TCI value with 60 percent. The value of Thailand and Laos also increased. Philippines and Singapore showed consistency with their previous period's value. Myanmar demonstrated a considerable decline and reached the lowest level up to 14 percent.

By 2015, India has high TCI value for the Philippines, Malaysia, Indonesia, Thailand, and Vietnam than the rest of the ASEAN. Brunei and Singapore maintained a moderate value. Myanmar showed some recovery in TCI value. Cambodia and Laos showed a declining trend. From the overall analysis of India's agricultural trade complementarity with the ASEAN nations, it has been observed that there is a vast potential for trade with maximum countries within ASEAN. There is a fair amount of similarity of India's agricultural export with the imports of ASEAN. An interesting fact came out from the present analysis regarding the trade potentiality with Brunei.



Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata

**Figure 4.2: Trade Complementarity Index (TCI) in Agricultural Products of India with ASEAN (2000-2015)**

Comparatively, India's trade relation with Brunei is less within ASEAN nations. India exports, but there are nil or negligible imports from Brunei. As mentioned by the Ministry of Commerce and Industry (2016), India has a prospect of exporting

agricultural products like potato and peppers of the genus capsicum, vegetable fats and oil, wheat flour, rice, and grapes worth five million US dollar. India exported the same products to other countries, and Brunei imported the same products in 2015-16. The result of complementarity in agriculture trade is consistent with the Trade Intensity Index in the earlier section. Those countries which have high TCI value with India also have higher value concerning TII value. It indicates higher intensity with a high prospect of a trade.

#### **4.6 Conclusion**

It has been observed from the analysis of the structure of direction of agricultural trade of India with ASEAN that from the year 2000 till 2015, countries like Indonesia and Malaysia are important trade partners with maximum shares throughout the study period. Vietnam is a crucial export destination with Singapore, the Philippines, and Thailand, while Myanmar can be considered an essential import source for India. The study observed flexible agricultural trade policy and devaluation of the currency by Indonesia, Malaysia-India Comprehensive Economic Cooperation Agreement (MICECA) in 2011, strengthening the trade relationship and the direction of agricultural trade these countries. From 2010 to 2015, Vietnam recorded the highest agriculture trade share with India within ASEAN. Diversity in exports plays a crucial role in earning a stable income. India's exports of agricultural products are practically diversified with ASEAN nations as compared to imports. The study found that ASEAN is a significant trading partner for India. Trade Intensity Index (both EII and III) confirmed that India's agricultural trade is intense with ASEAN nations. To measure the degree of similarities or dissimilarities in the export and import structure of agricultural products, TCI was calculated between India and ASEAN nations from

2000 till 2015. In 2000, Singapore complemented well for agricultural products and accounted for a higher TCI value. By 2015, India had high TCI value for the Philippines, Malaysia, Indonesia, Thailand, and Vietnam than the rest of the ASEAN. Countries with high TCI value with India also have higher TII value indicating an increased prospect for trade. It is worthy to see further the changing status of comparative advantage between India and ASEAN regarding agricultural products to globally witness their competitive nature. Furthermore, to have a productive analysis of agricultural trade between India and ASEAN, the determination of trade's influential factors is a must. These are discussed in the next chapter.



## **Chapter 5**

### **Comparative Advantage and Determinants of Agricultural Trade between India and ASEAN**

The present chapter analyzes India and ASEAN's comparative advantage in agricultural products via the Revealed Comparative Advantage (RCA) and the Revealed Symmetric Comparative Advantage (RSCA) techniques, as discussed in section 5.1. The RCA and RSCA values of India and ASEAN nations in agricultural products were determined to witness a relative position over a period. This analysis is valuable as it measures international trade specialization and competitiveness between India and ASEAN. It measures the degree of a country's comparative advantage or disadvantage of its products exported concerning their partner country. Section 5.2 of this chapter is devoted to analyzing several influential factors of trade in agricultural products between the two trading blocs. The analysis of the determinants of agricultural trade is accomplished via the gravity model.

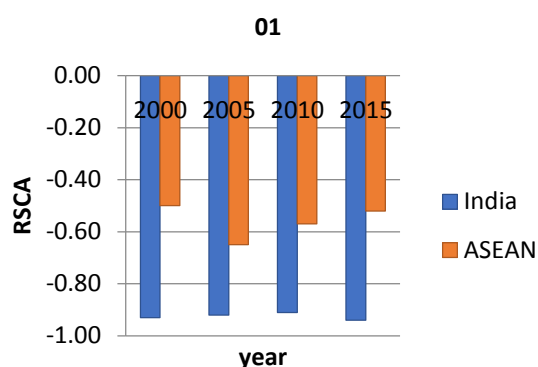
#### **5.1 Comparative Advantage of India and ASEAN in Agricultural Products**

The product-wise comparative advantage in agricultural exports of India and ASEAN have been estimated in the present section. The comparative advantage of India and ASEAN for four different periods (2000, 2005, 2010, and 2015), from 2000 to 2015 has been computed via Revealed Comparative Advantage (RCA) and Revealed Symmetric Comparative Advantage (RSCA) techniques. The result is explained for individual agricultural products falling under HS-2-digit, from chapter 01 to 24 under four sections.

### 5.1.1 Section-1 (Live animals; animal products)

#### HS-01 (Live Animal)

The Revealed Symmetric Comparative Advantage (RSCA) for product HS-01 (Live Animal) is presented in figure 5.1 (see Appendix A for RCA values). By observing figure 5.1, it is evident that throughout the period under consideration, neither India nor ASEAN nations enjoyed the comparative advantage concerning this product group.



Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

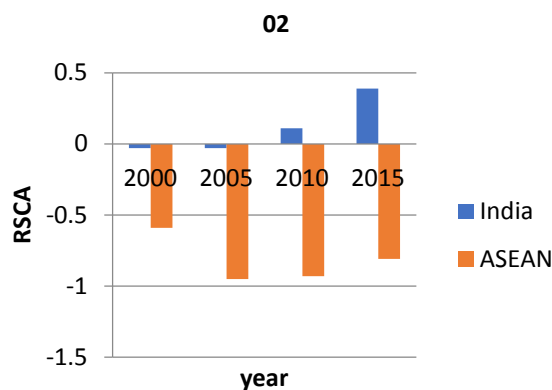
**Figure 5.1 The Revealed Symmetric Comparative Advantage (RSCA) for product HS-01 (Live Animal)**

From the country-wise result, it is observed that from the ASEAN side, Lao PDR enjoyed comparative advantage from 2000 till 2010 with the declining trend. In 2015, Myanmar held a comparative advantage in this particular product group with a positive RSCA value of 0.38 (see Appendix-B).

#### HS-2 (Meat and edible meat offal)

The comparative advantage status for product HS-02 was negative for ASEAN throughout the period under consideration. The only country whose RSCA value was

positive was Thailand, with a positive value of 0.16 in 2000 (see Appendix-B). For the rest of the period, it showed a negative value.



*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

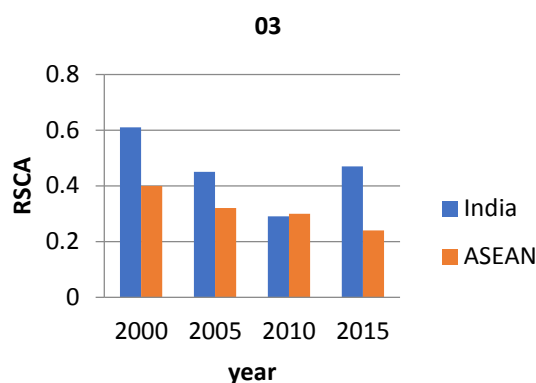
**Figure 5.2 The Revealed Symmetric Comparative Advantage (RSCA) for product HS-02 (Meat and edible meat offal)**

From 2010 to 2015, India dominated the scenario in terms of holding comparative advantage status compared to ASEAN. Exports of animal products signify an imperative and substantial contribution to the Indian agriculture sector. Meat is a vital animal product for export. According to APEDA (2015), out of various meats, India's buffalo meat in the international market has flashed a rapid increase in meat exports. The main markets for Indian buffalo meat and other animal products from ASEAN are Vietnam and Malaysia. Since none of the ASEAN countries have a comparative advantage in this product, India has a high potential to export this product to ASEAN.

### **HS-03 (Fish and crustaceans, molluscs, and other aquatic invertebrates)**

According to the National Fisheries Policy (2020) and Fisheries and Fishing Communities in India, India has signed various regional and bilateral agreements, where fish and fish products are essential components. It is reflected in the export share of this product. India has a significant share in export earnings from the product

HS-03 from the world, and it enjoys a comparative advantage. Throughout the study period, India and ASEAN showed consistency, as indicated by the RSCA value, which is shown in Figure 5.3.



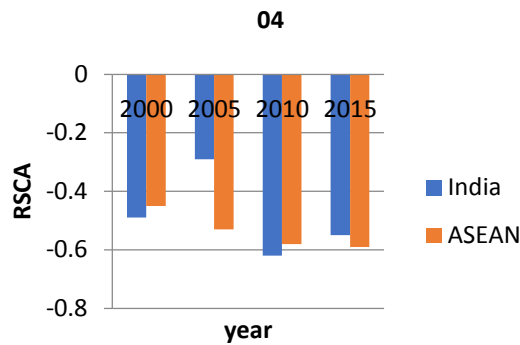
*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

**Figure 5.3: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-03 (Fish and crustaceans, molluscs, and other aquatic invertebrates)**

The value of RSCA indices for India is comparatively higher than ASEAN throughout the study period, as depicted in Figure 5.3. Despite higher value, RSCA's trend is quite fluctuating, and the value of RSCA decreased from 0.61 in 2000 to 0.47 in 2015. The major competitor from the ASEAN nation in Vietnam, with an RSCA value of 0.89 in 2000, declined to 0.73 in 2015. Philippines, Thailand, Indonesia, and Myanmar also enjoyed the comparative advantage status in this product group.

**HS-04 (Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included)**

As observed in Figure 5.4, it is apparent that India, along with ASEAN, does not possess a comparative advantage throughout the study time frame decided by RSCA and RCA values (see Appendix-A).



Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

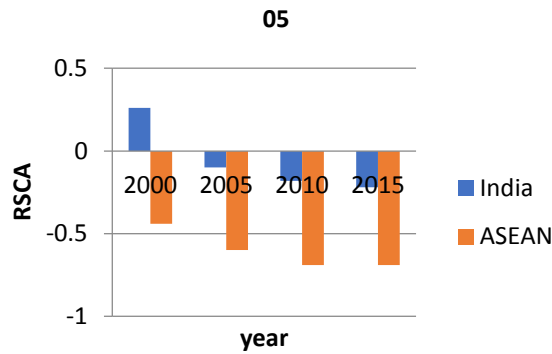
**Figure 5.4: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-04 (Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included)**

The only country from ASEAN, which enjoyed comparative advantage status, was Vietnam, with a positive RSCA value of 0.47 in 2000. Since India is the leading producer of dairy products globally, including milk, ranks 6<sup>th</sup> in the exports of natural honey, India must concentrate on this product group and explore its exports to ASEAN, as ASEAN has a comparative disadvantage.

#### **HS-05 (Products of animal origin not elsewhere specified or included)**

The comparative advantage position of HS-05, i.e., the Products of animal origin not elsewhere specified or included for India and ASEAN, is presented in Figure 5.5 and Appendix A, via RSCA and RCA, respectively.

India was comparatively better as it possessed a comparative advantage initially in 2000. But apart from 2000, India lost its advantage throughout the study period. Neither ASEAN nor individual ASEAN nations had a comparative advantage in this section.



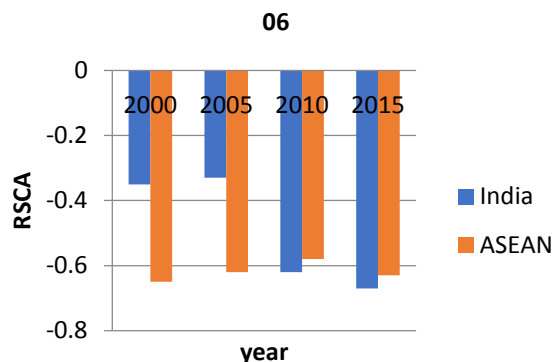
Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

**Figure 5.5: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-05 (Products of animal origin not elsewhere specified or included)**

### 5.1.2 Section-2 (Vegetable Products)

#### HS-06 (Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage)

The Revealed Symmetric Comparative Advantage (RSCA) for product HS-06 is presented in Figure 5.6. The result indicates that India seemed to have no comparative advantage in HS-06 products. Even ASEAN has a comparative disadvantage in this product group throughout the study period.



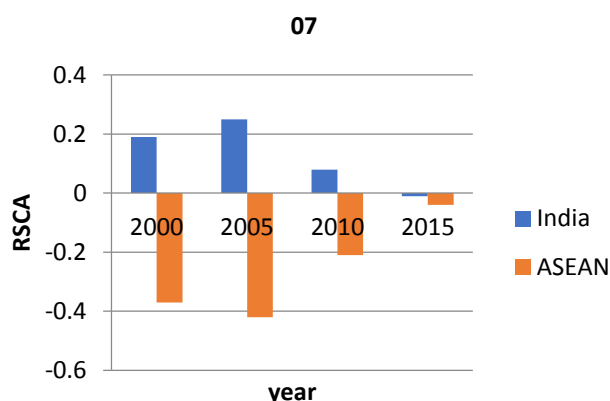
Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

**Figure 5.6: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-06 (Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage)**

There are no single ASEAN countries that are holding the comparative advantage. Each nation's RSCA value is negative throughout the period considered (see Appendix-B). For India, the result of negative RSCA can be compared with its negligible export share of this product group.

### HS-07 (Edible vegetables and certain roots and tubers)

India enjoyed a comparative advantage in product group HS-07 until 2010, as seen from the value of RSCA in Figure 5.1.7. It did not retain the same in 2015. Throughout the period taken into consideration, ASEAN holds the comparative disadvantage with the negative value of the RSCA.



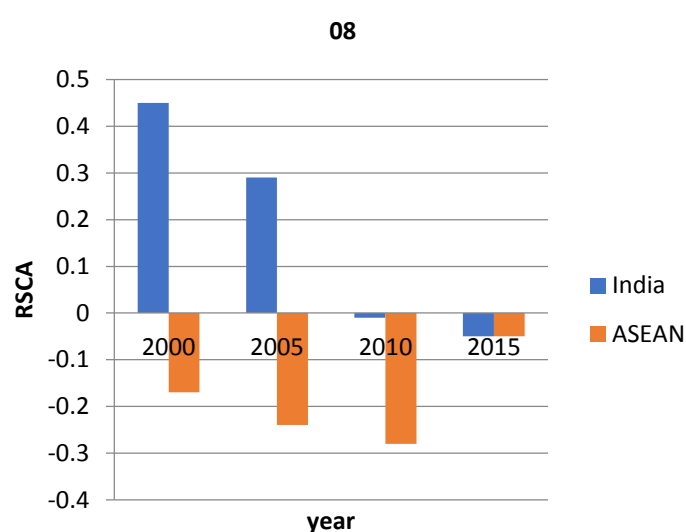
Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

**Figure 5.7: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-07 (Edible vegetables and certain roots and tubers)**

The strong contender from ASEAN is Myanmar, which accounted for the RSCA value of 0.86 in 2015, and is consistent throughout the period (see Appendix-B). Other significant players from ASEAN have a comparative advantage consistently in every interval, including Vietnam, Thailand, and Lao PDR (Lao PDR from 2005) [see Appendix-B]. But ASEAN as a whole does not hold the positive result throughout the study period.

### HS-08 (Edible fruit and nuts; peel of citrus fruit or melons)

The comparative advantage for product HS-08 for ASEAN is negative throughout the study, as confirmed by the value of RCA and RSCA (see Appendix-A). Figure number 5.8 revealed that India was holding a better position for this product in terms of the comparative advantage for the consecutive period (2000 till 2005). From 2010, India lost its place.



Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

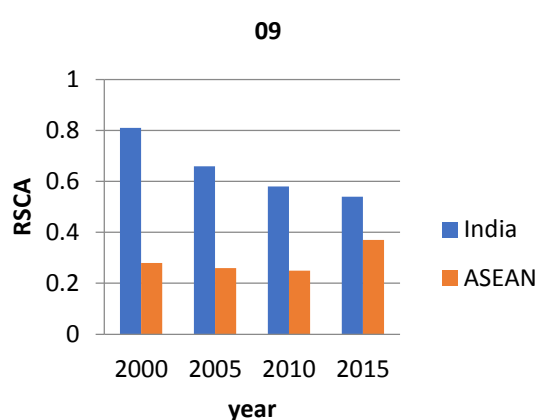
**Figure 5.8: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-08 (Edible fruit and nuts; peel of citrus fruit or melons)**

Major players and India's strong competitors from ASEAN are Vietnam and the Philippines, who retained their supremacy throughout the study period. In 2000, the Philippines and Vietnam had a positive RSCA value of 0.48 and 0.69 (see Appendix-B). In 2015, their RSCA value accounted for 0.66 and 0.50, respectively. Even Thailand registered to hold the comparative advantage in 2015, with a positive RSCA value of 0.01 (see Appendix-B).



### HS-09 (Coffee, tea, mate, and spices)

The comparative advantage position of India and ASEAN was positive in HS product 09, as revealed by RCA and RSCA values. Figure 5.9 shows the value of RSCA for product HS-09 between India and ASEAN. Although it is observed that both trading blocs are enjoying the comparative advantage, but the position of India is better compared to ASEAN.



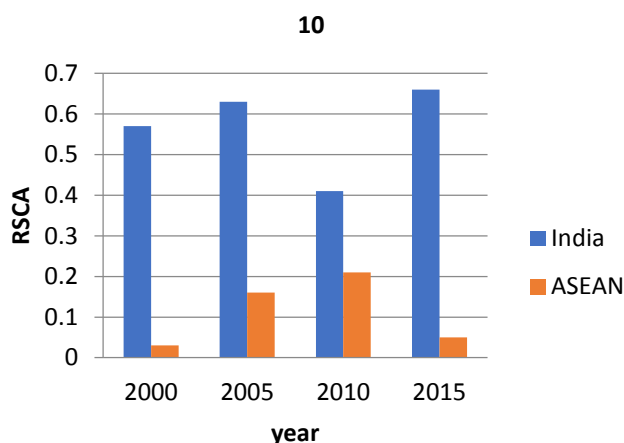
Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

**Figure 5.9: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-09 (Coffee, tea, mate, and spices)**

India has a comparative advantage throughout the time under consideration. The same can be supported by the significant contribution of these products to India's total agricultural export. According to FAO statistics (2018), India ranks top in spices' production; it is the 2<sup>nd</sup> largest tea producer and ranks 8th in coffee production. Therefore, RCA and RSCA values are higher in India's favor, though ASEAN also enjoys the comparative advantage. India's strong competitors are Vietnam and Lao PDR, whose value is very high compared with India (see Appendix-B). But the study observed a gradual declining trend of India's RCA and RSCA in this product, which is a matter of concern.

## HS-10 (Cereals)

The RSCA for cereals is presented in Figure 5.10 between India and ASEAN. The figure depicts that both the trading blocs have positive values of RSCA in the case of cereals. But India's value in every interval is higher than the ASEAN.



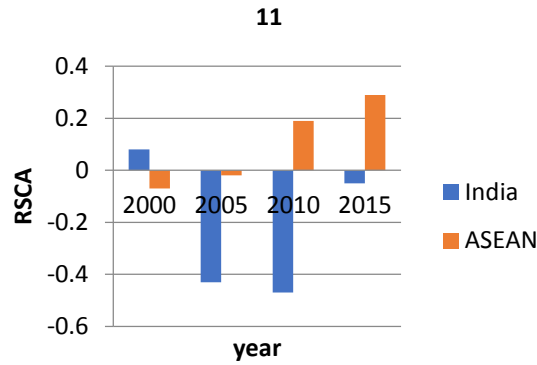
*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

**Figure 5.10: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-10 (Cereals)**

India's share of cereals is comparatively high in total export. ASEAN as a whole and few nations from ASEAN are strong throughout the study period. Countries like Brunei, Indonesia, Malaysia, the Philippines, and Singapore have a comparative disadvantage throughout the period. There is greater scope for India to earn income by exploring these countries via exports of this product group.

## HS-11 (Products of the milling industry; malt; starches; inulin; wheat gluten)

The RSCA values for product HS-11 is presented in Figure 5.11. In 2000, India had a comparative advantage in HS-11. After, the value of RCA and RSCA (see Appendix-A for RCA) subsequently declined. India no more holds a comparative advantage. While ASEAN started enjoying the comparative advantage from 2010 onwards.



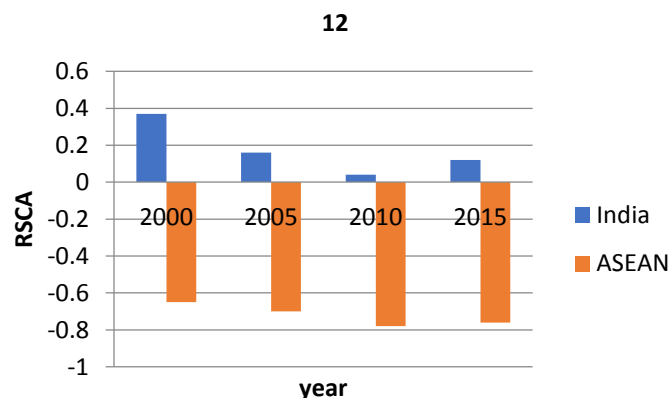
Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

**Figure 5.11: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-11 (Products of the milling industry; malt; starches; inulin; wheat gluten)**

Countries from ASEAN are enjoying comparative advantage throughout the study period are Vietnam and Thailand. Even Lao PDR in 2015 has shown a positive performance.

**HS-12 (Oil seeds and oleaginous fruits; miscellaneous grains, seeds, and fruit; industrial or medicinal plants; straw and fodder)**

India enjoys a comparative advantage in the product HS-12 throughout the study period, taken into consideration, as shown by RSCA value in Figure 5.12.



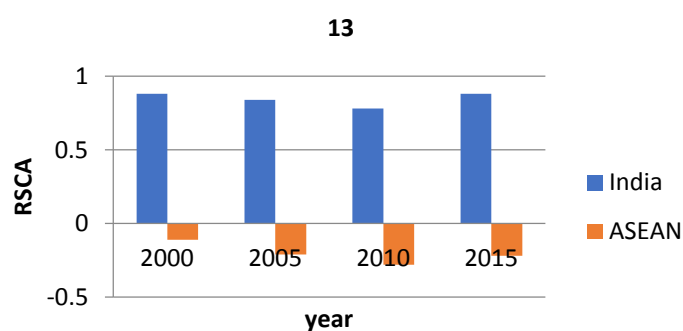
Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

**Figure 5.12: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-12 (Oil seeds and oleaginous fruits; miscellaneous grains, seeds, and fruit; industrial or medicinal plants; straw and fodder)**

This category's primary competition is coming from Lao PDR and Myanmar (see Appendix-A and B). ASEAN, as a whole, does not reveal a comparative advantage in this product classification. There is greater scope for India to export this product group to ASEAN and gain benefit from it.

### **HS-13 (Lac; gums, resins, and other vegetable saps and extracts)**

The value of RSCA is positive and very high for India throughout the study period compared to ASEAN, as shown in Figure 5.13 for HS-13.



*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

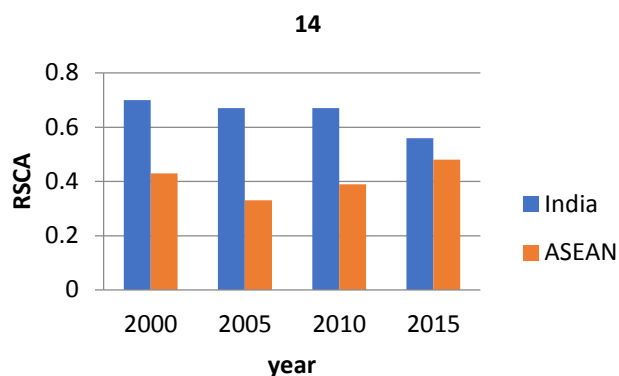
**Figure 5.13: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-13 (Lac; gums, resins, and other vegetable saps and extracts)**

Even a few ASEAN nations like Lao PDR and the Philippines are consistent. Except in 2010, Indonesia was enjoying a comparative advantage from the ASEAN side. ASEAN, as a whole, does not hold the same for the entire period.

### **HS-14 (Vegetable plaiting materials; vegetable products not elsewhere specified or included)**

Lao PDR, Indonesia, Malaysia, and Vietnam are India's primary competitors for this product group (see Appendix). The computed RCA and RSCA values revealed that India has a comparative advantage throughout the period. But Lao PDR, Indonesia,

and Malaysia are more competitive than India, demonstrated by their RSCA value (see Appendix).



*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

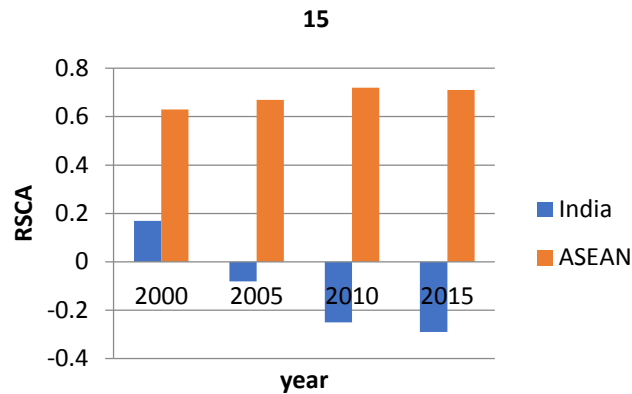
**Figure 5.14: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-14 (Vegetable plaiting materials; vegetable products not elsewhere specified or included)**

The gradual downfall in the value of RCA and RSCA from 2000 to 2015 is a matter of concern, though India has a comparative advantage. Even ASEAN as a whole is a strong competitor for India, which is consistent throughout.

### **5.1.3 Section-3 (Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes)**

#### **HS- 15 (Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes)**

The Revealed Symmetric Comparative Advantage (RSCA) for product HS-15 is shown in Figure 5.15. It is observed from the figure that Apart from the year 2000, India does not have a comparative advantage in this product group. While ASEAN has maintained consistency and is competent throughout.



Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

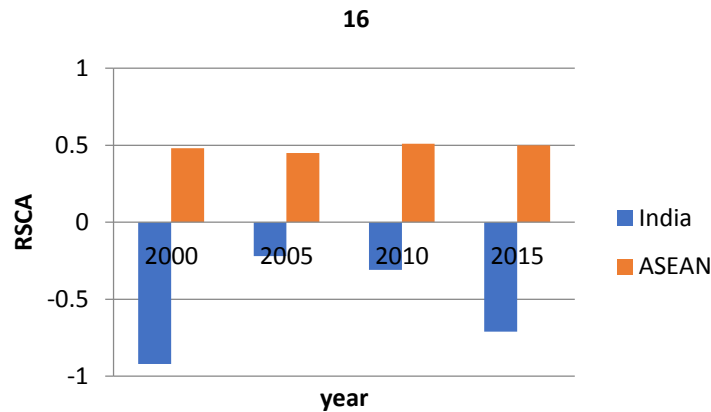
**Figure 5.15: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-15 (Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes)**

Indonesia, Malaysia, and the Philippines are the nation from ASEAN, which immensely contributed to the region's comparative advantage revealed by the high and positive RSCA values throughout the study period. Indonesia and Malaysia are the top nations enjoying a comparative advantage in the year 2015.

#### **5.1.4 Section-4 (Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes)**

#### **HS-16 (Preparations of meat, of fish or crustaceans, molluscs, or other aquatic invertebrates)**

India does not have a comparative advantage status for HS-16 throughout the study period revealed by Figure 5.16. While the value of RSCA for ASEAN is positive, indicating they are enjoying a competitive position globally.



*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

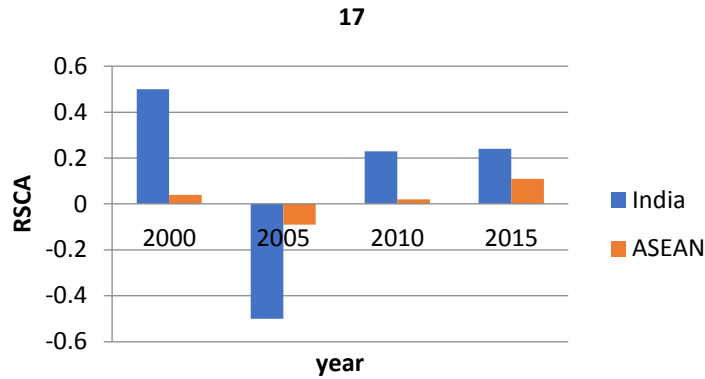
**Figure 5.16: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-16 (Preparations of meat, of fish or crustaceans, molluscs, or other aquatic invertebrates)**

Within ASEAN nations, Thailand, Vietnam, and the Philippines hold comparative advantage throughout the study. Throughout the period, Thailand has achieved the highest RSCA value ranging from 0.87 to 0.83 in the year 2000 and 2015, respectively.

### **HS- 17 (Sugars and sugar confectionery)**

India stands as a 2<sup>nd</sup> largest sugar producer in the world and is a significant exporter of HS-17. Figure 5.17 shows that India enjoyed the comparative advantage throughout the study period except in 2005. Even the situation of ASEAN is the same in terms of holding a comparative advantage in this product.

But, from ASEAN, the strong competitor is Thailand, which ranks fourth in the world. The RSCA value of this category for Thailand is higher than India throughout the study period. It ranged from 0.64 in 2000 to 0.68 in 2015. From 2010 onwards, even Lao PDR had a comparative advantage and giving a tough competition to India.



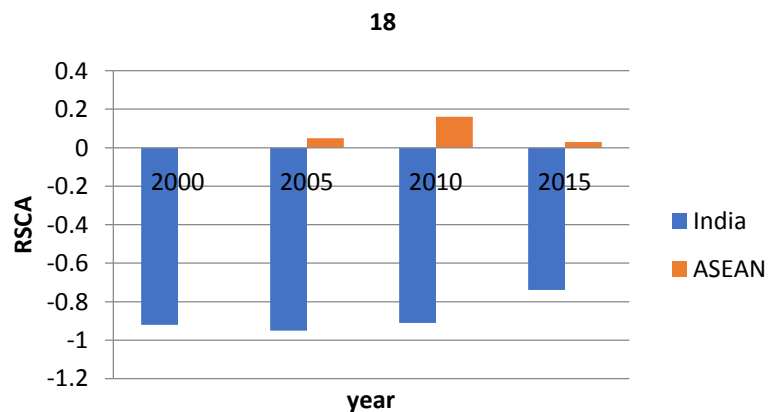
Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

**Figure 5.17: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-17 (Sugars and sugar confectionery)**

The contribution of these nations made ASEAN as a whole to earn a comparative advantage. India must concentrate on exporting this product to another important economy from ASEAN having a comparative disadvantage.

### HS- 18 Cocoa and cocoa preparations

From Figure 5.18, it is confirmed that India does not have a comparative advantage in cocoa and cocoa preparations throughout the period revealed by the strong negative value of RSCA.



Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

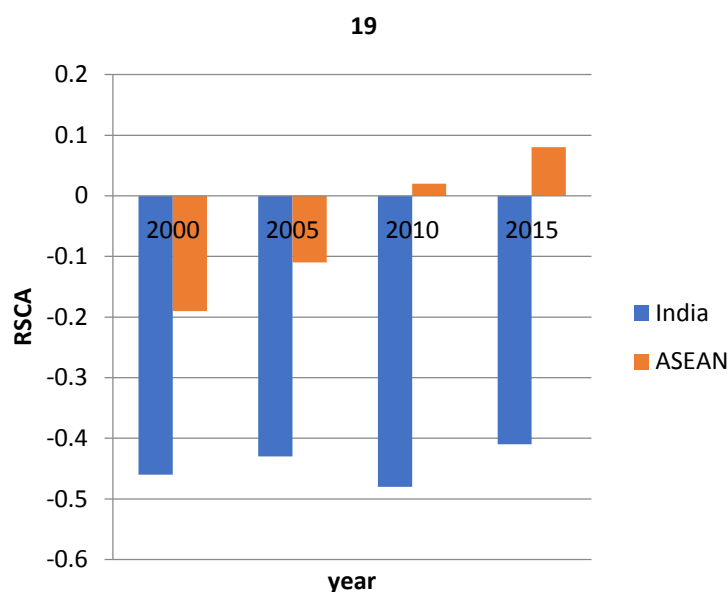
**Figure 5.18: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-18 (Cocoa and cocoa preparations)**



But, in contrast, ASEAN is enjoying the comparative advantage throughout except in 2000. According to FAO statistics, 2018, Indonesia is the third-largest cocoa producer globally, and contributed immensely to ASEAN's status of holding a relative position. Within the ASEAN countries, Indonesia and Malaysia are the only two nations having a comparative advantage throughout the study period.

### HS- 19 Preparations of cereals, flour, starch, or milk; pastry cooks' products

The Revealed Symmetric Comparative Advantage for product HS-19 is presented in Figure 5.19. It can be clearly seen that India does not hold a positive value of RSCA for the entire period under consideration. It signifies India has a comparative disadvantage in this product group for the whole of the period.



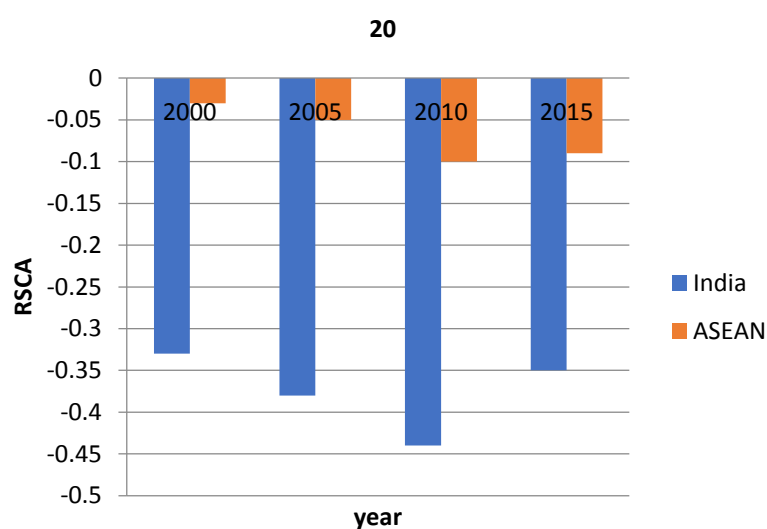
Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

**Figure 5.19: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-19 (Preparations of cereals, flour, starch, or milk; pastry cooks' products)**

While ASEAN enjoyed a comparative advantage in 2010 and 2015, within ASEAN, Thailand, and Vietnam are the consistent players in this particular category with positive RSCA values over the period (see Appendix-B).

### HS- 20 Preparations of vegetables, fruit, nuts, or other parts of plants

India does not possess a comparative advantage in all periods under consideration for this product group, as revealed by strong negative values of RSCA in Figure 5.20.



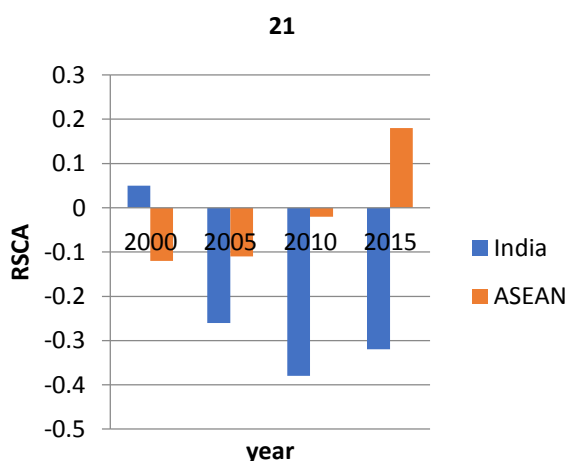
Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

**Figure 5.20: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-20 (Preparations of vegetables, fruit, nuts, or other parts of plants)**

Even, ASEAN does not have the comparative advantage status for the entire period. Although, in comparison, ASEAN is in a better position than India. From ASEAN, the Philippines and Thailand are the two nations with a consistent value of RSCA (see Appendix-B), claiming a comparative advantage for this product group for the entire period..

## HS- 21 miscellaneous edible preparations

The RSCA values of miscellaneous edible preparations of India and ASEAN are presented in Figure 5.21. It is seen that India had a comparative advantage only in the year 2000 with a positive RSCA value of 0.05. But after, it lost its comparative advantage status for the entire period.



Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

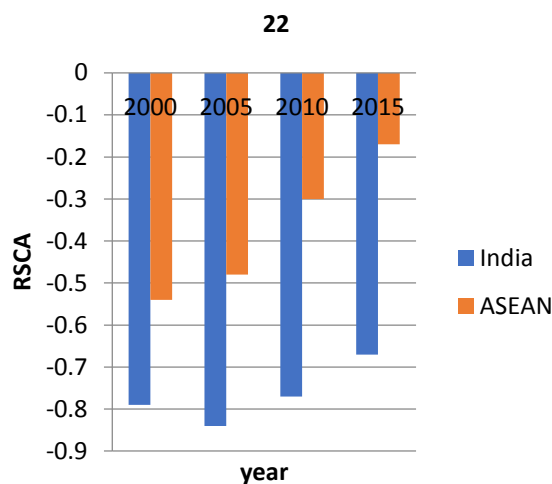
**Figure 5.21: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-21 (miscellaneous edible preparations)**

ASEAN also had a comparative disadvantage until 2010, but it enjoyed a comparative advantage in 2015 with a positive RSCA value. The country from ASEAN which retained in this category and possessed a comparative advantage consistently is Thailand. Other contenders in the recent past include Singapore, Indonesia, and Malaysia (see Appendix-B).

## HS- 22 Beverages, spirits, and vinegar

India does not enjoy a comparative advantage throughout the study period for this product group, as shown in Figure 5.22. The export share of India is also is very

negligible for this product group. Similarly, ASEAN is also having a comparative disadvantage for this product group, seen in Figure 5.22.



Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

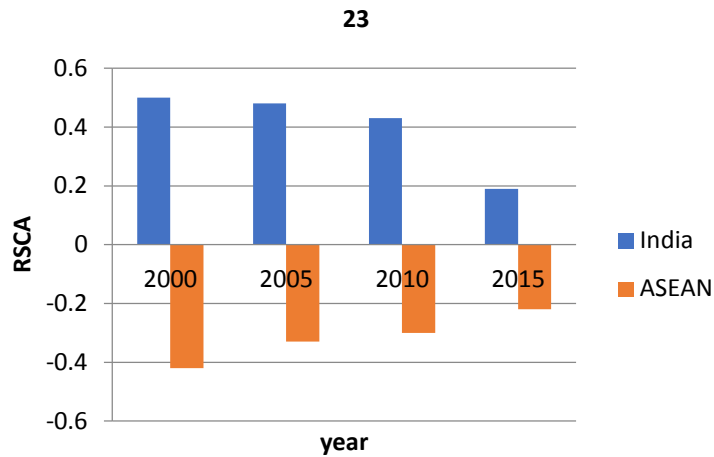
**Figure 5.22: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-22 (Beverages, spirits, and vinegar)**

Apart from Singapore, which is gaining a comparative advantage in 2015, no other nation is holding a comparative advantage in the global scenario.

### **HS- 23 Residues and waste from the food industries; prepared animal fodder**

The product category HS-23 (Residues and waste from the food industries; prepared animal fodder) has a significant export share for India. It has been reflected in the comparative advantage status for India. As observed in Figure 5.23, for the entire period, the RSCA value is positive.

While ASEAN is having a negative RSCA value for the entire period. Apart from Thailand, no single ASEAN nations compete with India and do not enjoy the comparative advantage during the study period.

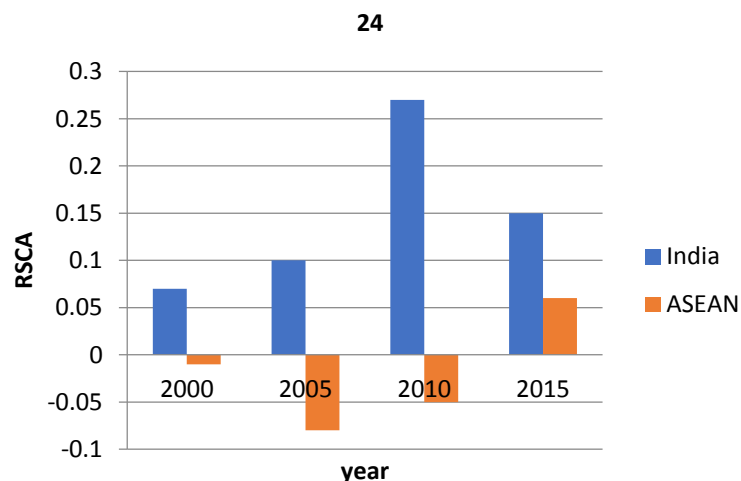


Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

**Figure 5.23: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-23 (Residues and waste from the food industries; prepared animal fodder)**

#### HS- 24 Tobacco and manufactured tobacco substitutes

India has retained its comparative advantage position throughout the study period for tobacco and manufactured tobacco substitutes. The RSCA value that is depicted in Figure 5.24 revealed that ASEAN has a comparative advantage in this product group in 2015 only.



Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.

**Figure 5.24: The Revealed Symmetric Comparative Advantage (RSCA) for product HS-24 (Tobacco and manufactured tobacco substitutes)**

The value of RCA for India was 1.15 in the year 2000 and 1.34 in 2015 (see Appendix-A). From ASEAN, Indonesia maintained its consistency throughout in holding the comparative advantage. The other main competitors for India from ASEAN are Lao PDR and the Philippines.

The overall picture of India and ASEAN's dynamics in holding the comparative advantage status in agricultural exports, measured via RCA and RSCA technique, is shown in Table 5.1. It is seen in Table 5.1 that in 2000, India retained the comparative advantage in agricultural export for 15 products group while ASEAN had in 8 products group.

**Table 5.1: Number of HS 2-digit Agriculture Product having Comparative Advantage**

Countries	2000	2005	2010	2015
India	15	10	11	10
Brunei	0	0	0	0
Cambodia	1	1	1	2
Indonesia	6	8	7	9
Lao PDR	5	7	9	9
Malaysia	2	2	5	5
Myanmar	5	5	6	6
Philippines	6	8	7	11
Singapore	2	1	0	4
Thailand	10	11	10	11
Vietnam	16	11	10	8
ASEAN	8	7	10	12

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata.*

But the matter of concern is, India is retaining a comparative advantage in agricultural export for only ten products group in 2015, while ASEAN has maintained its position for 12 product groups revealed by RCA and RSCA value. The study observed India's

less competent nature in exports of agricultural products than ASEAN nations globally in recent time.

## **5.2 Determinants of India's Agricultural Trade with ASEAN**

It is a known fact that with similar cultural history, there is a robust economic relationship between India and ASEAN nations. In the last couple of decades, the trade relationship between the two trading blocs has improved and escalated high. The gravity model has evaluated the several decisive factors of trade in agricultural products between the two trading blocs. The variables that are included for the estimation includes-Total agricultural trade between India and ASEAN (in 000' US\$), GDP of ASEAN (in 000' US\$), GDP of India (in 000' US\$) from 2000-2015, distance (measured in k.m.), common border, landlocked, common language, common colony, FTA. The large quantitative variables like Total agricultural trade, GDP of ASEAN, GDP of India (in 000' US\$) from 2000-2015, and distance are converted into log form to meet the assumptions of inferential statistics. The variable's summary statistics included in the gravity model are presented in Table 5.2.

**Table 5.2: Summary statistics of the variables included in the gravity model**

Variables	Mean	Median	Maximum	Minimum	Standard Deviation	Kurtosis	Skewness
Total trade(million US dollar)	852198.7114	269810.3336	6813955.343	4.541043263	1376367.621	0.002423	0.005749
GDP of ASEAN (million US dollar)	178625068.7	133444350.4	988128596.7	3582186.705	206118931.4	0.001831	0.003573
GDP of India (million US dollar)	1420126000	1359082125	2302413592	802754758.8	469559979.3	0.000339	-0.00113
Distance (k.m.)	3550.9999	3470.08	4843.75	2133.165	838.4384978	0.053089	-1.0754
Common Border*	1						
Landlocked*	1						
Common Language*	1						
Common Colony*	5						
FTA*	6						

*Source: Author's calculation based on data generated from the ITC database (UN-COMTRADE), World Bank and DGCIS, Kolkata.*

*Note: \*qualitative variables were counted in numbers  
Total number of years is 16*

The gravity model deals with panel data, and there are three types of panel models for the estimation: the Pooled Model, Fixed Effect Model (FEM), and Random Effect Model (REM). Autocorrelation and heteroscedasticity are the two common problems



that occur in the panel data. The pooled model disregards these significant issues. Therefore, FEM and REM are alternatives for the estimation of the panel data. The result of the estimate has been presented in Table 5.3.

Further, to find out group-wise heteroscedasticity, the Wald test (Greene, 2008) was applied. To find out the heteroscedasticity in the model Breusch-Pagan-Godfrey test was used. The outcomes were statistically significant ( $p < 0.01$ ); therefore, the assumption of homoscedasticity was rejected. The present study conducted Hausman Specification Test to select between FEM and REM models appropriate for the analysis (Hausman, 1978). The null hypothesis established that there is no significant difference between FEM and REM accepted against the alternative hypothesis that FEM is better than REM is rejected. In other words, the null hypothesis that there is no correlation between random disturbance term and explanatory variables has been accepted against the alternative hypothesis that there is a correlation between random disturbance term and explanatory variables. The acceptance of the null hypothesis shows that the REM model is appropriate.

The REM model then estimated the panel data through the Feasible Generalized Least Squares (FGLS) method to achieve efficient and consistent estimators. FGLS assumes that all aspects of the model are entirely specified; here, the disturbances have different variances for each panel and are constant within the panel. The benefit of FGLS is the ability to handle both heteroscedasticity and serial correlation (Akhter and Ghani, 2010; Mulenga, 2012). The FGLS is the most suitable model if the exact form of heteroscedasticity in the data is overlooked. It weighs the observations according to their variances' square root and is robust to any form of heteroscedasticity (Zarzoso et al., 2007).

**Table 5.3: Result of Random Effect and Fixed Effect Model**

Dependent variable: ln (Total Agricultural Trade between India and ASEAN)

Variable	Random Effects Model		Variable	Fixed Effects Model	
	Coefficient	Z-statistics		Coefficient	T-statistics
	-31.74			-35.44	
constant	14.42975	-2.2	Constant	11.33709	-3.13
	1.539997***			1.09***	
lngdpjt	0.071876	21.43	Lngdpjt	0.6707049	1.62
	0.584721			0.95	
lngdpit	0.489119	1.2	Lngdpit	0.6819548	1.40
	-0.56818***				
lndis	0.645384	-0.88	Lndis		
	2.220648				
combor	0.547353	4.06	Combor		
	-1.79136***				
landlock	0.381006	-4.7	Landlock		
	-0.67209				
comlang	0.340718	-1.97	Comlang		
	0.020823				
comcol	0.264523	0.08	Comcol		
	0.448879			0.43	
fta	0.337521	1.33	Fta	0.2828383	1.53
wald chi2	1013.91		f/wald statistic	39.68	
prob> chi2	0.0000		prob> f	0.0000	
observations	160		Observations	160	
Breusch-Pagan LM					
Chi square=118.19					
prob>Chi square = 0.0000					
Hausman Test					
Chi square=0.38					
prob>Chi square=0.9444					

Notes: \*\*\* p<0.01

The figures within the parentheses are standard errors

The variable GDP of ASEAN nations was found to be positive and statistically significant. It means a one percent increment in ASEAN's GDP leads to a 1.54 percent increase in the bilateral trade in agriculture between the two trading blocs. Distance factor plays a critical role in international trade is also confirmed from the result as expected. The coefficient value is negative and significant. There will be a 0.57 percent decrease in bilateral trade in agriculture if the distance is increased by one percent.

Interestingly the result found no significant impact of the variable GDP of India in determining bilateral trade between the two blocs. The common border too was found to be insignificant. Myanmar is the only country from ASEAN nation which shares a common border with India. Although, Myanmar is the fourth largest trade partner of India globally, and in contrast to the expectation, the result is not justified on this ground. This result is similar and consistent with Gul et al. (2011) and Renjini et al. (2017). They stated that a common border is not necessary for trade to increase. There are other crucial factors such as less developed infrastructures, etc., which may hinder trade apart from sharing common borders between nations.

The landlocked variable was found to be negative and significant in influencing trade. There is only a single landlocked country in this study, namely Laos. The negative value highlights that because India and Laos' trade was significantly less throughout the period under consideration, the landlocked nation usually trades less. Since India and ASEAN's free trade agreement had been implemented recently in 2010, there is no significant trade impact. Further, the other essential variables for trade, such as common language and common colony, were insignificant in determining the bilateral trade between the two blocs.

### **5.3 Conclusion**

India and ASEAN's dynamics in holding the status of comparative advantage in agricultural exports, measured via RCA and RSCA technique, revealed that India is less competent in exports of agricultural products than ASEAN nations in recent time compared to its past performances. Over the period, India has lost its comparative advantage status. In 2000, India booked the comparative advantage in agricultural export for 15 products group while ASEAN had in 8 products group. By 2015, India

retains a comparative advantage in agricultural export for only ten products group in 2015, while ASEAN has maintained its position for 12 product groups. Considering the significance of trade relation between India and ASEAN, the present study analyzed India-ASEAN trade determinants in agricultural products. The gravity model has been employed to witness the determinants of agriculture trade between the two trading partners. The study found that ASEAN countries' GDP is positive and significant. The variable distance and landlocked were observed to be negative and significant, which confirmed that trade would decrease if distance increases and if the country is landlocked, respectively.

Interestingly, variables like FTA, GDP of India, common language, common colony, and common border did not significantly affect the bilateral trade between the two blocs. There is only a single landlocked country in this study, namely Laos. The negative value highlights that because India and Laos' trade was significantly less, the landlocked nation usually trades less. Since the free trade agreement between India and ASEAN has been implemented recently in 2010, there is no significant trade impact. Further, the other essential variables for trade, such as common language and common colony, were insignificant in determining the bilateral trade. Due to the significant influence of the distance variable in trade, even ASEAN must concentrate imports from India.

## **Chapter 6**

### **Conclusion and Policy Implications**

The summary of the findings, a handful of policy implications, and the study's limitations are presented in the present chapter. Section 6.1 deals with the outline of the secondary data set's overall findings concerning the India-ASEAN agriculture trade from 2000 to 2015. Subsequently, section 6.2 covers a few policies that are prescribed after the overall conclusions. Finally, section 6.3 has uncovered the limitations of the study.

#### **6.1 Summary of the Findings**

India's current international situation discloses that India's share in the agricultural exports in India's total trade with the world is declining from the period 2000 till 2015, and the trend is fluctuating. The stimulating fact to consider is export is approximately three times the import as observed in 2015. However, India is an exporter of primary agricultural produce in India-ASEAN trade as its share is very high. In contrast, ASEAN is exporting processed and manufactured agricultural products to India. The idea that ASEAN is quite developed in terms of value-added and manufactured services as compared to India can be generated from the study. The high share of HS-02 (meat and edible meat offal) is because India is a world-leading producer of total livestock population, second in goat population, fourth in chicken production, and fifth in poultry meat production. HS-03 (Fish and crustaceans, molluscs, and other aquatic invertebrates) also have a significant share as India is a second leading producer of fish globally. The study analyzed that India's import from ASEAN is more than its export to ASEAN for the entire period under consideration.

It can be depicted from the ongoing discussion and result on growth and instability that although India has witnessed a higher export growth rate than ASEAN, there is a considerable amount of volatility, as confirmed by the Cuddy-Della Valle Instability Index for the period 2000 to 2015. Comparatively, ASEAN's agriculture exports are stable.

It has been observed from the analysis of the structure of direction of agricultural trade of India with ASEAN from the year 2000 till 2015 that countries like Indonesia and Malaysia are important trade partners with maximum shares throughout the study period. Indonesia has a flexible trade policy concerning agriculture. Indonesia further eliminated all Non-Tariff Barriers for commodities bound in the WTO. Malaysia and India signed The Malaysia-India Comprehensive Agreement (MICEA) in 2011, strengthening their trade relation. Vietnam is an important export destination with Singapore, the Philippines, and Thailand, while Myanmar can be considered an essential import source for India. Small economies like Brunei, Cambodia, and Laos have shown negligible agricultural trade relations with India. However, there are future possibilities to strengthen agricultural trade relations between India and these economies.

It is worth mentioning here that agriculture price in the international market is volatile so that that export diversification will help India's export earnings stability. India's exports of agricultural products are reasonably diversified with ASEAN as a whole as compared to imports. The result designates India to be better positioned, as diversification in exports leads to export earnings stability. It can produce positive results for a country's economic growth.

The natural trading partner theory fits the bill nicely in the present study, as it suggests that the intensity of trade with its neighboring countries is always high compared with the rest of the world. The present study has confirmed that India's agricultural trade with ASEAN is robust and intense throughout the period under consideration. The value of India's agricultural export intensity and import intensity is above one throughout the study period from 2000 till 2015. Compared to the rest of the world, India's agricultural trade is intense with ASEAN nations as suggested by the two indexes, namely Export Intensity Index (EII) and Import Intensity Index (III). As India is among Vietnam's top ten trading partners, it consistently stood as India's major agricultural export destination, followed by Malaysia and Indonesia throughout the period under consideration. Myanmar sharing a common border with India stood first in terms of import intensity. For the prospect and deepening of the trade relationship, complementarities in production and trade must exist between them. From the overall analysis of India's agricultural trade complementarity with the ASEAN nations, it has been observed that there is a vast potential for trade with maximum countries within ASEAN. There is a fair amount of similarity of India's agricultural export with the imports of ASEAN. There is a change in trade complementarity over Singapore to the Philippines, Malaysia, Indonesia, Thailand, and Vietnam.

An interesting fact came out from the present analysis regarding the trade potentiality with Brunei. India has a prospect of exporting agricultural products like potato and peppers of the genus capsicum, vegetable fats and oil, wheat flour, rice, and grapes worth five million US dollars. The result of the complementarity index in agriculture trade is consistent with the Trade Intensity Index.

The overall picture of India 's RCA and RSCA in agricultural exports showed that in 2000, India retained the comparative advantage in agricultural export for 15 products group while ASEAN had in 8 products group. But the matter of concern is, India is maintaining a comparative advantage in agricultural export for only ten products group in 2015, while ASEAN has retained 12 product groups revealed by RCA and RSCA value. The study observed India's less competent nature in exports of agricultural products as compared with ASEAN nations. India must focus on exporting products like HS-2, HS-11, HS-12, HS-13, HS-15, HS-16, HS-18, HS-21, and HS-23 to those ASEAN countries, lacking comparative advantage in these products.

The factors like GDP of ASEAN, distance, and landlocked were significant in determining agricultural trade between India and ASEAN. As expected from the literature, variables like FTA did not significantly affect the bilateral trade between the two blocs with a common language, a common colony, and a common border. Due to the significant influence of the distance variable in trade, even ASEAN must concentrate imports from India. A commitment under FTA is yet to complete by 2020; a faster conclusion of bilateral talks with ASEAN as a whole and flexible trade policies with individual ASEAN nations is the need of the hour to increase trade and further integration within the region.

## **6.2 Policy Implications**

The present study has provided a valuable perception and insight into the India-ASEAN agricultural trade. It truly helped in proposing a few policies that will support India's policymakers in upcoming years. The policy recommendations from the present research are:



- India must take up the export promotion measures as there is a trade deficit in agriculture products with ASEAN.
- India must develop processed and manufactured agricultural products to compete with ASEAN.
- Although there is a vast potential for trade with major ASEAN countries, India must explore export measures with less developed countries like Brunei and the Lao PDR. The untapped potential in trade lies in these countries.
- The matter of concern for the policymakers is India is gradually losing its comparative advantage with ASEAN. India must focus on the export of those products where ASEAN lacks a comparative advantage.
- Due to the significant influence of the distance variable in trade, even ASEAN must concentrate imports from India with a comparative disadvantage.
- Since FTA's commitment is yet to complete by 2020, a faster conclusion of bilateral talks is needed to increase trade and further integration within the region.

### **6.3 Limitation of the Study**

The present study is limited to the HS-2-digit product group only concerning the agriculture sector. So, this study is the macro view of agriculture trade. Moreover, 85 percent of agriculture products have been considered to address all the study issues, comprising chapter 01 to 24.

## References

Adhikary, A.K. (2013). *A Study of Export of Agricultural Commodities and Agro Based Products from Gujarat in the WTO Regime*, Ph.D. Thesis, Department of Business Management, Sardar Patel University. Retrieved from <http://hdl.handle.net/10603/7327>

Agosin, M. R. (2007). *Export Diversification and Growth in Emerging Economies*. Working Paper No. 233. Departamento de Economía. Universidad de Chile.

Ahmed, G. (2012). Krugman Trade Theory and Developing Economies, *China-USA Business Review*, 11, 1557-1564.

Ahmed, S. (2010). *India-ASEAN Free Trade Agreement: A Sectoral Analysis*, SSRN Working paper 1698849. Retrieved from <http://dx.doi.org/10.2139/ssrn.1698849>

Akhter, N., Ghani, E. (2010). Regional integration in South Asia: An analysis of trade flows using the gravity model, *The Pakistan Development Review*, 49, 105- 118.

Ali, R., Alwang, J., Siegel, P. (1991). *Is export diversification the best way to achieve export growth and stability? A look at three African countries*, Policy Research Working Paper Series 729, The World Bank.

Ali S., Jabbar, A. (2015). Growth and Variability of Area, Production and Yield of Selected Fruit Crops in Khyber Pakhtunkhwa, *Pakistan J. of Agric Resources*, 28 (1), 64-69.

Alkhteeb, T., Sultan, Z. A. (2015). Determinants of India's Agricultural Export, *European Journal of Business and Management*, 7 (4), 53-62.

Amoro, G., Shen, Y. (2013). The Determinants of Agricultural Export: Cocoa and Rubber in Cote d'Ivoire, *International Journal of Economics and Finance*, Canadian Center of Science and Education, 5, 228-233.

Anderson, J. E. (1979). A Theoretical Foundation for the Gravity Equation, *American Economic Review*, 69, 106-116.

Annual report (2015). Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India. Retrieved from <http://agricoop.nic.in/annual-report>

Anwasha, A., Rajat, A. (2013). Export diversification, composition, and economic growth: Evidence from cross-country analysis, *The Journal of International Trade & Economic Development*, Taylor & Francis Journals, 22 (7), 959-992.

Balance, R.H., Forstner, H., Murray, T. (1987). Consistency tests of alternative measures of comparative advantage, *Review of Economics and Statistics*, 69, 157-161.

Balassa, B. (1965). Trade Liberalisation and Revealed Comparative Advantage, *The Manchester School of Economics and Social Studies*, 33(2), 99-123.

Banga R., Das A. (2012). *Twenty Years of India's Liberalisation: Experiences and Lessons*, United Nations Conference on Trade and Development, UNCTAD Publication, UNCTAD/OSG/2012/1. Retrieved from [https://unctad.org/system/files/official-document/osg2012d1\\_en.pdf](https://unctad.org/system/files/official-document/osg2012d1_en.pdf)

Bardhan, D. (2007). India's Trade Performance in Livestock and Livestock Products. *Indian Journal of Agriculture Economics*, 62 (3), 411-425.

Batra, A., Khan, Z. (2005). *Revealed comparative advantage: An analysis for India and China*, Working Paper, Indian Council for Research on International Economic Relations 168, New Delhi. Retrieved from <http://www.icrier.org/pdf/wp168.pdf>

Bhattacharyya, R. (2011). *Revealed Comparative Advantage and Competitiveness: A Case Study for India in Horticultural Products*. International Conference on Applied Economics – ICOAE 2011.

Boansi, D., OdilonKounagbéLokonon, B., Appah, J. (2014). Determinants of Agricultural Export Trade: Case of Fresh Pineapple Exports from Ghana, *British Journal of Economics, Management & Trade*, 4(11), 1736-1754.

Burange L. G., Chaddha, S.J. (2008). *India's Revealed Comparative Advantage in Merchandise Trade*, Working Paper UDE28/6/2008, Department of Economics, University of Mumbai, India.

CEPII (2015). Centre for Prospective Studies and International Information, [http://www.cepii.fr/cepii/en/bdd\\_modele/bdd.asp](http://www.cepii.fr/cepii/en/bdd_modele/bdd.asp)

Chadha, R., Nataraj, G. (2008). *Trade in services and investment flows in South Asia*, Paper presented at the NCAER-EABER Conference in the Micro-Economic Foundations of Economic Policy Performance in Asia, New Delhi, India, April 3-4. Retrieved from [https://www.researchgate.net/profile/Rajesh\\_Chadha/publication/228743511\\_Trade\\_in\\_Services\\_and\\_Investment\\_Flows\\_in\\_South\\_Asia/links/02bfe50f9260d5a9db000000.pdf](https://www.researchgate.net/profile/Rajesh_Chadha/publication/228743511_Trade_in_Services_and_Investment_Flows_in_South_Asia/links/02bfe50f9260d5a9db000000.pdf)

Chakravarty, L.S., Chakrabarty, R. (2014). A gravity model approach to Indo-ASEAN trade-fluctuations and swings, *Procedia - Social and Behavioral Sciences*, 133, 383-391.

Chand, R. (2005). India's Export Performance and Competitiveness in Changed International Scenario. In C.H Rao, B.B. Bhattacharya and N.S. Siddharthian (eds.), *Indian Economy and Society*, New Delhi: Academic Foundation.

Chand, R., Saxena, R. (2014). *Bilateral India-Pakistan Agricultural Trade: Trends, Composition and Opportunities*, Working Paper 287, Indian Council for Research on International Economic Relations.

Chandran, S. (2011). *Trade Complementarity and Similarity Between India and ASEAN Countries in the Context of the RTA*. Munich Personal RePEc Archive. Retrieved from [https://mpa.ub.uni-muenchen.de/29279/1/MPRA\\_paper\\_29279.pdf](https://mpa.ub.uni-muenchen.de/29279/1/MPRA_paper_29279.pdf)

Chaney, T. (2018). The Gravity Equation in International Trade: An Explanation, *Journal of Political Economy*, 126 (1), 150-177.

Chauhan, K. P. (1999). *India's Trade and Investment Relationship with ASEAN Countries: With Special Reference to Singapore and Malaysia*, Ph D. Thesis, South Asian Studies, Division Centre for South Central South East Asian and South West Pacific Studies, School of International Studies, Jawaharlal Nehru University, New Delhi.

Chowdhury, A. B. (2014). Determinants of India's Export to Small and Large Economies: An Analysis with Some Select Parameters, *Journal of Business Management & Social Sciences Research (JBM&SSR)*, 3, (7).

- Corden, W. M. (1971). *The Theory of Protection*. Oxford, Clarendon Press.
- Cuddy, J.D.A., Valle, P.A. (1978). Measuring the Instability of Time Series Data, *Oxford Bulletin of Economics and Statistics*, 40, 79-85. Retrieved from <https://doi.org/10.1111/j.1468-0084.1978.mp40001006.x>
- Dalum, B.K., Laursen K., Villumsen, G. (1998). Structural change in OECD export specialization patterns: De-specialization and 'stickiness'. *International Review of Applied Economics*, 12, 447- 467.
- Dastagiri, M., Vajrala, A. (2018). World Trading Signals for Indian Agriculture during WTO Regime: Multi-Stakeholders Decision Making. *American Journal of Plant Sciences*, 9, 1868-1893.
- Datta, S.K., Chakrabarti, M., Chattarjee, S. Gandhi, M. (2001). Composition of India's Agri-Exports: Changes in the Post-reforms Period in Datta, S.K., Deodhar, S.Y. (ed.), *Impact of WTO Agreements on Indian Agriculture*, CMA, IIMA, Ahmedabad.
- Deb, U., Pramanik, S. (2015). Groundnut Production Performance in Bangladesh: A District Level Analysis, *Economic Affairs*, New Delhi Publishers, 60 (3), 391-400.
- Dennis, A., Shepherd, B. (2007). *Barriers to Entry, Trade Costs, and Export Diversification in Developing Countries*. The World Bank Policy Research Working Paper. Retrieved from [http://siteresources.worldbank.org/INTTRADERESESEARCH/Resources/5448241320091873839/8238146-1320451708214/Dennis\\_paper.pdf](http://siteresources.worldbank.org/INTTRADERESESEARCH/Resources/5448241320091873839/8238146-1320451708214/Dennis_paper.pdf).
- Deardorff, A. (1998). Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World?, NBER Chapters, in *The Regionalization of the World Economy*,

7-32, National Bureau of Economic Research. Available at <https://www.nber.org/system/files/chapters/c7818/c7818.pdf>

DGCIS (2015). Directorate General of Commercial Intelligence and Statistics, Ministry of Commerce and Industry, Government of India. Retrieved from <http://www.dgciskol.gov.in/>

Dudhat, A.S., Yadav, P., Venujayakanth, B. (2017). A Statistical Analysis on Instability and Seasonal Component in the Price Series of Major Domestic Groundnut Markets in India. *International Journal of Current Microbiology and Applied Sciences*, 6 (11), 815-823.

Frankel, J. (1997). *Regional Trading Blocs in the Economic System*, Peterson Institute for International Economics, Harvard University, 1-388.

Francis, S. (2011). The ASEAN-India Free Trade Agreement: A Sectoral Impact Analysis of Increased Trade Integration in Goods, *Economic and Political Weekly*, 46 (02). [https://www.networkideas.org/ideasact/dec09/pdf/Smitha\\_Francis\\_Paper.pdf](https://www.networkideas.org/ideasact/dec09/pdf/Smitha_Francis_Paper.pdf)

Gulati, A., James H., Garry, P. (1989). *Effective Incentives in Indian Agriculture*, Policy Planning and Research Working Paper No.332 (Trade Policy Division), the World Bank.

Goldin, I. (1990). *Comparative Advantage: Theory and Application to Developing Country Agriculture*, OECD Development Centre, Working Paper No. 16 (Formerly Technical Paper No. 16), 14.

Greene, W. H. (2008). *Econometric analysis, 6th ed.*, Upper Saddle River, N.J.: Prentice Hall.

Gruber, W. H., Vernon, R. (1970). The Technology Factor in a World Matrix. In Vernon, R. (ed.), *The Technology Factor in International Trade*, 233-272, New York: Columbia University Press.

Gururaj, B., Satish, K., Kumar, M. (2016). Analysis of Factors Affecting the Performance of Exports in India, *International Journal of Agriculture Environment and Biotechnology*, 9 (4), 613.

Hatab, A., Abu, Romstad, E., Huo, X. (2010). Determinants of Egyptian Agricultural Exports: A Gravity Model Approach, *Modern Economy*, 1, 134-143. Retrieved from <http://www.SciRP.org/journal/me>

Hausman, J. A. (1978). Specification tests in econometrics, *Econometrica*, 46, 1251-1271.

Herzer, D., Lehnmann D. F. (2006). What does export diversification do for growth? An econometric analysis, *Applied economics*, 38 (15), 1825-1838.

Herlitz, L. (1964). The concept of mercantilism, *Scandinavian Economic History Review*, 12 (2), 101-120.

ITC Trade Map (2015). International Trade Center Trade Data Base. Retrieved from <https://www.trademap.org/Index.aspx>

Jagadambe, S. (2016). *Analysis of Export Competitiveness of Indian Agricultural Products with ASEAN Countries*, Working Paper 356. Institute of Social and Economic Change, Bangalore. Retrieved from <http://www.isec.ac.in/WP%20356%20-%20Subhash%20Jagdambe.pdf>



- Joshi, P.K., Gulati, A., Badal, P.S., Tewari, L. (2004). Agricultural diversification in South Asia: Pattern, determinants and policy implications. *Economic and Political Weekly*, 39, 2457-2467.
- Kanaka, S., Chinadurai, M. (2012). A Study of Comparative Advantage of Indian Agricultural Exports, *Journal of Management and Science*, 1, 175-183.
- Kannan, E., Sundaram, S. (2011). *Analysis of Trends in India's Agricultural Growth*, Working Paper, The Institute for Social and Economic Change, Bangalore.
- Kannan, M. (2013). The Determinants of Production and Export of Natural Rubber in India, *IOSR Journal of Economics and Finance (IOSR-JEF)*, 1 (5), 41-45.
- Kaur, A. (2012). Pattern of India's Foreign Trade in Pre and Post Reform Era: An Empirical Investigation, *International Journal of Advancements in Research & Technology*, 1 (5), 170-199.
- Kimura, F., Lee, H. (2006). The gravity equation in International Trade in Services, *Rev. World Econ.*, 142, 92-121.
- Kingu, J. (2014). Determinants of Tanzanian agricultural export: A case of cotton lint, *Developing Country Studies, IISTE*, 4(1). Retrieved from <https://core.ac.uk/download/pdf/234681465.pdf>
- Kojima, K. (1964). The Pattern of International Trade among Advanced Countries, *Hitotsubashi Journal of Economics*, 5 (1), 16–36.

- Kumar, A. (2010). Exports of Livestock Products from India: Performance, Competitiveness and Determinants, *Agricultural Economics Research Review*, 23, 57-67.
- Linder, S. B. (1961). *An Essay on Trade and Transformation*, Stockholm: Almqvist and Wiksell. Retrieved from <https://ex.hhs.se/dissertations/221624-FULLTEXT01.pdf>
- Liesner, H. H. (1958). The European Common Market and British Industry, *Economic Journal*, 68, 302-16.
- Lugeiyamu, E. (2016). *Is Export Diversification a Key Force to Africa's Economic Growth? Cross-Country Evidence*, Master's Thesis, Department of Economics, Jonkoping university, International business school.
- Mahajan, P., Nanda, P. (2012). Structural Changes in Commodity Composition and Direction of Agricultural Exports in India Under WTO Regime, *The IUP Journal of Agricultural Economics*, 8 (3), 7-23.
- Maity, S. (2013). India's Leather and Manufactures Export in the Scenario of WTO: An Analysis Trend and Structural Shift, *Managing Global Transitions*, 11(3), 261-281.
- MEA (2018). India-ASEAN Relations, Ministry of Economic Affairs, Government of India. Retrieved from <https://mea.gov.in/aseanindia/20-years.htm>
- Moïsé, E., Delpeuch, C., Sorescu, S., Bottini, N., Foch, A. (2013). *Estimating the Constraints to Agricultural Trade of Developing Countries*, OECD Trade Policy Papers, OECD, France. Retrieved from

[http://www.businessenvironment.org/dyn/be/docs/253/Estimating\\_the\\_Constraints\\_to-Agricultural\\_Trade.pdf](http://www.businessenvironment.org/dyn/be/docs/253/Estimating_the_Constraints_to-Agricultural_Trade.pdf)

Matthee, M., Naudé, W. (2008). *Export Diversity and Regional Growth: Empirical Evidence from South Africa*, WIDER Working Paper Series RP2007-11, World Institute for Development Economic Research (UNU-WIDER).

Mulenga, C. (2012). *An Investigation of the Determinants of the Intra Industry Trade between Zambia and It's Trading Partners in the Southern African Development Community (SADC)*, Working Paper Series No 2012- 01, Trade and Industrial Policy Strategies, Pretoria, South Africa.

Nabi, T., Dhami, J. K. (2013). Analysis of India's Agriculture Export Performance in Pre and Post WTO Regime, *International Journal of Enhanced Research in Management & Computer Applications*, 2 (6), 9-13.

NFP (2020). *National Fisheries Policy*, National Fisheries Development Board, Government of India. Retrieved from [http://nfdb.gov.in/PDF/National\\_Fisheries\\_Policy\\_2020.pdf](http://nfdb.gov.in/PDF/National_Fisheries_Policy_2020.pdf)

Nijkamp, P., A. Reggiani (1992). *Interaction, Evolution and Chaos in Space*, Berlin, Springer.

OECD (2015). *The Changing Landscape of Agricultural Markets and Trade*, Organization for Economic Co-operation and Development, France. Retrieved from <https://www.oecd.org/agriculture/topics/agricultural-trade/>

Pal, P., Dasgupta, M. (2009). The ASEAN-India Free Trade Agreement: An assessment, *Economic and Political Weekly*, 44 (38), 11-15.

Paswan, N.K. (2000). *India's Trade in Agricultural Food Products with South Asia: 1990-95*, Ph. D. Thesis, South Asian Studies, Division Centre for South Central South East Asian and South West Pacific Studies, School of International Studies, Jawaharlal Nehru University, New Delhi .

Paswan, N.K., Bano, S. (2010). *India-New Zealand Trade and Trade Potential: Recent Experience and Future Opportunities*, Paper for the 51st New Zealand Association of Economists (NZAE) Annual Conference University of Auckland Business School on 30 June - 2 July 2010.

Patil, S.S., Vishweshar, S., Kulkarni, G.N. (2009). Liberalisation and its impacts on India's imports and exports of agricultural commodities, *Karnataka Journal of Agriculture Science*, 22 (4), 927-928.

Rajadhyaksha, N. (2012). *The Indian Economic Liberalisation Story, An Audit from a Liberal Perspective*, Discussion Papers, Project for Economic Education, Papers presented at a seminar in Mumbai on May 5, 2012. Retrieved from <http://www.freedomfirst.in/freedom-first/pdf/the-indian-economic-liberalisation-story.pdf>

Raju, S. (2010). *ASEAN – India FTA: Emerging Issues for Trade in Agriculture*, Revised version of the paper presented at the Seminar on ASEAN India FTA and Way Forward, February 5-6, 2010, Centre for Development Studies, Thiruvananthapuram. Retrieved from <http://agritrade.iift.ac.in/html/Training/ASEAN%20E2%80%9320India%20FTA%20Emerging%20Issues%20for%20Trade%20in%20Agriculture/Sunita%20Raju%20mam.pdf>

Renjini, V., Kar, A., Jha, G., Kumar, P., Burman, R., Praveen, K. (2017) Agricultural Trade Potential between India and ASEAN: An Application of Gravity Model, *Agricultural Economics Research Review*, 30 (1), 05-112.

Sahoo, B., Nauriyal, D. (2013). Determinants of Software Exports from India, *International Economics and Economic Policy*, Springer. DOI 10.1007/s10368-013-0254-7

Sahni, P. (2014). Trends in India's Exports: A Comparative Study of Pre And Post Reform Period, *IOSR Journal of Economics and Finance (IOSR-JEF)*, 3 (2) I, 8-18.

Salvatore, D. (1998). *International economics*. Upper Saddle River, N.J: Prentice Hall.

Samen, S. (2010). *A Primer on Export Diversification: Key Concepts, Theoretical Underpinnings and Empirical Evidence*, Growth and Crisis Unit, World Bank, Washington DC. Retrieved from [https://blogs.worldbank.org/files/growth/EXPORT\\_DIVERSIFICATION\\_A\\_PRIMER\\_May2010%281%29.pdf](https://blogs.worldbank.org/files/growth/EXPORT_DIVERSIFICATION_A_PRIMER_May2010%281%29.pdf).

Sanidas, E. (2018). World Trade: The Importance of Neighbours, *International Journal of Economics and Management Sciences*, 7 (1). DOI: 10.4172/2162-6359.1000492

Sasatra, S., Prasopchoke, M. (2007). Go with the Gang, ASEAN! *ASEAN Economic Bulletin*, Institute of Southeast Asia Studies, Singapore. 24 (3), 339-335.

Sharma, V. P. (2011). *India's Agricultural Development under the New Economic Regime: Policy Perspective and Strategy for the 12th Five Year Plan*, Working Paper, 2011-11-01, Indian Institute of Management Ahmedabad, India.

Sihmar, R. (2014). Growth and Instability in Agriculture Production in Haryana: A District level Analysis, *International Journal of Scientific and Research Publications*, 4 (7), 1-10. Retrieved from <http://www.ijsrp.org/research-paper-0714/ijsrp-p3151.pdf>

Shinoj, P. (2007). *India's Trade in Agricultural Commodities with Major Asian Trading Partners - a Post-Reforms Study*, Ph.D. Thesis, Indian Agricultural Research Institute; New Delhi.

<http://krishikosh.egranth.ac.in/handle/1/5810008281>

Shinoj, P. (2009). *India-ASEAN Trade in Agriculture: Retrospect and Prospect*, Policy Brief-29, National Centre for Agricultural Economics and Policy Research.

Shinoj P., Mathur, V. C. (2008). Comparative Advantage of India in Agricultural Exports vis-a vis Asia: a post reforms Analysis, *Agricultural Economics Research Review*, 21, 60-66.

Singh, K., Singla, S. K. (2012). An Analysis of India's Exports (1991-2006), *Zenith International Journal of Business Economics & Management Research*, 2 (2), 79-108.

Singh, N.P., Kumar R., Singh, R.P. (2006). Diversification of Indian Agriculture: Composition, Determinants and Trade Implications, *Agricultural Economics Research Review*, 19 (2006), 23-36.

Simpson, E. H. (1949). Measurement of diversity, *Nature*, 163, 688. Retrieved from <file:///C:/Users/Administrator/Downloads/163688a0.pdf>

Subasat, T. (2003). What Does the Heckscher-Ohlin Model Contribute to International Trade Theory? A Critical Assessment, *Review of Radical Political Economics*, 35(2), 148-165.

Suseela K., Chandrasekaran, M. (2016). Growth and Instability in Dryland Agriculture of Andhra Pradesh, *International Journal of Agricultural Science and Research (IJASR)*, 6 (2), 285-294.

Tejaswi, P.P., Naik, B. K., Kunnal, L. B., Basavaraj, H. (2005). Direction of Trade and Changing Pattern of Indian Coffee Exports – An Application of Markov Chain Analysis, *Karnataka Journal of Agriculture Science*, 19 (1), 71-75.

Tesfaye, E. (2014). Determinants of Agricultural Export in Sub-Saharan Africa: Evidence from Panel Study, *American Journal of Trade and Policy*, 1 (2), 62-70.

Thomas, S., Sheikh, W. (2011). Growth and Composition of Indian agricultural Exports During Reform Era, *Abhinav Journal of Research in Commerce and Management*, 1 (6), 92-104.

Tinbergen, J. (1962). *Shaping the World Economy: Suggestion for an International Economic Policy*, The Twentieth Century Fund, New York.

TPCI (2018). *Analytical Study of India's Agricultural Exports Policy*, Trade Promotion Council of India, Center for Advanced Trade Research (CATR). Retrieved from <https://www.tpci.in/indiabusinesstrade/blogs/analytical-study-of-indias-agricultural-exports-policy-2018/#>

Tripathi, A., Prasad, A.R. (2009). Agricultural Development in India since Independence: A Study on Progress, Performance, and Determinants, *Journal of Emerging Knowledge on Emerging Markets*, 1 (1).

Vaish, M.C., Singh, S. (2006). *International Economics*, Eight Edition, Oxford and IBH Publishing.

Veeramani, C., Saini, G. K. (2010). *Impact of ASEAN-India FTA on India's plantation commodities: A simulation analysis*, IGIDR working paper 2010-004, Indira Gandhi Institute of Development Research, Mumbai.

Wani, N., Dhani, J., Rehman, A. (2016). The Determinants of India's Imports: A Gravity Model Approach, MPRA Paper No. 74700.<https://mpa.ub.uni-muenchen.de/74700/>

WDI (2018). World Development Indicators, World Bank. Data. Retrieved from <https://data.worldbank.org/indicator>

World Bank (2018). Trade Indicators, WITS, World Bank. Retrieved from [https://wits.worldbank.org/wits/wits/witshelp/Content/Utilities/e1.trade\\_indicators.htm](https://wits.worldbank.org/wits/wits/witshelp/Content/Utilities/e1.trade_indicators.htm)

WCO (2015). World Customs Organization. <http://www.wcoomd.org/>

Zarzoso, M., Lehmann, N., Vollmer, S. (2007). *The Log of Gravity Revisited*, CeGE Discussion Paper No64, University of Göttingen, Germany.



## Appendix A

**Table 1: The Revealed Comparative Advantage (RCA) of India in Agricultural Products**

Product code	2000	2005	2010	2015
1	0.04	0.04	0.05	0.03
2	0.94	0.94	1.25	2.27
3	4.1	2.62	1.81	2.81
4	0.34	0.55	0.23	0.29
5	1.7	0.82	0.7	0.64
6	0.48	0.51	0.24	0.19
7	1.47	1.67	1.17	0.98
8	2.61	1.82	0.98	0.91
9	9.45	4.85	3.71	3.3
10	3.66	4.45	2.36	4.93
11	1.18	0.4	0.36	0.91
12	2.17	1.38	1.09	1.26
13	15.14	11.76	7.93	15.62
14	5.71	5.14	4.98	3.59
15	1.42	0.85	0.6	0.55
16	0.04	0.63	0.52	0.17
17	3.02	0.34	1.59	1.65
18	0.04	0.03	0.05	0.15
19	0.37	0.4	0.35	0.42
20	0.5	0.45	0.39	0.48
21	1.11	0.58	0.45	0.52
22	0.12	0.09	0.13	0.2
23	2.98	2.84	2.52	1.46
24	1.15	1.22	1.73	1.34
No. of sections with RCA>1	15	10	11	10

*Source: Authors calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata*

**Table 2: The Revealed Symmetric Comparative Advantage (RSCA) of India in Agricultural Products**

Product code	2000	2005	2010	2015
01	-0.93	-0.92	-0.91	-0.94
02	-0.03	-0.03	0.11	0.39
03	0.61	0.45	0.29	0.47
04	-0.49	-0.29	-0.62	-0.55
05	0.26	-0.1	-0.18	-0.22
06	-0.35	-0.33	-0.62	-0.67
07	0.19	0.25	0.08	-0.01
08	0.45	0.29	-0.01	-0.05
09	0.81	0.66	0.58	0.54
10	0.57	0.63	0.41	0.66
11	0.08	-0.43	-0.47	-0.05
12	0.37	0.16	0.04	0.12
13	0.88	0.84	0.78	0.88
14	0.7	0.67	0.67	0.56
15	0.17	-0.08	-0.25	-0.29
16	-0.92	-0.22	-0.31	-0.71
17	0.5	-0.5	0.23	0.24
18	-0.92	-0.95	-0.91	-0.74
19	-0.46	-0.43	-0.48	-0.41
20	-0.33	-0.38	-0.44	-0.35
21	0.05	-0.26	-0.38	-0.32
22	-0.79	-0.84	-0.77	-0.67
23	0.5	0.48	0.43	0.19
24	0.07	0.1	0.27	0.15

*Source: Authors calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata*

**Table 3: The Revealed Comparative Advantage (RCA) of ASEAN in Agricultural Products**

Product code	2000	2005	2010	2015
1	0.34	0.21	0.28	0.32
2	0.26	0.03	0.04	0.11
3	2.31	1.93	1.86	1.64
4	0.38	0.31	0.27	0.26
5	0.38	0.25	0.18	0.18
6	0.21	0.23	0.26	0.22
7	0.46	0.41	0.65	0.92
8	0.71	0.61	0.56	0.9
9	1.79	1.71	1.68	2.17
10	1.07	1.37	1.53	1.11
11	0.87	0.97	1.47	1.83
12	0.21	0.17	0.13	0.14
13	0.8	0.65	0.57	0.64
14	2.52	2	2.25	2.85
15	4.45	5.03	6.14	5.82
16	2.84	2.66	3.06	2.99
17	1.07	0.84	1.05	1.25
18	1	1.1	1.39	1.05
19	0.69	0.8	1.05	1.18
20	0.94	0.9	0.81	0.83
21	0.79	0.81	0.97	1.44
22	0.3	0.35	0.54	0.71
23	0.41	0.5	0.54	0.64
24	0.98	0.84	0.9	1.14
No. of sections with RCA>1	8	7	10	12

*Source: Authors calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata*

**Table 4: The Revealed Symmetric Comparative Advantage (RSCA) of ASEAN in Agricultural Products**

Product code	2000	2005	2010	2015
01	-0.5	-0.65	-0.57	-0.52
02	-0.59	-0.95	-0.93	-0.81
03	0.4	0.32	0.3	0.24
04	-0.45	-0.53	-0.58	-0.59
05	-0.44	-0.6	-0.69	-0.69
06	-0.65	-0.62	-0.58	-0.63
07	-0.37	-0.42	-0.21	-0.04
08	-0.17	-0.24	-0.28	-0.05
09	0.28	0.26	0.25	0.37
10	0.03	0.16	0.21	0.05
11	-0.07	-0.02	0.19	0.29
12	-0.65	-0.7	-0.78	-0.76
13	-0.11	-0.21	-0.28	-0.22
14	0.43	0.33	0.39	0.48
15	0.63	0.67	0.72	0.71
16	0.48	0.45	0.51	0.5
17	0.04	-0.09	0.02	0.11
18	0	0.05	0.16	0.03
19	-0.19	-0.11	0.02	0.08
20	-0.03	-0.05	-0.1	-0.09
21	-0.12	-0.11	-0.02	0.18
22	-0.54	-0.48	-0.3	-0.17
23	-0.42	-0.33	-0.3	-0.22
24	-0.01	-0.08	-0.05	0.06

*Source: Authors calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata*

## Appendix B

**Table 1: The Revealed Symmetric Comparative Advantage (RSCA) of Brunei in Agricultural Products**

Product code	2000	2005	2010	2015
01	-0.98	-0.98	-1.00	-0.99
02	-0.99	-0.99	-1.00	-1.00
03	-0.96	-0.85	-0.96	-0.88
04	-0.99	-0.99	-0.99	-0.87
05	-1.00	-1.00	-1.00	-1.00
06	-0.99	-1.00	-1.00	-0.98
07	-1.00	-1.00	-1.00	-0.83
08	-1.00	-1.00	-0.99	-0.99
09	-1.00	-1.00	-1.00	-0.95
10	-1.00	-1.00	-1.00	-1.00
11	-1.00	-1.00	-1.00	-0.78
12	-1.00	-1.00	-1.00	-1.00
13	-1.00	-1.00	-0.96	-1.00
14	-1.00	-1.00	-1.00	-1.00
15	-0.99	-1.00	-1.00	-0.97
16	-0.99	-1.00	-0.99	-1.00
17	-1.00	-1.00	-1.00	-1.00
18	-0.92	-0.95	-0.99	-0.95
19	-0.99	-0.99	-0.98	-0.59
20	-1.00	-1.00	-0.99	-0.75
21	-0.99	-0.99	-0.98	-0.98
22	-1.00	-0.99	-0.96	-0.73
23	-1.00	-1.00	-1.00	-0.99
24	-1.00	-1.00	-1.00	-1.00

*Source: Authors calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata*

**Table 2: The Revealed Symmetric Comparative Advantage (RSCA) of Cambodia in Agricultural Products**

Product code	2000	2005	2010	2015
01	-0.34	-0.99	-0.97	-0.99
02	-1.00	-0.98	-1.00	-1.00
03	-0.26	-0.25	-0.83	-0.98
04	-0.22	-1.00	-1.00	-1.00
05	-0.97	-1.00	-1.00	-0.93
06	-1.00	-1.00	-0.99	-1.00
07	-0.90	-0.97	-0.92	-0.25
08	-0.99	-0.87	-0.99	-0.96
09	-1.00	-0.98	-0.98	-0.58
10	-0.56	-0.54	0.09	0.54
11	-0.90	-0.45	-0.33	-0.78
12	-0.83	-0.45	-0.83	-0.95
13	-0.98	-1.00	-1.00	-1.00
14	0.24	-0.31	-0.95	-1.00
15	-1.00	-0.87	-0.50	-0.56
16	-1.00	-1.00	-1.00	-1.00
17	-1.00	-1.00	-0.53	0.13
18	-1.00	-1.00	-1.00	-1.00
19	-0.97	-0.99	-0.99	-0.97
20	-1.00	-1.00	-0.99	-1.00
21	-1.00	-1.00	-1.00	-1.00
22	-0.99	-0.91	-0.45	-0.77
23	-0.97	-1.00	-0.57	-0.51
24	-0.26	0.04	-0.04	-0.11

*Source: Authors calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata*

**Table 3: The Revealed Symmetric Comparative Advantage (RSCA) of Indonesia in Agricultural Products**

Product code	2000	2005	2010	2015
01	-0.34	-0.56	-0.57	-0.52
02	-0.91	-0.95	-0.95	-0.96
03	0.57	0.52	0.40	0.49
04	-0.27	-0.47	-0.50	-0.61
05	-0.66	-0.74	-0.74	-0.67
06	-0.78	-0.78	-0.86	-0.82
07	-0.63	-0.61	-0.74	-0.70
08	-0.44	-0.33	-0.45	-0.20
09	0.61	0.67	0.57	0.60
10	-0.93	-0.89	-0.96	-0.98
11	-0.68	-0.22	-0.53	-0.44
12	-0.69	-0.47	-0.58	-0.44
13	0.10	0.07	-0.15	0.05
14	0.77	0.78	0.70	0.73
15	0.78	0.88	0.90	0.92
16	-0.15	0.14	0.16	0.42
17	-0.41	-0.40	-0.46	-0.21
18	0.56	0.58	0.61	0.46
19	-0.33	-0.14	-0.06	0.06
20	-0.17	-0.19	-0.45	-0.41
21	-0.66	-0.47	-0.14	0.11
22	-0.86	-0.89	-0.85	-0.76
23	-0.41	-0.25	-0.26	0.00
24	0.17	0.22	0.30	0.44

*Source: Authors calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata*

**Table 4: The Revealed Symmetric Comparative Advantage (RSCA) of Lao PDR in Agricultural Products**

Product code	2000	2005	2010	2015
01	0.84	0.67	0.35	-0.60
02	-0.98	-1.00	-1.00	-1.00
03	-0.94	-0.99	-0.98	-1.00
04	-0.90	-0.97	-0.98	-1.00
05	-0.81	-0.97	-1.00	-0.90
06	-0.99	-0.96	-0.86	-0.91
07	-0.91	0.12	0.01	0.42
08	-0.79	-0.68	-0.51	-0.69
09	0.89	0.87	0.80	0.78
10	-0.66	0.58	0.58	0.30
11	-1.00	-1.00	-0.50	0.61
12	0.59	0.43	0.28	0.10
13	0.86	0.78	0.58	0.33
14	0.97	0.96	0.77	0.61
15	-0.76	-1.00	-1.00	-1.00
16	-0.83	-1.00	-1.00	-1.00
17	-1.00	-0.97	0.55	0.45
18	-1.00	-1.00	-0.99	-1.00
19	-0.99	-0.78	-1.00	-1.00
20	-0.42	-0.07	-0.32	-0.58
21	-0.99	-0.98	-0.96	-0.74
22	-0.91	-0.72	-0.90	-0.59
23	-0.98	-0.96	-0.98	-0.93
24	-1.00	-0.16	0.21	0.76

*Source: Authors calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata*



**Table 5: The Revealed Symmetric Comparative Advantage (RSCA) of Malaysia in Agricultural Products**

Product code	2000	2005	2010	2015
01	-0.10	-0.24	-0.17	-0.16
02	-0.97	-0.98	-0.96	-0.95
03	-0.39	-0.20	-0.21	-0.35
04	-0.62	-0.58	-0.52	-0.37
05	-0.81	-0.83	-0.87	-0.89
06	-0.70	-0.56	-0.29	-0.35
07	-0.67	-0.63	-0.68	-0.66
08	-0.61	-0.78	-0.82	-0.80
09	-0.48	-0.65	-0.64	-0.57
10	-0.98	-0.99	-0.99	-0.97
11	-0.28	-0.51	-0.49	-0.47
12	-0.92	-0.89	-0.93	-0.93
13	-0.97	-0.87	-0.85	-0.84
14	-0.61	-0.58	0.66	0.75
15	0.84	0.84	0.88	0.86
16	-0.42	-0.53	-0.52	-0.45
17	-0.41	-0.45	-0.40	-0.39
18	0.01	0.27	0.44	0.41
19	-0.13	-0.08	0.13	0.24
20	-0.73	-0.75	-0.63	-0.67
21	-0.20	-0.20	0.07	0.23
22	-0.61	-0.54	-0.35	-0.23
23	-0.48	-0.46	-0.39	-0.31
24	-0.17	-0.22	-0.17	-0.15

*Source: Authors calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata*

**Table 6: The Revealed Symmetric Comparative Advantage (RSCA) of Myanmar in Agricultural Products**

Product code	2000	2005	2010	2015
01	-0.27	-0.59	-0.91	0.38
02	-0.76	-0.64	-0.52	-1.00
03	0.62	0.69	0.77	0.47
04	-0.92	-0.92	-0.92	-0.91
05	-0.20	-0.01	0.19	-0.60
06	-1.00	-1.00	-1.00	-1.00
07	0.90	0.92	0.94	0.86
08	-0.68	-0.78	-0.88	-0.48
09	-0.42	-0.35	-0.28	-0.56
10	0.36	0.48	0.60	0.12
11	-0.93	-0.97	-1.00	-0.86
12	0.19	0.27	0.35	0.03
13	-0.96	-0.98	-1.00	-0.93
14	0.46	0.53	0.59	0.33
15	-0.99	-0.99	-1.00	-0.98
16	-0.85	-0.93	-1.00	-0.70
17	-0.63	-0.52	-0.41	-0.86
18	-1.00	-1.00	-1.00	-1.00
19	-0.98	-0.97	-0.97	-0.98
20	-0.54	-0.77	-1.00	-0.08
21	-0.94	-0.91	-0.89	-0.98
22	-0.98	-0.97	-0.97	-0.99
23	-0.88	-0.94	-1.00	-0.75
24	-0.64	-0.57	-0.49	-0.79

*Source: Authors calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata*

**Table 7: The Revealed Symmetric Comparative Advantage (RSCA) of Philippines in Agricultural Products**

Product code	2000	2005	2010	2015
01	-0.93	-0.83	-0.85	-0.68
02	-1.00	-0.94	-0.86	-0.85
03	0.13	0.02	0.09	0.21
04	-0.66	-0.40	-0.28	-0.78
05	-0.75	-0.69	-0.79	-0.65
06	-0.92	-0.92	-0.91	-0.84
07	-0.66	-0.64	-0.81	-0.80
08	0.48	0.49	0.37	0.66
09	-0.98	-0.95	-0.97	-0.91
10	-0.99	-1.00	-0.99	-0.97
11	-0.85	-0.82	-0.67	-0.42
12	-0.43	-0.59	-0.68	-0.67
13	0.56	0.52	0.72	0.76
14	-0.60	-0.75	-0.14	0.08
15	0.62	0.62	0.64	0.65
16	0.03	0.04	0.42	0.46
17	-0.20	0.08	-0.19	0.07
18	-0.72	-0.88	-0.90	-0.74
19	-0.21	-0.18	-0.15	0.08
20	0.34	0.37	0.34	0.47
21	-0.30	-0.33	-0.26	0.05
22	-0.82	-0.66	-0.70	-0.67
23	-0.45	-0.56	-0.39	-0.29
24	-0.50	0.18	0.38	0.53

*Source: Authors calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata*

**Table 8: The Revealed Symmetric Comparative Advantage (RSCA) of Singapore in Agricultural Products**

Product code	2000	2005	2010	2015
01	-0.94	-0.95	-0.96	-0.98
02	-0.99	-0.97	-0.96	-0.92
03	-0.42	-0.59	-0.73	-0.83
04	-0.69	-0.60	-0.64	-0.67
05	-0.65	-0.58	-0.82	-0.81
06	-0.72	-0.80	-0.81	-0.88
07	-0.84	-0.93	-0.96	-0.96
08	-0.80	-0.86	-0.88	-0.84
09	-0.09	-0.48	-0.68	-0.45
10	-0.99	-0.94	-0.98	-0.94
11	-0.72	-0.74	-0.78	-0.85
12	-0.75	-0.86	-0.92	-0.91
13	-0.42	-0.53	-0.67	-0.68
14	0.30	0.09	-0.33	-0.25
15	-0.30	-0.51	-0.56	-0.70
16	-0.82	-0.77	-0.84	-0.84
17	-0.76	-0.80	-0.65	-0.83
18	-0.20	-0.31	-0.15	-0.14
19	-0.44	-0.25	-0.04	0.05
20	-0.73	-0.77	-0.85	-0.81
21	-0.16	-0.26	-0.31	0.12
22	-0.34	-0.26	-0.05	0.07
23	-0.80	-0.74	-0.75	-0.78
24	0.23	-0.12	-0.17	0.04

*Source: Authors calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata*

**Table 9: The Revealed Symmetric Comparative Advantage (RSCA) of Thailand in Agricultural Products**

Product code	2000	2005	2010	2015
01	-0.59	-0.86	-0.38	-0.31
02	0.16	-0.92	-0.88	-0.40
03	0.64	0.52	0.46	0.22
04	-0.51	-0.54	-0.66	-0.64
05	-0.10	-0.38	-0.45	-0.43
06	-0.32	-0.24	-0.35	-0.40
07	0.24	0.19	0.19	0.37
08	-0.20	-0.25	-0.26	0.01
09	-0.50	-0.71	-0.81	-0.78
10	0.64	0.67	0.67	0.59
11	0.53	0.55	0.66	0.72
12	-0.64	-0.71	-0.81	-0.78
13	-0.11	-0.25	-0.46	-0.53
14	-0.03	0.07	-0.41	-0.18
15	-0.32	-0.42	-0.51	-0.36
16	0.87	0.85	0.85	0.83
17	0.64	0.55	0.61	0.68
18	-0.78	-0.66	-0.71	-0.74
19	0.00	0.07	0.12	0.17
20	0.51	0.54	0.48	0.48
21	0.26	0.36	0.37	0.44
22	-0.48	-0.52	-0.30	0.00
23	0.08	0.23	0.17	0.21
24	-0.53	-0.58	-0.64	-0.68

*Source: Authors calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata*

**Table 10: The Revealed Symmetric Comparative Advantage (RSCA) of Vietnam in Agricultural Products**

Product code	2000	2005	2010	2015
01	-0.64	-0.82	-0.94	-0.94
02	-0.42	-0.70	-0.84	-0.89
03	0.89	0.86	0.83	0.73
04	0.47	-0.13	-0.55	-0.53
05	0.48	-0.28	-0.47	-0.58
06	-0.56	-0.69	-0.53	-0.61
07	0.24	0.06	0.04	0.29
08	0.69	0.60	0.57	0.50
09	0.90	0.89	0.87	0.85
10	0.76	0.82	0.78	0.51
11	0.43	0.54	0.70	0.68
12	0.17	-0.13	-0.58	-0.86
13	0.08	0.16	-0.94	-0.90
14	0.86	0.61	0.36	0.47
15	-0.02	-0.74	-0.59	-0.49
16	0.28	0.59	0.67	0.67
17	0.05	-0.63	-0.29	-0.26
18	-0.98	-0.98	-0.91	-0.92
19	0.40	0.16	0.12	-0.12
20	0.19	-0.17	-0.11	-0.25
21	0.04	-0.41	-0.39	-0.14
22	-0.77	-0.75	-0.55	-0.47
23	-0.82	-0.83	-0.33	-0.16
24	-0.20	0.24	0.11	-0.10

*Source: Authors calculation based on data generated from the ITC database (UN-COMTRADE) and DGCIS, Kolkata*